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ONLINE SYSTEMS
—Expanding Data Networks—

No. 54

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NOTE: It should be noted that the opinions expressed by the various contributors to the JIPDEC Report do not necessarily reflect those views held by JIPDEC.

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ONLINE SYSTEMS IN JAPAN

This article will attempt to outline the current situation for online systems in Japan. Since practically all data communication lines in Japan, with the exception of a few special circuits, are installed and operated by the Nippon Telegraph and Telephone Public Corporation (NTT), our discussion of these lines here will be based on the "1982 Telecommunications White Paper" put out by the Ministry of Posts and Telecommunications (MPT).

The information contained herein concerning online systems currently in operation in Japan has been taken from the "1982 Report on Online Demand," a summary of results of an annual questionnaire survey conducted by JIPDEC and aimed at Japanese computer users to keep abreast of online utilization trends.

KEY FACILITIES, SCALE AND NUMBER OF ONLINE SYSTEMS IN JAPAN

Table I-1. Utilization Of Data Communication Lines In Japan

Category		Year	1978		1979		1980		1981		1982	
			Number Of Lines	Ratio To Year Prior	Number Of Lines	Ratio To Year Prior	Number Of Lines	Ratio To Year Prior	Number Of Lines	Ratio To Year Prior	Number Of Lines	Ratio To Year Prior
Specified Communication Lines (Leased Circuit)	Frequency band series (band use transmission)	D-1 (Frequency band use)	25,658	125.1%	31,392	122.3%	39,236	125.0%	48,930	124.7%	58,747	120.1%
		D-1S (Frequency band use—Special)	–	–	2	–	49	2,450.0	169	344.9	294	174.0
		D-6 (1,200 bps)	10,027	91.6	294	–	114	38.8	71	62.3	69	97.2
		D-7 (2,400 bps)	4,697	174.6	95	–	99	104.2	115	116.2	101	87.8
		D-9 (4,800 bps)	439	156.2	25	–	27	108.0	26	96.3	33	126.9
		D-13 (9,600 bps)	–	–	–	–	–	–	3	–	2	66.7
		I-1 (Frequency band use)	64	278.3	95	148.4	140	147.4	165	117.9	197	119.4
		I-3 (48K bps)	82	143.9	1	–	–	–	1	–	1	100.0
		J-1 (Frequency band use)	4	–	4	–	7	175.0	10	142.9	12	120.0
	Code transmission series (digital transmission)	50 bps	11,653	105.0	12,055	103.4	17,873	148.3	22,768	127.4	26,006	114.2
		100 bps	482	87.6	423	87.8	413	97.6	373	90.3	338	90.6
		200 bps	5,961	91.4	5,963	100.0	6,124	102.7	6,540	106.8	7,437	113.7
		300 bps	–	–	–	–	–	–	–	–	7	–
		1,200 bps	–	–	10,584	–	11,353	107.3	11,803	104.0	11,201	94.9
		2,400 bps	–	–	5,788	–	7,039	121.6	7,890	112.1	8,622	109.3
		4,800 bps	–	–	592	–	888	150.0	1,206	135.8	1,970	163.3
		9,600 bps	–	–	17	–	49	288.2	98	200.0	261	266.1
		48K bps	–	–	92	–	104	113.0	101	97.1	113	111.9
		Total	58,977	112.1	67,422	114.3	83,515	123.9	100,269	120.1	115,401	115.1
Public Communication Lines		Telephone-based (Generally 1,200bps)	8,306	152.4	12,606	151.8	19,738	156.6	30,671	155.4	40,455	131.9
		Telegraph-based (Generally 50bps)	3,811	122.3	3,611	94.8	3,833	106.1	3,763	98.2	3,593	95.5
		Total	12,117	141.5	16,217	133.8	23,571	145.3	34,434	146.1	44,048	127.9
Total		Number Of Lines	71,094	116.2	83,639	117.6	107,086	128.0	134,703	125.8	159,449	118.4
		Transmission Capacity (Bit Rate)	73,112,400	128.0	91,235,800	124.8	116,445,000	127.6	146,683,850	126.0	178,073,650	121.4
	Circuit Switching Services		–	–	–	–	69	–	106	153.6	391	368.9
	Packet Switching Services		–	–	–	–	–	–	59	–	171	289.8
	(For Reference Purposes) Number Of Dedicated Lines		278,300	103.8	289,204	103.9	297,824	103.0	301,861	101.4	308,956	102.4

Note: Calculation of the frequency bands for specified communication lines (leased circuits) and transmission capacities (bit rates) for public communication lines were based on the following: D-1 and D-1S = 1,200 b/s; I-1 = 14,400 b/s; J-1 = 72, b/s; and all others are as indicated in parentheses.

Source: "Telecommunications White Paper" prepared by MPT

1) Current Utilization Of Data Communication Lines

Table I-1 indicates the rate at which Japanese data communication lines were utilized between 1978 and 1982. As of March, 1983, 159,449 data communication lines were in use, increasing the amount of information capable of being transmitted via these circuits to roughly 2.5 times what it had been during the past five years.

2) Digital Data Switching (DDX) Network

NTT began a circuit switching service in December, 1979, using its digital data switching (DDX) network. Utilization of DDX to date has been as shown in Table I-2. A look at utilization growth in terms of rates of information transfer in bits per second (bps) shows that high speed services grew remarkably between 1980 and 1981, the 2,400 bps service rising 355.6%, the 9,600 bps service growing 482.1% and the 48K bps service increasing from 7 to 46 lines and leaping 657.1%.

NTT also started up a packet switching service in July, 1980, utilization of which has tended to grow along the same lines as that for the circuit switching service, with utilization of the 2,400 bps service jumping up 600% and that of the 9,600 bps service growing 433.3% in the one year period between 1980 and 1981 (See Table I-3). These figures clearly show that of all the bit rates available in the NTT DDX network, the 2,400 bps and 9,600 bps services account for approximately 80% of total utilization.

3) Number Of Online Systems Installed

The number of online systems installed in Japan during the past 10 years is as shown in Table I-4. As of March, 1981, there were 7,095 online systems in operation here, of which 3,052 utilized dedicated lines, 2,416 utilized public communication lines and another 752 made

Table I-2. Circuit Switching Service Utilization

Year / Bit Rates	1979	1980	1981	
	Number Of Lines	Number Of Lines	Number Of Lines	Ratio To Year Prior
200 bps	–	–	–	–
300 bps	–	5	9	180.0%
1,200 bps	5	7	15	214.3
2,400 bps	18	27	96	355.6
4,800 bps	29	32	90	281.3
9,600 bps	13	28	135	482.1
48K bps	4	7	46	657.1
Total	69	106	391	368.9

Source: Telecommunications White Paper" prepared by MPT.

use of both types of lines.

As Table I-4 clearly shows, the installation of online systems has been growing at a rate of better than 100% annually for the past 10 years. It should be pointed out, however, that the figures in this table do not include those for private systems such as the ones used by electric power companies to automatically control the supply of electricity to their customers, or those used by the National Railways Corporation for seat reservations.

The number of independent online systems installed on a per industry basis between the years 1977 and 1981 are shown in Table I-5. Online systems being utilized by manufacturing and commercial firms to control production, manage sales and control inventory account for more than 60% of all online systems currently in operation in Japan. Online banking systems make up another 8% of the total.

Table I-3. Packet Switching Service Utilization

Year / Bit Rates	1980	1981	
	Number Of Lines	Number Of Lines	Ratio To Year Prior
200 bps	1	1	100.0%
300 bps	5	9	180.0
1,200 bps	10	33	330.0
2,400 bps	14	84	600.0
4,800 bps	21	23	109.5
9,600 bps	3	13	433.3
48K bps	5	8	160.0
Total	59	171	289.8

Source: "Telecommunications White Paper" prepared by MPT.

Table I-4. Data Communication Systems Installed In Japan Between 1972 And 1981 (Ten Year Period)

Category / Year		'72	'73	'74	'75	'76	'77	'78	'79	'80	'81
Number Of Systems	Independent Systems	441	706	1,126	1,429	1,999	2,689	3,403	4,598	5,807	7,095
	Public Systems	27	38	42	50	58	60	65	70	72	76
	Total	468	744	1,168	1,479	2,057	2,749	3,468	4,668	5,879	7,171
	Growth Over Year Prior	160	276	424	311	578	692	719	1,200	1,211	1,292
Ratio To Year Prior (%)		152	159	157	127	139	134	126	135	126	122

Source: "Telecommunications White Paper" prepared by MPT.

Table I-5. Independent Systems Installed By Industry

Industry \ Year	1977		1978		1979		1980		1981	
	Number Of Systems	Percentage Of Total	Number Of Systems	Percentage Of Total	Number Of Systems	Percentage Of Total	Number Of Systems	Percentage Of Total	Number Of Systems	Percentage Of Total
		%		%		%		%		%
Manufacturing/ Construction	1,005	37.4	1,319	38.8	1,758	38.2	2,246	38.7	2,674	37.7
Commerce	475	17.6	669	19.7	983	21.4	1,463	25.2	1,902	26.8
Finance	363	13.5	399	11.7	494	10.7	521	9.0	570	8.0
Securities	18	0.7	19	0.6	23	0.5	28	0.5	36	0.5
Insurance	35	1.3	44	1.3	47	1.0	43	0.7	42	0.6
Transportation	68	2.5	88	2.6	120	2.6	153	2.6	217	3.0
Gas/Electric	21	0.8	20	0.6	30	0.6	25	0.4	36	0.5
Telegraph/Publishing/Services	125	4.6	151	4.4	203	4.4	283	4.9	361	5.1
Warehousing/ Real Estate	29	1.1	45	1.3	67	1.5	85	1.5	111	1.6
Data Communication/Software	151	5.6	211	6.2	294	6.4	341	5.9	419	5.9
Government	64	2.4	76	2.2	86	1.9	101	1.7	107	1.5
Local And Regional Groups	241	9.0	253	7.4	308	6.7	318	5.5	369	5.2
National University	37	1.4	45	1.3	53	1.2	48	0.8	62	0.9
Corporate Bodies	49	1.8	62	1.8	118	2.6	136	2.3	169	2.4
Others	8	0.3	2	0.1	14	0.3	16	0.3	20	0.3
Total	2,689	100.0	3,403	100.0	4,598	100.0	5,807	100.0	7,095	100.0

Source: "Telecommunications White Paper" prepared by MPT.

CROSS-SECTIONAL EVALUATION OF JAPANESE ONLINE SYSTEMS

1) Forms Of Online Utilization

The various forms of utilizing online systems are presented in Table II-1. As this table indicates, there were no big changes in the forms of utilization from 1980 to 1982, but according the five-year plans of the various companies surveyed, it seems that the utilization of online systems as remote job entry and time sharing systems will be quite popular in future. This apparent trend is felt to be the result of in-house end users being inclined to carry out message switching via remote job control and/or time sharing systems.

2) Current State Of Affairs And Five-Year Forecast For Computers/Computer Networks

Computers and computer networks in operation in Japan today, the latter of which include both in-house and intercompany networks, suffer from a number of systematic limitations. However, as

the results of that portion of the JIPDEC survey presented in Table II-3 show, the number of companies planning to install computers and/or construct either in-house or inter-company computer networks during the next five years is rather high.

3) Terminal Utilization Today And Five Years From Now

The results of that segment of the JIPDEC survey conducted on the number of online terminals currently in use and the number predicted to be in use five years from now are presented in Table II-4.

At present, the total average number of online terminals in use per company by type of terminal worked out to 156 units. This figure is expected to rise to 240 units five years from now.

Also, the ratio of non-intelligent to intelligent terminals in use today is about 60:40. This ratio is seen as being somewhere around 54:46 five years from now due to an expected rise in the utilization of intelligent terminals by that time. The results of a similar survey conducted in 1981, however, indicated that the ratio of non-intelligent to intelligent terminals then in use was roughly 44:56. It could well be that we are witnessing a slowdown in the growth of intelligent terminal utilization.

4) Acoustic Coupler Utilization Today And Five Years From Now

Since there is no other data available in Japan at this time concerning the present utilization of acoustic couplers, data concerning this area gleaned via JIPDEC's survey are being presented in Table II-5. Of the 735 companies that responded to this survey, 190 are presently making use of acoustic couplers. While 75% of these users are operating only 10 modems or less, results showed that the number of respondents planning to utilize acoustic couplers within the next five years will rise to 243 and the ratio of users with only 10 units or less will drop to below

Table II-1. Forms Of Online Utilization

	1980	1981	1982	1987 (Estimated)
Data Collection Systems	405	411	492	418
Message Switching Systems	185	192	203	335
Inquiry And Response Systems (No File Updating)	397	414	488	457
Inquiry And Response Systems (File Updating)	406	411	473	480
Remote Job Entry	216	239	296	422
Time Sharing Systems	180	215	292	375
Others	8	9	10	13

Source: JIPDEC "Report On Online Demand"

Table II-2. Forms Of Online Utilization By Industry

(Upper figures in each block represent number of companies and lower figures percentage of companies, both on a per industry basis.)

Type of System / Industry	Actual Number Of Respondents	Data Collection Systems	Message Switching Systems	Inquiry And Response Systems (No File Update)	Transaction Processing Systems (File Update)	Remote Job Entry Systems (Remote Batch Processing Systems)	Time Sharing Systems	Others	Number Of Accumulated Responses
Primary Industries	2 100.0	2 100.0	1 50.0	1 50.0	1 50.0	0 0.0	0 0.0	0 0.0	5 250.0
Secondary Industries	306 100.0	242 79.1	74 24.2	222 72.5	188 61.4	152 49.7	130 42.5	4 1.3	1,012 330.7
Tertiary Industries	379 100.0	237 62.5	123 32.5	240 63.3	266 70.2	137 36.1	143 37.7	5 1.3	1,151 303.7
Government	35 100.0	11 31.4	5 14.3	25 71.4	18 51.4	7 20.0	19 54.3	1 2.9	86 145.7
Total	722 100.0	492 68.1	203 28.1	488 67.6	473 65.5	296 41.0	292 40.4	10 1.4	2,254 312.2
Principal Types Of Business: Construction	21 100.0	9 42.9	1 4.8	11 52.4	5 23.8	14 66.7	13 61.9	0 0.0	53 252.4
Food Manufacturing	32 100.0	27 84.4	6 18.8	19 59.4	22 68.8	10 31.3	9 28.1	1 3.1	94 293.8
Textiles	19 100.0	18 94.7	4 21.1	16 84.2	14 73.7	12 63.2	8 42.1	0 0.0	72 378.9
Chemicals	57 100.0	51 89.5	19 33.3	44 77.2	36 63.2	29 50.9	30 52.6	0 0.0	20.9 366.7
Steel	16 100.0	15 93.8	9 56.3	15 93.8	13 81.3	9 56.3	7 43.8	1 6.3	69 431.3
Electric Machine And Tool Manufacturing	38 100.0	28 73.7	10 26.3	31 81.6	24 63.2	20 52.6	15 39.5	0 0.0	128 336.8
Transportation Machinery and Tool Manufacturing	26 100.0	22 84.6	6 23.1	20 76.9	19 73.1	14 53.8	14 53.8	0 0.0	95 365.4
Wholesale/ Commerce	80 100.0	65 81.3	17 21.3	52 65.0	54 67.5	33 41.3	23 28.8	1 1.3	245 306.3
Retail	32 100.0	24 75.0	7 21.9	18 56.3	19 59.4	4 12.5	2 6.3	0 0.0	74 231.3
Finance	103 100.0	48 46.6	72 69.9	76 73.8	94 91.3	24 23.3	34 33.0	1 1.0	349 338.8
Transportation/ Communication/ Warehousing	26 100.0	20 76.9	6 23.1	16 61.5	22 84.6	9 34.6	4 15.4	0 0.0	77 296.2
Gas/Electric	9 100.0	7 77.8	1 11.1	8 88.9	4 44.4	6 66.7	7 77.8	0 0.0	33 366.7
Advertising/ Research/ Information Services	3 100.0	1 33.3	0 0.0	2 66.7	3 100.0	2 66.7	2 66.7	0 0.0	10 333.3
Information Processing/ Software	53 100.0	39 73.6	8 15.1	32 60.4	36 67.9	27 50.9	29 54.7	0 0.0	171 322.6

50%, indicating a trend towards multiple utilization.

5) Current And Planned Local Area Network (LAN) Utilization

During the past few years Japan has been experiencing a boom in office automation and local area networking.

As a result of this trend, the JIPDEC annual questionnaire survey added a section dealing with local area networks (LAN) to its 1982 questionnaire. The results of responses to those inquiries are as shown in Tables II-6 and II-7.

