IBM System/38
Communications Capabilities

MANAGEMENT SUMMARY

The much talked about System/38 is now finally a reality. First commercial deliveries, delayed by an 11-month set-back caused by problems encountered in the development of the operating system and its integration with the data base management system, officially began July 1, 1980. Shipments seem to be moving now, and IBM's strong promotional efforts seem to have done much to smooth any feathers ruffled during the long wait.

The System/38 is the "first of a truly new IBM generation" whose architectural orientation is data base driven. Some key characteristics include: extensive data base facilities, flexible work management functions, high levels of device-independence for programs, and new control language and data definition interfaces providing consistent access to all control program and utility functions.

Clearly intended to be a stand-alone multi-workstation business computer, the System/38 offers up to 2048K bytes of main memory and up to 387.1 megabytes of disk storage. The System/38 can accommodate up to 80 local workstations, plus supporting point-to-point or multipoint communications with remote clusters of terminals. The Control Program Facility (CPF), an operating system newly developed for the System/38, features multiple access paths to disk, which are shared by active programs. Applications programs are written to service a single workstation. Re-entrant code is generated, which permits simultaneous use of a program by multiple workstations. Batch and interactive tasks can be serviced simultaneously. IBM-provided user programming languages include RPG III and COBOL. In addition, a number of specialized software packages are available. ▷

Optional features for the System/38, which permit up to eight SDLC or BSC communications links with the IBM 5250 Information Display System devices, another System/38, IBM System/370, 30XX, or 43XX processors, and other IBM systems and terminals.

Half-duplex communications over switched, non-switched, or DDS facilities at up to 9600 bps are supported.

Monthly rental for the attachment of communications lines to the system is priced at $106 for attachment and control features required for each four-line set, plus $66 to $83 per line.

CHARACTERISTICS

VENDOR: International Business Machines Corporation, General Systems Division, 5775 Glenridge Drive, N.E., Atlanta, Georgia 30301. Telephone (404) 256-7000.

DATE OF ANNOUNCEMENT: October 1978.

DATE OF FIRST DELIVERY: July 1980.

NUMBER DELIVERED TO DATE: Information not available.

SERVICED BY: IBM.

CONFIGURATION

The System/38 is available in 96 models offering from 512K to 2048K bytes of main memory and from 64.5 to 387.1 ▶

The 5381 System Unit, pictured at left, is the heart of the System/38. It features a diskette magazine drive (top left), a console/keyboard display (top right), and contains the CPU, disk storage, workstation controller, and communications adapters.

IBM System/38
Communications Capabilities

▷ When the System/38 was introduced, its communications capabilities did not seem to match the power of the processor. However, in January 1981, IBM announced a number of significant communications enhancements, including: support for BSC communications (originally only SDLC was supported); an increase in the number of local workstations supported from 40 to 80; and an increase in the number of communications lines from four to eight.

The new BSC capability will allow the System/38 to communicate (in point-to-point mode only) with other System/38s, as well as IBM System/3, System/32, System/34, Series/1, and 5110/5120 computers, and IBM 3741, 5230, 5280, and 5260 terminal systems. Communications with a host System/370, 30XX, or 43XX Series mainframe can now be under SDLC or BSC control. Maximum communications speed remains at 9600 bps; as yet, no high-speed data transfer capability has been announced.

In this same announcement, IBM expressed its intent to extend System/38 SNA/SDLC and BSC communications capabilities by providing support for SNA Remote Job Entry (SRJE), BSC Multi-leaving Remote Job Entry (MRJE), and BSC Multipoint Tributary connections, each with the System/38 functioning as a terminal to a host System/370, 30XX, or 4300 Series host. These product enhancements are expected to become available within the next three years.

Adding communications lines to an already functioning System/38 does not require changing the CPF system software. The communications functions of CPF are bundled, i.e., provided to all System/38 users whether or not the user requires a communications capability.

Offering an attractive migration path for System/3 and System/34 users, the System/38 features increased main memory, disk storage, sophistication in software and function, and communications capabilities over the predecessor systems. IBM makes the System/34 to System/38 conversion even more attractive by utilizing the same IBM 5250 Information Display System family of terminals that is basic to the System/34. Like the System/34, the System/38 offers point-to-point and multipoint communications capabilities. In a multi-point capacity, which is supported under SDLC only, the System/38 can serve either as a host to multiple remote 5250 clusters or as a tributary terminal to a remote host in a larger network. The System/38 also offers a variety of communication line interfaces and attachments similar to those for the System/34. Both System/3-to-System/38 and System/34-to-System/38 conversion aids are available.

USER REACTION

In February 1981, Datapro conducted a user survey of computer systems, and received responses from 26 System/38 users, who each had one System/38 installed. ▷

▶ megabytes of non-removable disk storage (1 to 6 drive units). The group is built from two CPU models: Model 300 and 500. The former features new 64K-bit chips, a 1.1 microsecond cycle time for a four-byte fetch, and a non-expandable control storage of 8K 32-bit words (0.4 microsecond cycle time). The quicker and more powerful Model 500 features new 32K-bit chips, a 0.6 microsecond cycle time for a four-byte fetch, and 8K 32-bit control storage words (0.2 microsecond cycle time). In some Model 500 processors, IBM has recently substituted 16-bit chips for the 32-bit ones.

The 5381 System Unit is the heart of the System/38. It features a system console with keyboard and display, a diskette magazine drive, and contains the interface for local attachments and communications lines.

A multi-function 96-column card reader/punch (Model 5424), a magnetic tape unit (Model 3411), and up to two 1200 lpm (Model 3203-5), 600 lpm (Model 3262), or 300 lpm (Model 5211-2) printers can be accommodated. In addition to its non-removable disk storage, the Model 500 processor can also support one to four Model 3370 disk drives, for 571.3MB to 2285.5MB of additional disk storage. Up to 80 local workstations (5250 keyboard/displays and printers) can be accommodated. Remote devices, including host computers and various terminals, can be connected via up to eight communications lines.

The 5381 unit contains an integrated Work Station Controller with eight ports, which can handle the local attachment of up to 12 devices, including the 5251 Display Station (Models 1 and 11), the 5252 Dual Display Station (Model 1), and the 5256 Printer (Models 1, 2 and 3). These devices are attached via either 5250 twinax cable or 3270-compatible coax cable. Twinax cable provides for multipoint cable connections and device attachment up to 5000 ft. from the processor unit. Coax cable is limited to 2000 ft. Up to seven devices can be attached to one Work Station Controller port with twinax cable using the Cable Thru feature on the 5250 devices, but the overall maximum for all eight ports is 12 without additional features.

For more than 12 local 5250 devices, additional features are required. A Device Interface Expansion (#5321) attaches to the basic Work Station Controller and provides an additional eight ports for attachment of eight more devices. If no more than eight cable ports are required, a Device Control Expansion (#5331), which provides the necessary control storage to support eight more devices without additional cable ports, is used instead of the Interface Expansion.

For more than 20 local devices, a second, third, and fourth Work Station Controller (#5302, #5303, and #5304, respectively) may be required. Each provides eight ports for cable attachments and can support 12 devices. A Device Interface Expansion (#5322/#5323/#5324) or a Device Control Expansion (#5332/#5333/#5334) are available for each additional Work Station Controller to bring the local device total up to the system maximum of 80 using 32 or 64 ports.

A basic multiline facility is integrated into the 5381 unit for the attachment of up to eight communications lines. Additional, optional features are required to implement remote data communications. Communications line attachments do not exclude any of the local device attachments, nor do they affect the maximum system capacity for locally attached devices.

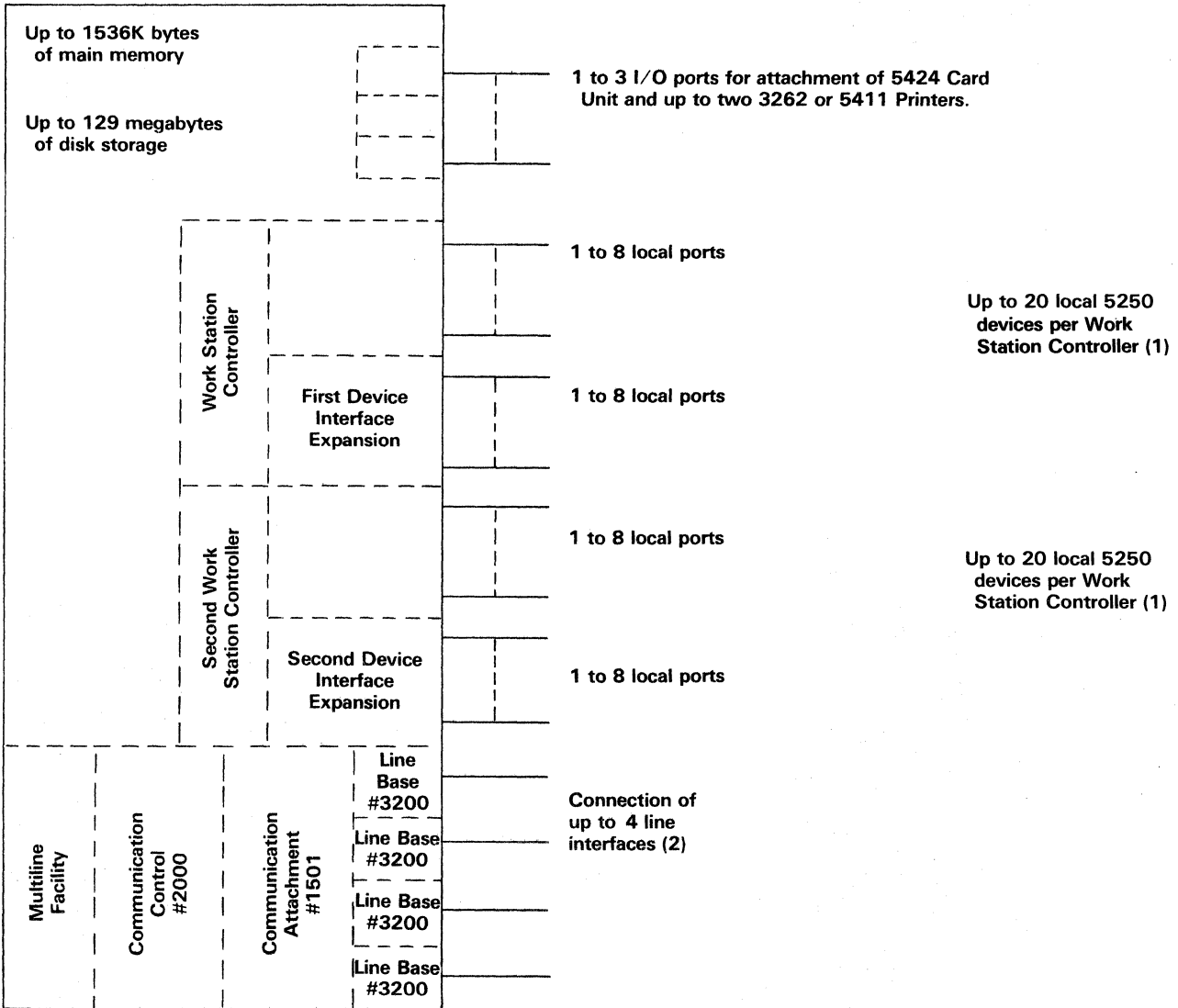## COMMUNICATIONS FEATURES
AND COMPONENTS

