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ELECTRONICS REVOLUTION AND THE WORLD OF FINANCE

— Present Situation And Future Outlook —

Significant changes are expected to take place in the near future in the Japanese world of finance in line with the advance of the electronics revolution. In order to adequately assess the many problems that will accompany these changes from a professional standpoint, a Special Committee For The Study Of Financial Systems was set up in October, 1982. The following article was compiled from a report based on the findings of this Special Committee.

PRESENT SITUATION

The introduction of electronics into the world of finance can be broken down into three rather distinct stages. Stage one witnessed the introduction of electronic machines and equipment into individual financial institutions. This was followed by interconnecting various such individual financial institutions themselves by means of online systems during the second stage of the revolution. And now, in the third stage, we find a situation where companies and even individual homes are being linked up online to these same financial institutions.

1. Stage One: In-house Computers And Online Systems At Individual Financial Institutions

If we look back over the development of the electronics revolution at financial institutions in Japan, we see that computers were first introduced into banks around 1960 for the purpose of rationalizing work processes and saving labor (See Table 1). Then, during the late 1960's, this revolution took a giant step forward when banks and other financial institutions began connecting their mainframe computers online with terminal units located at their various branch offices, primarily to handle deposits and money transfer transactions more efficiently. This move made it possible for banks to provide deposit and withdrawal services to customers no matter what branch office the customer might choose to utilize.

Comprehensive online systems were established in the mid-1970's to handle all the different types of transactions carried out by banking and other financial institutions. These comprehensive online systems enabled the processing of various banking transactions to be linked together, making it possible for money orders and other forms of money transfer

Table 1. Automation At City Banks

	Automation	Remarks
1950~ 1951	Introduction of single-function machines for the processing of deposits.	• Accounting machines, adding machines and calculating machines for paper and metallic currency.
1952~ 1953	Introduction of punch card systems (PCS)	• Automation of those work processes not directly related to customers such as the preparation of deposit and loan reports, settlement of accounts and the calculation of employee wages. • The automatic transfer of money in payment of telephone bills.
1960	Introduction of computers	• Data sent to a computing center from business offices was processed offline by computers installed at that center.
1964	Online operations for ordinary deposit accounts only	
1965	The first online systems were introduced and put into partial operation around this time.	
1966		
1967		
1968		
1969	Introduction of cash dispensers (CD) [Offline]	• Wages transferred directly from the company to employees' bank accounts.
1970		
1971	Interconnection of certain online systems and the first CDs brought online.	
1972		• All-in-one accounts
1973	Commencement of the nationwide bank data communication system.	• System for the real-time, online processing of money orders.
1974		
1975	Nippon Cash Service Co., Ltd., commences business; the second set of online systems introduced and put into operation.	• Joint utilization system for CDs installed outside of branch offices.
1976		
1977		
1978		
1979	Introduction of automatic teller machines (ATM)	
1980	Start of SICS* and TOCS*.	• (ACS*, SCS* and the credit union network cash service also begun)
1981	Introduction of OTM*	
1982		
1983		• (SOCS started)

(Source: Ministry of Finance)

Notes: SICS : Six-Bank Cash Service
 TOCS : Tugin (city bank) Online Cash Service
 OTM : Online Tellers Machine
 ACS : All Chigin (regional bank) Card Service
 SCS : Sogoginko (mutual financing bank) Card Service
 SOCS : Shintakuginko (trust bank) Online Cash Service

Table 2. Percentage Of Financial Institutions With Online Systems

	Total Number Of Institutions	Total Number Of Offices	Number of Institutions With Online Systems		Number Of Offices Connected Online	
				Percentage (1)		Percentage (1)
City Banks	13	2,803	13	100.0	2,803	100.0
Long-Term Credit Banks	3	55	3	100.0	55	100.0
Trust Banks	7	328	7	100.0	328	100.0
Regional Banks	63	5,931	63	100.0	5,927	99.9
Mutual Financing Banks	71	4,036	71	100.0	3,970	98.4
Credit Banks	456	5,891	456	100.0	5,518	93.7
Credit Unions	468	2,675	142	30.3	1,135	42.4

Sources: The Federation Of Banker's Associations Of Japan, Regional Banks Association Of Japan Inc., National Association Of Sogo Banks, National Federation of Credit Association and National Credit Union Central Association.

(Note) The figures cited in Table 2 were for the dates listed below.

City Banks	End of May, 1982
Long-Term Credit Banks	End of May, 1982
Trust Banks	End of May, 1982
Regional Banks	End of June, 1982
Mutual Financing Banks	End of September, 1982
Credit Banks	End of March, 1983 (The number of offices connected online is as of the end of March, 1982)
Credit Unions	End of December, 1982

to be automatically credited to a customer's bank account and/or loan repayments to be automatically withdrawn from a customer's bank account.

At present, online systems such as those discussed above are in place at national, city and mutual financing banks, as well as credit unions and other financial institutions nationwide (See Table 2). The number of automatic cash dispensers (CD) and automatic teller machines (ATM) operated directly by the customers themselves have also been steadily increasing throughout the country, together with the plastic cash cards used to operate these machines (See Table 3).

The results of all this automation has been improved customer services in such areas as the automatic payment of public

Table 3. Number Of Cash Cards Issued To Date

Financial Institution	Number of Cash Cards Issued
	(In tens of thousands)
City Banks	3,300
Regional Banks	2,500
Mutual Financing Banks	1,100
Credit Banks	600
Credit Unions	n.a.

Source: Ministry of Finance

(Note) The figures cited in Table 3 were obtained on the dates listed below.
City, Regional and Mutual
Financing Banks End of September, 1982
Credity Banks End of March, 1982

utility bills, company wages automatically transferred to employees' bank accounts at the end of the month, extended

banking hours via the utilization of CDs and ATMs, and even bill collecting services aimed at the corporate customer.

2. Stage Two: Online Systems Connecting Various Individual Financial Institutions

Computer-to-computer networks between and among banks and other financial institutions have been progressing in the form of nationwide inter-bank data communication systems for the carrying out of domestic money exchange transactions, and the linking of CDs online (See Table 4).

There is also an international inter-bank data communications systems operated by the Society For Worldwide Inter-

Bank Financial Telecommunications (SWIFT) which handles foreign exchange transactions. This system currently serves some 1,045 financial institutions in 49 countries around the globe (See Table 5).

3. Stage Three: Online Systems Connecting Companies And Private Homes With Banking And Other Financial Institutions.

The establishment of online systems interconnecting banks and other financial institutions with their corporate and private customers is still in its early stages, and as yet only consists of automatic access systems, which enable customers to automatically access information concerning their current financial

Table 4. Volume Of Money Orders Handled Via The Nationwide Banking Data Communication System For The Five-Year Period From 1978 To 1982

Year	Number Of Participating Banks	Number Of Participating Offices	Number Of Transactions	Yearly Amounts
			(Tens of thousands)	(Trillions of yen)
1978	87	8,459	12,683	163
1979	704	18,331	20,742	255
1980	703	18,756	24,288	318
1981	698	19,354	26,303	354
1982	699	20,132	26,993	394

Source: Federation Of Banker's Associations Of Japan

Table 5. Utilization Of SWIFT

Year	Japan			Total Number of SWIFT Transmissions	Percentage Accounted For By Japanese Transmissions
	Number of Participating Banks	Total Number of Transmissions	Total Number of Messages Received		
1981	53	720,587	930,953	53,803,226	1.3
1982	81	1,571,509	1,913,123	80,039,167	2.0

Source: Federation of Banker's Association of Japan

status as recorded in the bank's computer directly from their place of business or home, and/or digital data exchange networks which make the online transmission of data possible.

However, the public relations departments of various financial institutions have also recently begun to introduce portable terminals capable of the online processing of deposit and withdrawal transactions into the offices and homes of corporate and private customers.

FUTURE OUTLOOK

Online networks interconnecting corporate and private customers directly with their respective banks and other financial institutions will quite likely show considerable development in future in line with the appearance of new communication methods and reduced investment costs.

However, the pace at which these networks spread will probably differ according to the needs of the corporate and private customers concerned.

1. Major Factors Contributing To The Development Of Online Systems Interconnecting Financial Institutions Directly With Their Customers

a. Appearance of new means of communication

Various new means of electronic communication are being developed all the time, including digital and fiber-optic communications capable of transmitting large amounts of data quickly and accu-

ately, as well as videotex systems, like the CAPTAIN system currently being test operated jointly by the Ministry of Posts and Telecommunications (MPT) and the Nippon Telegraph and Telephone Public Corporation (NTT), which utilize terminals equipped with video and telephone capabilities to enable users to receive video data and send instructions and messages. Then there is also the new Information Network System (INS) being developed by NTT to interconnect both corporate and private subscribers by means of multiple data communications systems.

b. Reduced investment costs

Ongoing developments in electronics technology are rapidly lowering the amounts of money required to invest in computers and network systems.

c. Relaxation of communication circuit utilization regulations

Revisions to the Public Electricity and Communications Law made in October, 1982, considerably liberalized circuit utilization regulations in Japan, making it possible to link both corporate and private customers online with the computers installed at financial institutions to create networks for the provision of a wide variety of online financial services.

These revisions also recognized the system of providing value-added communication capabilities to small- and medium-sized companies in the form of value-added networks (VAN).

d. General acceptance of computers and

online systems

As microcomputers find their way into more and more companies and homes, the average person will become more accustomed to using these new machines in the conduct of everyday business, thus making the carrying out of even financial transactions via computers and/or terminals very commonplace.

e. Computerization of related fields

Computers and online systems are coming into widespread use at consumer finance companies, savings and trust companies and securities firms. Even the Postal Savings System is making use of online systems now. It is conjectured that savings and trust companies will be introducing home shopping services in future which make use of terminals installed in private homes (See Tables 6 & 7).

Table 6. Number Of CDs and CATs Installed At Seven Leading Credit Finance Companies (End Of 1982)

CD	CAT
248 (Orders have been placed for 330 additional machines)	68

Source: Ministry of Finance

(Note) CAT is the acronym for credit authorization terminal, a machine used to carry out online credit checks of credit cards.

Table 7. Number Of CDs and ATMs Installed In The Postal Savings System (Estimated As Of End Of 1982)

CD	ATM
114	901

Source: Ministry of Posts and Telecommunications

f. Progress of computerization overseas

Online services aimed at the corporate client are already widely available in the United States. In addition to being able to process funds transfers by means of terminals, it is getting to the point in the U.S. now where balance and financial status inquiries can be made on overseas accounts as well.

It is quite likely that these kinds of financial online services will spread more rapidly and widely in Japan in future, too.

2. The Demand For Online Systems

a. At companies

Being linked online to banks or other financial institutions has definite advantages for the company, among which are the rationalization of business affairs, the prompt completion of financial transactions and the efficient management of funds.

However, the need for online service differs greatly according to the individual company's line of business, size and degree of computerization. Generally speaking, it hasn't been felt to be all that pressing a matter to date.

Although much would depend on the costs involved, there is also a good possibility that with the number of companies today that are committed to computerization, should financial institutions make appropriate online services available to their corporate customers, this move alone would stimulate the need for such services.

b. At home

It is felt that the need for online financial services for private customers isn't all that strong as yet. However, if comprehensive services are offered which include such conveniences as information on medical treatment, shopping and education, plus a consulting service and home shopping and reservation capabilities, then this in itself would help generate demand.

c. At financial institutions

The advantages of online links with corporate and private customers for financial institutions include rationalized business operations and the pioneering of new services which in turn will mean increased revenues. Direct online linkups with customers will also strengthen the competitive power of banks and other financial institutions vis-a-vis other members of the financial world, which are steadily "going electronic," as well as overseas financial institutions.

However, these institutions must remember the enormous outlay of money required for investments in machinery and equipment, software development and safety measures, all aspects involved in bringing ones operations online.

3. Immediate Possibilities

a. Firm banking

When a bank's computer is connected online to computers or terminals in place in the business offices or factories of corporate customers, those customers become capable of performing the following financial transaction via their own in-

house terminals:

- 1) Remittances and bill collections, plus fixed-amount loans;
- 2) Efficient management of funds by means of concentrating available funds in special accounts;
- 3) Quick access to account balances and payments and receipts data, plus information on various types of securities and foreign exchange rates; and
- 4) Financial consultations.

Since there is quite a bit of difference between the online requirements and investment capabilities of various companies, for the time being it is very likely that firm banking services will be targeted only at certain companies.

b. Home banking

When a bank's computer is linked online with a terminal installed in a private home, that individual customer becomes capable of performing the following financial transactions via his terminal:

- 1) Checking the balance of his account(s) automatically, paying bills by means of account-to-account money transfers, purchasing bonds and applying for loans;
- 2) Accessing data concerning money rates and receiving financial counseling; and
- 3) Availing himself of home shopping and home reservation services by means of the bank's computer links with organizations providing those services.

However, if we consider the online requirements of the normal individual,

plus the hardware and software development situation for home-use machines, it is rather unlikely that home banking services will spread too quickly for the time being; the gradual development of this service is much more likely.

c. Point of sales (POS)

Large numbers of retail stores have terminals installed at each of their sales counters which are linked online to a computer center for the purpose of effectively and efficiently managing sales and inventories. This is called a point-of-sales (POS) system. In future, POS systems will be connected online with the computers of banks and other financial institutions, enabling the user to make instant checks on customer credit ratings, as well as collect payments for goods and services purchased immediately via account-to-account electronic money transfers.

d. BOJ data communications settlement system

The Bank of Japan (BOJ) has already begun investigating the possibilities of constructing a data communications system for the settlement of accounts by interconnecting its computer system with those of all the other banks and financial institutions in Japan via an online network.

OVERALL EFFECTS ON THE FINANCIAL WORLD

It is still rather unclear just how fast and how far computerization will spread

within the financial world. And attempting to make predictions concerning the effects this phenomenon will have on that industry is extremely difficult. However, it is felt that online systems connecting banks and other financial institutions directly to their corporate and private customers will affect the financial world in a qualitatively different way from the previous computerization and construction of online systems within individual financial institutions, and the subsequent linking of these systems with those of other banks and financial institutions.