Table II-3. Computers/Computer Networks Today And Five Years From Now

Computers/Computer Networks		Today			Five Years From Now			
		Possess	Don't Possess	Total	Plan To Possess	Won't Possess	Un-decided	Total
In-house Networks	Number Of Companies	252	400	652	259	62	201	522
Inter-Company Networks	Number Of Companies	153	384	537	240	69	252	561
Total	Number Of Companies	405	784	1,189	499	131	453	1,083

Source: JIPDEC "Report On Online Demand"

Table II-4. Terminal Utilization Today And Five Years From Now

			KBD (Keyboard Printer/ Typewriter)	CRT Or Other Display Units	Terminals For Financial Use	Paper Tape Reader/Punch	Key-To-Tape/ Disk (Includes Cassettes)	Dedicated Output Printers (Includes Line Printers)	POS Terminals	Special Terminals For Use In Making Reservations	K-ANJI Terminals	Facsimile Terminals	Work Stations	Others	Total	Percentage Of Total
Today	Non-Intelligent Terminals	Total Number Of Units Per Industry	7,553	27,961	16,720	687	579	10,384	1,264	308	905	16	1,354	1,941	69,671	62.8
		Average Number Of Units Per Company By Type Of Terminal	32.7	61.5	265.4	10.1	13.8	33.4	97.2	102.7	12.6	3.8	33.0	24.9	119.9	
	Intelligent Terminals	Total Number Of Units Per Industry	3,177	4,974	23,551	339	432	1,644	1,052	18	523	1	2,435	3,072	41,218	37.2
		Average Number Of Units Per Company By Type Of Terminal	33.4	23.5	294.4	14.7	13.9	22.5	131.5	18.0	14.9	1.0	27.7	65.4	97.7	
	Total	Total Number Of Units Per Industry	10,730	32,935	40,271	1,026	1,011	12,028	2,316	326	1,428	16	3,789	5,013	110,889	100.0
		Average Number Of Units Per Company By Type Of Terminal	36.4	58.1	347.2	11.5	15.1	32.9	115.8	108.7	14.0	3.2	32.9	43.2	156.0	
Five Years From Now	Non-Intelligent Terminals	Total Number Of Units Per Industry	5,379	28,684	11,271	168	275	9,447	2,211	320	6,731	318	2,385	2,120	69,319	54.1
		Average Number Of Units Per Company By Type Of Terminal	43.7	93.2	322.0	8.0	10.2	45.6	170.1	160.0	74.8	15.9	99.4	49.3	173.7	
	Intelligent Terminals	Total Number Of Units Per Industry	3,023	22,474	17,286	198	376	2,587	5,296	5	1,943	631	3,504	1,588	58,911	45.9
		Average Number Of Units Per Company By Type Of Terminal	40.9	92.5	278.8	18.0	15.0	33.2	441.3	5.0	23.7	26.3	41.2	37.8	144.7	
	Total	Total Number Of Units Per Industry	8,402	51,168	28,557	366	651	12,034	7,507	325	8,674	949	5,889	3,708	128,230	100.0
		Average Number Of Units Per Company By Type Of Terminal	48.3	121.0	332.1	11.4	13.6	44.7	312.8	108.3	58.6	22.6	59.5	46.4	240.1	

Source: JIPDEC "Report On Online Demand"

As these tables indicate, at present only 21 of the 555 companies which responded to the survey have LAN in place, an extremely small 3.8%. However, some 302 of the respondents or 54.9% indicated that they are currently considering constructing such networks.

Two-hundred forth-three of the respondents indicated that they planned to construct LAN within the next five years, most of which will apparently be of the loop and digital private branch exchange (DPBX) types.

6) Breakdowns Involving Online Systems

Those users of online systems who have experienced either partial or total breakdowns with the systems they are using are more numerous than might be expected. Table II-8 shows the types of malfunctions, breakdowns and "accidents" (natural and 'man-made' disasters) that have been the cause of system downtime and the number and percentage of respondents who have experienced these various troubles. Hardware malfunctions can be seen as being a cause of system downtime in nearly 95% of the companies surveyed.

7) Measures To Enhance Online System Reliability

The results of that portion of the JIPDEC survey conducted to determine the kinds of measures being taken by users of online systems to improve the reliability of those systems are shown in

Table II-5. Acoustic Coupler Utilization By Bit Rate Today And Five Years From Now

	Bit Rate \ Number Of Units In Use		Less Than 10 Units	Between 10 and 30 Units	Between 30 and 50 Units	Between 50 and 100 Units	100 Or More Units	Total
Today	300 bps or less	Number Of Companies	84	14	5	1	7	111
	300–1,200 bps	Number Of Companies	59	9	1	1	2	72
	Over 1,200 bps	Number Of Companies	32	8	1	0	1	42
	Total	Number Of Companies	175	31	7	2	10	225
Five Years From Now	300 bps or less	Number Of Companies	45	23	7	7	10	92
	300–1,200 bps	Number Of Companies	51	40	11	14	7	123
	Over 1,200 bps	Number Of Companies	34	16	5	10	7	72
	Total	Number Of Companies	130	79	23	31	24	287

Source: JIPDEC "Report On Online Demand"

Table II-6. LAN Currently In Operation By Industry

(Upper figures in each block represent number of companies and lower figures percentage of companies, both on a per industry basis.)

Industry \ Utilization		Already Utilizing	Utilization Under Study	Never Heard Of LAN	Total Number Of Respondents
Primary Industries		1 50.0	0 0.0	1 50.0	2 100.0
Secondary Industries		9 3.6	145 57.8	97 38.6	251 100.0
Tertiary Industries		10 3.7	150 54.9	113 41.4	273 100.0
Government		1 4.2	7 29.2	16 66.7	24 100.0
Total		21 3.8	302 54.9	227 41.3	550 100.0
Principal Types Of Business	Construction	0 0.0	11 64.7	6 35.3	17 100.0
	Food Manufacturing	1 5.0	11 55.0	8 40.0	20 100.0
	Textiles	1 6.3	8 50.0	7 43.8	16 100.0
	Chemicals	1 2.4	24 58.8	16 39.0	41 100.0
	Steel	1 8.3	7 58.3	4 33.3	12 100.0
	Electric Machine And Tool Manufacturing	3 7.9	22 57.9	13 34.2	38 100.0
	Transportation Machinery And Tool Manufacturing	0 0.0	19 76.0	6 24.0	25 100.0
	Wholesale/Commerce	3 4.8	27 43.5	32 51.6	62 100.0
	Retail	0 0.0	18 62.1	11 37.9	29 100.0
	Finance	0 0.0	36 52.2	33 47.8	69 100.0
	Transportation/Communication/Warehousing	1 5.3	11 57.9	7 36.8	19 100.0
	Gas/Electric	0 0.0	5 83.3	1 16.7	6 100.0
	Advertising/Research/ Information Services	0 0.0	3 100.0	0 0.0	3 100.0
	Information Processing/ Software	0 0.0	25 75.8	8 24.2	33 100.0

Source: JIPDEC "Report On Online Demand"

Table II-7. Types Of LAN Utilization Five Years From Now By Industry

(Upper figures in each block represent number of companies and lower figures percentage of companies, both on a per industry basis.)

Type of Utilization / Industry		Actual Number Of Respondents	LAN					DPBX	Number Of Accumulated Responses
			Star	Loop	Ring	Bus	Others		
Primary Industries		1 100.0	0 0.0	0 0.0	1 100.0	1 100.0	0 0.0	0 0.0	0 200.0
Secondary Industries		129 100.0	42 32.6	51 39.5	31 24.0	35 27.1	1 0.8	41 32.8	201 155.8
Tertiary Industries		108 100.0	35 32.4	51 47.2	18 16.7	31 28.7	1 0.9	46 42.6	182 168.5
Government		5 100.0	3 60.0	1 20.0	0 0.0	2 40.0	0 0.0	2 40.0	8 160.0
Total		243 100.0	80 32.9	103 42.4	50 20.6	69 28.4	2 0.8	89 36.6	393 161.7
Principal Types Of Business	Construction	7 100.0	3 42.9	2 28.6	3 42.9	0 0.0	0 0.0	3 42.9	11 157.1
	Food Manufacturing	10 100.0	6 60.0	4 40.0	3 30.0	2 20.0	0 0.0	2 20.0	17 170.0
	Textiles	9 100.0	3 33.3	5 55.6	3 33.3	2 22.2	0 0.0	2 22.2	15 166.7
	Chemicals	20 100.0	3 15.0	9 45.0	4 20.0	6 30.0	0 0.0	7 35.0	29 145.0
	Steel	7 100.0	1 14.3	4 57.1	3 42.9	1 14.3	0 0.0	4 57.1	13 185.7
	Electric Machine And Tool Manufacturing	24 100.0	9 37.5	6 25.0	5 20.8	7 29.2	0 0.0	7 29.2	34 141.7
	Transportation Machinery And Tool Manufacturing	15 100.0	4 26.7	5 33.3	3 20.0	7 46.7	0 0.0	4 26.7	23 153.3
	Wholesale/Commerce	20 100.0	6 30.0	4 20.0	4 20.0	5 25.0	0 0.0	9 45.0	28 140.0
	Retail	13 100.0	3 23.1	8 61.5	1 7.7	4 30.8	0 0.0	4 30.8	20 153.8
	Finance	23 100.0	6 26.1	12 52.2	5 21.7	8 34.8	0 0.0	9 39.1	40 173.9
	Transportation/Communication/Warehousing	1 100.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	1 100.0	1 100.0
	Gas/Electric	7 100.0	3 42.9	2 28.6	0 0.0	1 14.3	0 0.0	4 57.1	10 142.9
	Advertising/Research/Information Services	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
	Information Processing/Software	19 100.0	7 36.8	9 47.4	3 15.8	8 42.1	1 5.3	10 52.6	38 200.0

Source: JIPDEC "Report On Online Demand"

Table II-8. Online System Failures

	Total Failures To Date	Failures During The Past Year
Number Of Respondents (%)	680 (100.0)	671 (100.0)
Hardware Failures	642 (94.4)	582 (86.7)
Software Failures	567 (83.4)	456 (68.0)
Air Conditioning Failures	360 (52.9)	183 (27.3)
Power Failures	212 (31.2)	113 (16.8)
Circuit Failures	432 (63.5)	351 (52.3)
Breaks In The Wiring	60 (8.8)	19 (2.8)
Malfunctions/Failures Caused By Leaks	80 (11.8)	21 (3.1)
Malfunctions/Failures Caused By Natural Water Damage	23 (3.4)	12 (1.8)
Malfunctions/Failures Caused By Fire	12 (1.8)	2 (0.3)
Malfunctions/Failures Caused By Smoke	3 (0.4)	2 (0.3)
Malfunctions/Failures Caused By Earthquakes	16 (2.4)	3 (0.4)
Malfunctions/Failures Caused By Human Error	266 (39.1)	170 (25.3)
Malfunctions/Failures Caused By Humans With Malicious Intent	1 (0.1)	0 (0.0)
Others	18 (2.6)	8 (1.2)

"Others" might include failures due to lightening or interference from ham radios.
Source: JIPDEC "Report On Online Demand"

Table II-9. The number one cause of system downtime as pointed out in Table II-8 concerning online system failures is hardware malfunctions and breakdowns. In order to increase the reliability of the hardware comprising online systems, most users are utilizing backup systems and carrying out regular inspections and maintenance.

8) Other Results

Other results obtained via the JIPDEC survey on online systems are shown in Tables II-10 through II-13.

Table II-9. Measures To Enhance Reliability By Industry

(Upper figures in each block represent number of companies and lower figures percentage of companies, both on a per industry basis.)

Industry		Actual Number Of Responses	Self-Diagnostic Systems	Regular Inspections And Maintenance	Backup Systems	Duplexing Circuits	Dual CPU Systems
Primary Industries		2 100.0	1 50.0	0 0.0	2 100.0	0 0.0	0 0.0
Secondary Industries		282 100.0	149 52.8	192 68.1	201 71.3	12 4.3	19 6.7
Tertiary Industries		333 100.0	160 48.0	208 62.5	254 76.3	50 15.0	99 29.7
Government		30 100.0	11 36.7	20 66.7	24 80.0	0 0.0	8 26.7
Total		647 100.0	321 49.6	420 64.9	481 74.3	62 9.6	126 19.5
Principal Types Of Business	Construction	19 100.0	10 52.6	15 78.9	17 89.5	0 0.0	0 0.0
	Food Manufacturing	29 100.0	12 41.4	21 72.4	22 75.9	0 0.0	2 6.9
	Textiles	15 100.0	7 46.7	11 73.3	10 66.7	0 0.0	1 6.7
	Chemicals	51 100.0	33 64.7	33 64.7	34 66.7	2 3.9	2 3.9
	Steel	16 100.0	9 56.3	9 56.3	11 68.8	0 0.0	4 25.0
	Electric Machine And Tool Manufacturing	35 100.0	20 57.1	31 88.6	27 77.1	3 8.6	1 2.9
	Transportation Machinery And Tool Manufacturing	29 100.0	16 55.2	20 69.0	22 75.9	4 13.8	5 17.2
	Wholesale/Commerce	64 100.0	29 45.3	33 51.6	48 75.0	5 7.8	4 6.3
	Retail	27 100.0	12 44.4	18 66.7	19 70.4	0 0.0	4 14.8
	Finance	96 100.0	45 46.9	58 60.4	81 84.4	27 28.1	57 59.4
	Transportation/Communication/Warehousing	23 100.0	10 43.5	14 60.9	15 65.2	2 8.7	3 13.0
	Gas/Electric	9 100.0	5 55.6	5 55.6	9 100.0	2 22.2	4 44.4
	Advertising/Research/ Information Services	2 100.0	2 100.0	1 50.0	1 50.0	0 0.0	1 50.0
	Information Processing/ Software	49 100.0	28 57.1	34 69.4	37 75.5	9 18.4	15 30.6

Source: JIPDEC "Report On Online Demand"

Table II-10. Transmission Methods

(Multiple Responses)

Category		Number Of Actual Responses	Full Duplex Transmission	Half Duplex Transmission	Simplex Transmission	Total Accumulated Responses
All Industries	Number Of Responses	567	273	404	26	703
	(%)	100.0	48.1	71.3	4.6	124.0

Table II-11. Communication Control Methods (Protocols)

(Multiple Responses)

Category		Number Of Actual Responses	Polling	Contention	Others	Total Accumulated Responses
All Industries	Number Of Responses	618	498	257	30	785
	(%)	100.0	80.6	41.6	4.9	127.0

Table II-12. Transmission Coding Methods (With Telex Lines)

(Multiple Responses)

Category		Number Of Actual Responses	JIS 6-Bit Code	CCITT No. 2	Others	Total Accumulated Responses
All Industries	Number Of Responses	187	167	31	8	206
	(%)	100.0	89.3	16.6	4.3	110.2

Table II-13. Transmission Coding Methods (Circuits Other Than Telex Lines)

(Multiple Responses)

Category		Number Of Actual Responses	ISO	BCD	EBCDIC	Others	Total Accumulated Responses
All Industries	Number Of Responses	582	220	34	384	42	680
	(%)	100.0	37.8	5.8	66.0	7.2	116.8

ONLINE POSTAL SAVINGS SYSTEM

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Ministry of Posts and Telecommunications

POSTAL FINANCIAL SERVICES

Financial services offered by the Ministry of Posts and Telecommunications (MPT) can be broken down into postal saving, postal money order, postal credit transfer and pension services.

1) Postal Savings

Postal savings occupy a very important place in the field of personal savings in Japan. This particular means of saving money is as easy as it is safe and assured, and is thus being widely used throughout the country. Postal savings also contribute toward stabilizing the economy and improving the nation's welfare. Most holders of postal savings accounts in Japan are individuals. These private citizens come from all walks of life and from every geographical region of Japan, and account for around 60% of all Japanese citizens.

The money deposited in postal savings accounts is used as a principal source of operational funds by the Ministry of Finance in its financial investment and loan activities. Postal savings deposits also contribute toward the development of the Japanese economy and the promotion of the nation's welfare by providing funds for the construction of new housing and the improvement of the quality of life.

2) Postal Money Orders

Postal money orders serve as an easy and sure way of sending money through the mails. The preparing, mailing and cashing of money orders is handled by all post offices throughout Japan. This type of convenience accounted for the fact that the total number of money orders issued at post offices nationwide during 1981 reached 17.89 million, amounting to 538.6 billion yen by value.