Several optional components are required in addition to the integrated multiline facility in the 5381 unit to effect ▶

IBM System/38
Communications Capabilities

Configuration

5381 System Unit

Up to 1536K bytes of main memory

Up to 129 megabytes of disk storage

Work Station Controller

First Device Interface Expansion

Second Work Station Controller

Second Device Interface Expansion

Multiline Facility

Communication Control #2000

Communication Attachment #1501

Line Base #3200

Line Base #3200

Line Base #3200

Line Base #3200

1 to 3 I/O ports for attachment of 5424 Card Unit and up to two 3262 or 5411 Printers.

1 to 8 local ports

1 to 8 local ports

Up to 20 local 5250 devices per Work Station Controller (1)

1 to 8 local ports

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Up to 20 local 5250 devices per Work Station Controller (1)

Connection of up to 4 line interfaces (2)

(1) A Device Control Expansion feature can be used in lieu of the Device Interface Expansion, but will limit each Work Station Controller to 8 ports, even though 20 workstations can be connected.

(2) Interfaces may connect to remote System/370's and/or remote 5250 clusters; see the accompanying table for specifications of each available interface adapter.

► within the host is through VTAM, ACF/VTAM, TCAM, or ACF/TCAM.

With the System/38 using SDLC protocol in an SNA network, data communications into the host will be via a 370X front end, which will require NCP/VS or ACF/NCP/VS, as appropriate.

TRANSMISSION SPECIFICATIONS

A separate Line Base (#3200) is required for each communications line attachment. Under the System's Control Program Facility (CPF), each line operates with half-duplex SDLC protocol. Transmission at 600, 1200, 2400, 4800, 7200, or 9600 bps over leased (non-switched) or telephone (switched) lines supported. Each line can operate at a different speed.

Four versions of a 1200 bps line interface with integrated modem are offered. These interfaces, for which internal clocking is contained in the Line Base, can alternatively be operated at 600 bps via parameter modification to the CPF software. For private lines, a non-switched interface (#5500) is available. For switched lines, interfaces with Auto Answer (#5501) and manual answer (#5502) are available. There is also a non-switched with switched network backup (with Auto Answer) interface (#5508). The devices communicating with the System/38 must also be equipped with a similar 1200 bps integrated modem interface.

An EIA interface (#3701) is offered and will support external modems conforming to RS-232C. An Auto Call Adapter (#5760), which, under program control, automatically dials into a switched network facility, is available in conjunction with the EIA interface. Each line with an Auto Call unit takes two interface positions, and therefore reduces the total number of line connections possible. ►

IBM System/38
Communications Capabilities

▶ Two versions of the Dataphone Digital Service (DDS) interface are offered. One version (#5650) supports point-to-point and multipoint lines. The other version (#5651) supports the System/38 operating on a multipoint line as a tributary to a host, which serves as the control processor. Speeds of 2400, 4800, and 9600 bps are supported with the DDS adapters. Remote workstations that are to be linked to the System/38 via DDS require the 5251 (Model 2 or 12) to have the DDS adapter for multipoint, tributary lines (#5651).

A loop station adapter for the System/38 is available via RPQ.

SOFTWARE

All communications functions of the System/38 are included in the basic Control Program Facility (CPF), a new, bundled system support program product announced with the System/38. A key aspect of CPF is multiple, simultaneous access to an applications program from multiple workstations. Multiple access paths are maintained to disk storage. CPF supports interactive and batch processing with multiple, concurrent users. RPG III, an updated version of RPG II, is presently the only language provided for user program development. Additional software products which are available include Interactive Data Base Utilities; Conversion Reformat Utility, for the sorting, merging and copying of data base files; and System/3 Batch Conversion Utilities, for the conversion of System/3 software products to their System/38 equivalents. Application programs are available for Manufacturing, Accounting and Production Information Control System (MAPICS), and Distribution Management System (DMS).

System/38 software is "object" oriented. The objects, such as programs, subroutines, and data base files reside in virtual storage.

A sophisticated control language is provided with the system; it provides commands with which the user can tailor subsystem functions not included in a licensed program for his particular applications.

The System/38 software offers attractive message-handling capabilities that permit operator-initiated messages to be sent from any workstation to any other workstation. Also, program entry and modification can be effected from any workstation.

PRICING

All System/38 components are available on a purchase, month-to-month rental, or three-year lease basis. Both rental arrangements include prime shift maintenance, and purchased components can have a separate maintenance contract. The terms and conditions of IBM's Agreement of Lease or Rental varies with component.

For example, the 5381 System Unit and the 5211 printer are offered under Rental Plan B for unlimited usage, while the 5424 Multifunction Card Unit and the 3411 Magnetic Tape Unit are treated as metered I/O units under Rental Plan B.

System/38 licensed programs are provided under the agreement of IBM Licensed Programs.■

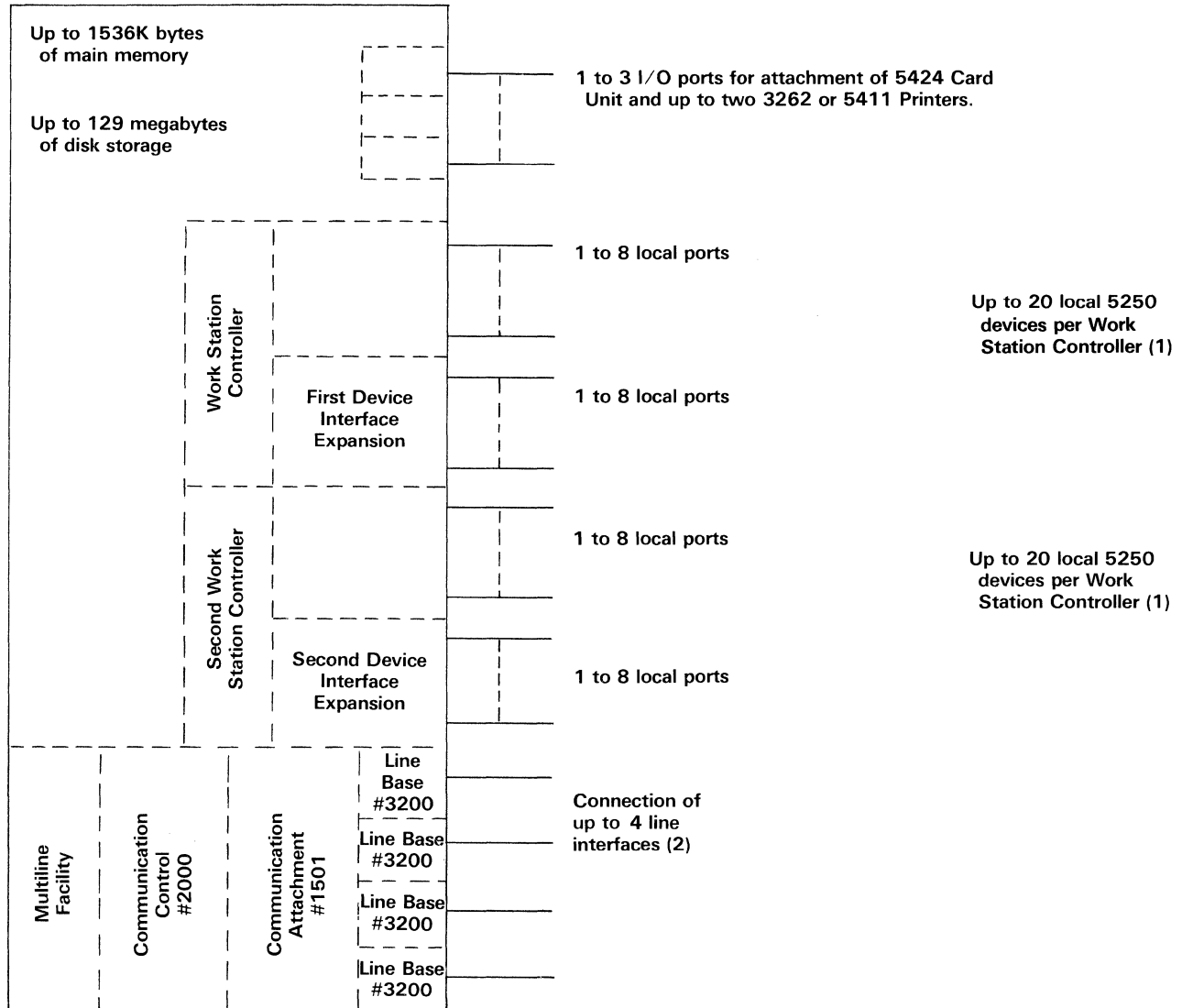|		Monthly Charge* Rental	Lease	Purchase Price	Monthly Maintenance
	5250 Information Display Devices				
	5251 Display Station (Model 12)	$160	$136	$4,050	$44.50
2550	Single Cluster Feature	53	45	1,520	11.50
2551	Dual Cluster Feature	108	92	3,040	23
2680	Cable Thru Feature	4	3	115	1
4703	Internal Clock	6	5	210	1
	5251 Display Station (Model 11)	101	86	2,850	20.50
	5252 Dual Display Station	108	92	3,040	23
	5256 120 cps Printer (Model 3)	231	197	6,250	53
	Communications Components				
1501	Communication Attachment	25	22	780	6.50
2000	Communication Control	81	70	2,535	21
3200	Line Base	52	46	1,675	2.50
3701	EIA Interface	14	12	430	6
5650	DDS Adapter, Point-to-Point	27	24	840	5.50
5651	DDS Adapter, Multipoint	27	24	840	5.50
5500	Non-Switched Interface	21	18	660	9
5501	Switched w/Auto Answer Interface	29	25	880	8
5502	Switched w/Manual Answer Interface	21	18	660	10
5508	Non-Switched w/Switched Backup & Auto Answer Interface	31	27	1,015	10.50
5760	Auto Call Adapter	14	12	430	2.50
	Attachment Expansion Units				
5305	Second Work Station Controller	144	125	5,070	20
5331	Device Control Expansion, First	37	32	1,230	2.50
5332	Device Control Expansion, Second	37	32	1,230	2.50
5321	Device Interface Expansion, First	86	76	2,870	6.50
5322	Device Interface Expansion, Second	86	76	2,870	6.50
6300	1st Processor Unit Expansion**	62	54	1,950	5.50
6302	3rd Processor Unit Expansion**	12	11	390	1.50