1. Effects On The Financial World

a. Changes in the way business is conducted

The business of banks and other financial institutions, including the accepting of deposits, loans and money transfers, has steadily been computerized, and with the exception of cash transactions and final decisions concerning loans and other financing operations, practically all banking and other financial transactions are now being carried out by computer. With the spread of home and firm banking systems, the percentage of these transactions carried out via terminals installed at the customers' locations will increase. It is also felt that the importance of information and consulting services, which up until now have only played a secondary role in banking affairs, will increase significantly and in a hurry in line with improved computer capabilities and online systems.

b. Development of new banking products

The advance of the electronics revolution into the financial world is also expected to raise incentives for the development of new financial products and services, as well as broaden the scope of such developments. Some examples of the types of new products envisioned include:

- 1) Products which combine investability with liquidability;
- 2) Products which subdivide marketable assets and provide daily accounts of their status.

c. Transformation of business offices

The business offices of banking and other financial institutions are seen as changing in nature in line with the increased utilization of computers and on-line systems in the financial world. In addition, since more and more financial transactions will be taking place at the company and/or in the home of the clients themselves, the importance of the office as a place to do business will decline, thus making it quite likely that banking offices will undergo a major transformation in both construction and roles. It is also felt that the ability of banks to acquire funds will no longer be determined by the number of branch offices they have.

d. Changes in business days and hours

Large consumer financing companies have already initiated 24-hour business days using CDs, and banking and other financial institutions have felt the need

to do likewise, i.e. make use of automatic machinery to increase the number of business days as well as lengthen business hours, in order to remain competitive.

2. Effects on Financial Transactions

a. Inter-bank transactions

Online systems interconnecting banks and other financial institutions with one another make it quite easy for them to carry out mutual business transactions. These systems are also felt to be capable of creating environments in which the institutions linked online can make the contents of their business operations and mutually-handled products the same qualitatively. Also, since the advantages of business tie-ups increase the more each partner gives full play to its own individual specialities, even online business tie-ups shouldn't impair the special nature of individual financial institutions.

There is also the possibility that online business tie-ups between and among banks and other financial institutions will result in the systematization and/or reorganization of the Japanese financial world.

Many are of the opinion that the spread of online systems will increase inter-bank linkups, thus enabling the direct, bilateral adjustment of fund surpluses and/or deficiencies.

b. Transactions with corporate and private customers

Since a variety of banking and other financial services will be available at companies and private homes, and since

the types of transactions involved will be extremely diverse, customers will most likely base their selection of a bank or other financial institution not only on the types of products offered, but on a more comprehensive formula including the types of information services also available. In other words, it is felt that banking customers will become much more critical and selective in line with the penetration of electronic capabilities into financial institutions.

Also, as the amount of over-the-counter transactions dwindle, the customers criteria for choosing a certain bank will change and the importance placed on the geographic location of branch and business offices will gradually decline.

There is also the possibility that as the technology for assets management improves at companies and private residences, the mobility of funds will increase substantially.

There are those who feel that online banking systems which interconnect with the computers of corporate customers will encourage those customers to reduce the number of banks they do business with until finally they deal with only one bank exclusively. However, general opinion has it that this will not occur all that soon because dealing simultaneously with a number of different banks and financial institutions provides the customer with a wider range of financial products and services.

c. Relations with related businesses

The spread of computerization has encouraged consumer finance companies to

devise "cashing services" and securities companies to offer products similar to deposit accounts.

Financial institutions, together with securities firms, insurance firms, savings and trust companies and consumer finance companies, are also expected to create computer-to-computer systems interconnecting them with non-financial institutions for the purpose of entering into online business tie-ups. This process is seen as leading to the gradual overlapping of services and products offered by the financial and non-financial sectors of the economy.

d. Inter-company financial transactions

As non-financial companies establish online systems between and among themselves, it is believed that parent companies and the big general trading firms could begin to act like finance houses, becoming channels for funds being transferred between companies.

It is also felt that inter-company settlement of accounts will be carried out via online terminals. However, when companies run into problems concerning legal protection, when technical or other troubles occur, or when cash is needed prior to the end of a payment period, it is felt there will be a strong probability that these same companies will revert to using good old-fashioned commercial bills or promissory notes.

3. Effects On Financial Policies

a. Effects on the demand for cash

Liquid assets serve both as a source of

reserve deposits and as a basis for the establishment of credit, but as computerization of financial transactions grows more widespread, there is the possibility this will lead to a gradual cutback in the amount of ready cash on hand.

b. Effects on the national money supply

As computer utilization and online systems increase, there is the likelihood that this will lead to the following problems:

- 1) As funds management becomes more efficient for companies and individuals alike, they will tend to concentrate their money in special accounts, meaning that the liquidity of deposit balances will be compressed;
- 2) New financial assets will be established leading to confusion in money supply statistics; and
- 3) The speed at which currency circulates will change, destabilizing the relationship between the national money supply, prices and the economy.

c. Effects on financial policy measures

The computerization of financial transactions is believed to be advantageous from the standpoint of increasing the mobility of open market operations. Also, it is quite possible that it will be necessary to review reserve deposit liabilities as new financial assets increase.

PROBLEMS REQUIRING FURTHER STUDY

In light of the public nature of banks and other financial institutions, they will have to give a great deal of consideration to means of ensuring customer security and overcoming difficulties concerning access as online systems interconnecting their computers with those of their corporate and private customers become more widespread.

1. Ensuring Customer Security

a. Security measures

Since online systems are being used to carry out all sorts of different financial transactions, wide-ranging, yet detailed safety measures will have to be formulated. To fail to do so will mean that banks and other financial institutions offering such online services will not be able to guarantee their customers' privacy, which in turn could lead to a lack of confidence in these financial institutions.

Therefore, safety measures must be devised which will ensure the secure carrying out of transactions both within the central part of the network as well as at the terminal locations. In other words, it will be necessary to ensure safe, secure operation throughout the entire system. In order to achieve this, individual banks, etc., will have to formulate their own safety measures, and the finance world as a whole should lay down general safety standards.

b. Factors threatening secure operations

Some of the factors which threaten the safe, secure operation of online systems, and thus the financial transactions that are being carried out via these systems, are natural disasters such as earthquakes, fires, equipment failures and operation errors, plus criminal acts such as unauthorized access and/or willful destruction of machines, equipment and software.

Also, the storing of financial data in a single location gives rise to the fear that the privacy and secrets of customers will be infringed upon.

c. Specific safety measures

Since the causes of most equipment failures can be pinpointed and repaired, if banks and other financial institutions invest sufficient amounts of money and effort they can construct online systems which are technically safe and secure, using highly reliable parts and equipment, multiple-channeled communications circuits, duplexed computer systems and devices capable of automatically detecting malfunctions.

In the case of criminal acts, measures such as physically protecting computer installations and facilities and encoding data are possible. However, compared to the measures capable of being taken to prevent accidental breakdowns, those designed to prevent criminal acts are far from being complete.

Banks and other financial institutions must also be capable of providing reparations for damages incurred by customers as a result of online transactions. In-

surance coverage is one possible solution. However, numerous problems exist when it comes to insurance coverage for online operations, such as how to evaluate the worth of the information concerned, where to place responsibility and calculating the appropriate insurance premium rates.

2. Overcoming Access Difficulties

a. Difficulties concerning computer-terminal access

There are a wide variety of different makes and models of computers and terminal equipment available in Japan, and the computer and online systems employed by individual financial institutions tend to differ in composition as a result. Thus, companies must possess access programs and terminals in numbers equal to the number of different banks and other financial institutions with whom they have online dealings. This means a considerable outlay of money and can lead to significant losses for the company. The incompatibility of computer and online systems also narrows the corporate customers' choice of banks, etc., since they must select financial institutions which employ computers which are capable of interconnecting with their own, or else purchase machines that are.

b. Cultivating value-added network vendors

In addition to efficiently linking the computers in place at banks and other financial institutions with those installed

at commercial firms and private homes, there are plans afoot to cultivate the growth of value-added network vendors and computer centers designed for the cooperative utilization of financial institutions, thus interconnecting various different types of computers and terminals to create an open network that doesn't place any restrictions on whom one can carry out online business transactions with.

c. Need for standardization

In order to construct a comprehensive network, it is imperative that the numerous different types of hardware and software currently being produced and used by manufacturers and users alike be standardized from the standpoint of communications control, even should increasing numbers of value-added network vendors appear on the scene. In line with this, it would probably be advisable to unify these various standards into a single system of communications regulations. Since the longer the establishment of such standards is postponed, the more diverse the types of machines in use will become, it will be important to standardize computer hardware and software as soon as possible.

3. Clarification Of Legal Implications

The online settlement of accounts is something altogether new and completely different from conventional means of settling accounts such as paying cash or making use of checks and promissory notes. Therefore, it is expected to give

rise to some rather difficult to solve problems as far as current interpretations of the law are concerned. For example, at what point and/or via what specific actions should the settlement of accounts via online systems be considered completed? Or in the case of a mishap or criminal act involving remittances, who is to be held responsible? And finally, what should the thinking be concerning the legal implications of operating computers?

It will therefore be extremely important to establish rules and legislation pertaining to the utilization of online systems to settle accounts in order to solve these problems and make such transactions safe and secure.

HOW TO DEAL WITH FUTURE COMPUTERIZATION

In order for banks and other financial institutions to deal effectively with the continued moves toward computerization, it will be essential for management to become more efficient and develop more future-oriented perspectives and policies. The national government should also establish suitable, yet flexible measures which conform with those being adopted by the financial world.

1. Timely Measures

a. The advance of the technological revolution

As stated previously, it is very difficult to predict with any certainty just how fast computerization will progress

in future. And it is also still rather unclear just what the needs of commercial firms and private homes will be when it comes to firm and home banking services, for instance. But nevertheless, it is expected that the technological revolution will move forward with remarkable speed and that firm banking and related services will gain a solid foothold that will enable their rapid spread.

In the midst of all this, there will be a need for enormous investments and huge numbers of development personnel to provide these advanced new online financial services. Since it will be impossible to cope with this challenge in a short period of time, it will be important to devise timely measures which are in keeping with these new developments as they occur.

b. Competition with peripheral industries

In light of the computerization of finance-related (peripheral) industries, if banks and other financial institutions fail to adopt adequate measures to deal with this trend, then they will be late getting off the mark and will find themselves incapable of competing with peripheral industries as to the types of services offered. In this respect as well, the devising of timely measures in keeping with computer-related developments is imperative.

However, due to the scope and public nature of banks and other financial institutions, special consideration will also have to be paid to ensuring the safety and security of online transac-

tions.

c. International competition

Should Japan fail to keep pace with the rate of computerization at banks and other financial institutions in the United States, for instance, then there is a good chance Japanese banks will lose a considerable amount of their international competitive power. Therefore, it will be very important for Japan's banks and other financial institutions to take part in the formation of international networks and to take an active hand in the establishment of international standards.

And once again the question of security, in this case, national security, will have to be fully addressed in the process of constructing international communication networks.

2. Consideration For Human Relations

The advance of computerization will bring with it the necessity of paying due consideration to problems related to human interaction. For example, as computerization spreads and becomes more predominant, over-the-counter transactions will drop off and face-to-face business relations will become much less frequent; differences in the abilities of persons from different age groups to operate computers will surface; and as the amounts of information available through computer systems increase to vast proportions, it is quite likely that making suitable judgements based on that information will become quite difficult.

3. Implications For Management

a. Management's position vis-a-vis computerization

Dealing with the huge amounts of information that will be made available to banking concerns and other financial institutions through advances in technology envisioned in the future is going to present serious problems to those institutions from the standpoint of management. They will be required to tackle these problems in a forward-looking manner, taking full responsibility for their decisions.

However, in light of the public nature of banks and other financial institutions, it will be imperative that they give due consideration to the effects their decisions will have on the running of their institutions and the financial system in general. A slow, steady approach to the handling of computerization and the informationalization of their operations would be wise.

b. Pressures on management due to rising costs

The creation of networks connecting banks and other financial institutions directly to their corporate and private customers will entail enormous outlays of money for equipment investments, systems development and operation costs.

Moreover, as the ability to transfer funds increases as a result of online transactions, the financial stability of banks, etc., is expected to waver and revenue management to grow increasingly more difficult.

c. Cooperative measures

In order to reduce the burden of these costs, measures such as joint equipment investments, systems development and maintenance should be considered, together with the utilization of packaged software developed by software houses.

This type of cooperation could quite likely mean a drop in the number of original services offered by banks and other financial institutions. But although the basic portions of network systems will be developed and used in cooperation with one another, each institution will still be capable of adding its own personal touch to the finer points regarding the services made available using these systems.

d. The beneficiaries' share of the burden

It will be imperative that banks and other financial institutions initiate steps to ensure that the beneficiaries of their online services assume a share of the cost burden commensurate with the types of computerized services they are receiving.

Up until recently, the thinking in Japan has always been that the customer be supplied with free service, with banks and other financial institutions tending to provide an overabundance of services with little or no regard for profits in order to remain competitive. However, in future these same institutions should seriously consider adhering to the principle that beneficiaries of their services should pay their fair share of the financial burden for these services.

- e. Need for subjective judgement on the part of management

Increased use of online systems by banks and other financial institutions in their dealings with customers will make it more and more difficult to assess customer needs. Online transactions will also make it hard to ensure stable funds and suitable profit margins. All these factors, plus the fact that continued computerization will require such large amounts of money, will make it imperative that management possess even stronger subjective judgement capabilities.

Therefore, it will be risky to continue making investments in computerization from the standpoint of keeping pace with the competition. In future, it will be extremely important that the managers of banks and other financial institutions make such investments based on their own judgement, keeping in mind the future profits of the institution.