3) Postal Credit Transfers (Giro)

When a payer and payee don't wish to carry out a transaction in cash, they can do so by transferring funds directly from one account to the other to settle their accounts. These forms of money transfer can be carried out through postal credit transfers (giro) handled by all post offices throughout Japan. The utilization of postal credit transfers has been steadily increasing, with the total number of such accounts open as of the end of 1981 amounting to 770 thousand in all. The total number of credit transfers made through these postal transfer accounts

during 1981 came to 230 million and involved a total of 14,500 billion yen.

4) Pensions And Other Services

In addition to the above services, Japanese post offices nationwide also verify whether or not individuals are entitled to receive benefits such as pensions (national, welfare and relief pensions) and pay the recipients of such benefits in cash. Post offices are also authorized to accept payment of national taxes as well as dispurse tax rebates on behalf of the government. Thus, post offices serve to carry out a wide variety of financial transactions.

MPT'S ONLINE SYSTEM

The Ministry of Posts and Telecommunications (MPT) provides such financial services as savings, remittances and accounts settlement. With the number of individuals availing themselves of these services increasing every year, MPT has been automating its post office cashier windows and computerizing those operations involved in the keeping of ledgers on postal savings and transfer accounts in order to improve these services by making them more efficient.

Private financial institutions such as banks, for example, began linking mainframe computers installed at their computing centers to terminals set up at their business offices as early as 1965, thus creating computer systems capable of online realtime processing of information related to daily financial transactions. However, the needs of the Japanese people concerning financial services such as savings, remittances and accounts settlements has tended to diversify and grow more sophisticated in line with the social and economic development of this country.

Due to the fact that the capabilities of existing online systems to answer these growing public needs have been limited, MPT decided in 1974 to start work on drawing up plans for putting its money order and savings account services online so as to be able to provide services that matched the needs of the people in these areas. The design of the system, development of the terminals that would be used in it and the construction of computing centers were all begun shortly thereafter, and by August, 1978, post offices located in a section of Kanagawa Prefecture got the ball rolling by commencing to provide savings and money order services via a new online system.

1) Special Features Of The Online System

The online postal savings system features the following special characteristics:

a) Objectives – The utilization of an online system for the carrying out of postal savings transactions was designed to improve user services by means of upgrading the quality of the services offered and providing new services in line with growing needs, as well as to promote more efficient business operations and more modern, up-to-date administra-

tive operations.

b) Scale – The online postal savings system is an extremely large-scale system consisting of nine computing centers and some 19,000 post offices linked online to these various centers through leased communications circuits.

2) Online System Configuration

The online postal savings system is comprised of post offices, computing centers and business centers, each with functions and responsibilities as outlined below.

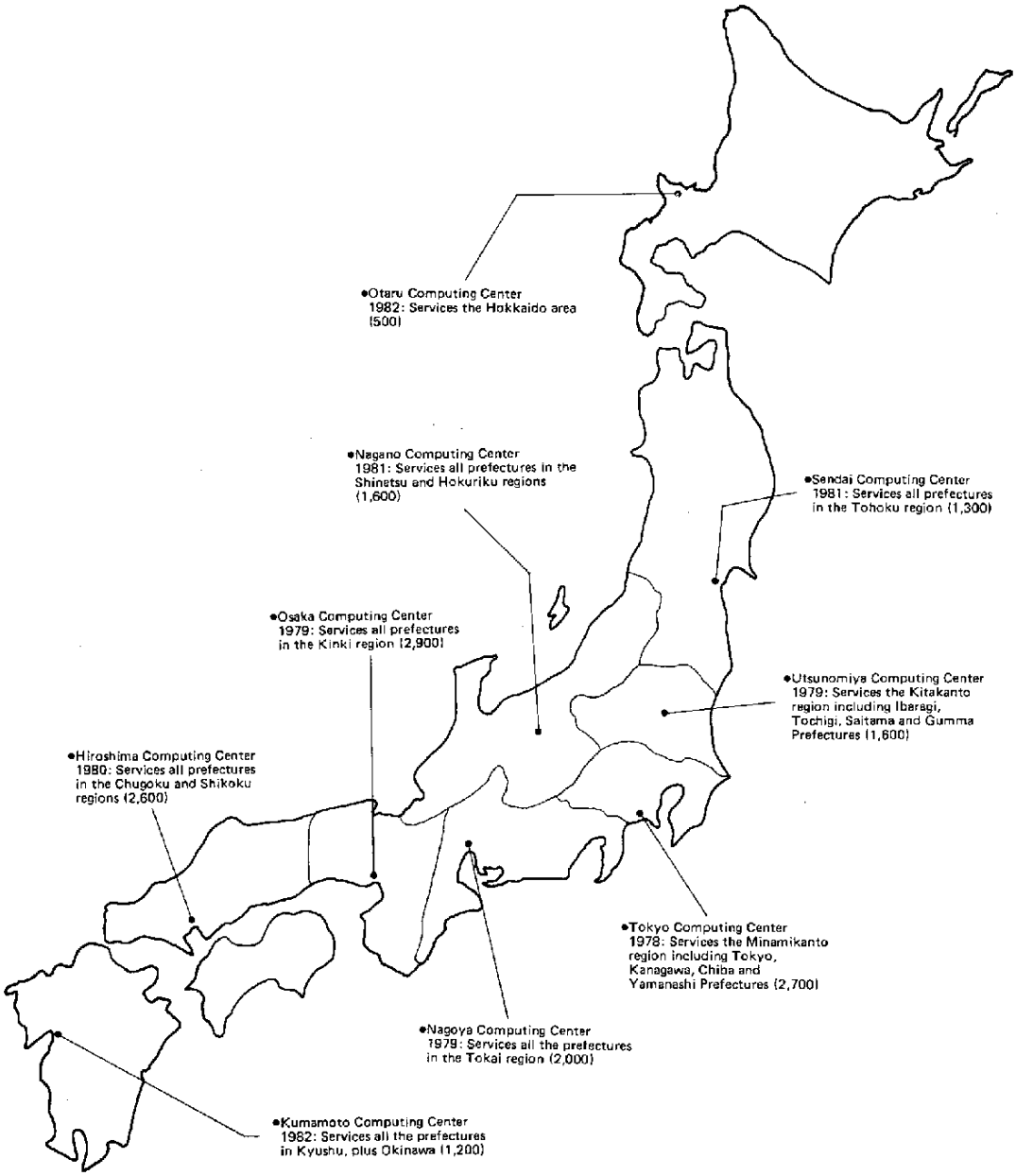
A) Post Offices

The individual post offices connected to this online system are the facilities that deal directly with the users of postal savings and money order services, acting as the cashier's windows for the carrying out of transactions related to these services. There are approximately 19,000 post offices located throughout Japan which will be connected to this system when it is complete, and they will all be equipped with remote counter terminals and automatic teller machines (ATM) developed by MPT itself. Figure 1 shows the locations of the computing centers to which the post offices in the various regions of Japan are or will be connected via leased circuits. Post offices currently a part of this system carry out online transactions from 9 A.M. to 4 P.M. during the week and from 9 A.M. to noon on Saturdays (The ATM, in principle, are in operation from 9 A.M. to 6 P.M. on weekdays, and from 9 A.M. to 2 P.M. on Saturdays.).

B) Computing Centers

For reasons of economy, efficiency of operation and to cut down on the dangers involved in a breakdown by distributing the system's processing capabilities, MPT's online postal savings system has a total of nine computing centers in locations such as Tokyo, Osaka and Nagoya (See Figure 1). All of these computing centers are equipped with ultra-large mainframe computers called DIPS-11 and their accompanying peripheral equipment. The computing centers in this system are responsible for processing all the data transmitted to them from the different types of terminals installed in the post offices located within the regions that they service. Also, all nine computing centers are interconnected by means of the circuits utilized in the switching system installed in the Tokyo Computing Center.

All the computing centers operate duplex systems, which means that they all possess two distinct and separate sets of facilities. Since online, realtime processing is the major job of these centers, one set of facilities is used for this purpose, while the second set of facilities is utilized for batch processing operations. Should a breakdown occur in the set of facilities being used for online, realtime processing, then the stand-by set of facilities which had been used for batch operations can immediately be switched over to assume online, real-time processing, thus ensuring that the primary function of the system is pre-



Note: Figures in parentheses denote the approximate numbers of post offices being serviced by the various computing centers as of the end of 1982.

Fig. 1. Regional Computing Centers And The Year They Started Operations

served.

C) Business Centers

Business centers have been established at postal savings bureaus in regions throughout Japan to confirm the contents, arrange and file the various documents and vouchers received from post offices, reissue passbooks and other documents when they have been lost, dispose of irregularities and prepare various types of input data for the computing centers.

These business centers deal primarily in work done by hand, but are also equipped with small-scale computers to categorize and arrange various types of input data and perform totalizing operations to determine the number of transactions carried out at each post office. They also have input devices and magnetic tape transmission equipment for the transmission and reception of large volumes of data to and from the computing centers.

D) Communications Network

One of the most important elements of any online system is its communications network. The communications network for the MPT online postal savings system utilizes circuits leased from Nippon Telegraph and Telephone Public Corporation (NTT). Those lines that interconnect the computing centers with the switching system located inside the Tokyo Computing Center are duplexed high-speed circuits.

Those circuits that connect the post offices with the computing centers account for the largest portion of the online postal savings system network.

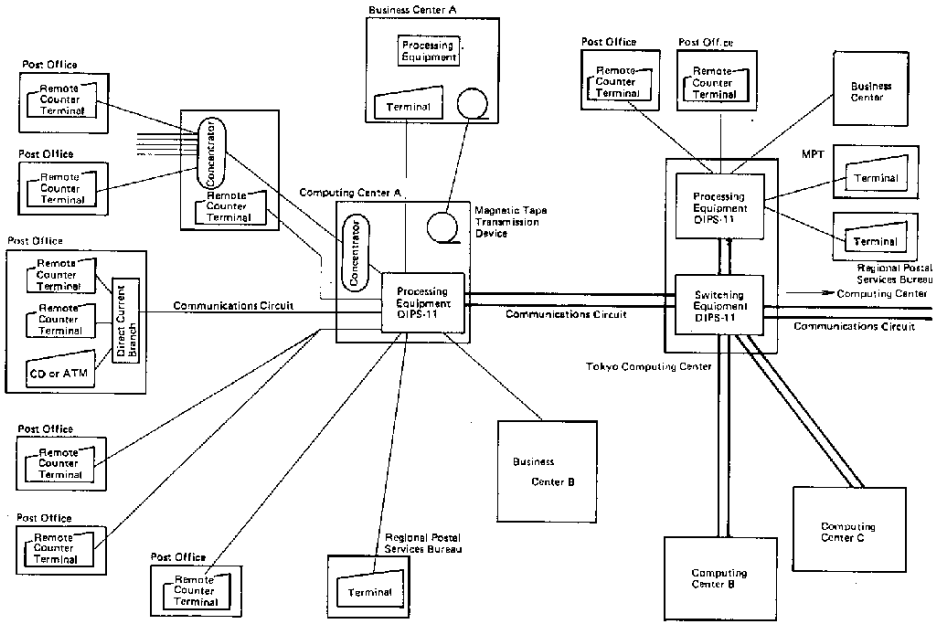


Fig. 2. Diagram Of Communication Circuits And Their Connections

As indicated in Figure 2, the use of branch connections and separate lines strives to make the system more economical.

3) Results Of The Online System

The utilization of the online postal savings system has enabled improved user services, more efficient business operations and more up-to-date administrative procedures.

The following is a run down of the principal improvements made to user services:

A) Automatic Loans

By combining an ordinary savings account with a fixed-amount savings account, anytime the balance in the ordinary savings account becomes insufficient, this system makes it possible for the post office to automatically loan the savings account holder the amount of the insufficiency using his fixed-amount savings account as collateral.

B) Automatic Payments

The online postal savings system enables holders of ordinary savings accounts to have all or portions of their public utilities charges and other bills paid automatically from their account on a regular (monthly) basis.

C) Automatic Cash Withdrawals

Users of this system can confirm the current amount of their savings account, make withdrawals and have that data recorded in their passbooks, all automatically, by simply inserting their cash card or passbook into one of the system's automatic teller machines and operating the appropriate buttons.

D) Prompt Remittance Settlements

This system has made it possible to speed up the processing of accounts settlements by remittances such as postal money orders and postal credit transfers.

E) Prevention Of Fraud

In addition to speeding up "stop payment" warnings in cases where a user's savings account passbook and/or other documents have been stolen, this system is also capable of preventing cases of fraud involving tampered with passbooks, etc., by means of instantly collating the data in these documents with the online ledger.

F) Faster Inquiries On Foreign Remittances

This system enables the post office concerned to inform users more promptly of the various exchange conditions and conversion rates in effect between Japan and other countries in cases of foreign remittances.

G) Pension And Wage Payments

Even though transfer deposits for pensions might not be entered in a user's passbook yet, these deposits are entered in his online account at post offices throughout the country so that payments are not delayed.

Furthermore, since transfer deposits involving wages are also immediately registered in the user's savings account,

not only is it possible for that user to have this data entered in his passbook and make withdrawals at any post office nationwide, but also he is able to utilized the automatic teller machines to make quick cash withdrawals on his own as soon as his wages have been transferred into his account.

H) Others

When withdrawals are made from savings accounts, any principle and interest not previously entered in the user's passbook are automatically entered at that time, and when an account is closed, payment in full, including the amount of the unrecorded principle and interest, can be obtained quickly from any post office throughout Japan.

IMPLEMENTATION OF THE ON-LINE SYSTEM

The online postal savings system, as mentioned earlier, is an extremely large system incorporating nine computing centers and some 19,000 post offices nationwide. Due to its size and to the fact that the type of services provided via this system are both numerous and diverse in nature, it would have been impossible to introduce it nationwide all at once. Instead, the construction of the computing centers and areas to be serviced online were gradually expanded, and the number and type of services available steadily increased until the system reached its present size and scope.

1) Number of Online Offices

The first online services for postal savings were begun in August, 1978, and covered only a portion of the post offices in Kanagawa Prefecture. These online post offices were serviced by the Tokyo Computing Center. Following that, as Table 1 indicates, the contruction of new computing centers was undertaken one right after the other, steadily increasing the number of post offices capable of being serviced online. As of March, 1983, all nine computing centers had been completed and were in operation. The number of post offices brought online as of this date had reached roughly 16,400 in all, or approximately 86% of all the post offices nationwide. The remainder of Japan's post offices are scheduled to be linked via communications circuits to the existing computing centers by the end of 1983, thus completing the national online postal savings network.

2) Online Services

The services provided by the online postal savings system have improved the overall service of the postal savings system in the ways outlined above in the section dealing with the results of online usage. However, had MPT attempted to initiate all the various services currently furnished online by this system simultaneously, it would have run into difficulties from the standpoints of systems development and the training of post office personnel in the operation of the equipment. Therefore, in order to make the scheduled development of the system and the incorporation of new and im-

Table 1. Transition To Online Operation

Year	Number of New Online Offices	Total Number of Online Offices	Percentage
			%
1978	300	300	2
1979	2,800	3,100	16
1980	4,100	7,200	38
1981	5,000	12,200	64
1982	4,200	16,400	86
(Scheduled) 1983	2,700	19,000	100

Table 2. Types Of Business Handled Online And Their Starting Dates

Date Online Service Commenced	Type of Business
August, 1978	• Ordinary Savings
	• Fixed Amount and Time Deposit
	• Account Holder Loans (*YUYU* Loans)
July, 1979	• Old Age Pension Transfer Deposits
February, 1980	• Refunds Using Automatic Cash Dispensers
March, 1980	• Wage Deposits
November, 1980	• Property-Formation Fixed-Amount Savings Accounts
March, 1981	• Withdrawals Using Automatic Teller Machines
June, 1981	• All-In-One Passbook Service (Automatic Loans)
October, 1981	• Postal Money Orders
	• Foreign Remittances
June, 1982	• Postal Credit Transfers
	• Automatic Payment Of Bills

Note: The dates given for the commencement of online services denote when the particular service indicated was first offered in the online mode in one or another of Japan's prefectures.

proved services into that system as smooth as possible, MPT has been gradually adding new and/or improved services to the system for each area serviced. The types of services offered online to date are as shown in Table 2.

A) Phase One Services

Ordinary savings, fixed-amount and time deposits plus loans for savings account holders were the initial services offered at each post office when it was brought on line.

B) Phase Two Services

Due to the special nature of services such as pensions, transfer deposits, wage deposits, property formation · fixed-amount savings and all-in-one passbooks, they were only begun once all the post offices in a given prefecture had been brought on line.

Other services such as postal money orders, postal credit transfers and remittances, and automatic payment of bills, etc., were not provided online until the number of prefectures covered by the online postal savings system included most of the prefectures in Japan and good results could be expected from commencing such services.

