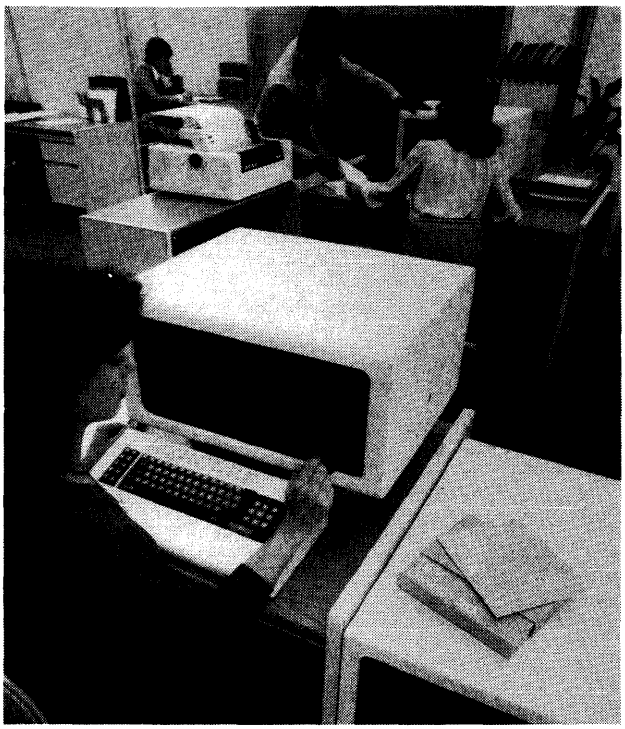
IBM 5280 Distributed Data System

MANAGEMENT SUMMARY

The 5280 Distributed Data Processing System was introduced by IBM on January 10, 1980. Originally a product of the now-defunct General Systems Division, the 5280 system consists of a family of diskette-based intelligent terminals that can be programmed to enter, validate, store, process, and print business information at the point of origin.

The 5280 equipment and software are designed to support a wide range of distributed environments and functions, including intelligent data entry batch and interactive communications, batch processing, transaction processing, and distributed printing. Thus, the 5280 should be attractive to both large and small data processing users who are considering the use of distributed intelligent terminals as part of new or existing data processing networks. Although the 5280's processing and input/output capabilities are comparable to those of many of the current microprocessor-based small business computers, IBM's marketing emphasis and software support make it clear that the 5280 is intended for use as an element in distributed systems rather than as a stand-alone computers.

In January 1981, IBM announced several enhancements to the 5280 system, including new communications ➢



The 5288 Programmable Control Unit (right foreground) provides the processing, control, and storage functions for larger 5280 configurations such as this one. Two keyboard/display stations and a serial matrix printer are also visible in the photo.

IBM's diskette-based distributed data processing system. Applications include batch and interactive communications, intelligent data entry, batch processing, and transaction processing.

MODELS: 5281 Data Station; 5282 Dual Data Station; 5285 Programmable Data Station; 5286 Dual Programmable Data Station; 5288 Programmable Control Unit.
CONFIGURATION: A 5280 configuration can be based on any of the following units: any model of the 5285 Programmable Data Station; any model of the 5286 Dual Programmable Data Station; and any model of the 5288 Programmable Control Unit with an attached 528 Data Station or 5282 Dual Data Station.
COMPETITION: Datapoint 1550 and 1800; Four-Phase System IV Series; Inforex 9000; Mohawk Data Sciences Series 21; Nixdorf 600/25, 600/35, 600/45, and 600/55; and Pertec XL20 and XL40.
PRICE: A minimum configuration, consisting of a 5285 Model A01 Programmable Data Station with 32K bytes of main storage, one Diskette 1 drive, and a keyboard, is priced at $6,337, or $205 per month on a two-year lease including maintenance.

A more elaborate system, consisting of a 5285 Model D10 Programmable Data Station with 96K bytes of main storage, two Diskette 2D drives, a keyboard, a communications adapter, and a 120-cps 5256 Model 3 Printer can be purchased for $16,207, or leased for $615 per month on a two-year lease with maintenance.

CHARACTERISTICS

MANUFACTURER: International Business Machines Corporation, Information Systems Group, National Marketing Division, 4111 Northside Parkway, Atlanta, Georgia 30327. Telephone (404) 238-2000.

CONFIGURATION

A 5280 System configuration can be based on any of the following units, each of which provides all processing and control functions of the system, including those of any attached auxiliary data stations or printers: 1) any model of the 5285 Programmable Data Station; 2) any model of the 5286 Dual Programmable Data Station; or 3) any model of the 5288 Programmable Control Unit with an attached 5281 Data Station or 5282 Dual Data Station (any model).