4. Administrative Policies

Individual banks and other financial

institutions will have to deal with the trend toward increased utilization of online systems in the carrying out of their business based on the principal of self-responsibility and respect for independence. However, in light of the public nature of such institutions and their broad social responsibilities, the government will also have to devise appropriate measures to augment those being implemented by individual banks, insurance firms and other financial institutions.

These government-sponsored administrative policies should be aimed at accurately perceiving national trends concerning the computerized services offered by banks and other financial institutions. They should also be devised with the national economy and long-range future perspectives in mind which take full consideration of maintaining a balance between the operational costs to the financial institutions and the national economic good, the security of the entire network, the freedom to do business with the bank of one's choice and the national security.

ELECTRONICS AND THE SECURITIES BUSINESS

PROBLEMS FACING THE SECURITIES BUSINESS

1. Coping With Diversifying Customer Needs

Customer preference for high yield securities is stronger than ever. The securities administration functions of the Ministry of Finance have also become less regulatory in nature, thus prompting a move toward freer interest rates. In order to deal with this situation, securities companies have had to come up with a number of new, more attractive products to stay in business, among which have been medium-term government bond funds and jumbo investment trust funds. So as to be able to handle the rapid movements of these new products, securities firms have had to make use of computers and related electronics technologies.

Securities firms must be readily accessible to their customers whenever the latter wish to make inquiries concerning the buying and selling of securities and balance information. For this reason, securities firms are obliged to create systems that provide their customers with easy access to this type of data

whenever the need might arise.

2. Advancing With The Electronics Age

Securities companies are planning to couple customer demands (needs) with advances in electronic technologies (seeds) to promote future forms of securities transactions such as "home dealing" and "firm dealing" which can be carried out without the need for actual physical business locations (offices).

These plans have raised some important administrative problems for the Ministry of Finance, which has already set its Securities Exchange Council to work deliberating the pros and cons of "all electronic" home and firm securities transactions. The primary task of the Council is to consider the effects on the existing order of things in the securities business should the buying and selling of stocks and bonds and balance inquiries all be brought online and carried out in a totally electronic fashion.

It is expected that securities transactions of the future will be carried out from jointly-operated offices and unmanned (fully-automated) offices, as well

as in an "office-less" (home and firm dealings) environment. It is only natural that the roles of the office and salesman in this type of business setting will have to be reconsidered and will eventually be changed significantly from what they are now.

3. Coping With Financial Restructuring

In April, 1982, Article 65 of the Securities Exchange Law was amended to permit banks approved by the Ministry of Finance to deal in securities as well.

This amendment set the stage for tearing down the legal barriers which have always separated the securities business from the banking business, creating a situation in which members of each side began entering the domain of the other. The below list outlines the steps this movement is expected to follow.

This restructuring of the financial order will not only remove the barriers that have existed between the securities and banking businesses, but will more

than likely also bring about certain restructuring in non-banking areas such as the credit, life and non-life insurance businesses. It will probably even extend its way into such non-financial operations as distribution, trading and manufacturing as well.

4. Coming To Grips With Greater Internationalization

Securities firms have been placing greater weight on their international operations in line with increasing foreign investments on the part of Japanese enterprises. As a result, the contributions towards sales and profits made by the international departments of securities firms have been increasing together with the expansion of these firms' overseas branch offices.

The internationalization of the Japanese securities market has been given a boost by the increased attractiveness of that market to foreign investors. This heightened attractiveness stems from the liberalization of investment policies,

	Securities Business	Banking Business
Step One	Development of medium-term government bond funds (1980)	Over-the-counter dealing in long-term government bonds (April, '83)
Step Two	Government bond-tied financing	Over-the-counter sales of medium-term government bonds (Fall, '83)
Step Three	Certificates of Deposit (CD) and Commercial Paper (CP) transactions; CMA cash management accounts; home dealing and firm dealing.	Dealing in issued bonds (April, '84); entry into the investment trust business; repeal of Article 65 of the Securities Exchange Law; home banking and firm banking.

plus the improved performance of Japanese companies in the international business area. The percentage of domestic securities transactions accounted for by foreign investments has thus been steadily increasing.

Economics and politics in today's Japan are intimately intertwined with events on the international scene, closely linking Japan with the other countries of the world. And the securities business is no exception in this regard. Every securities firm in Japan is struggling with the problem of how to establish efficient worldwide information networks.

TACKLING THE PROBLEMS THAT CONFRONT THE SECURITIES BUSINESS

Computers and related electronics technologies are essential to enable securities firms to tackle the problems confronting them. In securities transactions, information isn't simple a means of conducting business, it IS the business. Securities firms take raw information coming out of the stock exchanges, process it and then sell that processed securities data to their customers.

However, this doesn't necessarily mean the computerization is always the best course of action in this business. To computerize or not to computerize is something that can only be decided after a securities firm determines whether or not the introduction of computers can be carried out economically.

There are considerable differences between and among securities firms

concerning their respective human, financial and technical resources. With the exception of the top four companies in the business, most securities firms in Japan find it extremely difficult to computerize their operations on their own without weakening their financial position.

In fact, coming up with ideas as to how best to independently carry out the necessary computerization of their operations, without relying on the four major companies, has become a big administrative task for small- and medium-sized securities firms, as well as larger firms, in order to stay in operation and maintain the sound development of the securities business as a whole.

CURRENT STATE OF COMPUTERIZATION IN THE SECURITIES BUSINESS

A stock price information system which provides up-to-the-minute stock price data direct from the Tokyo and Osaka Stock Exchanges has been in operation in Japan since September, 1974. And starting in July, 1980, Quotations Information Center, K. K. (QUICK) commenced furnishing its subscribers, composed primarily of securities companies, newspaper firms and banks, with the latest stock price and other securities-related information directly from the Tokyo, Osaka and Nagoya Stock Exchanges via its integrated online system.

On-the-floor buying and selling of stocks listed on the second section of

Table 1. CURRENT STATE OF COMPUTER UTILIZATION AT SECURITIES FIRMS

		Self-Adminis- trated	Online							Sub- total	Batch	Total
			Linked To Different Networks									
			A	B	C	D	E	F	Other			
Major companies (4)		4								4		4
Large Companies (10)		8	1	1						10		10
Small- And Medium-Sized Companies	More than 500 million yen paid-in capital (22)	8	6	3	1	2		1	1	22		22
	Between 200~500 million yen paid-in capital (33)	4	3		1	3	3	5	1	20	13	33
	Less than 200 million yen paid-in capital (14)				2		2	1	1	6	8	14
Total		24	10	4	4	5	5	7	3	62	21	83

the Tokyo Stock Exchange was computerized in January, 1982, and trading of issues on the first section of the Tokyo Stock Exchange is scheduled to be automated by April, 1985 (See the article on "Online Stock Trading System" which follows).

All 83 of Japan's securities companies are planning to interconnect their computers with the Tokyo Stock Exchange Trading System scheduled to be put into operation around the middle of 1986. At present, approximately half of these companies have already brought their respective stock trading operations online. The remainder of the securities companies planning to link up with the proposed stock exchange trading

system are currently considering ways of bringing their operations online. Rumor has it that they are seeking a uniform solution (See Table 1).

FUTURE COMPUTERIZATION

A test model of the Information Network System (INS) being developed by Nippon Telegraph and Telephone Public Corporation (NTT) is scheduled to be put into operation by September, 1984, in the Mitaka area of Tokyo. Around ten securities firms have already submitted their applications for inclusion in this new communications system and are groping for answers to the question, "How should the securities business be

conducted in the era of INS?"

The ANSER System is an electronic communications system which has already commenced operations in the field of banking. If we count all those banks either currently utilizing or preparing to utilize this system, the total comes to about 50 in all. What is more, this system is expected to provide services related to the creation of medium-term government bond funds, balance inquiries on interest-bearing funds and stock trading information to securities firms in the very near future as well. The CAPTAIN Service, a videotex network system being developed by NTT and scheduled to commence services in the fall of 1984, is being designed as a deluxe version of the ANSER System and is expected to become the most likely system for use in home dealing in future.

A CD (cash dispenser) network interconnecting CDs in operation at securities companies in Japan is also being constructed, and is currently at the stage where the major securities firms are building their own individual CD networks. Tests are also already underway to upgrade this proposed CD network into an automatic teller machine (ATM) network. However, since this project is still plagued with numerous problems such as whether or not to include change giving functions and the exact date of the Finance Ministry's decision to switch to the proposed new money system, it will probably be some time before this system can be put into full-scale operation.

Nevertheless, it will most definitely be necessary to upgrade the CD network

into an ATM network eventually. In the meantime, it is felt the CD network will develop from a number of individual networks into a comprehensive network servicing all the companies in the securities business, even expanding to the point where it will also include banking institutions and credit unions as well.

As for the Tokyo Stock Exchange Trading System, as stated above, the second section of the Tokyo Stock Exchange was computerized and brought online in January, 1982, and the first section of the Tokyo exchange is scheduled to go online around early to mid-1985. Once the first section has been brought online, the plan is to interconnect this system with the online system being planned by the companies that make up Japan's securities business by 1986. In addition, it is also expected that stock transactions at regional stock exchanges such as the Osaka Stock Exchange will be computerized for both on-the-floor and over-the-counter trading.

Then there is the Stock Transfer Settlement System which is scheduled to commence services around 1986 once it has been connected online with the Tokyo Stock Exchange. The Ministry of Justice, which will have to submit a bill to the regular session of the Diet in 1984 concerning this proposed system, as well as the Ministry of Finance, stock issuing companies, securities firms and other related parties are supposedly diligently reviewing this new system right now.

Once the Tokyo Stock Exchange Trading and Stock Transfer Settlement systems have been completed, a very

important computer network will have been realized, one which interconnects all the computers then in operation at the Tokyo Stock Exchange with those at stock receiving organs (transfer settlement centers), securities companies, stock issuing companies, major stockholders, banks and Securities Finance Companies.

When it comes to the buying and selling of bonds, all of Japan's securities firms currently deal in these instruments on an over-the-counter basis. The largest securities companies, which also possess the most investing power, are using bond information systems which they developed on their own to supply clients with buy/sell data concerning the bond market as part of their bond dealing operations.

This bond information and dealing center is expected to be centralized soon in line with the one product, one price demands of bond customers. Also, if this center is hooked up to the stock data exchange center discussed earlier, then a securities information system which combines both stock and bond information will have been realized. This will not only enable securities firms to meet customer needs for total money management schemes, but will also make it possible for them to grasp the day-to-day trading situation for stocks, securities and funds on the company level, thus bringing the securities business a step closer to realizing its own version of a cash management system (CMS).

Securities firms in Japan are being forced to invest exorbitant amounts of money in computers in order to keep pace with the ever growing and diversify-

ing needs of their customers, as well as the computerization trend in which they find themselves entangled. Some examples of how this money is being spent are outlined below:

- a) The early development of cumulative funds such as medium-term government bond funds and interest-bearing funds;
- b) Means of coping with numerous new services scheduled to be offered in future (ATM network, guaranteed loans, comprehensive accounts, CMA and CMS, among others);
- c) Creation of a bond dealing information system; and
- d) The interconnection of the Tokyo Stock Exchange Trading System, the Transfer Settlement System and other securities-related network systems.

THE IDEAL SECURITIES INFORMATION NETWORK

Computers and computer systems are essential elements of the securities business, but realizing them can be difficult. Not until computers and computer systems can be economically introduced into a securities firm's operations will those firms be able to use this technology to remain competitive.

The following points outline some of the basic thinking concerning this problem.

1. Joint System Development And Utilization (Shared Processing)

Investments in computer technology by securities firms will become even higher in future, making the need for joint investment more important. It will be imperative to lighten the burden of investment by engaging in joint development and joint utilization projects.

Joint or shared processing systems are comparatively harder to realize than shared information or common-user circuit systems, but with anticipated progress in interface techniques, NTT Computer Network Architecture (DCNA), and distributed processing technology, it should be possible to make use of existing systems and attune their operations to the new computer systems that will be added.

The current level of software technology will also have to be upgraded considerably in order to protect the secrets of all the companies involved in the joint utilization of computer systems.

2. Development Of Interfaces That Will Enable Smooth Connection With Other Systems (Information Sharing)

Once the problem of interconnection with the Tokyo Stock Exchange Trading System has been solved in 1986, computerization in the Japanese securities business will really take off with the creation of a transfer settlement system, over-the-counter trading system, regional stock exchange trading systems and a bond information system.

With the development of home and firm dealing systems, it will also become increasingly necessary to interconnect other systems such as ANSER, the CD/ATM network, CAPTAIN, online banking and large subscriber systems.

It would be uneconomical, to say the least, for securities firms to try and go it alone all the time. By means of developing computers with standard interfaces, it will be possible for securities firms to save on investments and human resources, as well as smoothly carry out future expansion.

Also, the development of computer systems and networks with standard interfaces will relieve host computers and computer staffs at individual securities firms from much of their support functions, enabling them to concentrate on the job of processing data.

3. Creation Of Common Networks For Greater Efficiency (Common-User Circuits)

One approach to economically realizing the computer systems and networks so necessary to the securities business is for each securities firm to share its dedicated communications circuits with other firms. This will be important in order to lower the per company costs of circuit leasing.

Processing operations in network systems such as ANSER, CD/ATM and CAPTAIN follow determined patterns, making it easy to standardize and integrate them on an industry-wide basis.

Shared network systems such as the

bond information system, cumulative fund system and comprehensive account system will be used in common and each will be integrated on an industry-wide basis. The securities business will also aim at creating an industry-wide integrated stock transaction network based around a stock data exchange center.

Individual networks such as the CD/ATM and ANSER systems, joint utiliza-

tion systems like the bond information system and comprehensive account system, securities firms' host computer systems, the Tokyo Stock Exchange Trading System and the Transfer Settlement System are expected to be organically combined to realize a securities INS, thus amalgamating the securities business (See Table 2).