*Includes prime-shift maintenance.
**Required for Communication Attachment or Second Work Station Controller■

IBM System/38
Communications Capabilities

Configuration

5381 System Unit

Up to 1536K bytes of main memory

Up to 129 megabytes of disk storage

Work Station Controller

First Device Interface Expansion

Second Work Station Controller

Second Device Interface Expansion

Multiline Facility

Communication Control #2000

Communication Attachment #1501

Line Base #3200

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1 to 3 I/O ports for attachment of 5424 Card Unit and up to two 3262 or 5411 Printers.

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Up to 20 local 5250 devices per Work Station Controller (1)

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(2) Interfaces may connect to remote System/370's and/or remote 5250 clusters; see the accompanying table for specifications of each available interface adapter.

▶ within the host is through VTAM, ACF/VTAM, TCAM, or ACF/TCAM.

With the System/38 using SDLC protocol in an SNA network, data communications into the host will be via a 370X front end, which will require NCP/VS or ACF/NCP/VS, as appropriate.

TRANSMISSION SPECIFICATIONS

A separate Line Base (#3200) is required for each communications line attachment. Under the System's Control Program Facility (CPF), each line operates with half-duplex SDLC protocol. Transmission at 600, 1200, 2400, 4800, 7200, or 9600 bps over leased (non-switched) or telephone (switched) lines supported. Each line can operate at a different speed.

Four versions of a 1200 bps line interface with integrated modem are offered. These interfaces, for which internal clocking is contained in the Line Base, can alternatively be operated at 600 bps via parameter modification to the CPF software. For private lines, a non-switched interface (#5500) is available. For switched lines, interfaces with Auto Answer (#5501) and manual answer (#5502) are available. There is also a non-switched with switched network backup (with Auto Answer) interface (#5508). The devices communicating with the System/38 must also be equipped with a similar 1200 bps integrated modem interface.

An EIA interface (#3701) is offered and will support external modems conforming to RS-232C. An Auto Call Adapter (#5760), which, under program control, automatically dials into a switched network facility, is available in conjunction with the EIA interface. Each line with an Auto Call unit takes two interface positions, and therefore reduces the total number of line connections possible. ▶

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A loop station adapter for the System/38 is available via RPQ.

SOFTWARE

All communications functions of the System/38 are included in the basic Control Program Facility (CPF), a new, bundled system support program product announced with the System/38. A key aspect of CPF is multiple, simultaneous access to an applications program from multiple workstations. Multiple access paths are maintained to disk storage. CPF supports interactive and batch processing with multiple, concurrent users. RPG III, an updated version of RPG II, is presently the only language provided for user program development. Additional software products which are available include Interactive Data Base Utilities; Conversion Reformat Utility, for the sorting, merging and copying of data base files; and System/3 Batch Conversion Utilities, for the conversion of System/3 software products to their System/38 equivalents. Application programs are available for Manufacturing, Accounting and

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A sophisticated control language is provided with the system; it provides commands with which the user can tailor subsystem functions not included in a licensed program for his particular applications.

The System/38 software offers attractive message-handling capabilities that permit operator-initiated messages to be sent from any workstation to any other workstation. Also, program entry and modification can be effected from any workstation.

PRICING

All System/38 components are available on a purchase, month-to-month rental, or three-year lease basis. Both rental arrangements include prime shift maintenance, and purchased components can have a separate maintenance contract. The terms and conditions of IBM's Agreement of Lease or Rental varies with component.

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| | | Monthly Charge* | | Purchase | Monthly |
		Rental	Lease	Price	Maintenance
	5250 Information Display Devices				
	5251 Display Station (Model 12)	$149	$127	$4,050	$42.50
2550	Single Cluster Feature	49	42	1,520	11
2551	Dual Cluster Feature	100	85	3,040	22
2680	Cable Thru Feature	4	3	115	1
4703	Internal Clock	6	5	210	1
	5251 Display Station (Model 11)	94	80	2,850	19.50
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	Communications Components				
1501	Communication Attachment	23	20	780	6
2000	Communication Control	75	65	2,535	20
3200	Line Base	49	43	1,675	2
3701	EIA Interface	13	11	430	6
5650	DDS Adapter, Point-to-Point	25	22	840	5
5651	DDS Adapter, Multipoint	25	22	840	5
5500	Non-Switched Interface	20	17	660	9
5501	Switched w/Auto Answer Interface	27	23	880	8
5502	Switched w/Manual Answer Interface	19	17	660	10
5508	Non-Switched w/Switched Backup & Auto Answer Interface	29	25	1,015	10
5760	Auto Call Adapter	13	11	430	2
	Attachment Expansion Units				
5305	Second Work Station Controller	144	125	5,070	20
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5322	Device Interface Expansion, Second	80	70	2,870	6
6300	1st Processor Unit Expansion**	57	50	1,950	5
6302	3rd Processor Unit Expansion**	11	10	390	1

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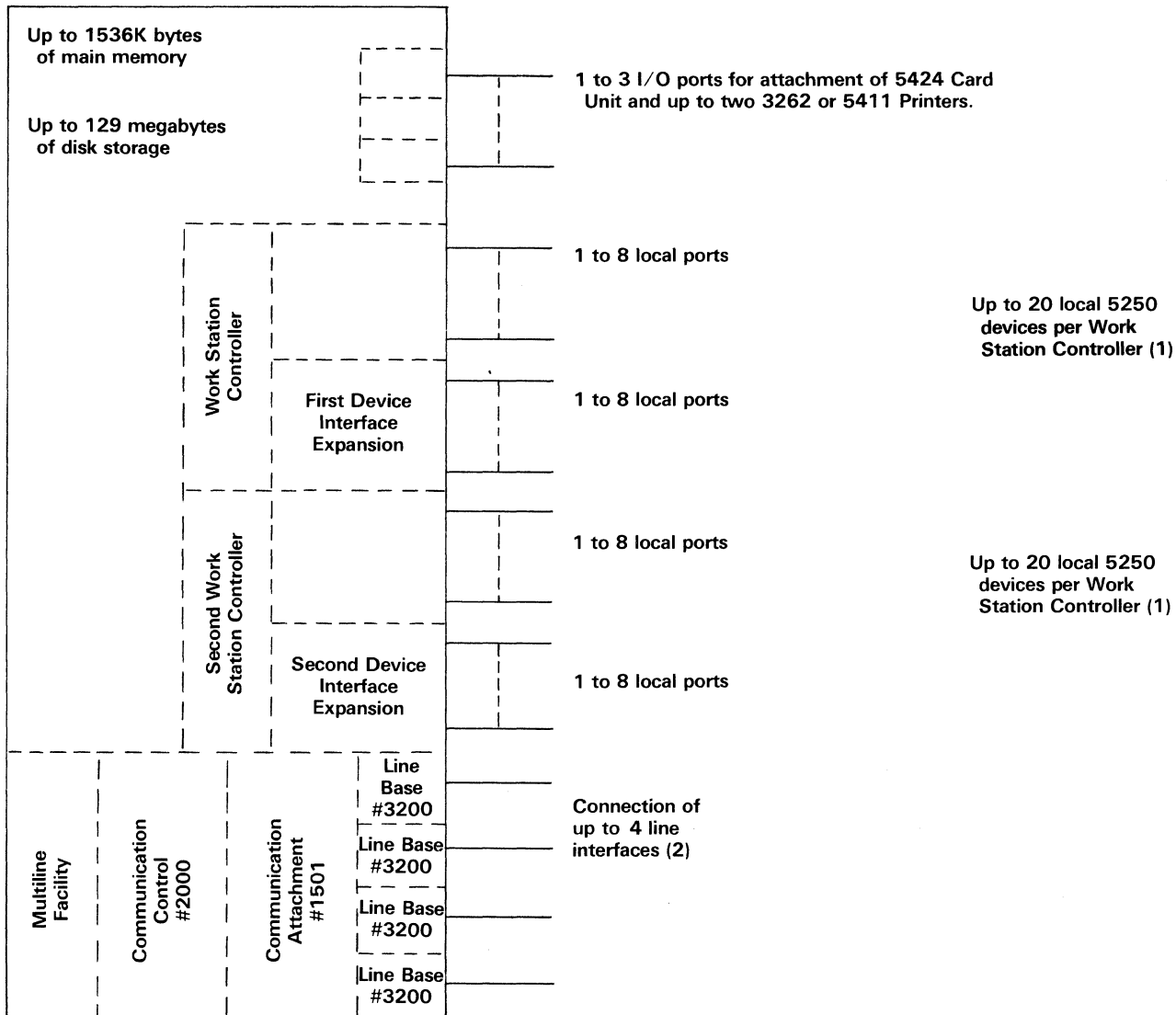**Required for Communication Attachment or Second Work Station Controller■