The *5285 Programmable Data Station* is a single, table-top keyboard/display unit with 32K, 48K, 64K, or 96K bytes of main storage and one or two diskette drives. The standard ➢

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features, increased storage capacity, and additional processing power. The 5280-3270 Emulation Licensed Program was introduced, which allows the 5285 or 5286 terminals to appear as IBM 3270 terminals using either BSC or SNA/SDLC. The 5285 and 5286 terminals, as well as the 5288 controller, were enhanced via new models with expanded main storage capacities. Also introduced was a new printer, the 5224, and a second application microprocessor feature which provides additional processing power to the 5280 system.

The 5280 hardware product line consists of nine units: single and dual programmable keyboard/display stations, single and dual auxiliary (nonprogrammable) keyboard/display stations, a programmable control unit, and four printers. Every 5280 system must include a programmable controller and at least one keyboard/display, which may or may not be housed in a single physical unit. System configuration possibilities span a wide range, from a single keyboard/display station with 32K bytes of memory and one diskette drive to a fully expanded system consisting of the programmable control unit with 288K bytes of memory, four keyboard/displays, eight printers, eight diskette drives totaling 9.6 megabytes, and a communications adapter. Hard disk drives and magnetic tape drives, however, are conspicuously absent from the 5280 product line at this writing.

The 5285 Programmable Data Station, the basic unit of the 5280 product line, is a table-top keyboard/display station with a single CRT display and keyboard, one or two diskette drives with a capacity of up to 2.4 megabytes, a programmable controller, and from 32K to 96K bytes of memory. A display capacity of 480, 960, or 1920 characters can be selected. Devices that can be attached to the 5285 are limited to one 5222, 5224, 5225 or 5256 Printer and *either* one auxiliary data station (5281 or 5282) or the communications adapter. Thus, a 5280 system built around the 5285 can have up to three keyboard/display station (through the attachment of an auxiliary 5282), but a multi-station configuration cannot be equipped for communications.

The 6286 Dual Programmable Data Station is a table-top unit that includes two independent keyboard/display stations, two diskette drives with a capacity of up to 2.4 megabytes, a programmable controller, and from 32K to 96K bytes of memory. The display capacity is limited to 480 characters at each station. The 5286 can control one auxiliary data station (5281 or 5282), but it cannot be equipped with either a printer or a communications adapter. Thus, the 5286 is a limited-function unit that appears to be designed mainly for key-to-diskette data entry functions where no communications capability is required.

The 5288 Programmable Control Unit is a floor-standing controller designed to serve as the central component of larger 5280 configurations. The 5288 contains from 32K to 288K bytes of memory and from one to four diskette drives with a total capacity of up to 4.8 megabytes. It can control a cluster of up to four keyboard/displays through

480-character display capacity can be expanded to 960 or 1920 characters. The following devices and features can be attached to the 5285: one auxiliary 5281 Data Station of 5282 Dual Data Station, connected via cable at a maximum distance of 200 feet; one 5225 or 5256 Printer, connected via twinax cable at a maximum distance of 5000 feet; one 2500 Communications Adapter with the appropriate line interface feature; one Magnetic Stripe Reader; one Elapsed Time Counter; and one Security Keylock. The 5285 and its auxiliary 5281 or 5282 Data Station must have the same display capacity. An auxiliary 5281 or 5282 Data Station cannot be attached if the controlling 5285 has the 2500 Communications Adapter.

The *5286 Dual Programmable Data Station* is a table-top unit that functions as two independent data stations, each with keyboard, display area, and diskette drive, main storage capacities of 32K, 48K, 64K, and 96K bytes are available. The display capacity is 480 characters at each operator position and cannot be expanded. The following devices and features can be attached to the 5286: one auxiliary 5281 Data Station or 5282 Dual Data Station, connected via cable at a maximum distance of 200 feet; one Magnetic Stripe Reader; one Elapsed Time Counter; and one Security Keylock. The 5286 and its auxiliary 5281 and 5282 Data Station must have the same display capacity (i.e., 480 characters). The 5286 cannot be equipped with either a printer or a communications adapter.