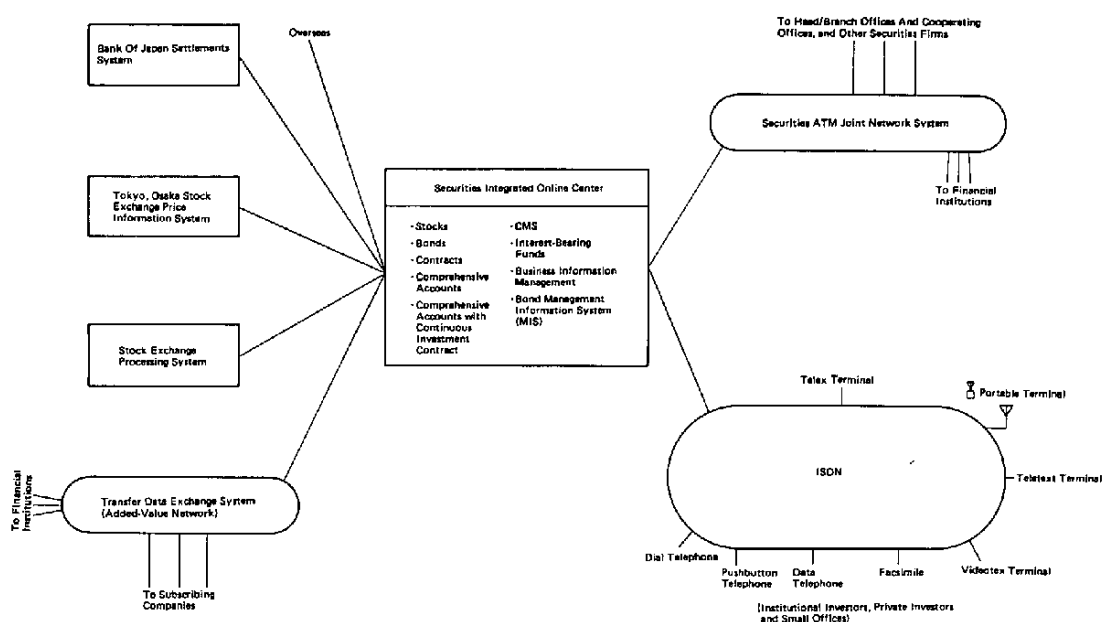


Table 2. SECURITIES NETWORK SYSTEM OF THE FUTURE

ONLINE STOCK TRADING SYSTEM

Hiromoto Iida
Chief, Systems Dept.
Tokyo Stock Exchange

The Tokyo Stock Exchange (TSE) put an online system into full-scale operation on March 23, 1982, for the online trading of stocks listed on the Second Section of the exchange. This system is called the Online Stock Trading System (OSTS) and has been operating smoothly for over a year now, handling some 20 million shares per day.

The idea for an online trading system was conceived in August, 1978, as a means of modernizing the securities market. At the same time, it was felt that an online trading system would be the perfect solution to the problem of relocating the trading floor of the Second Section of TSE in line with plans to renovate the structures that house that exchange. The steps leading up to this decision were as follows. First, TSE decided in March, 1977, to renovate the old buildings in which it did business. The main office building was to be torn down and in its place a new exchange (trading floors) was to be constructed. This was to be followed by the razing of the old exchange building and the construction of a new office building in its place. All of this is to be completed by the end of 1987. When it came time to tear down the old office building, TSE realized that

there wasn't a suitable place to move the trading floor of the Second Section, which had been located on the first floor of that building. For lack of a better place, the trading floor of the Second Section was moved to the basement of the old exchange building, which was already cramped for space. TSE immediately began formulating plans that would enable them to smoothly continue their buying and selling operations. In the end, it was decided that rather than having all the trading clerks of the various members gathered together at the exchange, it would be better to develop an online system which would enable them to carry out their buying and selling operations from terminals installed at the main offices of the securities companies themselves. This approach was seen not only as solving the problem of where to relocate the Second Section trading floor, but also as a means of creating a market mechanism that would provide TSE with advanced capabilities in the areas of equitable price formation and smooth trading.

The following is a brief outline of the OSTS.

SYSTEM OUTLINE

Key Points Of The System

The Online Securities Trading System utilizes computers to process buying and selling transactions concerning securities listed on the Second Section of TSE in the manner described below. Figure 1 shows a conceptual diagram of the configuration of the TSE online trading system.

- 1) All the members of TSE issue buying and selling orders via order input terminals installed at their main offices.
- 2) Once the buying and selling orders issued in this way have been received by the OSTS central processing

unit, it transmits order received notices to the output terminals located at the main offices of applicable members.

- 3) Every order received by the central processing unit is categorized by stock, numbered and arranged in order, and electronic order lists prepared.
- 4) All buying and selling orders are processed in strict accordance with the various regulations concerning auction rules, such as time and price priorities, by means of programs stored in the online trading system CPU.
- 5) Saitori members (a sort of broker's

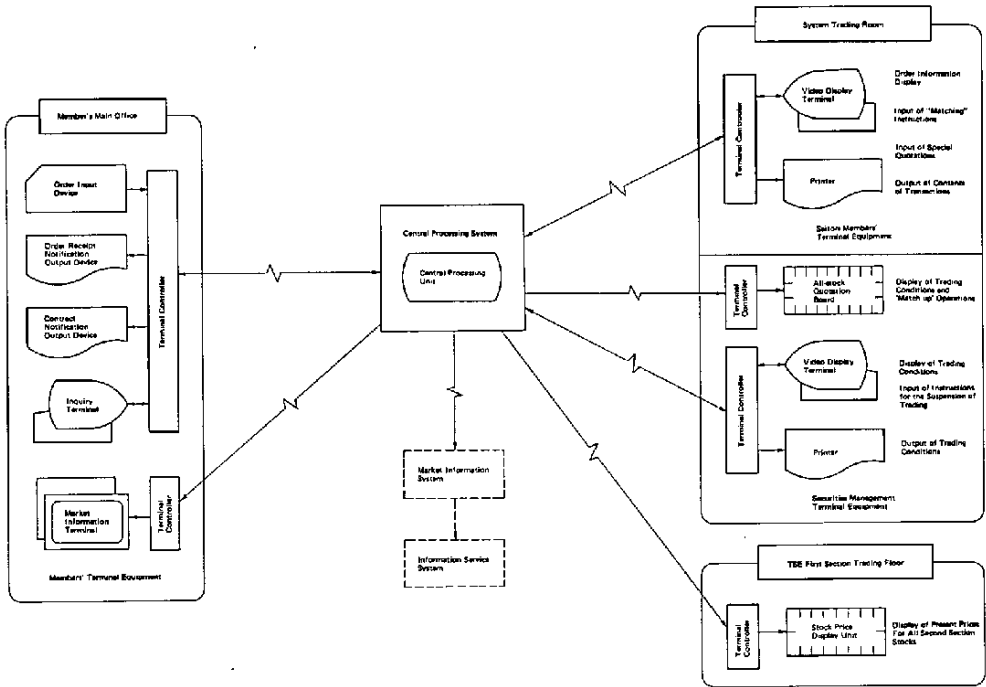


Fig. 1. Conceptual Diagram Of The System Configuration

broker) review all buy/sell orders displayed on their terminals located in the system trading room, and instruct the CPU to match the buying and selling orders, after judging whether or not such matching is suitable.

- 6) Once these matching instructions have been input to the system by the Saitori members, the particulars of the contracts concluded as a result are immediately transmitted to contract notification output terminals installed at the offices of the respective buying and selling members.
- 7) Data stored in the systems host computer concerning individual stock orders and trading trends are made available to all TSE members via inquiry and/or market information terminals installed in their main offices.
- 8) The OSTS CPU is connected to the CPU of the Market Information System. This enables constantly changing contract prices to be transmitted to the offices of securities companies throughout Japan via the Market Information System and Information Service System.
- 9) TSE manages the buying and selling transactions carried out via OSTS by monitoring these transactions as they are output on the market surveillance terminal installed in the system trading room. TSE prepares a variety of important documents such

as lists for clearing and settlement processing at the close of every trading session based on the data stored in the system's CPU.

OSTS Processing Capabilities

The securities processed by the OSTS consist of stocks listed on the Second Section of the Tokyo Stock Exchange. The kinds of operations handled by this online system are "regular-way" and "when-issued" transactions.

The OSTS was designed to smoothly process data concerning orders received, contract notifications, inquiries and market information reports on 500 different stocks, even when these stocks are being traded most actively. (See Table 1).

Table 1. Types Of Processing Done By OSTS

	Total Amount Of Data Processed Daily	Amount Of Data Processed Per Minute During Active Trading
	Number of Operations	Number of Operations
Orders Received	100,000	1,620
Contract Notifications	72,000	2,700
Responses to Inquiries	200,000	750
Market Information Reports	14,000	190
Time Between Inquiry and Response	Average of 3~5 seconds	

Central Processing System

The central processing complex for the

OSTS is comprised of two CPUs and their peripherals, as shown in Figure 2.

This is a duplex computer system consisting of two Hitachi HITAC M-180 computers (internal storage capacity of 7 MB and processing speed of 2 mips), which serve as the CPU's, one being on-line and the other being on "hot standby," ready to automatically assume the online processing operations of the other within two minutes of a failure. In light of the public nature of this system, all principal equipment and major storage devices have also been either duplexed or

triplexed to ensure system and data reliability.

TSE MEMBER TERMINAL EQUIPMENT

The terminal equipment used by TSE members to conduct their trading operations via the Online Securities Trading System are located in each member's main office, and are connected to the central processor by means of 2,400 bps. leased communications circuits. As Figure 3 indicates, the types of terminal

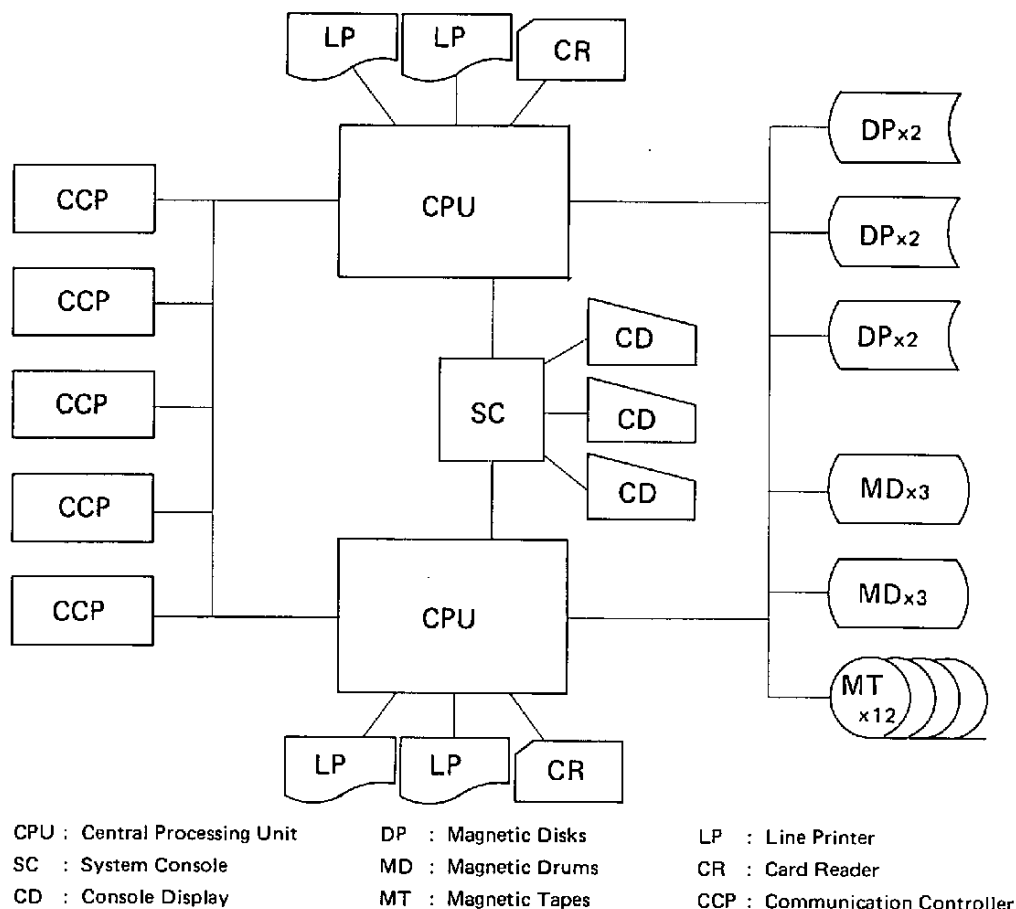


Fig. 2. Configuration Of The Central Processing System

equipment in operation include order input devices for the placement and correction of orders, output devices for the notification of orders received, other output devices for the notification of contracts completed and inquiry terminals which display order information in response to inquiries. There is also a market information terminal which reports changes in the market situation as they occur and are processed by the central processor. TSE members can install as many of these devices as they need, but they are prohibited from linking their own online systems with the OSTs.