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1 to 8 local ports

Up to 20 local 5250 devices per Work Station Controller (1)

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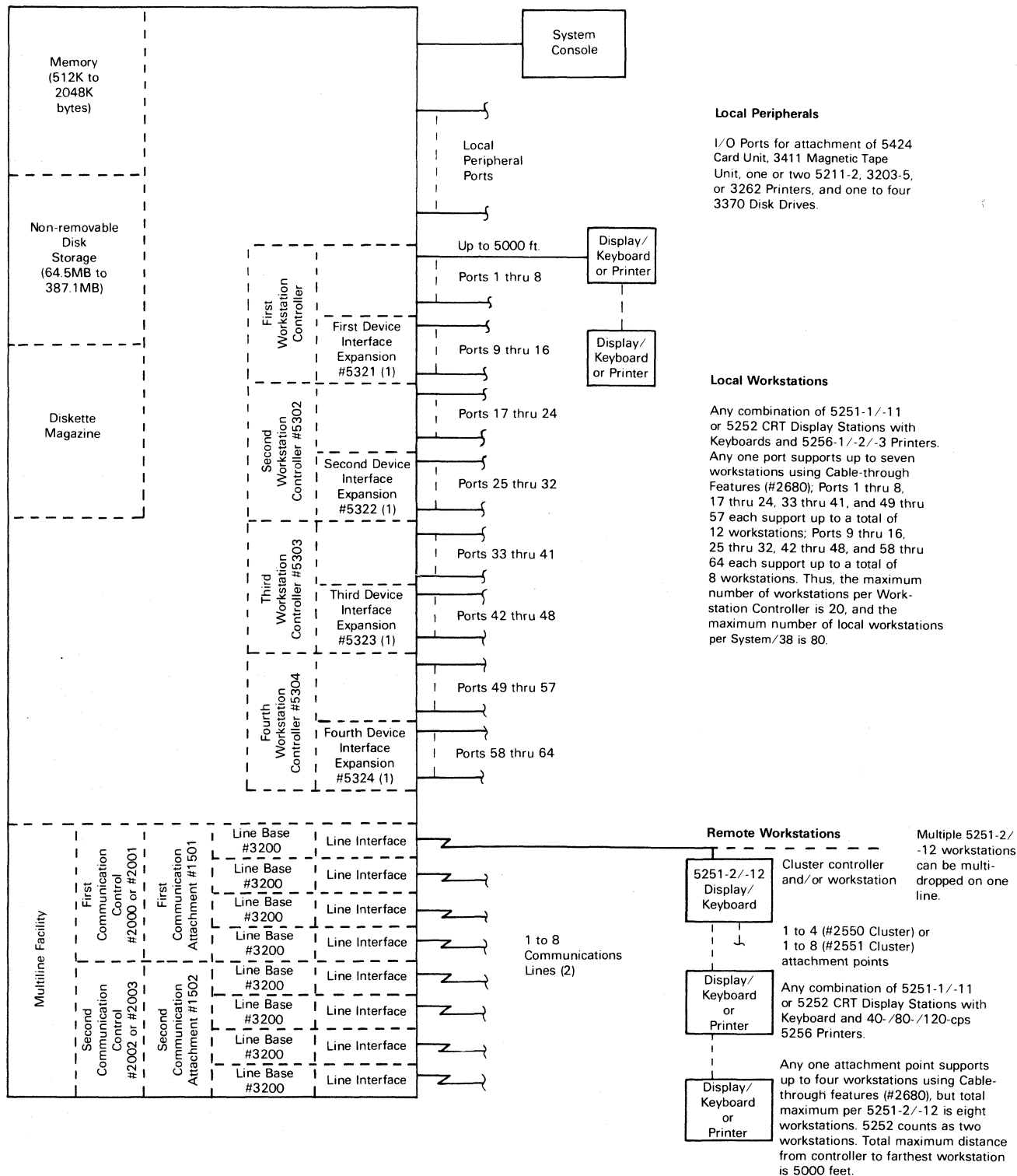|		Monthly Charge* Rental	Lease	Purchase Price	Monthly Maintenance
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6300	1st Processor Unit Expansion**	57	50	1,950	5
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Configuration

5381 System Unit

System Console

Memory (512K to 2048K bytes)

Non-removable Disk Storage (64.5MB to 387.1MB)

Diskette Magazine

Local Peripheral Ports

First Workstation Controller

First Device Interface Expansion #5321 (1)

Second Workstation Controller #5302

Second Device Interface Expansion #5322 (1)

Third Workstation Controller #5303

Third Device Interface Expansion #5323 (1)

Fourth Workstation Controller #5304

Fourth Device Interface Expansion #5324 (1)

Up to 5000 ft.

Ports 1 thru 8

Ports 9 thru 16

Ports 17 thru 24

Ports 25 thru 32

Ports 33 thru 41

Ports 42 thru 48

Ports 49 thru 57

Ports 58 thru 64

Display/ Keyboard or Printer

Display/ Keyboard or Printer

Local Peripherals

I/O Ports for attachment of 5424 Card Unit, 3411 Magnetic Tape Unit, one or two 5211-2, 3203-5, or 3262 Printers, and one to four 3370 Disk Drives.

Local Workstations

Any combination of 5251-1/-11 or 5252 CRT Display Stations with Keyboards and 5256-1/-2/-3 Printers. Any one port supports up to seven workstations using Cable-through Features (#2680); Ports 1 thru 8, 17 thru 24, 33 thru 41, and 49 thru 57 each support up to a total of 12 workstations; Ports 9 thru 16, 25 thru 32, 42 thru 48, and 58 thru 64 each support up to a total of 8 workstations. Thus, the maximum number of workstations per Work-station Controller is 20, and the maximum number of local workstations per System/38 is 80.

Multiline Facility

First Communication Control #2000 or #2001

First Communication Attachment #1501

Second Communication Control #2002 or #2003

Second Communication Attachment #1502

Line Base #3200 — Line Interface
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1 to 8 Communications Lines (2)

Remote Workstations

5251-2/-12 Display/ Keyboard

Display/ Keyboard or Printer

Display/ Keyboard or Printer

Cluster controller and/or workstation

Multiple 5251-2/ -12 workstations can be multi-dropped on one line.

1 to 4 (#2550 Cluster) or 1 to 8 (#2551 Cluster) attachment points

Any combination of 5251-1/-11 or 5252 CRT Display Stations with Keyboard and 40-/80-/120-cps 5256 Printers.

Any one attachment point supports up to four workstations using Cable-through features (#2680), but total maximum per 5251-2/-12 is eight workstations. 5252 counts as two workstations. Total maximum distance from controller to farthest workstation is 5000 feet.

(1) A Device Control Expansion (#5331, 5332, 5333, or 5334, respectively), can be used in lieu of the Device Interface Expansion, which increases the line handling capabilities of the Workstation Controller to 20 lines, but does not provide the additional 8 ports.

(2) Each line supports connection to one or more remote terminals, workstation clusters, or computers.

IBM System/38
Communications Capabilities

▷ Of these, nine indicated that their systems were being used in a data communications environment: two of the System/38s were being used as remote distributed processing systems, and the remaining seven were being used as central host computers with remote workstations. The systems had been installed for a period ranging from 3 months to 1 year and averaging 5 months. The following user reaction summary reflects the ratings and comments of these nine users.

All, but one of these users had converted from another IBM system; previous machines used included the System/34 (4 users), System/3 (5 users), and System/360 (1 user). One of the users had both a System/34 and a System/3, which were replaced by one System/38. The applications most frequently mentioned as being implemented by these users on the System/38 were order processing/inventory control (8 users), accounting/billing (7 users), payroll/personnel (5 users), and sales/distribution (5 users). Although all were doing some programming in-house, two were also using "ready-made" IBM programs, and one was using a proprietary (non-IBM) software package.

These users had an average of 10 local workstations and, for those who were using their System/38s as central systems, an average of seven remote workstations. The remote workstations were spread over an average of four remote sites. Five users had selected 1024K-byte memory capacity models and the other four had chosen 2048K models. All had over 200MB of disk storage.

These users' ratings are as follows:

	Excellent	Good	Fair	Poor	WA*
Overall satisfaction	5	4	0	0	3.6
Ease of operation	6	3	0	0	3.7
Reliability of mainframe	6	2	0	0	3.8
Reliability of peripherals	5	2	0	0	3.7
Maintenance service:					
Responsiveness	3	4	1	0	3.3
Effectiveness	4	2	1	0	3.4
Technical support:					
Trouble-shooting	4	3	1	0	3.4
Education	0	7	2	0	2.8
Documentation	3	5	1	0	3.2
Manufacturer's software:					
Operating system	7	2	0	0	3.8
Compilers & assemblers	7	2	0	0	3.8
Applications programs	4	0	0	0	4.0
Ease of programming	8	1	0	0	3.9
Ease of conversion	1	6	1	1	2.8

*Weighted Average on a scale of 4.0 for Excellent.

When these users were asked to select from a check-list of possible system benefits which were the most significant advantages of the System/38, the advantages most frequently cited were: that the data base language is efficient and effective (all 9 users); that the system is easy to expand/reconfigure (all 9 users); that IBM's productivity aids help keep programming costs down (7 users); and that users are happy with response time (6 users). When asked to select the most significant dis- ▷

▶ remote data communications for the System/38. Any communications line attachment requires the Communication Control feature (#2000/#2001/#2002/#2003), the Communication Attachment (#1501/#1502), and one Line Base (#3200) plus a line interface for each line.

The Communications Attachment and Communication Control features provide the basic control and circuits for direct attachment and control of a set of up to four communications lines. The two components work together in controlling up to four lines concurrently and allow the System/38 to communicate on non-switched point-to-point and multipoint (SDLC only) lines at speeds from 600 to 9600 bps and on switched lines at speeds from 600 to 4800 bps. The components permit only half-duplex transmission, regardless of whether the carrier facilities are switched or non-switched. The #1501 Communications Attachment feature and either the #2000 (SDLC only) or #2001 (SDLC or BSC) Communications Control feature support the first set of up to four lines; the #1502 Communications Attachment feature and either the #2002 (SDLC only) or #2003 (SDLC or BSC) Communications Control feature support the second set of up to four lines. BSC and SDLC lines may be mixed in any combination.