The *5288 Programmable Control Unit* is a floor-standing controller that contains from 32K to 288K bytes of main memory and from 1 to 4 diskette drives. The 5288 provides processing, control, main memory, diskette storage, communications and device attachment capabilities for other components of the 5280 system. The following devices and features can be attached to the 5288: 5281 Data Stations and/or 5282 Dual Data Stations in any combination providing a maximum of four keyboards; up to eight printers including any combination of the 5222, 5224, 5225, and 5256 printers; one 2500 or 3270 Emulation Communications Adapter with the appropriate line interface feature; one magnetic stripe reader; one Elapsed Time Counter; and one Security Keylock.

Each data station requires a separate Auxiliary Data Station Attachment on the 5288 and is connected to the system by a cable 200 feet long. All of the attached data stations must have the same display capacity (480, 960, or 1920 characters for the 5281 and 480 or 960 characters for the 5282). Printers are connected to the 5288 via one of four features: the Single Twinax printer Attachment (#1155), the Multiple Twinax Printer Attachment (#1160), the Single 5222 Printer Attachment (#1157), and the Multiple 5222/Twinax Printer Attachment (#1162). The first attachment provides a single twinax port and connects up to seven 5224, 5225, and/or 5256 printers to the 5288. The second attachment provides four ports for attaching a maximum of eight printers. The third attachment features a single port for the attachment of one 5222 Printer. The fourth attachment provides four 5222 Printer ports and a twinax printer port. A single 5222 printer can be attached to each 5222 port, while up to seven 5224, 5225, and/or 5256 printers can be supported by the twinax port.

The *5281 Data Station* is a single, table-top, auxiliary keyboard/display unit containing 0, 1, or 2 diskette drives. A nonprogrammable unit, the 5281 must be cable-connected to a 5285, 5286, or 5288 equipped with the appropriate Auxiliary Data Station Attachment feature. The 5281's display capacity is 480, 960, or 1920 characters, as determined by the attachment feature on the controlling device. If the 5281 contains 1 or 2 diskette drives, the controlling 5285, 5286, or 5288 must also have the appropriate Remote Diskette Drive Attachment feature. The 5281 can be equipped with an optional Magnetic Stripe Reader.

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the attachment of auxiliary data stations (5281 or 5282). The 5288 can also accommodate the communications adapter and up to eight printers. Diskette drives in the attached auxiliary data stations can be accessed by the 5288 along with its own drives, providing a total system capacity of up to 8 drives and 9.6 megabytes.

The 5281 Data Station is a table-top unit containing a single keyboard/display and 0, 1, or 2 diskette drives with a capacity of up to 2.4 megabytes. A nonprogrammable unit, the 5281 must be cable-connected to a 5285, 5286, or 5288 at a maximum distance of 200 feet. The display capacity is 480, 960, or 1920 characters as determined by the attachment feature on the controlling device.

The 5282 Dual Data Station is a table-top unit containing two independent keyboard/display stations and 0, 1, or 2 diskette drives with a capacity of up to 2.4 megabytes. Like the 5281, the 5282 is a nonprogrammable unit that must be cable-connected to a 5285, 5286, or 5288 at a maximum distance of 200 feet. The display capacity at each station is 480 or 960 characters, as determined by the attachment feature on the controlling device.

The number of printer models that can be configured to either a 5285 or a 5288 recently doubled. The 5225 and 5256 Printers are now accompanied by the 5222 and 5224 Printers. The 5222 is a wire-matrix table-top printer capable of printing 80 characters per second at 10 cpi (characters per inch) or 15 cpi horizontal print density. Each line of print can contain 132 characters (10 cpi) or 198 characters (15 cpi). The printer features bidirectional printing and accommodates one of three upper/lower casee character sets: a 95-character EBCDIC set, a 185-character multinational set, or a 95-character Spanish set. Vertical spacing is user selectable at 6 or 8 lines per inch, while the page length if program selectable with a maximum length of 255 lines per page. A variable-width forms tractor provides for the feeding of continuous forms.

The 5224 is an impact dot-matrix (8-by-7) line printer with a user-selectable print density of 10 or 15 cpi and line spacing of 6 or 8 lines per inch. Forms skipping and vertical spacing are under program control. The 5224 is available in two models: Model 1, with a printing speed of 140 lines per minute (lpm) at 10 cpi or 95 lpm at 15 cpi; and Model 2, with a printing speed of 240 lpm at 10 cpi or 175 lpm at 15 cpi. An audible alarm informs the operator when manual intervention is required due to one of nine printer error conditions. The 5224 features the same three character sets of the 5222 Printer, with the addition of ASCII graphics capabilities with the 185-character multinational set.