3) Automatic Withdrawals Using CDs and ATMs

In order to satisfy user demands for a means of quickly making deposits or refunds, and/or withdrawing cash from their savings accounts even after post office operating hours, as well as to cut down on the amount of labor needed to carry out financial transactions over the counter, MPT has been installing automatic teller machines (ATM) and cash dispensers (CD) both inside and outside of post offices nationwide. This method for automating postal savings services is rapidly becoming very widespread.

These automatic cash handling and dispensing machines provide users of postal savings accounts with a long-sought cash service using online capabilities. The number of post offices nationwide implementing such automated cash services as of March, 1983, had reached some 1,000 located in 40 different prefectures. Of these, 900 were equipped with ATMs and the remaining 100 post offices had CDs installed.

Cash service transactions include automatic cash withdrawals from savings accounts, automatic loans, balance inquiries and passbook entries. CDs and ATMs are available for use between the hours of 9 A.M. and 6 P.M. (5 P.M. at some post offices) Monday through Friday, and from 9 A.M. to 2 P.M. (12:30 P.M. at some post offices) on Saturdays. These machines are not operative on Sundays and holidays.

In order to operate CDs and ATMs, a plastic cash card is generally necessary. However, the ATMs used in the online postal savings system enable either cash cards or passbooks to be used to carry out automatic cash transactions.

FUTURE PLANS FOR THE ON-LINE SYSTEM

Plans for the online postal savings system are as stated previously, that is, to create a large-scale online system with a network of some 19,000 post offices linked up to nine computing centers, which are in turn interconnected by means of the Tokyo Computing Center's switching system circuits. Thusfar, plans have been proceeding ahead right on schedule.

During 1983, the schedule calls for bringing online the remaining 2,700 post offices located in eight different prefectures which have yet to be linked up with the system. This should take until the end of 1983, at which time the nationwide network will be completed.

The number of post offices equipped with either ATMs or CDs is also scheduled to be increased by some 700 during 1983, bringing the total number of post offices offering automatic cash services nationwide to around 1,700.

In addition, the kinds of operations capable of being handled online to improve user service will be steadily expanded. A database is also scheduled to be created using the various statistics stored at the computing centers as a result of online operations so that the system can easily gather together and analyze that data vital to the promotion of new and improved services, while at the same time making business operations more efficient.

MPT hopes also to improve this system in future so that it will continue to answer the growing needs of the nation's postal savings account users.

AUTOMATED METEOROLOGICAL DATA ACQUISITION SYSTEM

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INTRODUCTION

Japan's geographical setting is such that it is almost always surrounded by different types of air masses which tend to play havoc with its weather. This fact makes Japan's weather extremely changeable, meaning that sudden localized squalls and snowstorms, for instance, are quite numerous. The effect this has on the lives and lifestyles of the Japanese people is, of course, tremendous. For this reason, there has always been a great need for a meteorological observation network corresponding to the scale of this country's rather localized abnormal weather phenomena and a system for the timely gathering and quick analysis of the various meteorological data obtained via this network for the purpose of mitigating natural disasters caused by typhoons and other extreme weather disturbances.

In the past, Japan's meteorological service consisted of some 150 weather stations plus a considerable number of other district observatories, agricultural-oriented weather services and flood warning services all established to support the national weather service. This system relied on men and women untrained in the field of meteorology to carry out observations and prepare reports, and therefore data collection was neither fast nor reliable.

For this reason, the Japan Meteorological Agency (JMA) began studying ways of automating its weather observation system as early as the 1960's. However, due to the exhorbitant costs of transmission systems, this project failed to get off the ground at that time.

Upon entering the 1970's, rapid progress in the areas of data communications and computer technology made the costs of constructing an automated meteorological observation and data acquisition system drop considerably and a long sought dream suddenly became a possibility.

JMA, therefore, decided to create an automated meteorological data acquisition system (AMeDAS) which would make use of telemetry. Having gained the

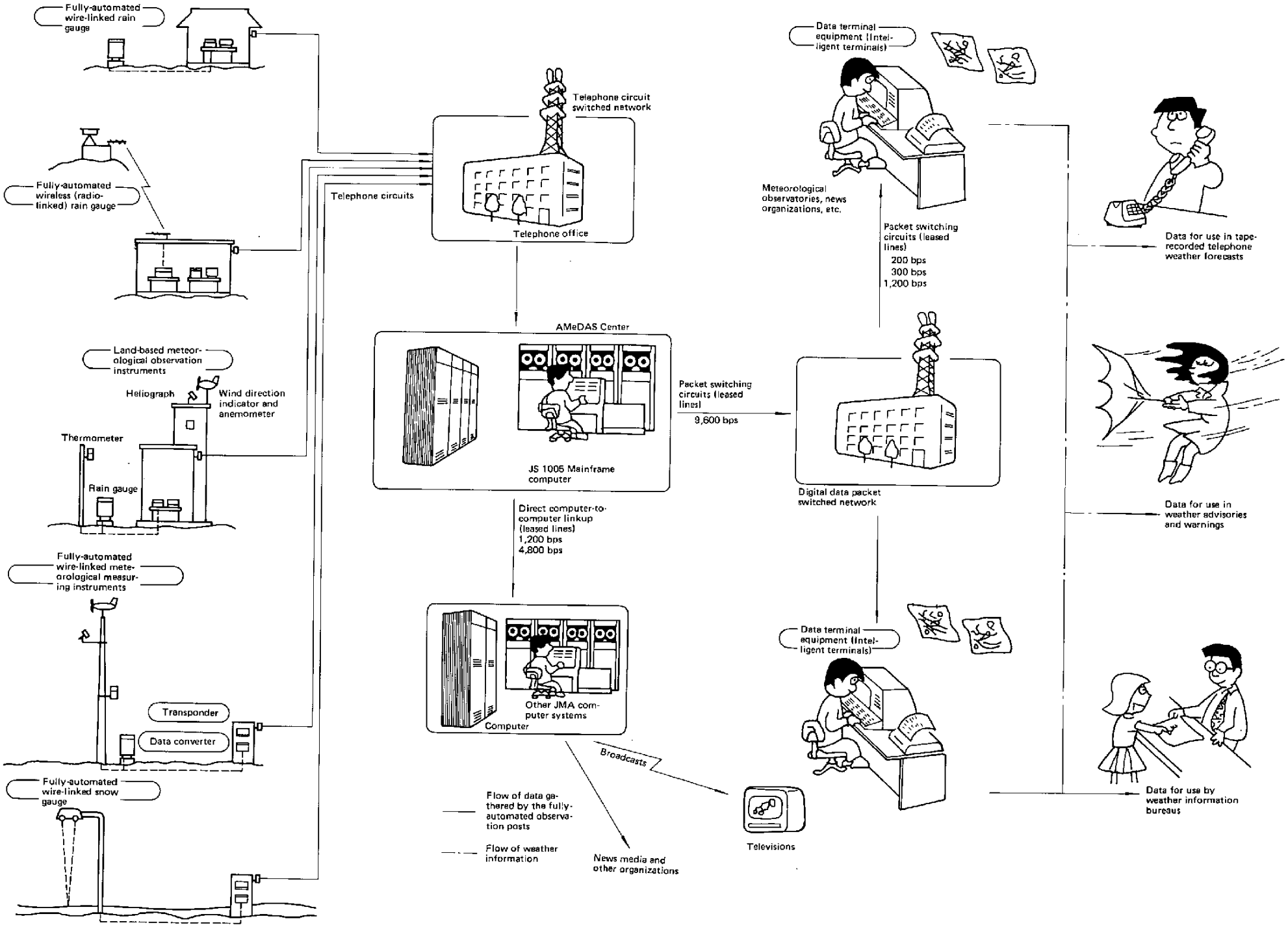


Fig. 1. Schematic Representation Of The AMeDAS System

complete cooperation of the Nippon Telegraph and Telephone Public Corporation (NTT), JMA began design and construction of this system.

After test operating a pilot station for 15 months, AMeDAS was commissioned on November 1, 1974. Initially, AMeDAS was only used for the automatic gathering and online transmission of data concerning the amount of rainfall recorded in various locations throughout Japan. But this system's functions were soon expanded to include the automatic gathering and transmission of data concerning the direction and speed of the winds, air temperatures, duration of sunshine and snow accumulation as well. AMeDAS has since proven of extreme benefit to the business of carrying out meteorological observations here in Japan.

In April, 1983, the AMeDAS was updated and improved. The storage capacities of the two computers at the AMeDAS Center have been increased significantly, weather station terminal units were replaced with improved models, digital data switching lines employed and online transmissions made available to various news media organizations. All things considered, the old system has been renovated to the point of looking like a totally new system.

As of April, 1983, AMeDAS was composed of 1,317 weather observation posts. The average distance between those posts designed specifically to measure, record and transmit data on amounts of precipitation is roughly 17 kilometers, and the distance between the other, 4-element observation posts averages out to about 21 kilometers. This type of density, combined with wide ranging distribution, makes AMeDAS one of the most unique systems of its kind anywhere in the world.

SYSTEM CONFIGURATION

1) Overview

AMeDAS consists of a computer center and over 1,300 fully-automated weather observation posts located throughout Japan. These observation posts are all connected to the central computer via regular telephone circuits. The central computer is then connected to numerous district and local meteorological observatories and weather forecasting centers and stations, as well as news organs all over Japan by means of leased digital data (packet) switching lines. This system is capable of online, realtime processing of the various meteorological data gathered and transmitted by its weather observation posts. An overall schematic representation of AMeDAS is presented in Figure 1.

Each of the weather observation posts in this system is composed of fully-automated measuring devices and instruments (sensors) fondly refered to by JMA as "weather robots." These weather robots measure and record the amounts of rainfall, air temperatures and wind speeds and direction, among other things. Then, in response to regular signals from the AMeDAS Center, automatically change the data they have gathered and stored into digital signals

for prompt transmission to the Center.

This meteorological data is then submitted to verification checks, editing and other pertinent processing at the Center prior to being transmitted, either automatically or from Center terminals in answer to specific requests, to the computers of other JMA systems and/or intelligent terminals installed at the aforementioned meteorological observatories, weather forecasting centers and news organizations.

AMeDAS was designed specifically for the purpose of constantly monitoring Japan's abnormally changeable weather in order to prevent or at least lessen damage resulting from typhoons and other weather extremes. This system's special features, therefore, include the following:

① Continuous online operation, 24-hours-a-day, everyday all year round;

② A telemeter network consisting of an extremely large number of terminals located throughout the length and breadth of Japan;

③ The ability to gather and transmit large volumes of data in a very short period of time (tens of minutes);

④ The multi-purpose utilization of all the meteorological data gathered by the system as a result of direct links between the AMeDAS Center computer and those computers used in other systems;

⑤ Assured accurateness and reliability thanks to data checking (verification) functions and backup systems.

2) Facilities Of The AMeDAS Center

The AMeDAS Center is located in Tokyo and is housed in a reinforced earthquake-proof building. The Center's facilities include two of the most modern, state-of-the-art JS 1005 series mainframe computers developed by NTT. The reason there are two such computers is that it is a duplex system, i.e. a system with two distinct and separate sets of facilities, each of which is capable of assuming the system function while the other assumes a standby status. Therefore, not only are there twin mainframe computers, but also twin peripheral devices and communication control processors. Even the data files have been duplicated to ensure the reliability of meteorological data gathered by the weather observation posts. A block diagram of the Center's facilities is presented in Figure 2.

One set of facilities in this duplex system is designed primarily for online use, while the other is utilized for off-line, batch operations and as a standby system.

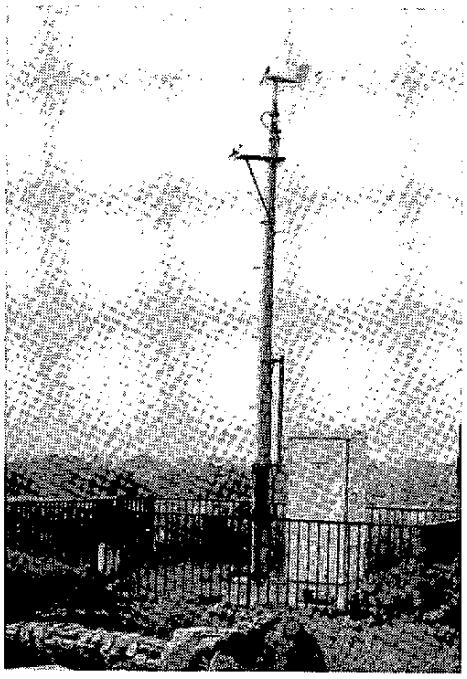
The JS 1005 computers, which make up the core of AMeDAS, utilize 64K bit VLSI architecture in their memory elements and 1,200 gate high-speed LSI chips in their logic elements: External memory is provided by high-density fixed magnetic disk units with 800 MB of storage capacity per spindle, plus magnetic tape units with storage density of 6,250 rows per inch. This system also

boasts an unusually large number of terminal units, and since the transmission circuits used have different data transmission rates, it has been equipped with JS 7401 series communication control processors capable of handling a maximum of 128 circuits.

3) "Weather Robots" And Transponders

The fully-automated measuring instruments and sensors that make up the weather observation posts, what JMA calls its "weather robots," are of four basic types: wire-linked meteorological instruments, wire-linked rain gauges, wireless (radio-linked) rain gauges and wire-linked snow gauges. These weather robots observe (eg. measure and record) the amount of rainfall (rain gauges), the speed and direction of the winds (wind direction indicators and anemometers), the air temperature (thermometers) and the duration of sunshine (heliographs). Each weather robot is composed of sensors and a data converter, and is connected to a transponder.

The meteorological data automatically gathered by these weather robots is immediately stored in their data converters. When the regularly transmitted signals from the Center requesting data are received by the weather robots, the transponders connected to them are activated, read the data stored in the data converters, convert that data to multi-frequency signals similar to the dial signals of telephones and then transmit these signals over telephone circuits to the Center for processing and retransmission.



Weather Robots

4) Data Terminal Equipment

Intelligent terminals are installed at meteorological observatories and other facilities in need of weather information located throughout Japan. These intelligent terminals are composed of keyboard printers, display units and diskette storage drives, all controlled by a processing and control element. These intelligent terminals are program-controlled, meaning that they carry out the transmission and reception of data to and from the AMeDAS Center as well as data processing in accordance with programs built into their processing and control elements. In addition to being capable of being used as online terminals, these intelligent terminals can also be utilized

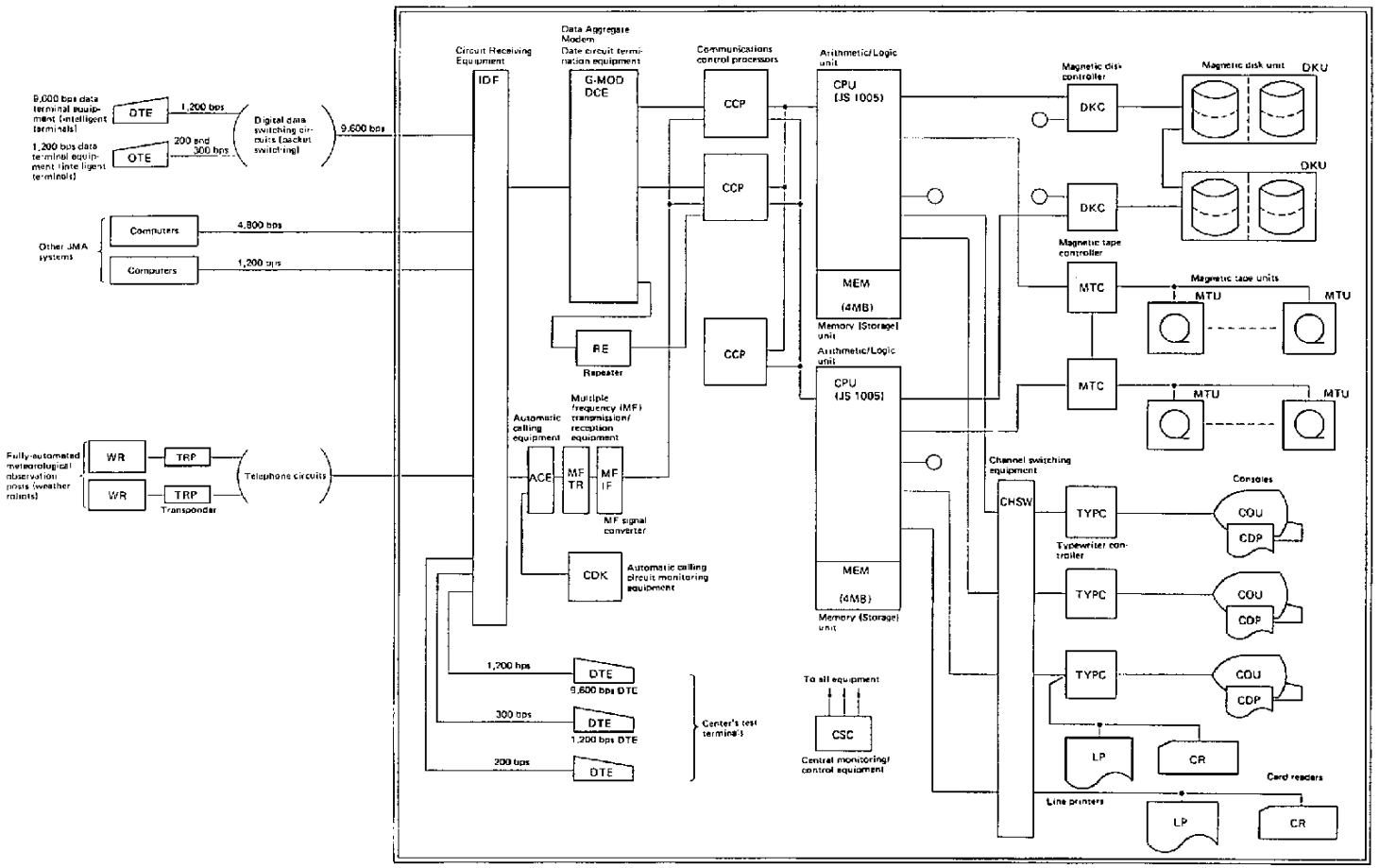


Fig. 2. Block Diagram Of The AMeDAS Center's Facilities

as personal computers. Intelligent terminals incorporated into AMeDAS are of two types: the DT-9621 model (1,200 bps) and DT-1223 model (300 or 200 bps).