Optional Terminal Equipment

The types of terminal devices used by members are limited to those described above for the most part. However, those members which find it necessary to substitute or add other types of devices to their terminal equipment, due to the volume of their trading being higher than usual or to the particular system they have established for in-house processing of securities transactions, are capable of hooking up those devices approved by TSE to the terminal controller. These other types of devices are called optional terminal equipment. The basic configura-

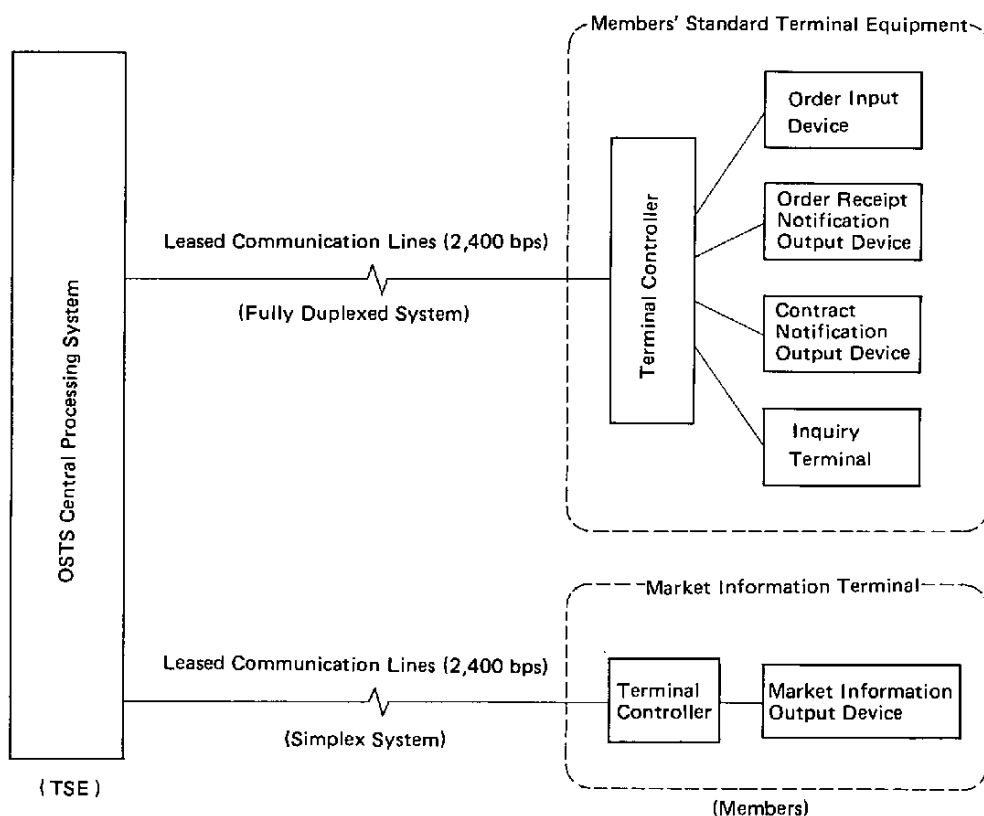


Fig. 3. Conceptual Diagram Of Terminal Equipment Connections

tion of the standard terminal equipment used by TSE members is as shown in Figure 4.

As you can see, the order input device is a mark card reader, and the order receipt notification output device is a printer, as is the contract information output device. The inquiry terminal is a CRT display unit. All of these devices are connected to a terminal controller, which has 64 KW of main storage capacity, one set each of fixed head and floppy disks and is capable of connecting up to a maximum of eight I/O devices at a time. The types of optional terminal equipment possible with this system include paper tape readers, OCR devices and floppy disk storage drive devices with or in place of the mark card reader order

input device, and paper tape punches and OCR printers together with or in place of the printer used to output information concerning contracts.

Also, should any of the standard terminal devices breakdown during operation, the system is designed to allow the operator to switch the functions of the down device to another device in the terminal equipment configuration quite simply. Table 2 shows those devices which can assume the functions of other pieces of terminal equipment in the case of a breakdown.

Should there be trouble with the terminal controller or communications circuit linking it to the OSTS central processor, an emergency terminal equipment room has been set up in the basement of

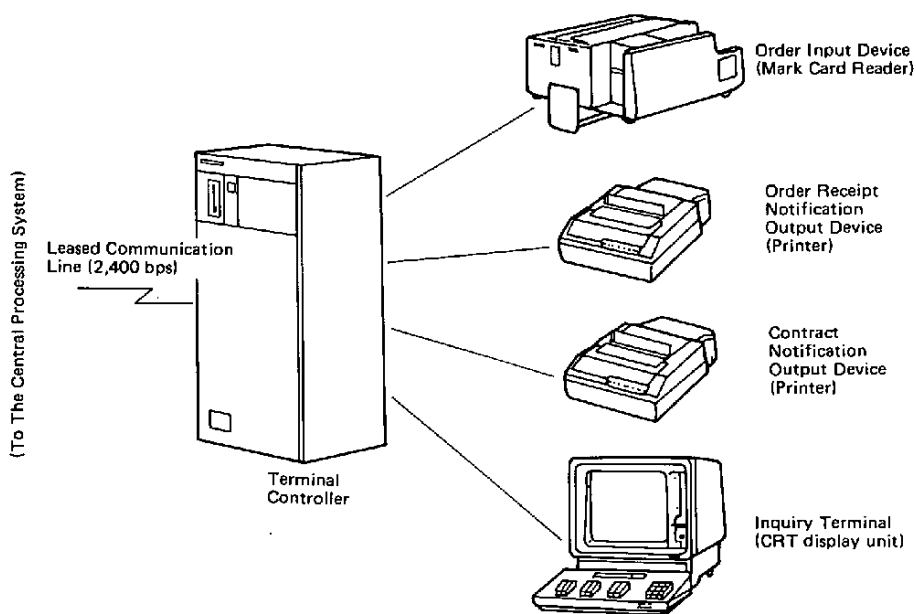


Fig. 4. Basic Configuration Of Members' Standard Terminal Equipment

Table 2. Function Switching Capabilities

Type Of Operation	Failed Equipment	Substitute Equipment
Order Placement/ Correction	Mark Card Reader	Inquiry Terminal (CRT Display Unit)
Receiving Of Order Receipt Notification	Order Receipt Notification Printer	Contract Notification Printer
Receiving of Contract Notification	Contract Notification Printer	Order Receipt Notification Printer
Order Information Inquiries	Inquiry Terminal (CRT Display Unit)	{Inquiries} Mark Card Reader
		{Responses} Order Receipt Notifi- cation Printer

TSE. A number of sets of standard terminal equipment are installed in this room, making it possible for members to continue their buying and selling operations in the event of a failure in their terminal controller or leased circuit without having to provide their own back-up systems.

Market Information Terminal

The market information terminal is a 23-inch CRT display unit, featuring a quotations information screen and a market information screen. The quotations information screen is capable of displaying quotations for either 24 or 32 stocks at a time, providing members with buying and selling quotations, as well as current and previous day prices and changes from previous days closing prices concerning the stocks of their choice. The market information screen is capable of displaying data on either 12 or 16 stocks at a time, providing members with market information on order-concentrated stocks

in the central processor, price fluctuations, large orders and big contracts, plus information which TSE deems necessary for dissemination such as special quotations and the suspension of trading activities. All of this information is displayed on the market information terminal as it happens. Whenever special TSE-designed information is displayed, a buzzer on the terminal sounds to let members know that special information is being transmitted.

HOW TRADING OPERATIONS ARE CARRIED OUT

Online buying and selling operations are carried out by TSE members as outlined below.

Order Placement/Correction And Order Receipt Notifications

The placing of orders and/or corrections thereto are carried out by means of

marking the appropriate blocks on a "New Order Card" (See Figure 5) or "Order Correction Card," using either a lead pencil or felt-tipped pen and then feeding those cards into the mark card reader serving as the order input device.

When placing a new order, members must mark those blocks on the New Order Card indicating the name of the stock involved, whether it is a buying or selling order, conditions of execution, the price of the stock and the number of shares (To eliminate problems arising as a result of marking mistakes, members can set a limit on the number of shares input per order in advance. When they wish to order more shares than the limit number allows, they can do so by simply marking the cancel block on the New Order Card.) Other blocks which must be marked on New Order Cards are those pertaining to TSE market surveillance operations and in-house processing instructions. The former item must be filled in so that TSE

can manage the buy/sell transactions for the stock in question, while the latter item is added for the internal use of members in keeping track of the number of online orders placed (Order serial numbers).

Once a New Order Card has been marked and input using the mark card reader, a series of 17 prescribed checks covering 73 items is conducted by the terminal controller and central processor concerning the contents of that card. After the buy/sell order has been stored in the central processor, an order received notification is output on the order receipt notification printer of the member who placed the order. This notifications contains such information as the contents of the received order, the order number and time of receipt. Whenever an error is detected in the contents of a new order, a notification to this effect is output on the same order receipt printer indicating the contents of the order plus the nature of

The form is titled "New Order Card" and is divided into several sections. At the top, there are labels for "Execution Conditions", "Stock Code", "Type of Transaction", "Member Code", "Buy or Sell", "Order Price", "Number of Shares", "Cancel", "Management Code", and "Internal Processing Codes". Below these labels, the form is organized into a grid of boxes. The first section, labeled "Data Items", contains a grid of boxes for marking orders, with columns for "金目" (Amount), "銘柄コード" (Stock Code), "注文コード" (Order Code), "注文価格" (Order Price), "注文数量" (Order Quantity), and "取消" (Cancel). The second section, labeled "社内処理用項目" (Internal Processing Items), contains a grid of boxes for marking internal processing instructions, with columns for "社内処理用項目" (Internal Processing Items) and "社内処理用項目" (Internal Processing Items). The form is designed to be filled out by a member placing an order, with the marked information being read by a mark card reader.

Fig. 5. New Order Card

the error. A buzzer is sounded on the printer when an error notification is to be output.

When a corrected order has been input using an Order Correction Card, it is stored in the central processor and a notification that the corrected order has been received is output on the order receipt notification printers of each member. Once the central processor has finished processing the corrections to the order, a notification to this effect is output on the contract notification printer of the member securities company concerned.

sion of a contract to the contract notification printers installed in the offices of the buying and selling members. The principal items contained in this notification are the name of the stock involved and its code number, whether it is a buying contract or a selling contract, the contract price, the number of shares stipulated in the contract, the time the contract was concluded, the contract notification number and the numbers of the buy/sell orders utilized to close the contract.

Order Inquiries

All inquiries to the system concerning market information and orders are made via the members' inquiry terminals. Eleven different types of information are displayed in response to inquiries on particular stocks. These types of data

Notification Of Contracts Concluded

Once a deal has been closed between a buyer and a seller via a Saitori member's matching operation, the system immediately outputs a notification of the conclu-

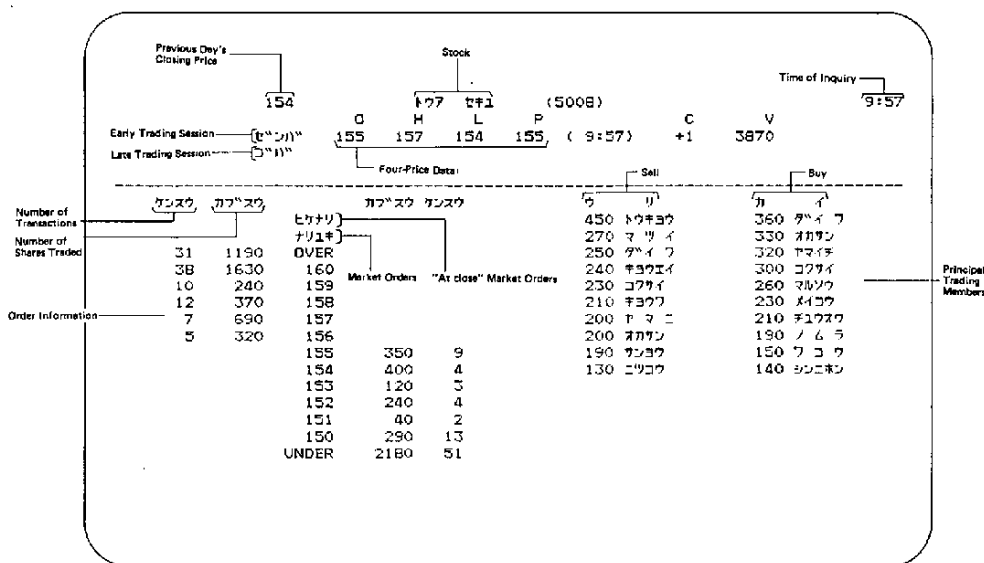


Fig. 6. Example Of An Order Information Response Screen

and the items they reveal are presented below. Inquiries are made using the terminal keyboard, and the responses received to these queries are displayed on the terminal screen, and contain the most up-to-the-minute data available in the central processor's memory banks. Figure 6 provides an example of the type of data displayed in response to inquiries for information on buy/sell orders.

1) Buy/sell information

Inquiries made concerning the status of a certain stock will provide the member with information as to that stock's opening price, high/low price, present price, the time of the last trade, the price difference compared to the previous day's closing price and the trading volume.

2) Order information

The total number of shares ordered by ordering price and the number of orders placed for the inquired stock will be displayed.

3) Principal trading members

The names of the top ten buying/selling members and the number of shares bought or sold by them as of the time of the inquiry will be displayed.

4) Inquiring member's order situation

The number of shares ordered will be displayed, with priority being given to those orders placed by the inquiring securities firm.

5) Twenty most current order-concentrated stocks

When 20 or more orders are placed for a stock in a period of five minutes, that stock is indicated as an order-concentrated stock, together with the total number of shares of buying and selling orders of the stock, respectively.

6) Twenty most current price-fluctuated stocks

The present price and price difference compared to the previous day's closing price will be displayed for those 20 stocks whose prices have risen or fallen 5% or more vis-a-vis the previous day's closing price.

7) Twenty most current stocks with large orders

The number of shares ordered, whether it was a buying or selling transaction, the order price and name of the ordering member will be displayed for those 20 stocks with single orders exceeding ten thousand shares.

8) Twenty most current stocks involved in large block trades

The number of shares contracted for, whether it was a buying or a selling transaction, the contract price and the name of the members who concluded the contract will be displayed for those 20 stocks for which contracts were concluded for ten thousand shares or more.

9) Twenty most current stocks with special quotations indications

Information on those 20 stocks for which indications of special quotations and/or the suspension of trading activities

have been made most recently.

10) Twenty most current compound data

Information concerning the 20 most current stocks described in items 5) through 9) will be compounded and displayed upon inquiry.

11) Trading precautions

Information on those stocks for which trading has been suspended or specially regulated will be displayed upon inquiry.

SYSTEM TRADING ROOM

TSE's market surveillance terminal, plus some 30 Saitori member's terminals for use in matching up selling and buying orders are installed in the System Trading Room in the basement of TSE.

Saitori Member Terminals

Each Saitori member's terminal equipment consists of a video display unit and printer, capable of handling up to 20 stocks at a time. One nice feature of Saitori member's terminals is the function which allows one Saitori member to transfer a certain stock or stocks that he is handling to another Saitori member's terminal when he gets too busy. This operation simply involves switching the key for the stock(s) involved from his own keyboard to that of the other Saitori member.