The 5225 Printer is a wire-matrix line printer that can be attached to either the 5285 or the 5288. It features operator-selectable horizontal spacing of either 10 or 15 characters per inch, as well as both upper and lower case characters. The 15-cpi spacing makes it possible to print most reports on standard correspondence-size paper to reduce forms costs and simplify the handling and filing of

The *5282 Dual Data Station* is a table-top unit that functions as two independent auxiliary data stations, each with keyboard, display area, and optional diskette. The 5282 is available with 0, 1, or 2 diskette drives. A nonprogrammable unit, the 5282 must be cable-connected to a 5285, 5286, or 5288 equipped with the appropriate Auxiliary Data Station Attachment feature. The display capacity at each operator position is either 480 or 960 characters, as determined by the attachment feature on the controlling device. If the 5282 contains 1 or 2 diskette drives, the controlling 5285, 5286, or 5288 must also have the appropriate Remote Diskette Drive Attachment feature. Either or both stations of the 5282 can be equipped with an optional Magnetic Stripe Reader.

COMPONENTS

DISPLAY: A standard component of the 5281 Data Station, 5282 Dual Data Station, 5285 Programmable Data Station, and 5286 Dual Programmable Data Station. Display capacities for each model are as follows:

Model	480 chars.	960 chars.	1920 chars.
5281	Std.	Opt.	Opt.
5282	Std.	—	—
5285	Opt.	Opt.	Opt.
5286	Opt.	Opt.	—

Display capacity for Models 5285 and 5286 is determined by the attachment feature selected on the controlling device. Models 5282 and 5286 provide a single split-screen display, with the indicated display capacity supported at *each* of the two operator positions. The display arrangement is 6, 12, and 24 lines of 80 characters for the 480-, 960-, and 1920-character capacities, respectively. Characters are formed within an 8-by-16 dot matrix character cell. A user-selectable choice of 94-character (upper/lower case) EBCDIC, 94-character ASCII, or 185-character Multinational character sets is provided. Program-controlled screen attributes include reverse video, high intensity, blinking, underlining, nondisplay (blanking), and column separation.

KEYBOARD: A required component of the 5281, 5282, 5285, and 5286. Dual station models (5282 and 5286) require two keyboards. Four keyboard types are offered: 83-key EBCDIC typewriter, 83-key ASCII typewriter, 66-key data entry, and 66-key data entry with proof arrangement. Each keyboard is movable and includes data keys, cursor movement keys, special function keys, and field edit keys.

MAGNETIC STRIPE READER: An optional feature for the 5281, 5282, 5285, or 5286. Up to 128 A.B.A. numeric characters, including control characters, can be read from a magnetic stripe on credit cards, identification cards, and other documents.

DISKETTE DRIVES: Two types of diskette drives are available for any 5280 system in any combination: a drive that can read and write only the IBM Diskette 1 format, and a drive that can read and write the IBM Diskette 1, 2, and 2D formats. (The latter is referred to as a Diskette 2D drive.) The on-line data capacity of each drive can range from 246K bytes to 1.2 megabytes depending upon the recording format in use, as tabulated below.

Diskette Type	Format	Bytes per Sector	Capacity, Bytes
1	1	128	246K
	2	256	284K
	3	512	303K
2	4	128	492K
	5	256	568K
	6	512	606K

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reports. The 5225 is offered in four models with rated speeds of 280, 400, 490, and 600 lines per minute at 10 cpi and 195, 290, 355, and 420 lines per minute at 15 cpi. Each line can have a maximum of 132 print positions at 10 cpi and 198 positions at 15 cpi.

The 5256 Printer is a serial matrix printer that prints bidirectionally, using a 96-character upper/lower case EBCDIC character set. The 5256 is available in three models with rated speeds of 40, 80, or 120 characters per second.

All of the 5280 units are designated as "customer set-up" machines, and their compact size should make them relatively easy to install.

The programmable controllers in the 5285, 5286, and 5288 perform identical processing and control functions, although they vary in their memory capacities and device attachment capabilities. Multiple microprocessors (up to six) are used in each controller to enable processing and I/O devices to operate independently, and the system supports multiprogramming with up to eight main storage partitions. IBM has been strangely reticent about defining the 5280's processing capabilities, so at this time no performance comparisons can be made between the 5280 and other systems from IBM or competing vendors.