The DT-9621 model terminals are equipped with 256 KB of main memory while the DT-1223 model terminals possess 128 KB of main storage capacity.

Also utility programs are provided with DT-9621 model intelligent terminals which make it possible for users to independently develop a variety of data processing programs on their local terminals using COBOL.

Major meteorological observatories which play a central role in JMA's activities are equipped with both DT-9621 and DT-1223 model intelligent terminals, while other, lesser important observatories have only DT-1223 model intelligent terminals installed at their facilities.

5) Data Transmission Circuits

The circuits utilized to transmit data in AMeDAS are divided into two types: those for data acquisition and those for data distribution. Since the traffic over those lines used to gather data from the weather robots comprising the fully-automated weather observation posts is relatively light and the transmission times short, and since these observation posts are scattered all over Japan, regular telephone circuits are utilized for the acquisition of meteorological data from these posts. However, in order to more economically distribute this information to JMA's numerous district and local meteorological observatories and other organizations with a need to know, digital data packet switching circuits are being leased for this purpose.

The rate of transmission from the AMeDAS Center to JMA's observatories, etc., can be either 200, 300 or 1,200 bps, depending on the amount of data being disseminated at any one time, and the leased digital data packet switching circuits are capable of a very economical 9,600 bps.

The recipients of the meteorological data sent out from the AMeDAS Center do not all rely solely on intelligent terminals to obtain this information. Rather, those organizations which must carry out special processing and analysis of this data have mainframe computers installed at their locations which are connected via circuits to the main computers at the Center in order to receive this data by means of direct computer-to-computer linkups. The circuits connecting these computers are capable of two rates of transmission, 4,800 bps and 1,200 bps.

OUTLINE OF AMeDAS SERVICES

The principal online services available with AMeDAS are the realtime acquisition of meteorological data by the Center from the system's numerous weather robots, the processing and editing of this data by the Center's online computer and then the dissemination of this processed data to JMA's district

and local meteorological observatories, weather forecasting centers and stations, other JMA systems and national news media organizations. To round out these services, the system is also capable of online inquiry and retrieval operations on the meteorological data stored at the Center.

AMeDAS off-line processing services are designed primarily to prepare a variety of statistical data and reports by means of batch processes performed on that data stored via online operations. The principal tables and lists among these statistics are then returned to memory via online terminals.

1) Regular Data Acquisition And Dissemination Services

The Center's online computer automatically calls up each of the fully-automated weather observation posts (weather robots) located throughout Japan using the telephone numbers assigned them every hour on the hour, thus activating their transponders and getting them to automatically transmit the meteorological data they had gathered during the past hour to the Center. Once this data has been received by the Center computer, it checks to verify that the data is correct and then stores it in the Center's data files.

The time necessary to obtain meteorological data from the more than 1,300 fully-automated observation posts located all over Japan in this way is less than 10 minutes.

If the telephone lines happen to be busy when the Center's computer automatically places its hourly call to the weather robots, the computer is programmed to wait a specified time and then try again (See Figure 3). The types of data gathered like this by the host computer are listed in Table 1.

The meteorological data gathered at the Center every hour is then edited and processed in accordance with its destination or type of data and then automatically transmitted to the intelligent terminals installed at JMA's outlying observatories, etc., either on a prescribed cycle or whenever any data indicative of sudden changes in the weather or abnormal meteorological conditions are detected. In the case of the latter, i.e. peculiar or abnormal weather conditions, the system is designed to sound a buzzer on the intelligent terminals receiving this data to alert those people in charge of these terminals that the incoming data requires special handling.

When the destination for Center disseminated data is a computer, all meteorological data gathered from the weather robots is put into a specified format and transmitted directly from the Center computer to the receiving computer every hour (See Figure 3). The type of data transmitted in this way is shown in Table 2.

2) Inquiry Service

The Center uses the time between hourly automatic data acquisition and dissemination operations (usually about 39 minutes, from 20 past the hour until one minute before the hour) to make inquiries requesting specific infor-

mation from the data stored in the data files or that which has just been gathered from the weather observation posts. It is also during this period that the Center is capable of transmitting specific data previously requested by its observatories, weather stations, etc., at the prearranged time. The types of inquiry operations possible with AMeDAS are shown in Table 3.

3) Statistical Reports Service

The voluminous amounts of meteorological data gathered by the Center's on-line computer are processed via batch operations by the off-line computer for the preparation of various types of statistics. These statistics are then

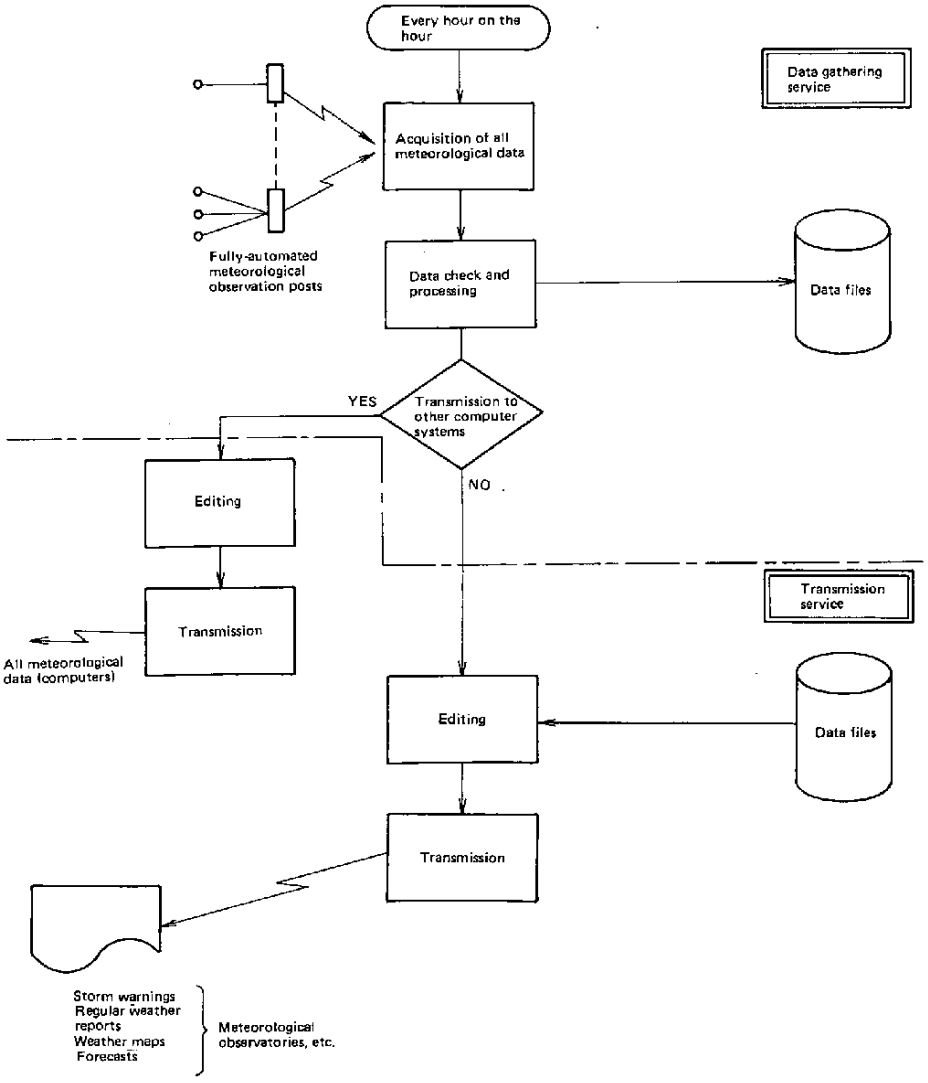


Fig. 3. Flow Chart Of Regular Hourly Data Acquisition/Transmission Services

Table 1. Acquisition Data

Type of observation \ Weather robots	Fully-automated wire-linked meteorological measuring instruments	Fully-automated wire-linked rain gauges	Fully-automated wireless (radio-linked) rain gauges	Fully-automated wire-linked snow gauges
Number of instruments installed	838	224	255	147
Amount of rainfall	o	o	o	–
Wind direction	o	–	–	–
Wind speed	o	–	–	–
Air temperature	o	–	–	–
Amount (duration) of sunshine	o	–	–	–
Snow accumulation	–	–	–	o
Differences between rainfall and snowfall	o	o	–	o
Power outage information	o	o	o	o

Note: The number of instruments installed as of May, 1983.

compiled into daily, bi-weekly, monthly and yearly reports. They are also stored on magnetic tape on a monthly basis and lent out to interested organizations by JMA for the purpose of research.

4) Local Terminal Service

The data disseminated by the Center is stored on the diskettes used in the intelligent terminals that receive this information and can therefore be output as the need calls for it. This data can also be edited and processed locally using the intelligent terminals and programs developed specifically for them by their users.

WAYS OF UTILIZING METEOROLOGICAL DATA AND THEIR RESULTS

1) How Meteorological Data Is Used By JMA

① As stated earlier in this article, the principal use to which AMeDAS is being put by JMA is in the constant monitoring of meteorological phenomena on a nationwide scale so as to be able to quickly detect and respond to sudden changes in local weather conditions indicating upcoming violent storms and other severe weather disturbances. The operation of this system has significantly improved the timeliness and reliability of JMA storm advisories and warnings;

② The realtime data acquisition capabilities of AMeDAS have opened up new horizons for the development of innovative short-range forecasting techni-

Table 2. Transmission Data

Item / Processing categories		1 Observation point number	2 Observation post name	3 Type of data	4 Amount of rainfall from the present time	5 Amount of rainfall from the nearest hour to	6 Amount of rainfall during the past hour	7 Amount of rainfall during the past three hours	8 Amount of rainfall during this past 24 hours	9 Amount of rainfall since midnight	10 Present meter reading between specified times	11 Snow accumulation/depth from the present time (rainfall)	12 Snow accumulation/depth from the nearest hour until the present time	13 Snow accumulation during the past hour	14 Snow accumulation during the past three hours	15 Snow accumulation during the past 6 hours	16 Snow accumulation/depth since midnight	17 Snow accumulation/depth since 9 A.M. yesterday and 9 A.M. today	18 Snow accumulation since 9 A.M. yesterday and 9 A.M. today	19 Snow accumulation/depth between 9 A.M. today and 9 A.M. today	20 Snow accumulation/depth between 9 A.M. yesterday and 9 A.M. yesterday	21 Present meter reading (snow depth) between specified times	22 Wind direction	23 Wind speed	24 Air temperature	25 Duration of sunshine	26 Weather (clear, cloudy, etc.)	27 Present meter reading (sunshine)	28 Difference between rainfall and snowfall	29 Power outage information	30 Buzzer	31 AQC display of snow depth	32 Time	Transmission periods
Prefectural storm warnings		o	o	o			o	o	o		o	o	o	o	o											o	o	o	o		o	o	o	As necessary
Regular prefectural weather reports		o	o	o			o	o	o		o	o	o	o	o											o	o	o	o		o	o	o	Every three hours
Regular local weather reports		o	o	o			o	o	o		o	o	o	o	o											o	o	o	o		o	o	o	Every hour
Regular national weather reports		o	o	o			o	o	o		o	o	o	o	o											o	o	o	o		o	o	o	Every hour
National precipitation maps											o																							Every three hours
Regular prefectural snow accumulation reports		o	o	o												o	o	o	o	o	o				o						o	o	o	o	Every three hours
Regular local snow accumulation reports		o	o	o												o	o	o	o	o	o				o						o	o	o	o	Every hour
Regular national snow accumulation reports		o	o	o												o	o	o	o	o	o				o						o	o	o	o	Every three hours
Prefectural	Wind speed/direction, temperatures, duration of sunshine and amount of rainfall.						o	o			o			o													o	o	o		o				As requested
	Amount of rainfall and snow accumulation						o	o			o			o				o				o				o						o			o	
Local weather map	Rainfall						o	o			o			o																						
	Wind, temperature and weather conditions																					o					o	o	o		o				As requested
	Snow accumulation																o				o				o									o	

Table 3. Inquiry Service

Types of inquiries	Description
Required Inquiries	Meteorological data can be promptly gathered from a maximum of ten observation posts at a time and output in response to inquiries whenever the need arises.
Retroactive Inquiries	Inquiries can be made on data gathered at specified hours anytime within the past 72 hours on a district, prefectural or observation posts basis. This data will be output in the same form as the regular weather reports.
Time Period Retroactive Inquiries	Data concerning any time period up to 24 hours which was gathered and stored within the past 72 hours can be inquired for a maximum of ten observation posts at a time and will be output by type of observation, i.e. amount of rainfall, wind speed, etc.
Prefectural Weather Map Inquiries	Data for any specified hour up to 72 hours in the past can be inquired on a prefectural basis. This data will be output in the form of situation maps for each type of observation specified.
District Weather Map Inquiries	Data for any specified hour up to 72 hours in the past can be inquired on a district basis. This data will be output in the form of situation maps for each type of observation specified.
National Snow Accumulation Map Inquiries	Data concerning the accumulation of snow at any specified hour within the past 72 hours can be inquired. This data will be output in the form of a situation map.
Amount Inquiries	Data concerning the amount of rainfall or snowfall recorded during any given day within the last three days can be inquired. This data will be output on a district or prefectural basis.
Statistical Inquiries	Statistical data concerning the semi-monthly or monthly totals for all meteorological data gathered during that time period can be inquired and will be output for a maximum of ten observation posts at a time.
Retransmissions Of All Meteorological Data	It is possible to retransmit all meteorological data collected from the observation posts at any specified hour within the past 72 hours to other JMA computer systems.

ques, such as integrating AMeDAS with radar networks and numerical weather prediction models.

③ By operating the off-line computer in parallel with the online computer, the former compiling statistics on local weather conditions based on the data gathered by the latter from the meteorological observation posts, has made it possible to supply users with complete, up-to-the-minute detailed weather information in a very short period of time. The results have been that the study and analysis of local weather phenomena has been speeded up and made more complete while at the same time making it easier to provide feedback for the purpose of compiling daily weather forecasts.