When remote 5250 workstations are to be attached, the first workstation for each remote cluster must be a 5251 (Model 2 or 12). This workstation includes support for one communications line attachment of either an EIA line interface for connection to an external modem, a line interface with integrated modem, or a DDS Adapter. Integrated modems are available at speeds of 1200, 2400, or 4800 bps. Communications between the remote cluster and the System/38 are half-duplex SDLC at up to 9600 bps.

Expansion of the single remote workstation to multiple stations is accomplished by attaching either a Four-Line or Eight-Line Cluster feature to the 5251 (Model 2 or 12). The types of attachable devices, the cable attachments (including the Cable Thru feature), and the cable configuration is the same as for the locally attached terminals, except that a maximum of eight devices (keyboard/displays, printers) can be attached to each 5251 (Model 2 or 12), giving a cluster maximum of nine devices. For both local and remote configurations, the 5252 Dual Display Station counts as two devices. The maximum number of clusters that can be multi-pointed on a communications line, and the maximum number of remote terminals that can be supported by one System/38 varies, and is a function of system size, mode of terminal operation, volume of terminal activity, transmission speed, response time required, and scanning/polling limitations.

Terminals that can be connected to the System/38 via BSC communications lines include the IBM 3741, 5230, 5280, and 5260.

HOST CONNECTION

SDLC communications lines can support connection to one or more IBM System/370, 30XX, or 43XX processors. The System/38 is viewed by the host as an RJE workstation emulating an IBM 3770 terminal, and is therefore supported under applications such as CICS/VS and IMS/VS. The System/38 communicates with IMS/VS applications operating under OS/VS1 or OS/VS2 (MVS) and CICS/VS applications operating under DOS/VSE, OS/VS1, or OS/VS2 (MVS) in System/370 Models 145 to 168 for IMS/VS and Models 135 to 168 for CICS/VS and 303X and 43XX processors. Communications with any of these operating systems running under VM/370 is also supported. Access within the host is through VTAM, ACF/VTAM, ACF/VTAME, TCAM, or ACF/TCAM.

With the System/38 using SDLC protocol in an SNA network, data communications into the host will be via a 370X ▶

▷ advantages from a check-list of possible problems, these users cited virtually no negative aspects to the system. When asked whether the system does all they expected it to do, and whether they would recommend the system to another user, these users unanimously answered yes to both questions.

Even when the brief time during which these systems have been installed is taken into consideration, one cannot help, but be impressed with the high degree of these users' satisfaction. Certainly, if these users' opinions reflect the sentiments of other System/38 users and remain constant as they gain more experience with their System/38s, the system should become as formidable in the marketplace as IBM has predicted all along it would.□

▶ front end, which will require NCP/VS or ACF/NCP/VS, as appropriate.

BSC communications lines can support point-to-point connection to one or more remote System/38s, or to System/3, System/32, System/34, Series/1, 5110/5120, System/370, 30XX, or 43XX computer systems. (No multi-point capability is offered with the System/38's BSC support.) Access within the host is through BTAM-ES under DOS/VSE operating systems and BTAM or TCAM under OS/VS1 and OS/VS2 operating systems. BSC protocol support will be available for the System/38 in February 1982.

IBM has also announced its intent to develop additional SDLC and BSC communications capabilities over the next three years. Among the functions to be offered are SNA Remote Job Entry (SRJE), BSC Multi-leaving Remote Job Entry (MRJE), and BSC Multipoint Tributary connection. In each case, the System/38 will operate as a terminal to a System/370, 30XX, or 43XX host system.

TRANSMISSION SPECIFICATIONS

A separate Line Base (#3200) is required for each communications line attachment. Under the System's Control Program Facility (CPF), each line operates with half-duplex SDLC or BSC protocol. Transmission at 600, 1200, 2400, 4800, 7200, or 9600 bps over leased (non-switched) or telephone (switched) lines supported. Each line can operate at a different speed.

Four versions of a 1200 bps line interface with integrated modem are offered. These interfaces, for which internal clocking is contained in the Line Base, can alternatively be operated at 600 bps via parameter modification to the CPF software. For private lines, a non-switched interface (#5500) is available. For switched lines, interfaces with Auto Answer (#5501) and manual answer (#5502) are available. There is also a non-switched with switched network backup (with Auto Answer) interface (#5508). The devices communicating with the System/38 must also be equipped with a similar 1200 bps integrated modem interface.

Two versions of both a 2400 bps and a 4800 bps modem are also offered. For private lines, the #5460 (2400 bps) or #5470 (4800 bps) interface is used. Either can be configured to allow the system to communicate on a point-to-point basis, or to operate as a multipoint control station or tributary station. For switched lines, the #5641 (2400 bps) or #5741 (4800 bps) interface is used.

An EIA interface (#3701) is offered and will support external modems conforming to RS-232-C. An Auto Call

Adapter (#5760), which, under program control, automatically dials into a switched network facility, is available in conjunction with the EIA interface. Each line with an Auto Call unit takes two interface positions, and therefore reduces the total number of line connections possible.

Two versions of the Dataphone Digital Service (DDS) interface are offered. One version (#5650) supports point-to-point and multipoint lines. The other version (#5651) supports the System/38 operating on a multipoint line as a tributary station. Speeds of 2400, 4800, and 9600 bps are supported with the DDS adapters. Remote workstations that are to be linked to the System/38 via DDS require the 5251 (Model 2 or 12) to have the DDS adapter for multipoint, tributary lines (#5651).

A loop station adapter for the System/38 is available via RPQ.

SOFTWARE

All communications functions of the System/38 are included in the basic Control Program Facility (CPF), a new, bundled system support program product announced with the System/38. A key aspect of CPF is multiple, simultaneous access to an applications program from multiple workstations. Multiple access paths are maintained to disk storage. CPF supports interactive and batch processing with multiple, concurrent users. RPG III, an updated version of RPG II, and an interactive/batch COBOL are offered for user program development. Additional software products which are available include Interactive Data Base Utilities; Conversion Reformat Utility, for the sorting, merging and copying of data base files; System/3 Batch Conversion Utilities and the newer System/3 CCP to System/38 Conversion Aid, for the conversion of System/3 software products to their System/38 equivalents; a System/34-to-System/38 Conversion Aid (available September 1981); and a Display Information Facility, for on-line file access program development. Application programs are available for Manufacturing, Accounting and Production Information Control System (MAPICS), Distribution Management System (DMS), and a Retail Data Preparation program for the retail industry.

System/38 software is "object" oriented. The objects, such as programs, subroutines, and data base files reside in virtual storage.

A sophisticated control language is provided with the system; it provides commands with which the user can tailor subsystem functions not included in a licensed program for his particular applications.

The System/38 software offers attractive message-handling capabilities that permit operator-initiated messages to be sent from any workstation to any other workstation. Also, program entry and modification can be effected from any workstation.

PRICING

All System/38 components are available on a purchase, month-to-month rental, or three-year lease basis. Both rental arrangements include prime shift maintenance, and purchased components can have a separate maintenance contract. The terms and conditions of IBM's Agreement of Lease or Rental varies with component.

For example, the 5381 System Unit and the 5211 printer are offered under Rental Plan B for unlimited usage, while the 5424 Multifunction Card Unit and the 3411 Magnetic Tape Unit are treated as metered I/O units under Rental Plan B.

System/38 licensed programs are provided under the agreement of IBM Licensed Programs. ▶

IBM System/38
Communications Capabilities

		Monthly Rental	Charge* Lease	Purchase Price	Monthly Maintenance
	5250 Information Display Devices				
	5251 Display Station (Model 12)	$160	$136	$4,050	$44.50
2550	Single Cluster Feature	53	45	1,520	11.50
2551	Dual Cluster Feature	108	92	3,040	23
2680	Cable Thru Feature	4	3	115	1
4703	Internal Clock	6	5	210	1
	5251 Display Station (Model 11)	101	86	2,850	20.50
	5252 Dual Display Station	108	92	3,040	23
	5256 120 cps Printer (Model 3)	231	197	6,250	53
	Communications Components				
1501/1502	Communication Attachment, First/Second	25	22	780	6.50
2000/2002	Communication Control, First/Second; SDLC only	81	70	2,535	21
2001/2003	Communications Control, First/Second; SDLC/BSC	86	75	2,925	28
3200	Line Base	52	46	1,675	2.50
3701	EIA Interface	14	12	430	6
5650	DDS Adapter, Point-to-Point	27	24	840	5.50
5651	DDS Adapter, Multipoint	27	24	840	5.50
5500	Non-Switched Interface	21	18	660	9
5501	Switched w/Auto Answer Interface	29	25	880	8
5502	Switched w/Manual Answer Interface	21	18	660	10
5508	Non-Switched w/Switched Backup & Auto Answer Interface	31	27	1,015	10.50
5760	Auto Call Adapter	14	12	430	2.50
	Attachment Expansion Units				
5302/5303/5304	Work Station Controller, Second/Third/Fourth	155	135	5,070	21
5331	Device Control Expansion, First	37	32	1,230	2.50
5332/5333/5334	Device Control Expansion, Second/Third/Fourth	37	32	1,230	2.50
5321	Device Interface Expansion, First	86	76	2,870	6.50
5322/5323/5324	Device Interface Expansion, Second/Third/Fourth	86	76	2,870	6.50
6300	1st Processor Unit Expansion**	62	54	1,950	5.50
6302	3rd Processor Unit Expansion**	12	11	390	1.50
6304	5th Processor Unit Expansion**	109	95	3,900	8
6305	6th Processor Unit Expansion**	69	60	2,340	5
6306	7th Processor Unit Expansion**	86	75	2,925	5

*Includes prime-shift maintenance.
**Certain Processor Unit Expansions are required for configuration of multiple Communication Attachments or Second Work Station Controllers.■

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Four versions of a 1200 bps line interface with integrated modem are offered. These interfaces, for which internal clocking is contained in the Line Base, can alternatively be operated at 600 bps via parameter modification to the CPF software. For private lines, a non-switched interface (#5500) is available. For switched lines, interfaces with Auto Answer (#5501) and manual answer (#5502) are available. There is also a non-switched with switched network backup (with Auto Answer) interface (#5508). The devices communicating with the System/38 must also be equipped with a similar 1200 bps integrated modem interface.