Data communications capabilities for the 5280 system are provided by an optional communications adapter on either the 5285 Programmable Data Station or the 5288 Programmable Control Unit. The 5285 or 5288 can communicate over a single line in half-duplex mode at a speed of up to 4800 bits per second, using either BSC or SDLC protocol. Point-to-point switched or nonswitched operation and multipoint tributary operation are supported. The required line interface can be provided by an internal modem, a Digital Data Service Adapter, or an EIA interface that permits the use of an external modem. The 5280 system can communicate with an IBM System/370, 303X, or 4300 Series computer in SDLC mode or with most current IBM computers and terminals in BSC mode.

The 5280's designers clearly paid considerable attention to data security provisions. Sensitive data can be entered via the keyboard without being displayed on the CRT screen. An optional Security Keylock feature makes it possible to restrict usage of the system to keyholders. An optional Magnetic Stripe Reader, available for each keyboard/display operator position, can be used to enter user identification data. Finally, a communicating 5280 system can exchange identification sequences with the host computer, thereby aiding the user in controlling access to data.

Initial software support for the 5280 consists of bundled System Control Programming (SCP) and eight separately priced licensed programs. The software is oriented toward the support of data entry, transaction processing, batch processing, and both batch and interactive communications.

2D	7	128	985K
	8	256	1136K
	9	512	1212K

For exchanging diskette data between the 5280 and other systems, IBM supports the following exchange types: Basic Exchange, in formats 1 and 4; H Exchange, in format 7 only; and I Exchange, in all of the above formats. Diskettes can be interchanged with the IBM Series/1, System/3, System/32, System/34, System/38, System/370, 303X, 4300, 3540, 3740, 3747, 3770, 3790, 5110, 5230, 5260, 8100, and other systems and devices that support a compatible diskette exchange type.

Diskette data transfer rates are 31,250 bytes/second in Diskette 1 or Diskette 2 mode and 62,500 bytes/second in Diskette 2D mode. The rotational speed is 360 rpm for both types of drives.

5222 LINE PRINTER: A bidirectional wire matrix line printer that connects to the 5285 or 5288 via twinax cabling at a distance of up to 5000 feet. Horizonal spacing of 10 or 15 characters per inch and vertical spacing of 6 or 8 lines per inch is operator-selectable. Maximum line width is 132 characters at 10 cpi and 198 characters at 15 cpi. A choice of 95-character EBCDIC, 185-character Multinational, or 95-character Spanish character sets is provided. Characters are formed via an 8-by-7 dot matrix. A forms tractor is standard. One model is available with a rated print speed of 80 cps at both 10 and 15 cpi.

5224 LINE PRINTER: An impact matrix line printer that connects to the 5285 or 5288. Horizontal spacing of 10 or 15 characters per inch and vertical spacing of 6 or 8 lines per inch is operator-selectable. Maximum line width is 132 characters at 10 cpi and 198 characters at 15 cpi. A choice of 95-character EBCDIC, 184-character Multinational, or 95-character Spanish character sets is provided. Characters are formed via an 8-by-7 dot matrix. A forms tractor is standard. A cable thru feature provides the capability of connecting a total of seven multiple 5224s, 5225s, 5256s, 5251 Models 1 or 11, and 5252s to a single twinax cable. Two models are available and differ only in their rated print speeds: Model 1 prints at 140 lpm at 10 cpi, and at 95 lpm at 15 cpi; Model 2 prints at 240 lpm at 10 cpi, and at 175 lpm at 15 cpi.

MODEL 5225 LINE PRINTER: A wire matrix line printer that connects to the 5285 or 5288 via twinax cabling at a distance of up to 5000 feet. Horizontal spacing of 10 or 15 characters per inch and vertical spacing of 6 or 8 lines per inch is operator-selectable. Maximum line width is 132 characters at 10 cpi and 198 characters at 15 cpi. A choice of 95-character EBCDIC, 184-character Multinational (including ASCII graphics), or 95-character Spanish character sets is provided. Characters are formed by an 8-by-7 dot matrix. A forms tractor is standard. Forms skipping is program-controlled. Four models are available and differ only in their rated print speeds: at 10 cpi, Model 1 prints at 280 lpm, Model 2 at 400 lpm, Model 3 at 490 lpm, and Model 4 at 560 lpm; at 15 cpi, Model 1 prints at 195 lpm, Model 2 at 290 lpm, Model 3 at 355 lpm, and Model 4 at 420 lpm.