2) Utilization By News Media, Municipal Governments And Private Firms

① The news media initially utilized meteorological data obtained through AMeDAS only when it was felt newsworthy. Recently, however, the pattern seems to be changing to the one adopted by NHK (Japan Broadcasting Corporation). That is, to receive the data transmitted by the AMeDAS Center via a computer-to-computer linkup, then process this data in quasi-realtime to compile rain charts for TV broadcasts (This has become a routine performed numerous times everyday at NHK. These kinds of broadcasts are expected to increase in frequency and broaden in content in future;

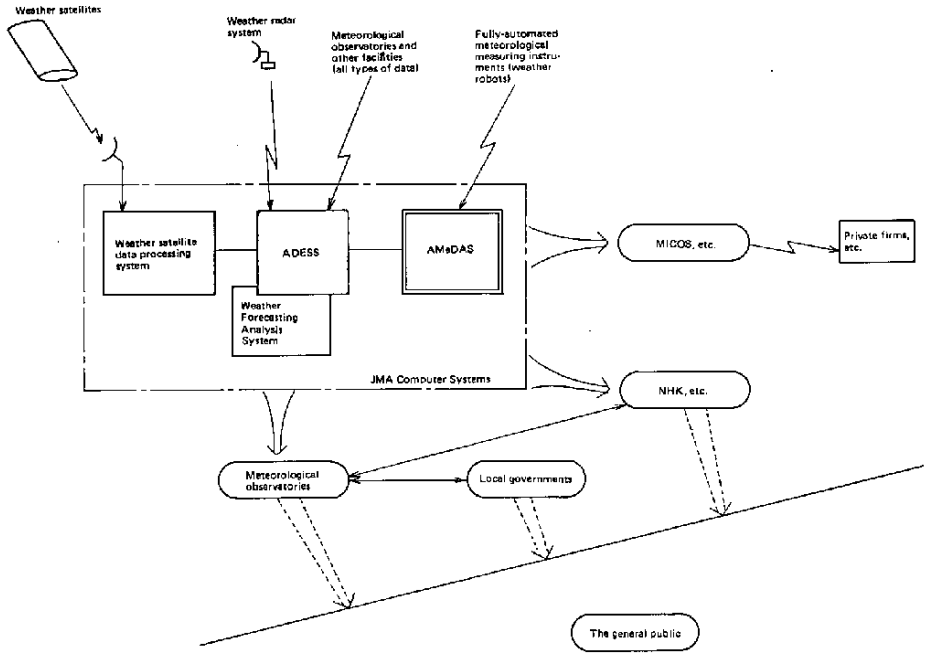
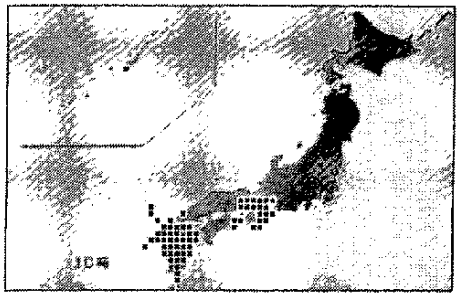


Fig. 4. The Flow Of Weather Information



An NHK Broadcast of a Rainfall Map

② The utilization of AMeDAS meteorological data by local governments (municipalities) and private businesses at present involves, for the most parts, the perusal of the various charts, tables and reports made available by JMA's main headquarters and various district observatories and field offices. In cases where these organizations wish to carry out private studies on large amounts of this data, it is possible for them to use the data stored on magnetic tapes available at JMA headquarters.

Another means for municipalities and private businesses to utilize AMeDAS data has been developed whereby these organizations contract with the Japan Meteorological Association to use its MICOS computer system, which is connected online to the computers at the AMeDAS Center, to carry out online data processing in a manner suited to their particular needs.

The principal reasons for municipalities and private firms using AMeDAS data are to devise measures aimed at preventing disasters, controlling the water level of dams and thus their power output, conducting surveys on available water resources, taking measures to prevent floods, keeping transportation facilities in operation and mitigating the adverse effects of disasters on coastal regions.

THE QUICK ONLINE SYSTEM

Kenji Okura
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QUICK

INTRODUCTION

QUICK (Quotation Information Center, K. K.) is Japan's largest information service company. Established in October, 1971, QUICK makes use of large-scale computers and data communications circuits to provide investment communities with up-to-the-minute information concerning both domestic and foreign markets on a realtime, online basis.

QUICK currently provides a number of information services related to market movements such as price and statistical information and other news concerning Japanese and foreign stock markets, foreign exchange markets, financial and commodity markets. The company also offers a newspaper article data retrieval service and a data service aimed at major newspaper companies. All of these and other services are provided domestically and to countries in Europe, the Middle East and Southeast Asia, utilizing an extensive international communications network that is linked to roughly 8,000 terminals installed at nearly 800 companies worldwide.

QUICK is also energetically engaged in efforts to utilize new forms of electronic communications media in order to provide stock market information services on a direct CPU-to-CPU basis. One such move in this direction calls for the company to join with Nippon Telegraph and Telephone Public Corporation (NTT) as the supplier of information to be transmitted over NTT's experimental CAPTAIN (videotex information network) service, which is scheduled for commercialization in 1984.

When it comes to overseas stock market information, QUICK receives stock and commodities information and related news from three of America's biggest venders, QUOTRO SYSTEMS, Bunker Ramo and GTE-IS. Information concerning foreign exchange and interest rates is supplied by Telerate, news by Dow-Jones and financial data by Standard & Poors and Moodies.

There are two organizations in Europe which provide services similar to those furnished by QUICK. These are the Reuters News Agency of the United Kingdom and Telekurs of Switzerland. Reuters boasts an extensive international network called the "Reuters Monitor," which provides a wide range of information services including that on stock markets, commodity exchanges, foreign

exchange and interest rates as well as other related news. QUICK has a tie-up with Reuters News Agency which entitles it to exchange stock price data with that organization, while at the same time serving as its general sales agent here in Japan.

QUICK also transmits information concerning Japanese stock prices to Telekurs of Switzerland. Although QUICK provides stock and other information to the countries of Europe over its own international network, stock prices and indices on Japanese markets are communicated to European investment communities via Telekurs.

Thus, while a number U.S. and European venders are providing stock market information characteristic of their respective regions, QUICK is the only information service company in Japan furnishing all possible forms of stock market and other financial and related data and news. The following is an outline of the QUICK online information system.

OUTLINE OF THE QUICK ON-LINE SYSTEM

QUICK has two major computer centers, one in Tokyo and the other in Osaka, which are wire-linked via leased communications circuits to relay bases in 55 principal Japanese cities and some 14 major overseas cities, including Hong Kong, Singapore, Bahrain, London, Edinburgh, Frankfurt, Paris, Amsterdam, Bern, Zurich, Geneva, San Francisco, Los Angeles and New York. The types of services offered over this international system are described below (See Figure 1).

1) QUICK Video-I System (Started in April, 1974)

The QUICK Online System is directly linked with the Tokyo and Osaka Stock Exchange systems via high-speed circuits to obtain the very latest stock prices, indices and changes in the total market volume. The financial and stock data and other news acquired by QUICK in this way is submitted to a variety of processing, stored on files and then put out over the QUICK Video-I system to 9-inch Video-I terminals installed in the offices of securities firms and institutional investors in response to their queries. At present, there are approximately 6,700 QUICK Video-I terminals in operation worldwide, and the QUICK Video-I online system is being utilized to respond to requests for stock market and related data on an average of 6.6 million times a day.

a. System Configuration

i. Central computer systems

As mentioned above, the QUICK Online System features two centrally located computing systems, one in Tokyo and the other in Osaka. The Tokyo Computer Center (TCC) is outfitted with HITAC 8700 mainframe computers each with 1 MB of main storage. The company is planning to replace these systems in the near future with HITAC M-280-H

computers with 16 MB of main storage. The operating system being used with these computers is a special-purpose RTCS (real time control system).

The facilities in place at the Osaka Computer Center (OCC) consist of two HITAC M-280-H computer systems run on VOS 3/SCP-M operating systems.

ii. Communication circuits

The leased communication circuits being utilized to transmit data from the Tokyo Stock Exchange to the QUICK Tokyo Computer Center are 48K bps simplex circuits, while those being used to send information from the Osaka Stock Exchange to the QUICK Osaka Computer Center are 1,200 bps simplex circuits. The circuits used to transmit data from the QUICK computing centers to the system's relay base line concentrators (L/C) are capable of transmission rates of 4,800/9,600 bps. And the circuits carrying data from the QUICK Online System's L/C to the terminal control equipment (TCE) are 1,200 bps half-duplex four-wire circuits.

iii. Terminals

This system's data terminal equipment consists of TCE with up to a maximum of eight 9-inch video display terminals (VDT) per TCE. The keyboards used with these terminals are simple devices comprised of numeric pads and function keys for each item of information (See Figure 2).

iv. Special features

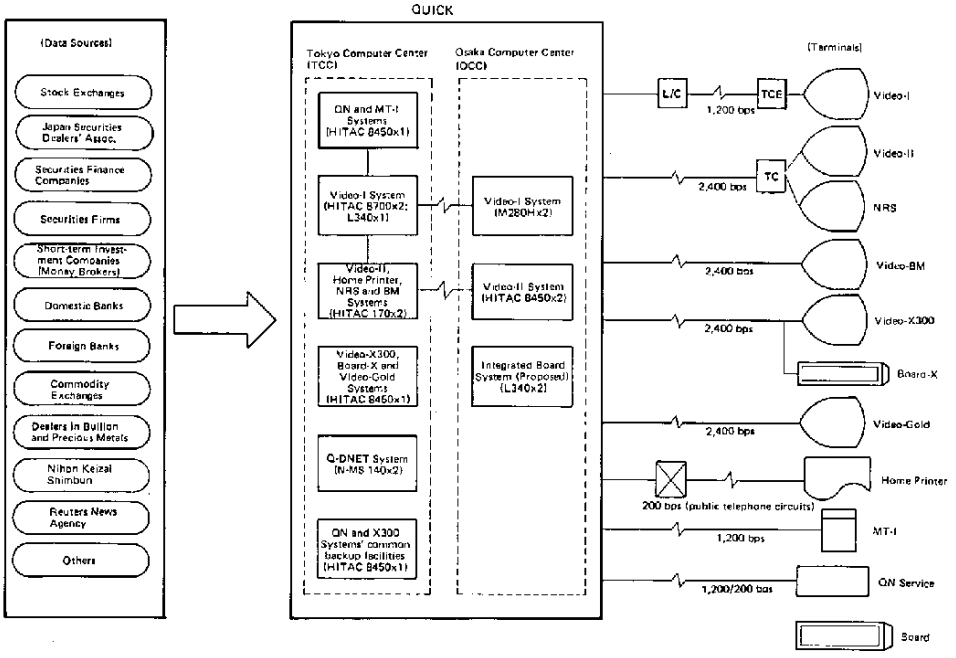


Fig. 1. Block Diagram of QUICK's Integrated Securities Information System

① QUICK places extreme importance on the reliability of its systems, and has thus duplexed the central computing, file and communications facilities of the Video-I system to ensure that this service can be provided on a continuous, non-stop basis even should one set of facilities breakdown. QUICK calls this a load-sharing system.

② The operating systems used in the central computing facilities (TCC = RTCS; OCC = VOS3/SCP-M) have been specially designed to handle large amounts of traffic.

③ When a subscriber is interested in the special news provided with the Video-I system, he simply pushes the terminal keyboard function key marked news and automatically receives continuous news transmissions from the computer center every 42 seconds.

④ In order to be capable of supporting multiple terminals, the Video-I system makes use of line concentraters (L/C) and intelligent time division multiplexers (ITDM) at each circuit relay base in the communications network.

b. Sources Of Information

The QUICK Video-I system acquires its information directly from the various Japanese stock exchanges located in Tokyo, Osaka, Nagoya, Sapporo, Niigata, Kyoto, Hiroshima and Fukuoka, as well as from Japanese over-the-counter stock-brokers, securities finance companies in Tokyo, Osaka and Nagoya, members of securities and exchange associations, the Nihon Keizai Shimbun (news and financial data) and Reuters News Agency (overseas stock prices and indices).

c. Types Of Service

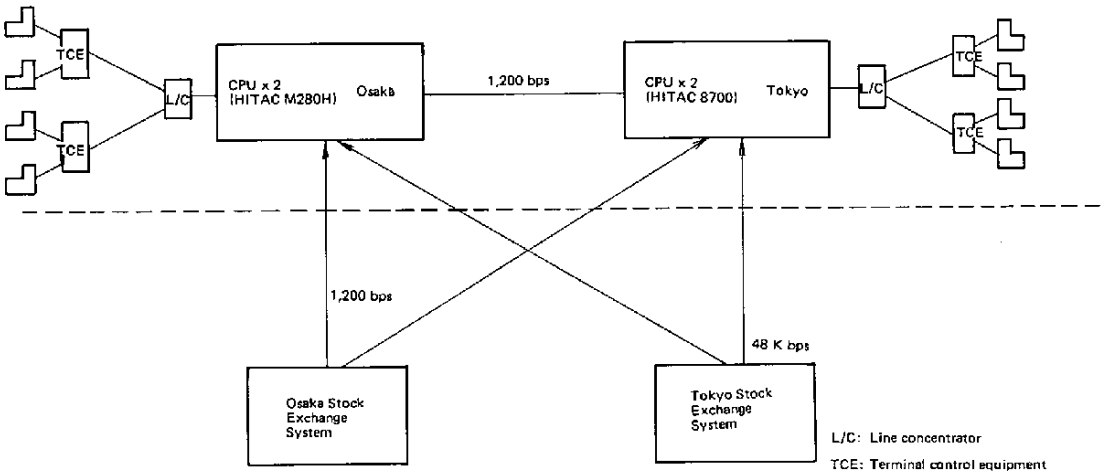


Fig. 2. Block Diagram Of Quick Video-I System

i. Individual stock information

This information consists of all data related to stocks, convertible bonds and public bonds listed on the Tokyo, Osaka and Nagoya Stock Exchanges such as latest prices, bid and asked prices, sequential prices, closing prices, PER, yield rates, per share earnings, dividends, account settlements, estimates and overseas stock prices and indices.

ii. Market information

The types of market information provided via the Video-I system consists of Nikkei Dow-Jones Averages, Osaka Stock prices, the top 20 most advanced and top 20 most declined stocks by price, the top 20 most active stocks, weekly market volume, price movements by industry, exchange price indices, the general market situation, market comments, over-the-counter stock trading trends, regional exchange stock prices (Sapporo, Niigata, Kyoto, etc.), over-the-counter trends in the trading of public bonds, foreign exchange rates, market analyses and overseas quotations.

iii. News

News items included in the data provided via Video-I deal primarily with political, economic and financial events and trends, as well as company-related news stories.

2) QUICK Video-II System (Started in April, 1978)

In order to be able to offer a richer, more specialized information service than the one provided through Video-I, QUICK created the Video-II system which employs intelligent terminals and a multiple screen divided into three distinct "frames" from top to bottom, the main frame, sub frame and inquiry frame. The main frame enables the subscriber to freely select and display any ten listed stocks that are of particular interest or import to him. When the quotations for these stocks change at the exchange, these changes are automatically displayed in the main frame portion of the multiple screen, thus providing the user with up-to-the-minute information on his chosen stocks. The QUICK Video-II system also comes equipped with two additional screens, a chart screen and news screen, which can be called up and utilized as the need arises. Thus, the QUICK Video-II system is an extremely novel information service featuring a multiple screen, a text which appears in KANJI (Japanized Chinese ideographs) and HIRAGANA (a Japanese syllabary or "alphabet") and additional screens for graphic chart presentations and news.

The QUICK Video-II system takes the form of a distributed processing system composed of a central computing system (CC), regional computing subsystem (RC) and terminal subsystem (TC).

Video-II is also linked online with the NTT CAPTAIN system and is transmitting stock prices over that system on a test basis.

a. System Configuration

i. Central and regional computer systems

The Tokyo Computer Center houses the central computing facilities for the QUICK Video-II system, being equipped with two HITAC M-170 computers with 4 MB of main storage each. These computers run on EDDS/MS-SCP operating systems. The reigonal computer system is located at the Osaka Computer Center and utilizes two HITAC 9450 computers with 768 KB of main storage each. These computers also run on EDOS/MOS-SCP operating systems such as those used in the CC.

ii. Communication circuits

All information obtained from the Tokyo and Osaka Stock Exchanges is transmitted to the QUICK Video-II system via the same circuits used to receive similar information in the Video-I system. Data then sent from the QUICK Video-II CC to RC are carried over 4,800 bps half-duplex four-wire circuits. Half-duplex four-wire circuits capable of transmitting data at the rate of 2,400 bps are then used to supply Video-II information to the intelligent terminals installed at the users' locations.

iii. Terminals

The terminal facilities are made up of terminal control units equipped with between 64 and a maximum of 128 KB of main memory, and a maximum of eight 14-inch intelligent terminals with KANJI and graphic display capabilities (See Figure 3).

iv. Special features

① The HITAC M-170 computer facilities at the CC and the HITAC 8450 facilities at the RC are both duplex in nature, one set of facilities serving as a backup system for the other set of facilities. Since both sets of facilities at both locations store all realtime data coming into them from the Tokyo or Osaka Stock Exchanges, the company calls this a "Hot Standby" system (See Figure 4).

Also, since it is necessary to switch to the backup set of facilities immediately in the case of a breakdown, these computer systems both employ automatic switching controllers (ASC), making them operate just like a dual system.