Figure 7 shows what the display screen of a Saitori member's terminal looks like when he is working. As you can see, the right half of the screen contains the names of the stocks being handled, order



System Trading Room

symbols (symbols which indicate the status of orders stored in the central processor for each stock), buy/sell quotations and designated prices for automatic matching. The left half of the screen displays the order information for inquired stocks (number of shares ordered by order price and the number of members placing orders), four-price data and the time of the last trading transaction. The printer is used to print out the contents of buying and selling transactions and a record of the operations performed by the Saitori member in charge of operating the terminal.

After the start of a trading session, whenever the buying and selling orders

for a certain stock satisfy the quantitative conditions necessary to close a deal within a fixed price range, the symbol designating that fact is automatically displayed in front of the name of that stock where it appears in the right half of the broker's display screen. When this happens, the Saitori member immediately calls up the order information for that stock, which is displayed in the left half of this screen. He then sets about matching up the selling orders with correspondingly priced buying orders, judging whether or not they are suitable as to timing and price. When he deems a sales order and purchase order to be suitably matched, he presses the "Matching"

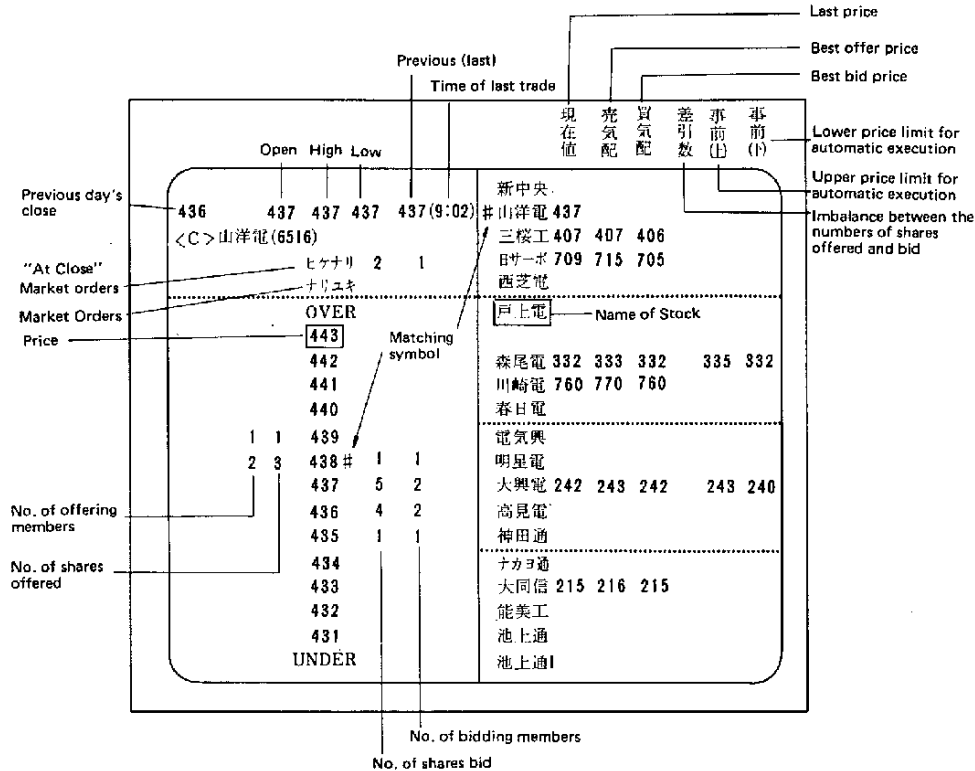


Fig. 7. Example Of A Broker's Video Display

key, thus inputting instructions to the central processor to carry out the processing necessary to complete a transaction in accordance with the principles of auction (time priority and price priority). If he decides that the selling and buying orders are not suitably matched, however, he presses the "No Matching" key and that particular operation is brought to an end.

In those cases where the Saitori member presses the "Matching" key, the computer immediately outputs a contract notification to the contract notification output devices located in the offices of the buying and selling members. The contents of the transaction are then printed out on the Saitori member's printer.

When a Saitori member finds that the prices of the buy/sell orders that he received are outside the range deemed appropriate to maintain continuity of price, then he inputs instructions to the computer from his terminal that will display special quotations on the inquiry terminals or market information terminals installed in the offices of the respective members.

Saitori members review the contents of buy/sell orders like this from the time opening prices are established until the end of a trading session. However, when the market conditions of stocks are such that it is unnecessary to individually match up all the orders which fall into a certain fixed price range, they may designate that price range via a keyboard input. Having done this, each time the price of a selling order corresponds to that of a buying order, and they both

fall within the price range designated by the Saitori member, the system automatically carries out transaction processing.

Market Surveillance Terminal

The Market Surveillance Terminal is composed of one all-stock quotation board, four CRT display units and four printers. The all-stock quotation board is a 36 screen CRT display unit, which displays the contract prices, buy/sell quotations, trading volume, previously designated prices for automatic matching and symbols indicative of orders to be matched for all stocks handled by the OSTs as these items occur and/or every time they change. This enables the TSE to keep close tabs on overall market trends, as well as manage the buying and selling transactions of individual stocks and the 'match up' operations of the Saitori members. The other four CRT display units are used to inquire 17 types of data, and to display various information related to the market in general and/or various detailed information concerning individual stocks when the proper instructions are entered through their keyboards. The printers are used to make hard copies of any and all information displayed on the four CRT displays whenever the need arises.

The Market Surveillance Terminal makes it possible for TSE to quickly comprehend the buying and selling situation and to review figures pertaining to the overall market, something that was either extremely difficult or downright impossible before now. It has also helped im-

prove TSE's market surveillance functions by enabling a trading session to be easily re-enacted after the fact.

There is also a stock price display device installed on the floor of the First Section of the exchange to display the trading situation for stocks handled by the OSTs. This device also displays the up-to-the-minute buy/sell quotations and present prices for all stocks processed by the system.

The preceding has been an outline of the Online Securities Trading System which was established both as a means of solving the problem of where to relocate the trading floor of the Second Section of TSE in line with the renovation of that exchange, and as a move to modernize the securities trading market. The creation of the OSTs has meant that the trading clerks of TSE member securities firms need no longer be physically present at the exchange to carry out their buying and selling operations, a fact which has brought some rather big changes to the way securities are traded and the types of market information available. Although TSE members had their doubts about this system at first, once it was put into operation, they realized that the time and price priorities of orders could be strictly observed while at the same time raising the percentage of contracts concluded, that the placement of orders and notification of contracts was much faster and that they could get much more detailed responses to their queries about market conditions. The performance of the OSTs has been so impressive, in fact, that it is now being called the "Model for

Securities Exchanges of the Future."

Based on the outstanding performance of the OSTs in the online trading of securities on the Second Section of the exchange, TSE studied the possibilities for computerizing its operations in the new exchange building once it is completed at the end of 1984 as well. In December, 1982, TSE put together a report titled, "Basic Outline For Phase One Of A Computerized Online System For The New TSE Facilities." The general plan outlined in this report calls for augmenting the OSTs central processors and other necessary equipment and devices and raising the number of stocks handled by this system from the current 450 Second Section stocks to 1,200, the additional 750 stocks being those listed on the First Section of the exchange for which trading isn't very active. The means of processing the buying and selling operations for these stocks would be carried out the same way they are now, from terminal equipment installed at members' main offices.

Plans for Phase Two of this computerization scheme call for the central processing units of online systems currently being operated by 34 of TSE's 83 members for the in-house placement of orders and notification of contracts, to be connected to the OSTs by means of leased lines. This would serve to link TSE directly to the main and branch offices of these members. The plan also stipulates that so-called "major stocks" for which trading is active would also be processed by the expanded system.

ONLINE SYSTEMS AND THE JAPANESE CONSUMER CREDIT INDUSTRY

INTRODUCTION

The Ministry of International Trade and Industry (MITI) defines the Japanese consumer credit industry as one which commercializes the act of extending credit to consumers who wish to defer payment on transactions involving goods, services or money. There are three representative types of consumer credit business in Japan: the consumer loan business, the credit sales business, and the credit operations of companies directly affiliated with banking institutions. At present, consumer credit transactions in Japan are increasing at an annual rate of more than 20%. According to a MITI survey, the amount of credit granted during 1981 came to 22,259.9 billion yen, and by 1985 is predicted to reach 37,060.0 billion yen. If this forecast holds true, the size of the consumer credit market will expand approximately 1.7 times in the space of four years. And this in a country where most consumer transactions are still carried out on a cash basis.

According to a report published by the Bank of Japan (BOJ), the amount of currency in circulation in 1981 was 21,258 billion yen, which means that the amount

of credit extended to consumers during that same year surpassed the amount of money in actual circulation. This points to an increased need for the consumer credit industry to update and modernize its business operations. As the number of credit customers and thus consumer credit transactions increases each year, the various business operations of the members of the consumer credit industry also increase, including such jobs as customer management, the management of credit transactions, settlement of accounts operations for specialty stores (stores specializing in only one product) and bank account transfer operations. These consumer credit firms will also be required to conduct more credit surveys and analyze and judge more credit information in line with the acquisition of new customers and as a means of preventing cases of multiple debt. In order to efficiently and effectively process all the data involved in these kinds of work, consumer credit firms will find it increasingly necessary to turn to computers for assistance.

However, there are numerous problems involved in the use of computers and online systems in the consumer credit business, not all of which can be satisfac-

torily solved through the efforts of individual firms. National policies concerning the consumer credit industry and computer utilization must also be dealt with. For example, there are the problems surrounding the standardization of credit cards, the establishment of personal credit information agencies and the installation of terminals at specialty stores which are connected to computers at various credit companies.

CREDIT CARDS

As can be seen from the figures give in Table 1, the number of credit cards issued in Japan to date is in excess of 30 million. One major obstacle to the systematization (online computer systems) of the Japanese consumer credit industry has been the fact that there are two types of credit cards currently being used here: those which conform to I.S.O. standards and those which apply uniform standards devised by Japanese banking institutions.

Cards in circulation which adhere to I.S.O. standards are presently limited to the embossed type based on I.S.O. standard 2894. To date only a few cards have been issued which make use of a strip of magnetic tape built into the credit card to store pertinent data. Up to now, those companies which have engaged in credit sales operations have relied on imported American-made machinery to manufacture their credit cards, which means that the formats of these cards adhere to international standards. The problem is that current legal restrictions make actual international credit

Table 1. Number Of Credit Cards Issued In Japan

(UNIT: 10,000)

	1979	1980	1981	1982	1983
Seven Major Credit Companies	349	524	694	988	1,372
Five Major Bank-Affiliated Companies	825	916	1,018	1,134	1,235
Small- And Medium-Sized Credit Groups	287	332	364	384	400

Taken from a survey conducted by MITI's Consumer Protection Division

(Note 1) Seven Major Credit Companies
Nippon Shinpan Co., Ltd.; Orient Finance Co., Ltd.; Central Finance Co., Ltd.; JACCS Co., Ltd.; Life Co., Ltd.; Daishinpan Co., Ltd.; Kokusai Shinpan Co., Ltd.

(Note 2) Five Major Bank-Affiliated Companies
JCB Co., Ltd.; Million Card Service Co., Ltd. Sumitomo Credit Service Co., Ltd.; Union Credito Co., Ltd.; Diamond Credit Co., Ltd.

(Note 3) Small- And Medium-Sized Credit Groups

Japan Specialty Stores Association, Japan Independent Stores Association

(Results compiled at the end of March each year)

transactions impossible for the time being.

Due to the widespread use of machines for the manufacture of embossed credit cards, magnetic tape credit cards have been rather slow getting started. However, more and more credit companies are constructing online computer networks and introducing point-of-sale (POS) terminals into these networks. This in turn is leading to the increased utilization of magnetic tape credit cards.

An important issue when it comes to the utilization of magnetic tape credit cards is whether they should adhere to

I.S.O. standard 3554 or to the standard currently in widespread use among Japan's banking institutions. A government advisory committee set up to look into this matter has suggested adopting the I.S.O. standard so that credit cards issued in Japan would conform to international standards.

Since 1969, Japanese banking institutions have been striving to make cash withdrawals easier and more efficient for their customers by providing all account holders with magnetic tape "cash" cards for use in automatic cash dispensing machines (CD) installed inside the banks. This has enabled banking customers to make cash withdrawals from their accounts themselves, automatically, using their cash cards to operate the CDs. After CDs came automatic depositories (AD) and automatic teller machines (ATM), which, in addition to enabling automatic cash withdrawals and deposits, also automated the processes for entering these transactions in the customers' bank book and for making balance inquiries. The number of cash cards issued by banks in Japan to date has reached 75 million. The establishment of a nationwide online banking system and the introduction of CDs and ATMs has led to the widespread use of bank-issued cash cards. This in turn is having a tremendous influence on efforts aimed at making credit card standards uniform. The result is that for the time being specialty stores and consumer credit companies are installing equipment capable of reading credit cards which adhere to both the I.S.O. standard and the standard followed by Japanese banks.

THE ESTABLISHMENT OF PERSONAL CREDIT INFORMATION AGENCIES

As the number of consumer credit transactions increases, it is predicted that the number of consumers with more debts than they are capable of repaying will also increase. In order to prevent this situation and improve the operations of the consumer credit industry at the same time, it will be essential to conduct thorough credit checks on all prospective customers prior to extending them credit, and to establish personal credit information agencies to facilitate these checks.

As Table 2 indicates, personal credit information agencies in Japan are either public or private organizations established and operated by banking institutions, credit companies or firms which sell merchandise on an installment basis. These respective personal credit information agencies are presently carrying out information gathering separate of one another, and as yet haven't begun to exchange the credit data they collect for their mutual benefit.