MODEL 5256 SERIAL PRINTER: A bidirectional serial matrix printer that connects to the 5285 or 5288 via twinax cabling at a distance of up to 5000 feet. Horizontal spacing is 10 characters per inch. Vertical spacing is operator-selectable at 6 or 8 lines per inch. Maximum line width is 132 characters. A 96-character (upper/lower case) EBCDIC character set is standard; a Multinational character set is also available. A forms tractor and a cut-forms capability are

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No integrated operating system has been announced for the 5280. The "free" SCP facilities are limited to a System Configuration Program that is used to define the physical and logical configuration of a 5280 system, an Initial Program Loader that initializes the system for program execution, a PTF/Patch Program that aids in applying program temporary fixes and program patches, and a Close Failure Recovery program that aids in recovering from abnormal program terminations.

Users of the 5280 have a choice of three programming languages: DE/RPG, Cobol, and Assembler. The principal IBM emphasis appears to be on DE/RPG, a new programming system that uses RPG-style specification forms to simplify the preparation of programs for interactive data entry, high-volume key entry, and user-defined processing functions. The 5280 Cobol language is an implementation of ANS Cobol 74 that supports interactive or batch commercial applications, provides limited data station support for interactive applications, and supports BSC and SDLC communications via a CALL interface. Cobol's usefulness, however, is limited by the fact that Cobol programs for the 5280 must be compiled on a host IBM System/370, 303X, or 4300 Series computer under either OS/VS or DOS/VSE. DE/RPG and Assembler programs, by contrast, can be compiled on the 5280 system itself.

Three utility packages complete the initial 5280 software complement. The 5280 Utilities consist of 11 routines to perform straight forward utility functions such as diskette file maintenance, resource allocation, and system status display. The 5280 Sort/Merge permits flexible sorting and merging operations on diskette files. The 5280 Communications Utilities provide software support for a 5285 or 5288 equipped with the communications adapter. Basic facilities are provided for batch data transfer and inquiry, multi-leaving remote job entry (MRJE), SNA remote job entry (SRJE), and communication configuration and job description. No software to support specific user applications has been announced for the 5280 to date.

The 5280 effectively supersedes the 3740 Data Entry System, IBM's earlier key-to-diskette system. Introduced in 1973, the 3740 had been progressively updated through the addition of programmability, communications, and printers—but the older system is clearly outclassed by the greater power and flexibility of the 5280. To assist 3740 users in converting to the 5280, IBM is providing three software conversion aids. The 3740 Format Conversion utility facilitates the conversion of 3740 key entry program levels into DE/RPG source programs. The Key Entry Utility accepts the 3740 key entry string language as input and creates formats for simple key entry functions on the 5280. The 3740 ACL Conversion Aid Program, supplied with the 5280 Assembler, aids in converting 3740 ACL programs into 5280 Assembler language.

The 5280 naturally invites comparison with the 8100 Information System, the distributed processing system standard. Three models are available and differ only in their rated print speeds: Model 1 prints at 40 cps, Model 2 at 80 cps, and Model 3 at 120 cps.

COMMUNICATIONS

COMMUNICATIONS ADAPTER: This optional feature (#2500) for either the 5285 Programmable Data Station or the 5288 Programmable Control Unit provides either SDLC or BSC data link control over a single communications line. Operating under store-program control, the feature allows the 5285 or 5288 to communicate at up to 4800 bits/second on a switched point-to-point or nonswitched point-to-point or multipoint line. (On a multipoint line, the 5285 or 5288 operates as a tributary station.) All transmission is in half-duplex mode. Switched network support includes manual dialing and manual or automatic answering (where the attached modem supports the latter capability).

The 5285s, 5288s, or other devices at all the terminations (or drop points) of a network must use the same clocking source, operate at the same transmission rate, use the same transmission code, and have the same two- or four-wire connection to the line. Compatible modems must be used at all terminations in a network.

A 5285 or 5288 using BSC protocol can communicate with the following other IBM systems:

- **A System/3 equipped with a 2074, 2084, or 2094 Communications Adapter.**
- **A System/32 equipped with a 2074 Communications Adapter.**
- **A System/34 equipped with a 2500, 3500, or 4500 Communications Adapter.**
- **A System/38 with an appropriately configured BSC Adapter and subfeatures (point-to-point only).**
- **A System/370 equipped with either an Integrated Communications Adapter, a 2701 Data Adapter Unit, or a 3704 or 3705 Communications Adapter with the ACF/NCP or PEP software, plus a BSC adapter and appropriate subfeatures.**
- **A 4331 System equipped with a communications adapter.**
- **A 303X or 4300 System with a 2701 Data Adapter Unit.**
- **A Series/1 equipped with a 2074, 2075, or 2093/2094 Binary Synchronous Control.**
- **A 3741 Model 2 Data Station or a 3741 Model 4 Programmable Workstation.**
- **A 3747 Data Converter equipped with a 1660 Communications Adapter.**
- **A 5265 communicating model (XX2).**
- **Another 5285 or 5288 equipped with the 2500 Communications Adapter.**

A 5285 or 5288 using SDLC protocol can communicate with a System/370, 303X, or 4300 Series computer via a 3704 or 3705 Communications Controller equipped with appropriate features.