② The CC, RC and TC form of distributed processing adopted by the Video-II system makes optimal use of the communications network, enhancing expandability and reliability and making the whole system more economical.

③ The operating system incorporates a special communication control program (SCP) into a general-purpose VO93 operating system, enabling it to handle large increases in data traffic as well as reduce overhead.

b. Types Of Services

i. Main frame

The main frame (top) portion of the multiple screen featured with the QUICK Video-II system provides the subscriber with four-price data (opening, high, low and latest prices), price movements and the bid and asking prices of the ten stocks and/or convertable bonds chosen by the user from among those listed on the Tokyo, Osaka and Nagoya Stock Exchanges, plus an update of the Nikkei Dow-Jones Averages every five minutes.

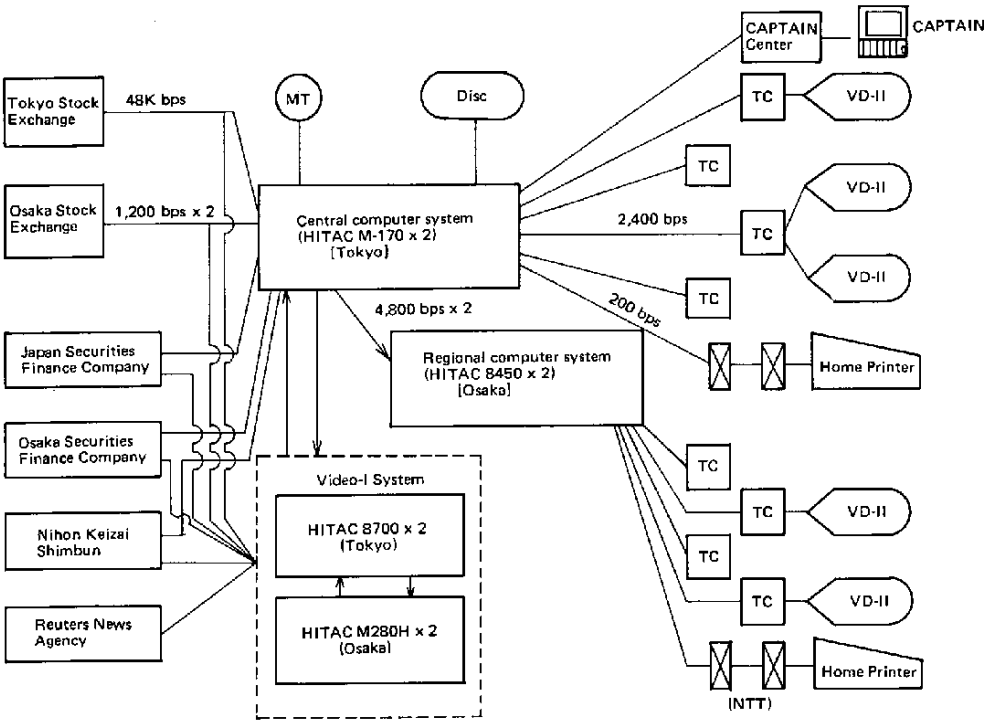


Fig. 3. QUICK Video-II System Configuration

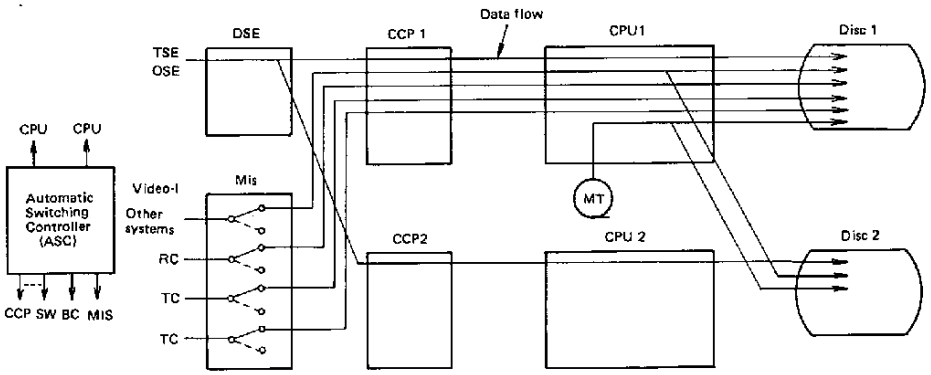


Fig. 4. Computer Center Configuration (Hot Stand-by System)

ii. Sub frame

The sub frame (middle) portion of the Video-II multiple screen furnishes the user with Nikkei Dow-Jones Averages, indices, total market volume, data on account settlements, historical data (on a yearly, monthly, weekly and daily basis), the most advanced and declined stocks by price, the top 20 most active stocks, the margin trade positions for the preceding day, the number of stocks that either rose or declined in price and news headlines.

iii. Inquiry frame

The inquiry frame (bottom) portion of the multiple screen provides the subscriber with four-price data, bid and asked prices, market volume, estimated PER, estimated yield and the year's high and low prices for listed stocks; four-price data, bid and asked prices, market volume, yield and parity prices for convertible bonds; and the volume price, trends, market volume, yield, coupon rate and redemption data of public bonds. This frame also gives information concerning overseas stock prices and indices.

iv. Chart screen

This screen is provided to enable the subscriber to take a look at the weekly and daily trends and price movements for individual stocks and/or those stocks listed on the Nikkei Dow-Jones Averages in the form of an easy-to-read graphic chart.

v. News screen

This is another optional screen like the chart screen described above, but this one provides the subscriber with a specially prepared selection of general, political, financial and stock market news items, plus comments concerning overseas stock and money markets.

3) QUICK Home Printer System (Started in December, 1978)

Unlike QUICK's Video-I and Video-II systems, which are aimed at professional stockbrokers working at securities firms or institutional investors, the QUICK Home Printer was developed with the individual invester in mind. This system employs a special thermal-type printer developed by QUICK and connected to the subscribers home telephone to make up-to-the-minute stock price data and hot market tips straight from the stock exchange available in the user's home on an online, realtime basis.

The Home Printer utilizes the same central computing facilities as the Video-II system, but relies on ordinary 200 bps telephone circuits as its communication channels.

To use the QUICK Home Printer, all the subscriber has to do is dial the number of the QUICK computer center and then input the codes necessary to obtain data on individual stocks, industry-related information or stock market comments by pushing the appropriate buttons provided on the keyboard built into the face of the printer. Having done this, the printer will automatically print out the stock prices, indices and other information sought

on a length of rolled paper.

4) QUICK Video-BM System (Started in July, 1980)

The QUICK Video-BM (Bond and Money) system is designed to provide subscribers with total information service concerning bond and money markets. This system uses a special color terminal to display a variety of bond and money market information in response to queries made by the subscriber. The particular types of data available include information on the over-the-counter bond prices being quoted by stockbrokers, broker transactions, market trends and announcements made by the Japan Securities Dealers' Association. Specific data concerning types of bonds being issued and their redemption dates, etc., plus call rates, bill discount rates and other types of information on interest rates are also furnished.

In addition to the above, the Video-BM system makes use of its special color display capabilities to provide easy-to-read color graphs comparing yield curves and the differences between domestic and foreign interest rates. This system also displays news items provided by Nihon Keizai Shimbun and historical data specially selected and compiled by QUICK.

The Video-BM system comes equipped with a private paging function as well which enables subscribers to utilize the QUICK network to carry out in-house remote inter-office communications and information exchanges on their own, plus take an active part in the provision of information to the system.

a. System Configuration

i. Central computer system

The QUICK Video-BM has its central computing facilities located at the Tokyo Computer Center together with those of the QUICK Video-II system. However, there are plans afoot to separate these two sets of facilities in the near future. The Video-BM central computing facilities consist of two HITAC M-170 computers with 4 MB of main storage each. These computers run on EDOS/MSO-SCP operating systems.

ii. Communication circuits

The circuits connecting this system's central computing facilities with the Tokyo and Osaka Stock Exchanges are the same as those being used with the Video-I system. All of the lines being utilized to obtain data from securities firms, short-term investment companies (money brokers) and banking institutions, as well as those interconnecting the terminals installed at the users' locations are 2,400 bps leased lines.

iii. Terminals

The terminals used by the subscribers are 14-inch stand-alone units capable of displaying data in seven different colors.

b. Sources Of Information

The information made available through this system comes from securities firms (over-the-counter bond prices), the

Tokyo and Osaka Stock Exchanges (straight and convertible bonds), the Japan Securities Dealers' Association (asked prices, standard bids and repurchase agreements reference rates), Japan Bond Trading Co., Ltd. and Daisan Nakadate Security Co., Ltd. (dealer transactions), bond issuing groups, short-term investment companies and Nihon Keizai Shimbun (news, market information and statistical data).

c. Types Of Service

i. Stock exchange information (straight bonds)

This information consists of government bond prices, domestic bond prices, yen-denominated foreign bond prices and historical items.

ii. Stock exchange information (convertible bonds)

Individual stock prices, charts and historical data, various indices, bond and money revised averages charts, simple averages charts, historical data on various indices and a variety of different rankings are provided in this category.

iii. Over-the-counter prices at securities firms

The type of information furnished in this category includes data on basic rates (unit price, simple yield, compound yield, current yield and yield to maturity on average life), yield curves, repurchase agreement rates and trends in over-the-counter trading of public bonds by company.

iv. Dealer transaction information

This category includes information on the actual price of bonds, the market volume, last record and market volume.

v. Information from the Japan Securities Dealers' Association

This Association supplies information concerning bid and asked prices of bonds, Nikkei bond indices, standard bid and asked prices, coupon yield curves and repurchase agreements reference rates.

vi. Foreign bond information

Foreign bond information includes foreign bond indices, U.S., Canadian, British, West German, Dutch, and Australian Government bonds, Yankee-dollar and Euro-dollar bonds, Euro-dollar floating interest bonds and Euro-yen bonds.

vii. Individual bond information

This category provides information concerning individual bonds. Roughly 80 different items of data are covered including bond issuing conditions, redemption rates, comparisons by type of issue, redemption dates and coupons, plus various forms of guidance such as individual and fixed codes.

viii. Money rate information

Money rate information provided via the QUICK Video-BM system covers such data as call rates, bill discount rates, CD rates, CD offers (by money brokers), foreign exchange rates, Tokyo dollar call rates, overseas money rates and comparisons of short-term interest

rates.

ix. Bond-related statistics

This category provides information on changes in over-the-counter trading, lists of new issues, volume of public bond issues, current market values, breakdown of distribution and a table of principal economic indicators.

x. News and market information

The type of news presented in this category includes general political and economic news, plus special news stories related to the bond market. It also encompasses data on market trends, overseas market movements and foreign exchange rates.

5) QUICK Video-X300 System (Started in April, 1977)

Interbank dollar rates on Tokyo's foreign exchange market are input to this system from four leading Japanese short-term investment companies, and every time the rates change, the new rates are automatically output on the terminal screen. In addition, the QUICK Video-X300 system also provides information such as the interbank dollar offer rates between Tokyo Bank and other major Japanese banks, customer rates, overseas rates, the prime and official rates of major overseas countries, news and other data related to the foreign exchange market. Whatsmore, the Video-X300 system is designed so that subscribers can utilize its communications network to carry out terminal-to-terminal in-house remote inter-office information exchanges or to transmit data to customers.

As an option, this system provides the QUICK Board X service which displays the Tokyo Foreign Exchange Market interbank dollar spot rates on a wall board furnished the subscriber for that purpose. Each time these spot rates change, the figures displayed on the wall board are automatically renewed.

Another optional service available with the QUICK Video-X300 system is the QUICK Gold System, which provides the subscriber with up-to-the-minute data on the price of gold on the Tokyo Gold Exchange, plus information and news concerning domestic gold bullion spot rates and foreign gold rates. Thus, using the same Video-X300 terminal, a subscriber can get information concerning both foreign exchange rates and gold rates.

a. System Configuration

i. Central computer system

The Tokyo Computer Center serves as the location for the Video-X300 system's central computing facilities. These facilities consist of two HITAC 8450 computers with 512 KB of main storage each. The operating system used with these computers is a special-purpose RTCS.

ii. Communication circuits

The communication circuits connecting the input terminals at short-term investment companies and banks with the computing center, as well as those used to

connect the computing center with the terminals installed at the subscribers' locations and to interconnect subscribers' terminals are all 2,400 bps leased lines.

iii. Terminals

A 14-inch CRT display terminal is used with the QUICK Video-X300 system.

iv. Special features

① This system is also equipped with duplexed CPUs and file storage devices so that while one set of facilities is performing the system function, the other set is acting as a backup system. Thus, even should a breakdown occur with one set of facilities, the system will continue to carry out its primary function by switching to the backup facilities. Also, the system reads the data stored in its files by alternating between the two sets of files, thus distributing the burden placed on the file storage devices and lengthening overall service life.

② In order to reduce disk access time when transmitting data to subscriber terminals, in addition to transmitting data directly from the disk files, this system also features a queued access method.

b. Sources Of Information

The QUICK Video-X300 system receives its data from Japanese short-term investment companies (money brokers) such as Tokyo Forex, Nihon Waribiki Tanshi, Yamane Tanshi and Ueda Tanshi, as well as the Bank of Japan and other Japanese banks such as Tokyo Bank, foreign banks, Nihon Keizai Shimbun, the Tokyo Gold Exchange and the Tanaka Precious Metals Company and other bullion dealers.

c. Types Of Service

The types of services offered via the QUICK Video-X300 system include the provision of information concerning interbank dollar rates (spot and one- to six- month future rates), market volume as determined and announced by the Bank of Japan, customer rates, the Tokyo dollar call rate, historical data, foreign exchange rates from New York, London, Hong Kong and Singapore, U.S. prime interest rates, domestic interest rates (call, bill discount, CD and repurchase agreement rates), major foreign countries' official rates, market trends and related news.

The optional QUICK Gold system which is also available with the Video-X300 system provides interested subscribers with information on gold prices, sell/buy position, volume of transactions and buying and selling records from the Tokyo Gold Exchange, plus domestic gold bullion spot rates from bullion and precious metals dealers. This service also furnishes data on overseas gold prices from markets in Hong Kong, London, Zurich, New York and Sidney, as well as market trends and other related

news.

6) Other QUICK Systems

In addition to those systems described above, QUICK also offers three more important information services: the QN System, QUICK MT-I System and QUICK Board. The QN (QUICK News) System is a service specially designed to transmit data concerning stock prices and commodity markets, as well as company news such as personnel changes and accounts settlements on a computer-to-computer (online) basis to major Japanese newspaper organizations, including the Asahi Shimbun, Mainichi Shimbun, Yomiuri Shimbun, Nihon Keizai Shimbun and Nihon Shoken Shimbun.

The QUICK MT-I System is another online information service providing subscribers with stock and bond prices immediately upon the close of the major Japanese stock exchanges each day utilizing the price data stored on magnetic tapes used in QUICK's (integrated securities) online information system.

Another important QUICK service is the QUICK Board, which, as its name implies, utilizes a wall stock price display board to display stock prices and indices in either one-price or four-price blocks at the counters of Japanese securities firms.

One final QUICK information service that should be mentioned here is NRS (Nikkei News Recall Service) which utilizes the KANJI terminals of the Video-II system to display keyword lists of news headlines and brief summaries by company, institution or industry as retrieved from the Nihon Keizai Shimbun computer system.

7) Conclusion

The preceding has been a very brief outline of the various systems and services offered by QUICK at present. However, the time is rapidly approaching when it will be necessary to upgrade or even replace the entire QUICK system. The company feels it must undertake this tremendous task so as to be able to continue to provide its subscribers with the up-to-the-minute data they require in the most accurate and reliable manner possible. Also, in order to better deal with the violent fluctuations in stock market and financial trends and the arrival of the age of new forms of electronic communications media expected in the not too distant future, QUICK hopes to employ new concepts in computer and data communications technology to create totally new systems as well.

CURRENT NEWS

THE 58TH ANNUAL BUSINESS SHOW HELD IN MAY

The 58th Annual Business Show was held for four days beginning May 11, 1983, at the Tokyo International Trade Center in Harumi, Tokyo. This event was co-sponsored by the Nippon Administrative Management Association (NOMA) and the Tokyo Chamber of Commerce. Participation at this year's show reached 370 thousand and the number of exhibitors rose to 204 companies, up considerably over the 173 companies that sent exhibits to last year's show. Among the exhibitors were 11 companies from nine foreign countries; only three foreign firms brought exhibits to the 57th Annual Business Show last year. The size of the display area had to be increased some 24% over last year's floor space to an all-time high of 23,000 square meters to accommodate the increased number of exhibits.