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IBM System/38
Communications Capabilities

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4703	Internal Clock	6	5	210	1
	5251 Display Station (Model 11)	108	92	2,420	20.50
	5252 Dual Display Station	116	99	2,585	23
	5256 120 cps Printer (Model 3)	249	212	4,850	43
	Communications Components				
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2000/2002	Communication Control, First/Second; SDLC only	87	76	2,535	21
2001/2003	Communications Control, First/Second; SDLC/BSC	86	75	2,925	28
3200	Line Base	56	50	1,675	2.50
3701	EIA Interface	15	13	430	6
5650	DDS Adapter, Point-to-Point	29	26	840	5.50
5651	DDS Adapter, Multipoint	29	26	840	5.50
5500	Non-Switched Interface	21	18	660	9-
5501	Switched w/Auto Answer Interface	31	27	880	8
5502	Switched w/Manual Answer Interface	21	18	660	10
5508	Non-Switched w/Switched Backup & Auto Answer Interface	33	29	1,015	10.50
5760	Auto Call Adapter	15	13	430	2.50
	Attachment Expansion Units				
5302/5303/5304	Work Station Controller, Second/Third/Fourth	167	145	5,070	21
5331	Device Control Expansion, First	40	35	1,230	2.50
5332/5333/5334	Device Control Expansion, Second/Third/Fourth	40	35	1,230	2.50
5321	Device Interface Expansion, First	93	82	2,870	6.50
5322/5323/5324	Device Interface Expansion, Second/Third/Fourth	93	82	2,870	6.50
6300	1st Processor Unit Expansion**	67	58	1,950	5.50
6302	3rd Processor Unit Expansion**	13	12	390	1.50
6304	5th Processor Unit Expansion**	109	95	3,900	8
6305	6th Processor Unit Expansion**	69	60	2,340	5
6306	7th Processor Unit Expansion**	86	75	2,925	5

*Includes prime-shift maintenance.
**Certain Processor Unit Expansions are required for configuration of multiple Communication Attachments or Second Work Station Controllers.■

IBM System/38
Communications Capabilities

MANAGEMENT SUMMARY

Offering an attractive migration path for System/3 and System/34 users, the System/38 features increased main memory, disk storage, sophistication in software and function, and communications capabilities over the predecessor systems. Designed as a multi-workstation system, the System/38 offers wide flexibility in workstation configuration and function. The System/38 can accommodate up to 40 local terminals plus remote clusters of display terminals.

IBM makes the System/34 to System/38 conversion even more attractive by utilizing the same IBM 5250 Information Display system family of terminals basic to the System/34. A comparison of communications capabilities shows IBM's continued prodding of its users towards an SDLC/SNA network utilization; the System/38 supports only SDLC protocol and cannot accommodate BSC. The System/3 can only support BSC, and the System/34 can support both.

Like the System/34, the System/38 offers point-to-point and multi-point communications capabilities. In a multi-point capacity, the System/38 can serve either as a host to remote 5250 clusters or as a tributary terminal (3770) to a remote host in a larger network. The System/38 also offers a variety of communication line interfaces and attachments similar to those for the System/34.

Clearly intended to be an independent business computer, the System/38 offers up to 1536K bytes of main memory and up to 387.1 megabytes of disk storage. Adding communications lines to an already functioning System/38 does not require changing the system software, Control Program Facility (CPF). The communications functions ▷

Optional features for the System/38, which permit up to four SDLC data communications links with IBM 5250 Information Display System devices or an IBM System/370 or 303X processor.

For connection to a host processor, the System/38 acts as a 3770 terminal. Half-duplex communications over switched, non-switched, or DDS facilities at up to 9600 bps are supported.

The attachment of one data link adds $235 to the monthly system rental cost ($203 if on a three-year lease). The monthly rental for four communications line attachments costs about $450 per month.

CHARACTERISTICS

VENDOR: International Business Machines Corporation, General Systems Division, 5775 Glenridge Drive, N.E., Atlanta, Georgia 30301. Telephone (404) 256-7000.

DATE OF ANNOUNCEMENT: October 1978.

DATE OF FIRST DELIVERY: August 1979.

NUMBER DELIVERED TO DATE: —.

SERVICED BY: IBM.

CONFIGURATION

The System/38 is available in 48 models offering from 512K to 1536K bytes of main memory and from 64.5 to 387 megabytes of nonremovable disk storage (1 to 6 drive units). The group is built from two CPU models: Model 300 and 500. The former features new 64K-bit chips, a 1.1 microsecond ▶
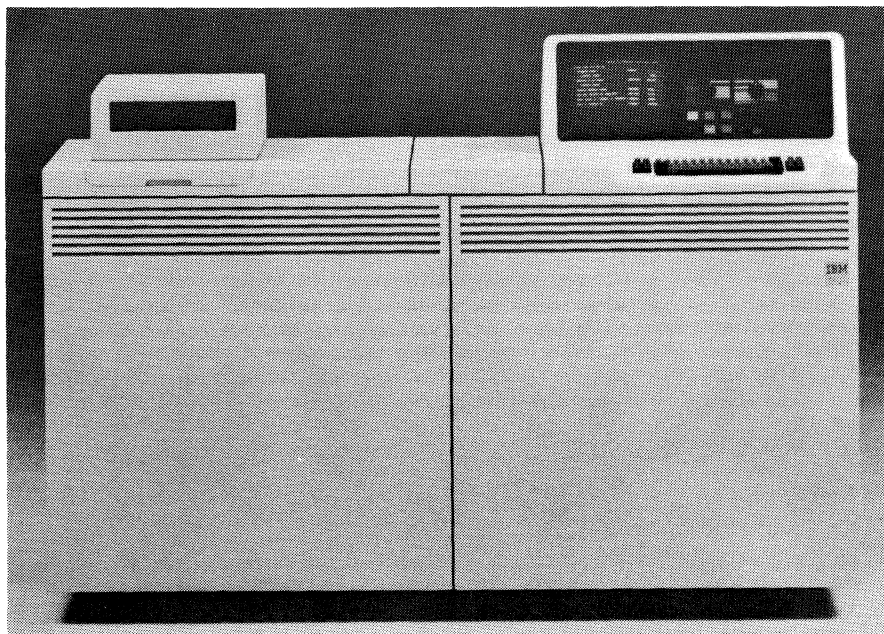
The 5381 System Unit, pictured at left, is the heart of the System/38. It features a diskette magazine drive (top left), a console/keyboard display (top right), and contains the CPU, disk storage, workstation controller, and communications adapters.

IBM System/38
Communications Capabilities

▷ of CPF are bundled; i.e., provided to all System/38 users whether or not the user requires communications capability.

CPF, a new operating system with the System/38, features multiple access paths to disk, which are shared by active programs. Applications programs are written to service a single workstation. Re-entrant code is generated, which permits simultaneous use of a program by multiple workstations. Batch and interactive tasks can also be serviced simultaneously. Another feature of System/38 software is RPG III; at present it is the only IBM-provided user language for the System/38. In addition, a number of specialized software packages are available.

The communications capabilities of the System/38 do not seem to match the power of the processor. IBM might eventually enhance the communications capability to include high-speed data transfers (presently limited to 9600 bps), more lines and full-duplex transmission. Line protocol support to include BSC is unlikely.□

▶ cycle time for a four-byte fetch, and a non-expandable control storage of 4K 32-bit words (0.4 microsecond cycle time). The quicker and more powerful Model 500 features new 32K-bit chips, a 0.6 microsecond cycle time for a four-byte fetch, and 8K 32-bit control storage words (0.2 microsecond cycle time).

The 5381 System Unit is the heart of the System/38. It features a system console with keyboard and display, a diskette magazine drive, and contains the interface for local attachments and communications lines.

A multi-function 96-column card reader/punch (5425) and up to two 650-lpm (3262) or 300-lpm (5211) printers can be directly attached to the 5381. Up to 40 local workstations (5250 keyboard/displays and printers can be accommodated. Remote 5250 keyboard/displays and printers can be connected via up to four communications lines. An interface for the local attachment of a 3411 Magnetic tape Unit and Control will be available in February 1980.

The 5381 unit contains an integrated Work Station Controller with eight ports, which can handle the local attachment of up to 12 devices, including the 5251 Display Station (Models 1 and 11), the 5252 Dual Display Station (Model 1), and the 5256 Printer (Models 1, 2 and 3). These devices are attached via either 5250 twinax cable or 3270-compatible coax cable. Twinax cable provides for multipoint cable connections and device attachment up to 5000 ft. from the processor unit. Coax cable is limited to 2000 ft. Up to seven devices can be attached to one Work Station Controller port with twinax cable using the Cable Thru future on the 5250 devices, but the overall maximum for all eight ports is 12 without additional features.

For more than 12 local 5250 devices, additional features are required. A Device Interface Expansion (#5321) attaches to the basic Work Station Controller and provides an additional eight ports for attachment of eight more devices. If no more than eight cable ports are required, a Device Control Expansion (#5331), which provides the necessary control storage to support eight more devices without additional cable ports, is used instead of the Interface Expansion.

For more than 20 local devices, a second Work Station Controller (#5302) is required. It provides eight ports for cable attachments and can support 12 devices. A second Device Interface Expansion (#5322) or a second Device Control Expansion (#5332) are available for the second Work Station

Controller to bring the local device total up to the system maximum of 40 using 16 or 32 ports.

A basic multiline facility is integrated into the 5381 unit for the attachment of up to four communications lines. Additional, optional features are required to implement remote data communications. Communications line attachments do not exclude any of the local device attachments, nor do they affect the maximum system capacity for locally attached devices.