The Communications Adapter must be connected to the communications line by means of either an Integrated Modem, an EIA Interface plus an external modem, or a

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that IBM's Data Processing Division introduced in October 1978. But the 8100 is a much larger, more powerful, and more costly system; the *smallest* 8100 processor has 256K bytes of main memory, and includes 29 megabytes of hard disk storage. Thus, the two systems occupy separate niches within IBM's growing line of distributed processing hardware and appear to be complementary rather than competitive.

The 5280's more direct competition will come not from other IBM products but from the distributed data systems that have long been marketed by companies such as Datapoint, Four-Phase Systems, Inforex, Mohawk Data Sciences, Nixdorf, and Pertec. Competitive systems with capabilities generally similar to those of the 5280 include the Datapoint 1550 and 1800, the Four-Phase System IV series, the Inforex System 9000, the Mohawk Data Sciences Series 21, the Nixdorf 600/25, /35, /45, and /55, and the Pertec XL20 and XL40.□

DDS Adapter. These devices are described in the following paragraphs.

3270 EMULATION COMMUNICATIONS ADAPTER: In addition to the functions provided by the 2500 Communications Adapter, this feature supports the 5280—3270 Emulation licensed program, and in conjunction with stored program control, permits the 5285 and 5288 to function on a switched or nonswitched public or private communications line. This adapter is required to attach to a communications line via the appropriate interface or modem (see INTEGRATED MODEMS). The 3270 Emulation Communications Adapter cannot be installed with the 2500 Communications Adapter. In addition, as with the 2500 adapter, the 3270 cannot be configured to an auxiliary data station or to a system equipped with the Second Application Microprocessor.

INTEGRATED MODEMS: IBM offers five types of 1200-bps Integrated Modems for use with a 5285 Programmable Data Station or 5288 Programmable Control Unit equipped with the 2500 Communications Adapter. All five versions permit either BSC or SDLC data transmission at either 600 or 1200 bits/second. Their distinguishing characteristics are as follows: Model 5500—non-switched; Model 5501—switched with auto-answer; Model 5502—switched without auto-answer; Model 5507—non-switched with Switched Network Backup manual answer capability; and Model 5508—non-switched with Switched Network Backup auto-answer capability. The devices communicating with the 5285 or 5288 must be equipped with compatible 1200-bps modems. Only one Integrated Modem can be installed in a 5285 or 5288, and the Integrated Modem is mutually exclusive with the EIA Interface and the DDS Adapter. The Power Supply Expansion (#5810) is required for the Model 5501 or 5508 Integrated Modem.

EIA INTERFACE (#3701): This feature can be chosen as an alternative to the IBM Integrated Modems for use with a 5285 or 5288 equipped with the 2500 Communications Adapter. The feature provides a cable and interface that meet the EIA RS-232-C specifications, permitting the attachment of an external modem supplied by IBM or another vendor. The Power Supply Expansion (#5810) is a prerequisite.

DIGITAL DATA SERVICE (DDS) ADAPTER: This feature enables a 5285 or 5288 equipped with the 2500 Communications Adapter to transmit and receive data at 2400 or 4800 bits/second in BSC or SDLC mode over AT&T's non-switched Dataphone Digital Data Service. The DDS Adapter is available in two versions: Model 5650 for point-to-point operation and Model 5651 for multipoint operation. Either model provides for appropriate interface and cable to the DDS channel service unit at the customer site.

SOFTWARE

Software support for the 5280 Distributed Data System is provided by System Control Programming (SCP), which is furnished at no charge, and by a set of separately priced licensed programs. These software facilities collectively provide the necessary support for the wide range of distributed environments including data entry, batch and interactive communications, batch processing, and transaction processing.