The theme at this year's show was, "OA: From A Vision To A Reality In One Giant Leap."

Shipments of domestically produced office automation machines and equipment (general business machines, business computers and related equipment, communications equipment and audiovisual equipment) during the past year was up 11.7% over the previous year's total, amounting to roughly 4,556 billion yen. Thus, it would seem that sales in this field are growing despite the worldwide business slump.

The hit of this year's show were the local area networks (LAN). NEC exhibited its C&C Optical Network System Loop 6830, Sord Showed its S-NET and Mitsubishi Electric, Toshiba, Hitachi and Fujitsu all displayed their respective versions of LANs. In all, 11 companies exhibited LANs at this year's show, whereas only eight companies showed such networks last year. Generally speaking, a LAN is a network comprised of various, normally stand-alone, OA machines and equipment connected together via coaxial or fiber-optic cables to form a system capable of numerous types of data communications.

Another special features of this year's 58th Annual Business Show was the Japan IBM 5550 and other multi-functional, 16-bit small business computers which have suddenly been announced. In addition to the Japan IBM machine, 16-bit small business computers were also shown by Oki Electric, Fujitsu,

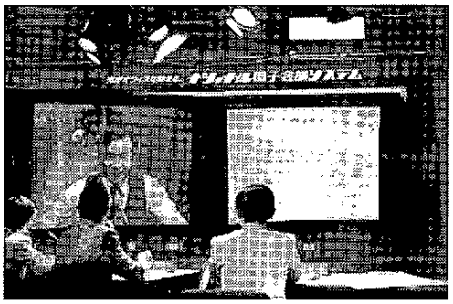
Flags Flying At The Entrance To The Business Show Symbolize Its International Nature

Hitachi and Mitsubishi Electric. Sord outdid these 16-bit machines, however, by exhibiting its 32-bit super microcomputer, the M685. And there were also a number of hand-held computers (HHC) capable of serving as portable data terminals exhibited by certain companies this year.

Other exhibits which attracted attention were yet-to-be-commercialized new model OCRs capable of reading handwritten characters. Mitsubishi Electric's "Japanese-language OCR Device" can recognize roughly 1,000 different handwritten Japanese ideographs, as well as read image-type data. The recognition methods employed by this OCR include a stroke matching method for reading Japanese KANJI (ideographs) and a contour analysis method for reading English-language characters, numerals and KANA (Japanese syllabaries). Sharp also showed an OCR which it calls its "Online Hand-Written KANJI Recognition Device." The Sharp OCR employs a pattern matching recognition system and is capable of reading 1,945 different KANJI.

The Turnout For This Year's Business Show Was The Largest In Its History

The combination of a rising need to improve office productivity and recent progress in electronic technologies has brought OA from the idea stage to the level of actual utilization. From the government agency to the private company, OA is rapidly coming into widespread use in all sorts of offices.



A Teleconferencing System Being Demonstrated At The 58th International Business Show

PROPOSAL TO IMPROVE GOVERNMENT DATA DISTRIBUTION SYSTEMS

The Database Service Vendors' Association was founded in December, 1979, by private database service vendors for the purpose of establishing the database service industry and promoting the construction of databases and the distribution of the data contained therein. This

association has recently announced a proposal it submitted to the Government urging it to update and improve its data distribution systems.

There is a considerable amount of data of all types being generated in Japan, but, nevertheless, this country's database services are far behind those available in the U.S. and Europe. The Database Service Vendors' Association thus proposed the following four points as methods for furthering the database service industry in Japan:

1) With the exception of cases involving national or company secrets or privacy, the government should update the lists of data which can currently be utilized by private database service vendors, improve the specific methods available for utilizing this data and make these public;

2) The government and related organizations and agencies in possession of databases should update and improve those databases and establish methods for distributing the data contained therein;

3) The government should perfect ways for quickly and effectively providing access to statistical databases and other files with high utilization value; and

4) The government should devise a system whereby private database service vendors can make long-term use of information other than statistical data, including the data and reports on various experiments and research activities and those results in the possession of national and other public organs.

The Database Service Vendors' Association currently has a membership of some 33 database service companies, all of which are active in the carrying out of studies and surveys of various kinds. Anyone wishing to get in touch with this group should contact JIPDEC's Research Section.

RESULTS OF THE 1982 CERTIFIED DATA PROCESSING EXAMINATION

As part of its overall policy of educating and training information processing specialists and engineers, the Ministry of International Trade and Industry (MITI) has been sponsoring a Certified Data Processing Examination for IP specialists and engineers once every year since 1969. This examination is broken down into three levels: a special examination for systems engineers, a grade-one examination for senior programmers and a grade-two examination for junior programmers. The passing of any of these three levels of examination's certifies that the examinee has acquired the knowledge and technical skills necessary for an information processing engineer at the level at which he/she tested.

The number of examinees who successfully completed the fourteenth round of examinations held during 1982 came to 615 in the special systems engineer

This table shows the results of the Certified Data Processing Examination for the past five year period.

Level / Year	Special (Systems Engineers)			Grade One (Senior Programmers)			Grade Two (Junior Programmers)			Total		
	Number of Applicants	Number of Examinees	Numbers Certified (Figures in parentheses indicate number of women engineers who passed the exams)	Number of Applicants	Number of Examinees	Numbers Certified (Figures in parentheses indicate number of women engineers who passed the exams)	Number of Applicants	Number of Examinees	Numbers Certified (Figures in parentheses indicate number of women engineers who passed the exams)	Number of Applicants	Number of Examiness	Numbers Certified Figures in parentheses indicate number of women engineers who passed the exams)
'78	4,866	3,204	295 (4)	13,713	9,406	973 (43)	29,247	21,112	4,138 (403)	47,826	33,722	5,406 (450)
'79	5,866	3,887	442 (4)	16,777	11,461	1,327 (78)	35,427	25,407	5,089 (459)	58,070	40,755	6,858 (541)
'80	7,123	4,628	490 (14)	19,596	13,206	1,430 (59)	42,058	28,940	5,507 (678)	68,777	47,774	7,427 (751)
'81	8,283	4,894	547 (11)	23,161	15,008	2,054 (114)	53,864	37,842	5,845 (707)	85,308	57,744	8,446 (832)
'82	9,563	5,566	615 (14)	27,315	17,636	2,671 (169)	71,596	49,724	8,066 (1,178)	108,474	72,926	11,352 (1,361)

category, 2,671 in the grade-one senior programmer category and 8,066 in the grade-two junior programmer category. The ratio of successful examinees worked out to 11.0%, 15.1% and 16.2%, respectively, for these three levels of examinations. The number of individuals who applied for this year's examinations exceeded 100 thousand for the first time since MITI started this program back in 1969, and the total number of people who took the various examinations reached 72,926. The average age of those who passed these tests ranged from 31.7 years for the special examination, to 25.5 years for the grade-one and 23.0 years for the grade-two examinations. By occupation, we see that the highest number of successful examinees came from software companies, whereas the highest percentage of those who passed the various levels of examinations were from computer manufacturers at 22.6%.

INS TO BEGIN TRIAL SERVICE IN SEPTEMBER OF NEXT YEAR

The Nippon Telegraph and Telephone Public Corporation (NTT) has been developing a sophisticated data communications system called the Information Network System (INS). NTT has recently announced that the first working model of this system will be put into operated by September of next year on a trial basis in the Mitaka area of Tokyo.

INS is an integrated digital network system which makes use of the latest in fiber-optic cables. It is being developed by NTT for the purpose of enabling standard rates to be charged nationwide, regardless of the distances involved, for a variety of different types of communication services, including telephone calls, data communications, facsimile and picture transmissions.

Until the entire national telecommunications network can be completely digit-

Conceptual Diagram Of INS

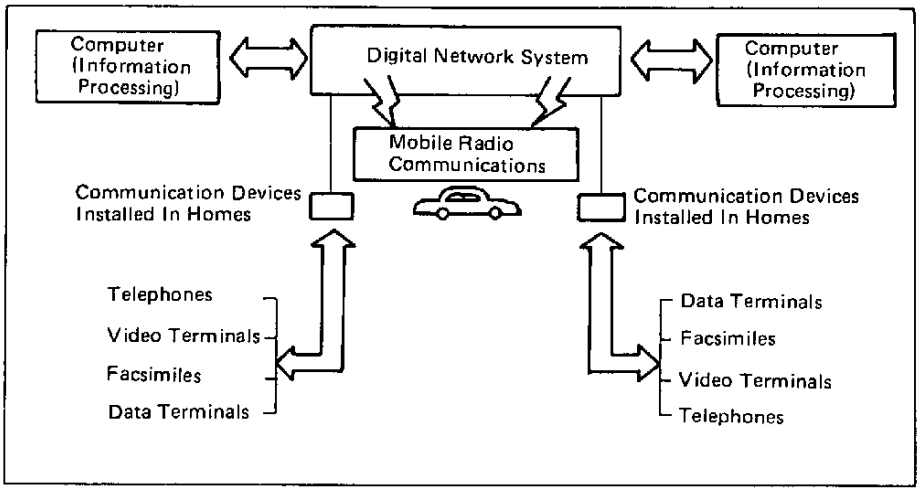
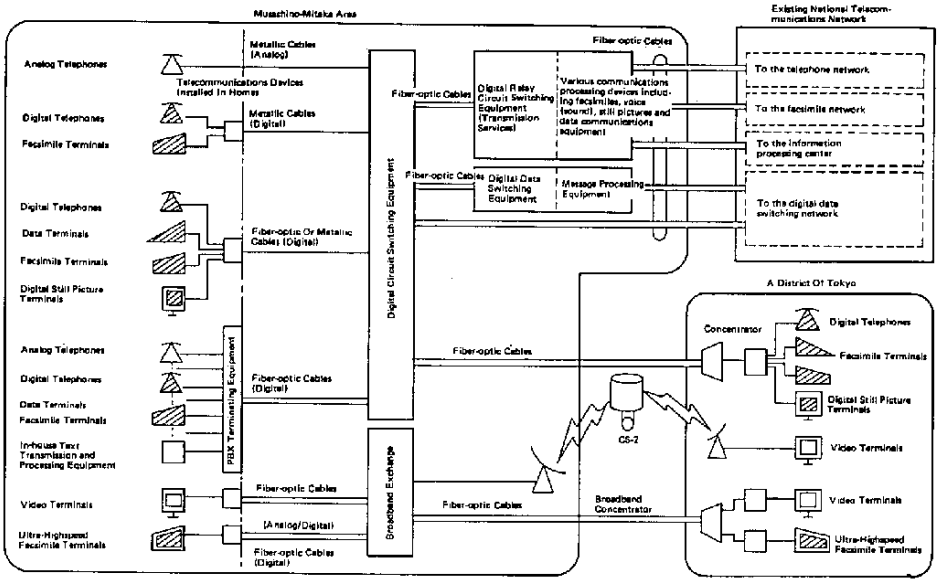


Diagram Of The Configuration Of The Model INS System



alized, analog and digital communications will continue to exist side-by-side and to be used together. One important aim of testing the INS model next September will be to strengthen the technological basis of that new system.

The construction of INS is an enormous undertaking that will cost NTT alone somewhere between 20 and 30 trillion yen in direct investments. The total cost of this project is expected to amount to roughly 60 trillion yen once all attendant expenses have also been figured in.

MATSUSHITA ELECTRIC DEVELOPS AN ERASABLE OPTICAL DISK

Matsushita Electric has developed an optical disk capable of being erased and reused more than one million times. This optical disk measures 20 cm in diameter and has a storage capacity of 1 gigabyte, or more than 20 times that of conventional fixed magnetic disks. The reflectivity of the materials used in this optical disk to actually store data is altered via the application of semiconductor laser technology, making it possible to store and retrieve data on and from this disk utilizing the differences in reflectivity produced in this way. This particular method for storing data on optical disks isn't new, but when the laser comes in contact with the surface of the disk, the primarily tellurium suboxide material used in it turns from crystal to amorphous in nature and vice-versa. It is this new storage media that has enabled Matsushita to develop an erasable optical disk.

FUJITSU DEVELOPS JAPAN'S FIRST "LISP" COMPUTER

Fujitsu has developed a new computer, called the "ALPHA," that is specially designed to run on LISP, a high-level language which is particularly well suited for manipulating symbolic strings in list processing. ALPHA is composed of four principal units: an instruction processing unit, main storage control unit, main storage unit and data transmission control unit. It is not a stand-alone machine, however, but rather is designed for use with a general purpose computer.

This computer has 16 KW (48 bit word) of control storage, an 8 KW (32 bit word) hardware stack (similar to the cache memory in general-purpose computers), and 16 megabytes of virtual storage. The control storage utilizes a microprogram, and the hardware stack is where the data necessary to perform LISP processing is stored. It is these two elements of the computer that enable it to achieve high-speed processing.

The processing speed of ALPHA is roughly 2 ~ 3 times faster than that for LISP computers already available on the market and at least a single digit faster that the average general-purpose computer.

COMPUTER INSTALLATION IN JAPAN
—As of the End of June, 1982—

General Purpose Computers in Operation

(Value: million yen)

Size of Computers		End of June, 1982	End of March, 1982
Large	Set (%)	3,563 (3.2)	3,500 (3.3)
	Value (%)	2,733,235 (56.6)	2,678,120 (56.8)
Medium	Set (%)	11,436 (10.4)	11,130 (10.5)
	Value (%)	1,125,871 (23.3)	1,095,331 (23.2)
Small	Set (%)	33,768 (30.6)	32,565 (30.6)
	Value (%)	615,686 (12.7)	594,294 (12.6)
Very Small	Set (%)	61,621 (55.8)	59,149 (55.6)
	Value (%)	362,573 (7.5)	348,675 (7.4)
Total	Set (%)	110,388 (100.0)	106,344 (100.0)
	Value (%)	4,837,364 (100.0)	4,716,420 (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 June, 1982)

(Value: million yen)

Industrial Category	Set	Value	Value per set
Agriculture	100	2,323	23.2
Forestry and hunting	36	370	10.3
Fisheries, fishing and pisciculture	181	3,794	21.0
Mining	151	4,536	30.0
Construction	2,416	61,335	25.4
Foodstuffs	3,590	82,529	23.0
Textiles and textile products	2,205	49,039	22.2
Pulp, paper and paper products	861	17,715	20.6
Publishing and printing	994	41,644	41.9
Chemicals and petroleum refining	3,815	178,459	46.8
Ceramics	903	30,258	33.5
Iron and steel	1,081	132,967	123.0
Non-ferrous metal	1,843	59,752	32.4
Machinery	2,207	86,485	39.2
Electric machinery	4,730	536,842	113.5
Transport equipment	1,774	201,374	113.5
Precision machinery	919	47,227	51.4
Other manufacturing	3,762	76,737	20.4
Wholesale and retail, trade firms	47,786	728,708	15.2
Finance	6,404	718,159	112.1
Security	305	68,119	223.3
Insurance	661	151,825	229.7
Real estate	281	5,259	18.7
Transportation, and telecommunications	3,460	128,359	37.1
Electricity, gas and water	464	72,086	155.4
Service	8,834	406,050	46.0
(General Service)	4,779	117,607	24.6
(DP Service)	4,055	288,443	71.1
Hospitals	797	25,177	31.6
Universities	1,168	142,397	121.9
Senior high schools	499	10,074	20.2
Other schools	325	10,780	33.2
Municipal bodies	1,607	110,552	68.8
Government department agencies	775	147,541	190.4
Governmental organizations	1,120	361,717	323.0
Cooperative association and organizations	4,185	130,857	31.3
Religious organizations	39	1,130	29.0
Not elsewhere classified	110	5,188	47.2
Total	110,388	4,837,364	43.8

UPCOMING EVENTS IN JAPAN
1983 – 1984

DATE	EVENT	CITY/PLACE	ORGANIZER/CONTACT
1983 September 12-14	The World Communications Conference, Tokyo	Keio Plaza Hotel Suite 1024	2-2-1 Nishi-Shinjuku, Shinjuku-ku, Tokyo 160 (03) 342-1839
September 29-4	Life and Information Exhibition	Shibuya Department Store, Tokyo	JIPDEC 3-5-8, Shibakoen, Minato-ku, Tokyo 105 (03) 434-8211 Ext 535
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
13	International Symposium on information	Yakult Hall, Tokyo	JIPDEC 3-5-8, Shibakoen, Minato-ku, Tokyo 105 (03) 434-8211 Ext 538
October 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 Shimbun 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
December	7-9	'83 International Technical Exhibition on Image Technology & Equipment	Otemachi Nokyo 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

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.

This 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 calender.

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

Japan Information Processing Development Center