COMMUNICATIONS FEATURES AND COMPONENTS

Several optional components are required in addition to the integrated multiline facility in the 5381 unit to effect remote data communications for the System/38. Any communications line attachment requires the Communication Control feature (#2000), the Communication Attachment (#1501), and one Line Base (#3200) plus a line interface for each line.

The Communication Control feature provides the basic control and circuits for direct attachment of up to four communications lines. These two components work together in controlling up to four lines concurrently and allow the System/38 to communicate on non-switched point-to-point and multipoint lines at speeds from 600 to 9600 bps and on switched lines at speeds from 600 to 4800 bps. The components permit only half-duplex transmission, regardless of whether the carrier facilities are switched or non-switched.

When remote workstations are to be attached, the first workstation for each remote cluster must be a 5251 (Model 2 or 12). This workstation includes support for one communications line attachment of either an EIA line interface for connection to an external modem, a 1200 bps line interface with integrated modem, or a DDS Adapter. Communications between the remote cluster and the System/38 are half-duplex SDLC at up to 9600 bps.
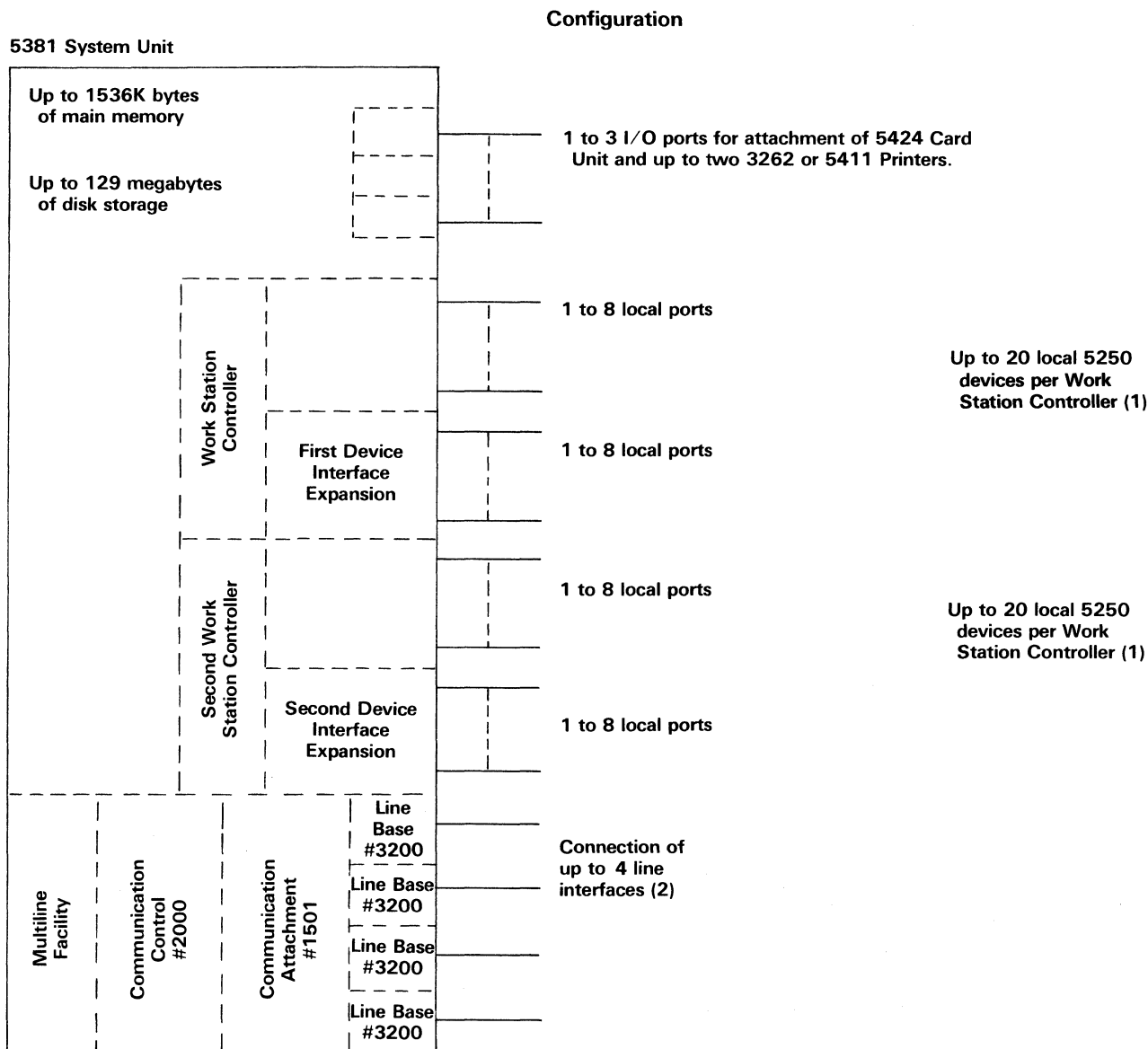
Expansion of the single remote workstation to multiple stations is accomplished by attaching either a Four-Line or Eight-Line Cluster feature to the 5251 (Model 2 or 12). The types of attachable devices, the cable attachments (including the Cable Thru feature), and the cable configuration is the same as for the locally attached terminals, except that a maximum of eight devices (keyboard/displays, printers) can be attached to each 5251 (Model 2 or 12), giving a cluster maximum of nine devices. For both local and remote configurations, the 5252 Dual Display Station counts as two devices. The maximum number of clusters that can be multi-pointed on a communications line, and the maximum number of remote terminals that can be supported by one System/38 varies, and is a function of system size, mode of terminal operation, volume of terminal activity, transmission speed, response time required, and scanning/polling limitations.

HOST CONNECTION

System/38's communications lines can support connection to one or more IBM System/370, or 303X host processors. The System/38 is viewed by the host as an RJE workstation emulating an IBM 3770 terminal, and is therefore supported under applications such as CICS/VS and IMS/VS.

The System/38 communicates with IMS/VS applications operating under OS/VS1 or OS/VS2 (MVS) and CICS/VS applications operating under DOS/VS, OS/VS1, or OS/VS2 (MVS) in System/370 Models 145 to 168 for IMS/VS and Models 135 to 168 for CICS/VS and 303X processors. Communications with any of these operating systems running under VM/370 is also supported. Access ▶

IBM System/38
Communications Capabilities

Configuration

5381 System Unit

Up to 1536K bytes of main memory

Up to 129 megabytes of disk storage

Work Station Controller

First Device Interface Expansion

Second Work Station Controller

Second Device Interface Expansion

Multiline Facility

Communication Control #2000

Communication Attachment #1501

Line Base #3200

Line Base #3200

Line Base #3200

Line Base #3200

1 to 3 I/O ports for attachment of 5424 Card Unit and up to two 3262 or 5411 Printers.

1 to 8 local ports

Up to 20 local 5250 devices per Work Station Controller (1)

1 to 8 local ports

1 to 8 local ports

Up to 20 local 5250 devices per Work Station Controller (1)

1 to 8 local ports

Connection of up to 4 line interfaces (2)

(1) A Device Control Expansion feature can be used in lieu of the Device Interface Expansion, but will limit each Work Station Controller to 8 ports, even though 20 workstations can be connected.

(2) Interfaces may connect to remote System/370's and/or remote 5250 clusters; see the accompanying table for specifications of each available interface adapter.

▶ within the host is through VTAM, ACF/VTAM, TCAM, or ACF/TCAM.

With the System/38 using SDLC protocol in an SNA network, data communications into the host will be via a 370X front end, which will require NCP/VS or ACF/NCP/VS, as appropriate.

TRANSMISSION SPECIFICATIONS

A separate Line Base (#3200) is required for each communications line attachment. Under the System's Control Program Facility (CPF), each line operates with half-duplex SDLC protocol. Transmission at 600, 1200, 2400, 4800, 7200, or 9600 bps over leased (non-switched) or telephone (switched) lines supported. Each line can operate at a different speed.

Four versions of a 1200 bps line interface with integrated

modem are offered. These interfaces, for which internal clocking is contained in the Line Base, can alternatively be operated at 600 bps via parameter modification to the CPF software. For private lines, a non-switched interface (#5500) is available. For switched lines, interfaces with Auto Answer (#5501) and manual answer (#5502) are available. There is also a non-switched with switched network backup (with Auto Answer) interface (#5508). The devices communicating with the System/38 must also be equipped with a similar 1200 bps integrated modem interface.

An EIA interface (#3701) is offered and will support external modems conforming to RS-232C. An Auto Call Adapter (#5760), which, under program control, automatically dials into a switched network facility, is available in conjunction with the EIA interface. Each line with an Auto Call unit takes two interface positions, and therefore reduces the total number of line connections possible. ▶

IBM System/38
Communications Capabilities

▶ Two versions of the Dataphone Digital Service (DDS) interface are offered. One version (#5650) supports point-to-point and multipoint lines. The other version (#5651) supports the System/38 operating on a multipoint line as a tributary to a host, which serves as the control processor. Speeds of 2400, 4800, and 9600 bps are supported with the DDS adapters. Remote workstations that are to be linked to the System/38 via DDS require the 5251 (Model 2 or 12) to have the DDS adapter for multipoint, tributary lines (#5651).

A loop station adapter for the System/38 is available via RPQ.

SOFTWARE

All communications functions of the System/38 are included in the basic Control Program Facility (CPF), a new, bundled system support program product announced with the System/38. A key aspect of CPF is multiple, simultaneous access to an applications program from multiple workstations. Multiple access paths are maintained to disk storage. CPF supports interactive and batch processing with multiple, concurrent users. RPG III, an updated version of RPG II, is presently the only language provided for user program development. Additional software products which are available include Interactive Data Base Utilities; Conversion Reformat Utility, for the sorting, merging and copying of data base files; and System/3 Batch Conversion Utilities, for the conversion of System/3 software products to their System/38 equivalents. Application programs are available for Manufacturing, Accounting and Production Information Control System (MAPICS), and Distribution Management System (DMS).

System/38 software is "object" oriented. The objects, such as programs, subroutines, and data base files reside in virtual storage.