For this reason, the operations of existing personal credit information agencies should be standardized to lay the groundwork for future such organizations. Existing agencies are experienced in the gathering, arranging and furnishing of credit information to members of the consumer credit industry. They also possess computers and other information processing equipment, have nationwide and/or regional organizations and are constructing online computer networks.

Table 2. Outline Of Personal Credit Information Agencies In Japan

Agency Name Item	Credit Information Exchange Center (Japan Installment Associations Inc.)	Japan Credit Information Center	Central Communication Bureau Co., Ltd. (C.C.B.)	All Japan Credit Information Center (Zenkoku Shinyo Joho Center Rengokai)	The Consumer Credit Information Center (Federation of Bankers' Associations of Japan)
Organization	A Division of Japan Installment Associations Inc.	Joint Stock Company	Joint Stock Company	Credit Information Center (A federation of joint stock companies, union cooperatives, etc.)	Operated as a part of a re- gional banking association.
Area of Operation	All prefectures	Tokyo & 20 prefec- tures	Tokyo plus 3 prefectures	30 prefectures (including Tokyo)	24 prefectures (including Tokyo)
Founding Date Membership Qualifications	September, 1965 People with Associ- ation Membership Qualifications and those working in a Consumer Credit Company	October, 1969 Stockholders and People who have been approved by The Board of Direc- tors	August, 1979 Corporations that fulfill the following conditions: 1) Corporations that grant credit to consumers. 2) Corporations which op- erate at interest rates ap- proved by the C.C.B., and which extend credit which is not connected to applied interest rates. 3) Corporations regarded by the C.C.B. as being moderate and possessing good sense as far as the extension of credit is concerned.	September, 1976 1) Member of citizens' finance associations who have received training at courses conducted by the board of governors of their association. 2) A person who is a member of a public interest corporation not listed above who has also received spe- cial training.	Tokyo area. January, 1973 Corporations that don't fall into the following catego- ries: 1) Member bank of a re- gional banking associa- tion in the business dis- trict of the center con- cerned. 2) Participating financial institution of a bill clear- ing house in the business district of the center concerned. 3) Corporation that runs a credit business for indi- viduals and which is re- commended by a mem- ber bank
Number of Members March, 1983	430 Companies	110 Companies	28 Companies	3,629 Companies	1,935 Companies
Amount of Regis- tered Information March, 1983	Roughly 15.8 million items	Roughly 4.15 million items	Roughly 300 thousand items	Roughly 5 million items	Roughly 3.9 million items
Percentage of Mishandled Payment Information Included in Registered Information	About 40%	About 80%	About 3%	About 3%	About 5% (Tokyo, Nagoya, Osaka)
Number of In- quiries per Month	Approximately 370,000 Cases	Approximately 280,000 Cases	Approximately 23,000 Cases	Approximately 2,500,000 Cases	Approximately 190,000 Cases (Tokyo, Nagoya, Osaka)
Response Rate per Inquiry	Approximately 20% (Sales Credit)	Approximately 14% (Sales Credit)	Approximately 51% (Consumer Finance)	Approximately 85% (Consumer Finance)	Approximately 30% (Consumer Finance)

Table 3. Personal Credit Information Input Items

	Item
1	Name
2	Date of Birth
3	Zip Code
4	Present Address
5	Address Code
6	Address Code Category
7	Type of Dwelling
8	Telephone Number
9	Company Name And Business Number
10	Occupation Code
11	Management Classification
12	Occupation Code
13	Form of Contract
14	Name of Product
15	Amount of Installment Payments/Total Amount/Financed Amount
16	Downpayment, Application Fee, Inquiry Fee
17	Number of Payments
18	Payment Method
19	Amount of Debt Remaining
20	Bank Savings Account Number
21	Date of Failure To Make Payment
22	Type of Mishandled Payments
23	Date of Final Payment, Repayment, Annulment of Contract
24	Amount of Mishandled Payments
25	Notices Given
26	Number of Months in Arrears
27	Details of Mishandled Payments
28	Contract Number
29	Number of Times in Arrears/Number of Months per Time
30	Others

Their next step will be to create a system that interconnects their various operations so that they can pool their resources for the common good. In order to smoothly promote an online system of this kind, it will be necessary for these various agencies to standardize their respective data

Table 4. Items Necessary To Make Credit Judgements

Items Necessary To Make Credit Judgement	
Item	Percentage
Name	96.2
Address	93.2
Address Code	19.7
Date of Birth	86.4
Sex	55.5
Telephone Number	53.0
Age	75.3
Type of Dwelling	69.1
Number of Years At Current Residence	71.6
Work Experience	67.9
Name of Company and Business Number	81.4
Married (Yes/No)	50.6
Date of Contract	80.2
Name of Product	72.8
Amount of Installment Payments	67.9
Downpayment	37.0
Number of Payments	69.1
Amount of Remaining Debt	83.9
Date of Mishandled Payment	91.3
Type of Mishandled Payment	88.8
Date of Amortization	79.0
Amount of Mishandled Payment	90.1
Notices Given	42.3
Number of Months in Arrears	65.4
Number of Time in Arrears/Number of Months per Time	32.0
Details of Mishandled Payment	85.1

formats and the items of registered information that they collect and process as quickly as possible. The kinds of registered information we are referring to here are shown in Table 3, and those items of information necessary in order to make judgements about an individual's credit worthiness are shown in Table 4.

Once the operations of personal credit information agencies have been standardized in this way, the most important problem confronting them then will be how to protect the privacy of their customers.

In order to do so, a number of measures will have to be devised. These measures should probably include the following:

- a) Individual consumers will have to be educated as to the existence of personal credit information agencies and their functions;
- b) The agencies themselves will have to be required to manage and utilize the personal credit information they gather wisely and fairly. They should be required to notify consumers on whom information is being gathered, should be forbidden from using that data for purposes other than simple information, should have to disclose the nature of the information gathered to the individual consumer concerned and should be required to correct any mistakes found in that information; and
- c) A governmental guidance system should be established to supervise the online mutual cooperation efforts of personal credit information agencies.

PROMOTION OF COMPUTER UTILIZATION

The rapid growth of the consumer credit industry in recent years has resulted in a tremendous work increase for the members of that industry, especially in

the areas of credit checks, credit transactions and customer management. Most of this work can be processed quickly and efficiently by computers and/or online computer systems.

However, the present situation in this industry is such that although a certain degree of computerization can be seen in most credit companies when it comes to handling basic business operations, only a few credit firms are making use of computers for the purpose of authorizing credit. And when it comes to carrying out credit checks, even though all personal credit information agencies make considerable use of computers and online systems in the performance of their work, they haven't yet begun to utilize the capabilities of these machines and systems on an inter-company basis.

It will, therefore, be very important for members of the Japanese consumer credit industry to rapidly computerize their operations and create online systems in order to continue to offer consumers quality service, while at the same time enlarging and strengthening their commercial bases.

The detection of invalid credit cards and checking of credit limitations in particular can't be carried out quickly enough or in an adequate manner due to the fact that computerization of credit authorization operations at member stores is still lagging behind. These shortcomings have become major problems in the management of business (they lead to an increase of bad credit transactions), the improvement of customer services and the maintenance of

credit card reliability.

The types of work done in the consumer credit industry consist of credit checks, credit transactions and the processing of basic business operations. Since these jobs are all so closely interconnected, this industry and its individual members will have to promote computer utilization in the form of total systems.

If we consider each of these work processes separately, then credit checks would be better carried out utilizing on-line computer networks established between the personal credit information agencies and their respective client companies. The performance of basic business operations at individual credit companies could be better handled if those firms were to make more and better use of in-house online systems. And when it comes to actual credit transactions themselves, it will be necessary for credit companies and their members stores to carry out credit authorizations faster and

more efficiently by installing terminals at the member stores and connecting these to the computers of the respective credit companies.

Another means of quickly promoting the increased utilization of computers and online systems in the consumer credit industry would be to establish a business-oriented information processing center for the common utilization of credit companies, especially the small- and medium-sized companies, which are lagging behind when it comes to computerization.

Since every store selling merchandise is a member store for a number of credit companies, a prime requisite for the smooth and rational advancement of computerization and online systems in all areas of the credit business, but especially in the area of credit authorizations, will be for all concerned to go beyond their respective lines of business and cooperate with one another on an equal basis to overcome the problems that crop up.

CURRENT NEWS

HISTORIC JAPAN-U.S. TELE- CONFERENCE

— Via Digital And Analog Com- munications Satellite Hook-Ups —

JIPDEC, in cooperation with the Japan Information Processing Center Association (JIPCA), has been sponsoring an international symposium each year as one of the events featured during Japan's annual "Information Month" held every October. Leading figures from Japan and abroad are invited to take part in these symposiums as speakers, being asked to share their opinions on themes which anticipate developments in the field of information processing. Because 1983 has been designated World Communications Year, these two organizations have decided to sponsor an international teleconference as the main event of this year's symposium, using satellite communications capabilities available through INTELSAT and SBS of America. This teleconference will be transmitted from locations in Tokyo and Hartford, Connecticut, and will thus be called the Tokyo-Hartford Video Teleconference. The theme selected for this historical event is also in keeping with World Communication Year and deals with "The

Impact of New Electronic Communications Media On The World Of Business."

This video teleconference will be transmitted between Yakult Hall in Tokyo and the teleconference rooms of the Aetna Life & Casualty Company's Hartford Office. Moving pictures and sound will be transmitted from the U.S. to Japan, and still pictures and sound from Japan to the U.S. Some 300 people are expected to attend the teleconference at the Japanese site.

As the accompanying diagram indicates, the Tokyo-Hartford Video Teleconference will utilize the transmission facilities of the Nippon Telegraph and Telephone Public Corporation (NTT) and Kokusai Denshin Denwa Co., Ltd. (KDD) in and from Japan, and SBS (Satellite Business Systems, a communications common carrier owned by Aetna Life & Casualty, COMSAT and IBM) in and from the U.S. The teleconference portion of the symposium will last approximately an hour and a half, from 1:30 to 3:00 P.M. on the afternoon of Thursday, October 13th, Japan time (from 12:30 to 2:00 A.M. U.S. time). Other related speeches and panel discussions will also be a part of the sym-

posium's proceedings. The symposium is scheduled to begin at 9:30 A.M. and last until sometime in the evening.

The speakers on the Japanese side will be Dr. Koji Kobayashi, Chairman of Nippon Electric Co. (NEC), and Mr. Yohei Mimura, President of Mitsubishi Corporation. Mr. Takao Nakayama, Managing Director of JIPDEC will act as the coordinator for the Japanese presentations. The American speakers will be Dr. Leo Esaki, an IBM Fellow currently with IBM's T. J. Watson Research Center, and Mr. Ray H. Fentriss, Senior Vice President of SBS.

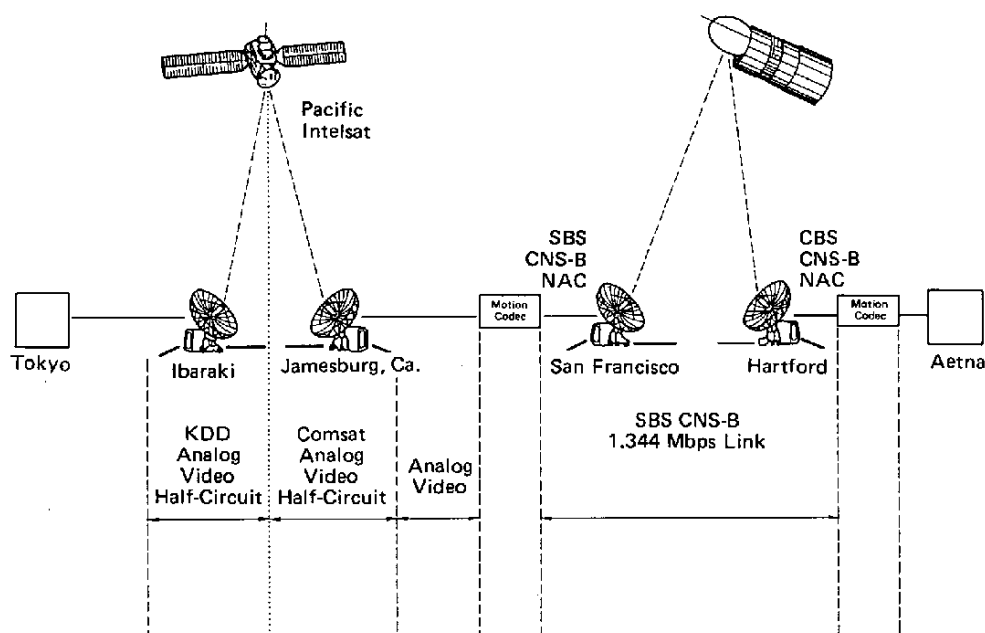
The technical facilities and know-how necessary to carry out this event at the respective locations will be furnished entirely by NEC and NEC, America. The Fuji Telecasting Co. is scheduled to

broadcast an edited version of the video teleconference for public viewing in Japan at a future date.

It should be added that this event would not have been possible without the kind cooperation of SBS and the Aetna Life & Casualty Hartford Offices.

IBM, JAPAN ENTERS INTO A SERIES OF TIE-UPS WITH JAPANESE FIRMS

Ever since 1981, America's IBM Corporation has been pursuing a policy of joining forces with outside firms in the fast-changing, rapidly growing field of computers and related areas. IBM, Japan has duly followed suit and has been entering into tie-ups with Japanese firms at a rate that has made the domestic comput-



Network Configuration of Japan-U.S. Teleconference

er industry stand up and take notice.

Since the spring of 1982, IBM, Japan has entered into special agent agreements with 48 Japanese firms in a variety of fields, and put up 35% of the funds necessary to found a leasing company with Kanematsu-Gosho Ltd. called Nippon Office Systems Ltd. In March, 1983, IBM, Japan announced a Japanese-language personal computer, the 5550, and made a deal with Matsushita Electric Industrial Co., Ltd. to handle the production of this new machine.

This past July the company reached a fundamental agreement with the Mitsubishi Corporation and Cosmo 80 Co., Ltd. concerning a joint venture deal to develop and sell products and services. This three-way tie-up is targetted at getting a piece of the estimated 70 trillion yen market for products and services necessary for NTT to carry out its big INS project. This joint venture calls for two companies to be established, one which will specialize in the planning and sale of products related to the INS project, and the other which will concentrate on systems development. The former company will be capitalized at 200 million yen (authorized capital of 800 million yen) with IBM, Japan and Mitsubishi putting up roughly 45% each and Cosmo 80 contributing the remaining 10%. The latter, a systems development company, will be capitalized at 1 billion yen (authorized capital of 400 million yen), with IBM, Japan and Cosmo 80 picking up 34% of the tab each and Mitsubishi covering the remaining 32% of the financing. IBM, Japan isn't missing any chances

to work its way into the future INS market.

Also, in August of this year, IBM, Japan signed a formal agreement with Japan Business Computer Co., Ltd. (JBCC), a medium-sized manufacturer of small business computers, to invest in that company's operations. This is the first such investment IBM, Japan has made in a Japanese computer manufacturer, and was carried out on the occasion of JBCC's merger with the Nikkyo Denki Kogyo Group (NDK). IBM, Japan's investment earned it 35% of all of the new JBCC's issued stocks. IBM, Japan has its eye on JBCC's KANJI (Japanese characters) processing technology and intends to actively promote the strengthening and expansion of that company's small-sized computer division. For its part, JBCC is counting on IBM, Japan's cooperation in providing it with the facilities, human resources and technology necessary for them to carry out joint projects.

This flourish of activity on the part of IBM, Japan stems from its being granted development and pricing rights by the parent company, IBM of America, for all independently manufactured products aimed at the Japanese market. This being the case, we can probably count on this company providing the Japanese computer industry with various topics to consider in the months ahead as well.

FBAJ LAUNCHES INTO A STUDY AIMED AT STANDARDIZING PROTOCOLS

"Personal Computer Banking," a new banking service that falls under the heading of "Firm Banking," is scheduled to be started this fall at Japanese city banks initially and then spread out from there. As a result, the Federation of Bankers' Associations of Japan (FBAJ) has made it clear that it will study ways of standardizing the protocols (rules governing the format and timing of message exchanges to control data movements and correct errors) needed for such an online banking service once the computers at banks have been linked online to the personal computers (workstations equipped with communication functions) installed at ordinary business firms.

The types of computers capable of being utilized to avail companies of "Personal Computer Banking" services will be 16-bit machines equipped with communication capabilities. One such type of computer is the multiple workstation so much in the news lately. These workstations are being manufactured by most leading computer manufacturers, making for quite a selection to choose from. And they all come with different protocols. The people at FBAJ thus realized that there is no way of getting around the task of coming up with a standard protocol that can be used in the provision of "Personal Computer Banking" services.

The start of "Personal Computer Banking" will open up a new market for the manufacturers of microcomputers, and since that market promises to be a big one, competition between and among makers will probably escalate.

NEC ESTABLISHES OFFICE AUTOMATION PROTOCOLS

In answer to a demand for office automation (OA) functions that could be easily added to computer systems, Nippon Electric Company (NEC) designed an Office Information Architecture (OIA) and established an OA protocol. More specifically, NEC has established two protocols, the Information Interchange Architecture (IIA) and the Information Content Architecture (ICA), which are patterned after IBM's DIA/DCA. The company intends to design all future OA products which it develops based around these two protocols.

But how, you may ask, can the establishment of these protocols enable the easy addition of OA functions to computer systems? Well, as you know, when a host computer is connected to a microcomputer, it takes very specialized knowledge and considerable time and effort to create the software necessary to enable these two machines to communicate with one another. And nowadays it's very important that different systems and various models of computers be capable of interacting with one another. This is where the IIA and ICA protocols come in. By standardizing the protocols used to enable various machines and systems to communicate together, they all become compatible.

IIA is a protocol for entering, retrieving, exchanging and distributing office information throughout a network system, whereas ICA is one which governs the format of office information, be it

in the form of Japanese-language texts, English-language texts, graphs, images or voice, and provides the rules for printing out this data.

The IIA/ICA protocols are completely transparent to the end user. All instructions and data input to the computer by the user are translated and processed internally by the IIA/ICA protocols. Now even protocols have become 'black boxes.'

NEC CONSTRUCTING A PLANT FOR THE PRODUCTION OF ONE MICRON VLSI

Nippon Electric Company (NEC) has commenced construction of a new plant inside its Kyushu operations for the production of VLSI circuits with a minimum line width of one micron. This will be the first time a manufacturing plant capable of mass producing one micron VLSI has been built in Japan.

Construction plans call for the plant to be built in two stages. The amount of money to be invested in the first stage of the construction project alone will come

to 20 billion yen. The first stage of construction is scheduled to be completed by July, 1984, and production output is expected to reach three million VLSI circuits a month when the plant is running at full capacity.

The facilities will consist of one three-story steel-reinforced concrete building with a total floor space of 13,500 square meters. The manufacturing processes performed by this new plant will include the diffusion of impurities and measurement. The production line will be fully automatic and will make use of computer-controlled robots to carry out the micro-level processing required to achieve a pattern rule of one micron. The MOS wafers processed by this line will be five inches or better in diameter.

The types of VLSI which will be turned out by this new plant once it goes into operation will include NEC's 256-kilobit dynamic random access memory (DRAM) chips, 64-kilobit static random access memory (SRAM) chips, 1-megabit masked read only memory (ROM) chips, 16-kilobit microprocessors and gate arrays.

COMPUTER INSTALLATION IN JAPAN

— As of the End of September, 1982 —

General Purpose Computers in Operation

(Value: million yen)

Size of Computers		End of September, 1982	End of June, 1982
Large	Set (%)	3,652 (3.1)	3,563 (3.2)
	Value (%)	2,799,163 (56.2)	2,733,235 (56.6)
Medium	Set (%)	11,852 (10.2)	11,436 (10.4)
	Value (%)	1,163,257 (23.3)	1,125,871 (23.3)
Small	Set (%)	35,463 (30.6)	33,768 (30.6)
	Value (%)	644,528 (12.9)	615,686 (12.7)
Very Small	Set (%)	65,037 (56.1)	61,621 (55.8)
	Value (%)	382,008 (7.7)	362,573 (7.5)
Total	Set (%)	116,004 (100.0)	110,388 (100.0)
	Value (%)	4,988,956 (100.0)	4,837,364 (100.0)

Notes 1. The characteristics of computers covered by the current survey include:

- (1) Digital type computers
- (2) Stored program computers
- (3) Main memory of 2,000 bits or more
- (4) Computing structure based on electronic logical computation

2. Standards for computer classification by scale in terms of purchase price

Classification	Purchase price
Large	More than ¥250 million
Medium	¥40—¥250 million
Small	¥10—¥40 million
Very small	Less than ¥10 million

Computer Use by Industry
(End of September, 1982)

(Value: million yen)

Industrial Category	Set	Value	Value per set
Agriculture	104	2,619	25.2
Forestry and hunting	51	552	10.8
Fisheries, fishing and pisciculture	195	3,943	20.2
Mining	153	4,579	30.0
Construction	2,581	64,125	24.8
Foodstuffs	3,698	84,299	22.8
Textiles and textile products	2,297	51,034	22.2
Pulp, paper and paper products	892	18,295	20.5
Publishing and printing	1,046	44,451	42.5
Chemicals and petroleum refining	3,965	184,841	46.6
Ceramics	926	30,866	33.3
Iron and steel	1,122	140,686	125.4
Non-ferrous metal	1,912	62,144	32.5
Machinery	2,321	89,188	38.4
Electric machinery	4,924	563,146	114.4
Transport equipment	1,874	209,501	111.8
Precision machinery	956	47,759	50.0
Other manufacturing	3,949	81,230	20.6
Wholesale and retail, trade firms	50,806	760,878	15.0
Finance	6,539	729,852	111.6
Security	308	71,614	232.5
Insurance	730	155,581	213.1
Real estate	304	5,292	17.4
Transportation, and telecommunications	3,628	131,137	36.1
Electricity, gas and water	500	71,726	143.5
Service	9,326	415,763	44.6
(General Service)	4,982	120,942	24.3
(DP Service)	4,344	294,821	67.9
Hospitals	865	27,249	31.5
Universities	1,179	145,371	123.3
Senior high schools	508	10,286	20.2
Other schools	343	11,320	33.0
Municipal bodies	1,643	113,908	69.3
Government department agencies	794	148,548	187.1
Governmental organizations	1,132	366,923	324.1
Cooperative association and organizations	4,282	133,908	31.3
Religious organizations	41	1,150	28.0
Not elsewhere classified	110	5,189	47.2
Total	116,004	4,988,956	43.0

UPCOMING EVENTS IN JAPAN

1983 - 1984

DATE	EVENT	CITY/PLACE	ORGANIZER/CONTACT
October	3-5 Software Show '83	Shinjuku NS Bldg., Tokyo	Japan Software Industry Association 3-5-8, Shibakoen, Minato-ku, Tokyo 105 (03) 436-4774
	3-5 Japan Display '83	Kobe Kokusai Kaigijo, Kobe	Japan Display '83 c/o Japan Convention Services, Inc. No. 22 Mori Bldg. 4-3-20, Toranomon, Minato-ku, Tokyo 105 (03) 433-0141
	6-11 Electronics Show 1983	Osaka Minato Kaijo, Osaka	Japan Electronics Show Association Tokyo Chamber of Commerce and Industry Bldg. 3-2-2, Marunouchi, Chiyoda-ku, Tokyo 100 (03) 284-1051
	11-14 Optoelectronic Industry & Technology Exhibition	Heiwajima Ryutsu Center, Tokyo	The Nihon Kagyo Shimibun Ltd. 1-7-2 Otemachi, Chiyoda-ku, Tokyo 100 (03) 231-7111
	13 International Symposium on Information	Yakult Hall, Tokyo	JIPDEC 3-5-8, Shibakoen, Minato-ku, Tokyo 105 (03) 434-8211 Ext 538
	17-19 ICTP '83	Keidanren Hall, Tokyo	Information Processing Society of Japan 3-5-8, Shibakoen, Minato-ku, Tokyo 105 (03) 431-2808
	18-21 Data Show '83		Japan Electronics Industry Development Association 3-5-8, Shibakoen, Minato-ku, Tokyo 105 (03) 434-8211 Ext 352
	24-27 83 Micro Computer Conference		Japan Management Association 3-1-22, Shibakoen, Minato-ku, Tokyo 105 (03) 434-1380
November	1-4 Home Electronics Show	Shinjuku NS Bldg.	Nihon Keizai Shimibun 1-9-5, Ote-machi, Chiyoda-ku, Tokyo 100 (03) 270-0251
	15-18 Electronics Display Device Exhibition	Kagaku-Gijutsu-kan, Tokyo	Japan Electronics Show Association Tokyo Chamber of Commerce and Industry Bldg. 3-2-2, Marunouchi, Chiyoda-ku, Tokyo 100 (03) 284-1051

December	1-3	Semicon Japan '83	Kokusai Mihon-ichi Kaijo, Tokyo	Semicon Japan, c/o Marcom International Inc. Rm. 805 Akasaka Omotecho Bldg. 4-8-19, Akasaka, Minato-ku, Tokyo 107 (03) 403-8515
	1-3	Nicograph '83	Sunshine City, Tokyo	Nicograph Association 5th Chuo Bldg., 1-2, Uchikanda 2-chome, Chiyoda-ku, Tokyo 101 (03) 252-4964/5
	7-9	'83 International Technical Exhibition on Image Technology & Equipment	Otemachi Nokyō Bldg., Tokyo	Seiki Tsushin, Rm. 101 Palace Mansion 2-18-15, Hyakunincho Shinjuku-ku, Tokyo 160 (03) 367-0571
1984 January	25-28	13th Internepson Japan/Semiconductor Exhibition	Kokusai Mihon-ichi Kaijo, Tokyo	CEG Japan, No 3 Hino Bldg. 3-4-11, Uchikanda, Chiyoda-ku, Tokyo 101 (03) 254-6041
February	16-18	5th Electro-optics/Laser Exhibition	Tokyo Ryutsu Center, Tokyo	CEG Japan, No 3 Hino Bldg. 3-4-11, Uchikanda, Chiyoda-ku, Tokyo 101 (03) 254-6041
	22-24	'84 Office Automation Show	Kokusai Mihon-ichi Kaijo, Tokyo	Nippon Administrative Management Association 1-8-4, Utsubohonmachi, Nishi-ku, Osaka 550 (06) 443-6961
April	3-6	Communication Tokyo '84	Tokyo Ryutsu Center, Tokyo	Communication Industries Association of Japan Sankei Bldg. Annex, 1-7-2, Otemachi, Chiyoda-ku Tokyo 100 (03) 231-3156
May	21-23	The 3rd International Microelectronics Conference	Keio Plaza Hotel Tokyo	Mr. Hirabayashi Hisao ISHM JAPAN 5-635 Hanakoganei, Kodaira, Tokyo 187 (0424) 67-7602
June	11-13	World Computing Services Industry Congress IV	Keio Plaza Hotel, Tokyo	JSIA/JIPCA Kikai-Shinko-Kaikan Bldg., Room 406-2, 5-8, Shibakoen 3-chome, Minato-ku, Tokyo 105 (03) 436-3938

Every fall for the past 11 years a special week, designated as Information Week, has been set aside to allow government agencies, private companies and public service oriented, non-profit organizations to sponsor various events dealing with and for the purpose of promoting information processing. Due to steadily increasing numbers of participants, beginning this past year, Information Week was extended to Information Month in order that all organizations wishing to hold events during this period would have the opportunity to do so.

The second annual Information Month is scheduled to be held during October of this year and will feature lots of events including a Software show, International Symposiums on Information and the Annual Datashow. The most representative of the events that will take place during Japan's Information Month are listed on the above calendar.

For further information please contact the Research Section of Japan Information Processing Development Center (JIPDEC).