A sophisticated control language is provided with the system; it provides commands with which the user can tailor subsystem functions not included in a licensed program for his particular applications.

The System/38 software offers attractive message-handling capabilities that permit operator-initiated messages to be sent from any workstation to any other workstation. Also, program entry and modification can be effected from any workstation.

PRICING

All System/38 components are available on a purchase, month-to-month rental, or three-year lease basis. Both rental arrangements include prime shift maintenance, and purchased components can have a separate maintenance contract. The terms and conditions of IBM's Agreement of Lease or Rental varies with component.

For example, the 5381 System Unit and the 5211 printer are offered under Rental Plan B for unlimited usage, while the 5424 Multifunction Card Unit and the 3411 Magnetic Tape Unit are treated as metered I/O units under Rental Plan B.

System/38 licensed programs are provided under the agreement of IBM Licensed Programs.■

		Monthly Charge* Rental	Lease	Purchase Price	Monthly Maintenance
	5250 Information Display Devices				
	5251 Display Station (Model 12)	140	119	4,050	39
2550	Single Cluster Feature	47	40	1,520	10
2551	Dual Cluster Feature	94	80	3,040	20
2680	Cable Thru Feature	4	3	115	1
4703	Internal Clock	6	5	210	1
	5251 Display Station (Model 11)	88	75	2,850	18
	5252 Dual Display Station	125	100	3,740	30
	5256 120 cps Printer (Model 3)	217	185	6,250	42
	Communications Components				
1501	Communication Attachment	23	20	780	6
2000	Communication Control	75	65	2,535	20
3200	Line Base	49	43	1,675	2
3701	EIA Interface	13	11	430	6
5650	DDS Adapter, Point-to-Point	25	22	840	5
5651	DDS Adapter, Multipoint	25	22	840	5
5500	Non-Switched Interface	20	17	660	9
5501	Switched w/Auto Answer Interface	27	23	880	8
5502	Switched w/Manual Answer Interface	19	17	660	10
5508	Non-Switched w/Switched Backup & Auto Answer Interface	29	25	1,015	10
5760	Auto Call Adapter	13	11	430	2
	Attachment Expansion Units				
5305	Second Work Station Controller	144	125	5,070	20
5331	Device Control Expansion, First	34	30	1,230	2
5332	Device Control Expansion, Second	34	30	1,230	2
5321	Device Interface Expansion, First	80	70	2,870	6
5322	Device Interface Expansion, Second	80	70	2,870	6
6300	1st Processor Unit Expansion**	57	50	1,950	5
6302	3rd Processor Unit Expansion**	11	10	390	1

*Includes prime-shift maintenance.
**Required for Communication Attachment or Second Work Station Controller■

IBM System/38
Communications Capabilities

▷ advantages from a check-list of possible problems, these users cited virtually no negative aspects to the system. When asked whether the system does all they expected it to do, and whether they would recommend the system to another user, these users unanimously answered yes to both questions.

Even when the brief time during which these systems have been installed is taken into consideration, one cannot help, but be impressed with the high degree of these users' satisfaction. Certainly, if these users' opinions reflect the sentiments of other System/38 users and remain constant as they gain more experience with their System/38s, the system should become as formidable in the marketplace as IBM has predicted all along it would.□

➤ front end, which will require NCP/VS or ACF/NCP/VS, as appropriate.

BSC communications lines can support point-to-point connection to one or more remote System/38s, or to System/3, System/32, System/34, Series/1, 5110/5120, System/370, 30XX, or 43XX computer systems. (No multipoint capability is offered with the System/38's BSC support.) Access within the host is through BTAM-ES under DOS/VSE operating systems and BTAM or TCAM under OS/VS1 and OS/VS2 operating systems. BSC protocol support will be available for the System/38 in February 1982.

IBM has also announced its intent to develop additional SDLC and BSC communications capabilities over the next three years. Among the functions to be offered are SNA Remote Job Entry (SRJE), BSC Multi-leaving Remote Job Entry (MRJE), and BSC Multipoint Tributary connection. In each case, the System/38 will operate as a terminal to a System/370, 30XX, or 43XX host system.

TRANSMISSION SPECIFICATIONS

A separate Line Base (#3200) is required for each communications line attachment. Under the System's Control Program Facility (CPF), each line operates with half-duplex SDLC or BSC protocol. Transmission at 600, 1200, 2400, 4800, 7200, or 9600 bps over leased (non-switched) or telephone (switched) lines supported. Each line can operate at a different speed.

Four versions of a 1200 bps line interface with integrated modem are offered. These interfaces, for which internal clocking is contained in the Line Base, can alternatively be operated at 600 bps via parameter modification to the CPF software. For private lines, a non-switched interface (#5500) is available. For switched lines, interfaces with Auto Answer (#5501) and manual answer (#5502) are available. There is also a non-switched with switched network backup (with Auto Answer) interface (#5508). The devices communicating with the System/38 must also be equipped with a similar 1200 bps integrated modem interface.

Two versions of both a 2400 bps and a 4800 bps modem are also offered. For private lines, the #5460 (2400 bps) or #5470 (4800 bps) interface is used. Either can be configured to allow the system to communicate on a point-to-point basis, or to operate as a multipoint control station or tributary station. For switched lines, the #5641 (2400 bps) or #5741 (4800 bps) interface is used.

An EIA interface (#3701) is offered and will support external modems conforming to RS-232-C. An Auto Call

Adapter (#5760), which, under program control, automatically dials into a switched network facility, is available in conjunction with the EIA interface. Each line with an Auto Call unit takes two interface positions, and therefore reduces the total number of line connections possible.

Two versions of the Dataphone Digital Service (DDS) interface are offered. One version (#5650) supports point-to-point and multipoint lines. The other version (#5651) supports the System/38 operating on a multipoint line as a tributary station. Speeds of 2400, 4800, and 9600 bps are supported with the DDS adapters. Remote workstations that are to be linked to the System/38 via DDS require the 5251 (Model 2 or 12) to have the DDS adapter for multipoint, tributary lines (#5651).

A loop station adapter for the System/38 is available via RPQ.

SOFTWARE

All communications functions of the System/38 are included in the basic Control Program Facility (CPF), a new, bundled system support program product announced with the System/38. A key aspect of CPF is multiple, simultaneous access to an applications program from multiple workstations. Multiple access paths are maintained to disk storage. CPF supports interactive and batch processing with multiple, concurrent users. RPG III, an updated version of RPG II, and an interactive/batch COBOL are offered for user program development. Additional software products which are available include Interactive Data Base Utilities; Conversion Reformat Utility, for the sorting, merging and copying of data base files; System/3 Batch Conversion Utilities and the newer System/3 CCP to System/38 Conversion Aid, for the conversion of System/3 software products to their System/38 equivalents; a System/34-to-System/38 Conversion Aid (available September 1981); and a Display Information Facility, for on-line file access program development. Application programs are available for Manufacturing, Accounting and Production Information Control System (MAPICS), Distribution Management System (DMS), and a Retail Data Preparation program for the retail industry.

System/38 software is "object" oriented. The objects, such as programs, subroutines, and data base files reside in virtual storage.

A sophisticated control language is provided with the system; it provides commands with which the user can tailor subsystem functions not included in a licensed program for his particular applications.

The System/38 software offers attractive message-handling capabilities that permit operator-initiated messages to be sent from any workstation to any other workstation. Also, program entry and modification can be effected from any workstation.

PRICING

All System/38 components are available on a purchase, month-to-month rental, or three-year lease basis. Both rental arrangements include prime shift maintenance, and purchased components can have a separate maintenance contract. The terms and conditions of IBM's Agreement of Lease or Rental varies with component.

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System/38 licensed programs are provided under the agreement of IBM Licensed Programs. ➤

IBM System/38
Communications Capabilities

		Monthly Rental	Charge* Lease	Purchase Price	Monthly Maintenance
	5250 Information Display Devices				
	5251 Display Station (Model 12)	$184	$157	$3,580	$44.50
2550	Single Cluster Feature	62	53	1,340	11.50
2551	Dual Cluster Feature	125	106	2,680	23
2680	Cable Thru Feature	4	3	119	1
4703	Internal Clock	6	5	218	1
	5251 Display Station (Model 11)	116	99	2,515	20.50
	5252 Dual Display Station	125	106	2,685	23
	5256 120 cps Printer (Model 3)	268	228	5,035	47.50
	Communications Components				
1501/1502	Communication Attachment, First/Second	28	24	811	7
2000/2002	Communication Control, First/Second; SDLC only	87	76	2,635	23
2001/2003	Communications Control, First/Second; SDLC/BSC	93	81	3,040	31
3200	Line Base	62	34	1,740	3
3701	EIA Interface	16	14	447	6
5650	DDS Adapter, Point-to-Point	32	28	873	5.50
5651	DDS Adapter, Multipoint	32	28	873	5.50
5500	Non-Switched Interface	22	19	686	9
5501	Switched w/Auto Answer Interface	33	29	915	8
5502	Switched w/Manual Answer Interface	22	19	686	10
5508	Non-Switched w/Switched Backup & Auto Answer Interface	36	31	1,055	11.50
5760	Auto Call Adapter	16	14	447	3
	Attachment Expansion Units				
5302/5303/5304	Work Station Controller, Second/Third/Fourth	167	145	5,270	23
5331	Device Control Expansion, First	40	35	1,230	2.50
5332/5333/5334	Device Control Expansion, Second/Third/Fourth	40	35	1,275	3
5321	Device Interface Expansion, First	93	82	2,870	6.50
5322/5323/5324	Device Interface Expansion, Second/Third/Fourth	94	82	2,980	7
6300	1st Processor Unit Expansion**	72	63	2,025	6
6302	3rd Processor Unit Expansion**	15	13	405	2
6304	5th Processor Unit Expansion**	117	102	4,055	9
6305	6th Processor Unit Expansion**	75	65	2,430	5.50
6306	7th Processor Unit Expansion**	93	81	3,040	5.50

*Includes prime-shift maintenance.
**Certain Processor Unit Expansions are required for configuration of multiple Communication Attachments or Second Work Station Controllers.■