OPERATING SYSTEM: No integrated operating system for the 5280 has been announced to date. Instead, IBM offers the *5280 System Control Programming (SCP),* which consists of four routines that provide the following basic system functions: 1) the System Configuration Program is used to describe the physical and logical configuration of a 5280 system; 2) the Initial Program Loader initializes the system and prepares it for program execution; 3) the PTF/Patch Program is used to apply program temporary fixes (PTFs) and to make program patches; 4) the Close Failure Recovery Program allows the user to specify an end-of-data (EOD) record in a diskette data set in the event that a program terminates abnormally.

LANGUAGES: IBM currently offers the DE/RPG, Cobol, and Assembler languages for use with the 5280 system. DE/RPG and Assembler programs can be prepared on the 5280 itself, whereas Cobol programs must be compiled on a host System/370, 303X, or 4300 Series computer under either OS/VS or DOS/VSE.

5280 DE/RPG is a new product designed to simplify the preparation of programs for applications ranging from simple key entry to high-function data entry jobs that require extensive editing, data set accessing, and user-defined processing.

DE/RPG makes use of the Data Description Specifications (DDS) form, which is also supported on the IBM System/38, for specification of data entry formats. A format or series of formats, defined by the user and presented in the display screen, provides the framework for a data entry job. A typical job would consist of entering data, editing and checking the data, creating records, and writing the records to a diskette data set. The sequence of execution of the formats can be determined by job definition, by operator selection, or by the program on the basis of an analysis of current data.

DE/RPG also features an RPG subroutine capability which provides a subset of the RPG III calculation operation codes. Using the RPG Calculation Specifications, the user can define subroutines to perform functions such as complex editing, arithmetic calculations, array handling, master data set access, and report printing. A total of 40 RPG II operation codes from the following categories are available: arithmetic and data manipulation, branching, indicator testing, subroutine operations, and special I/O operations. The RPG subroutine capability can also be used to create stand-alone batch DE/RPG programs that can run in any partition. RPG programmers should note, however, that the sequence of instruction execution is defined by the user; the usual RPG "cycle" does not apply.

DE/RPG permits considerable flexibility in display screen design and in data editing. Prompts and data fields can be positioned anywhere on the screen below the top line, which is reserved for status information, and multiple formats can

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be displayed on a single screen. Editing can be performed on a character, field, or record basis, and a wide range of editing, checking, testing, comparison, insertion, and table lookup operations is available.

DE/RPG diskette data sets are organized in sequential fashion. Three access methods are supported: sequential, direct by relative record number, and key indexed. Data sets can be shared by multiple programs on a read or write/update basis. There are safeguards against concurrent updating of a record by two or more programs.

All DE/RPG programs maintain production statistics on both a job basis and a station basis. Counts can be maintained of keystrokes, records, marked records, verify correction keystrokes, elapsed time, and number of jobs.

The DE/RPG licensed program consists of a Source Entry Program and a Compiler. The Source Entry Program permits interactive entry, verification, and updating of DE/RPG source statement data set, which becomes the input to the Compiler. The Compiler produces an object program data set, which is written to diskette. When two or more operators are to perform the same job, each operator must have an individual copy of the appropriate object program, executing in a separate partition.

The DE/RPG Compiler will run on any 5280 system that has at least one Diskette 2D drive or two Diskette 1 drives. Minimum main storage partition size requirements are 9K bytes for the Compiler and 13K bytes for the Source Entry Program. The 5280 SCP and 5280 Utilities are prerequisites.

5280 Cobol is available in two versions, which differ in the host IBM computers and software that are required to compile the Cobol source programs. The 5280 Cobol-OS/VS Host Compiler and Library product requires a System/370, 303X, or 4300 Series computer operating under OS/VS1 or OS/VS2 (MVS) for the compilation process, while the 5280 Cobol-DOS/VSE Host Compiler and Library product requires a System/370, 303X, or 4300 Series computer operating under DOS/VSE. Otherwise, the two versions have similar capabilities and features. Cobol object programs can be executed on a 5285, 5286, or 5288. Object programs can be transferred from the host to the 5280 system via diskette, RJE, or a user-written communications program.

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- Diskette Initialization Utility—formats a diskette according to the user's requirements.
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- Diskette Label Maintenance Utility—allocates space for new data sets, deletes old data sets, and modifies the labels of volumes and data sets.
- Diskette Label List Utility—displays or prints diskette volume labels, data set labels, data set names, and data set directories.
- Diskette Copy Utility—copies all or portions of a diskette onto the same or another diskette; supports multi-volume output data sets.
- Diskette Print Utility—prints all or selected records from a diskette, without reformatting or editing.
- Resource Allocation Utility—enables the user to add, delete, display, or alter an entry in the Resource Allocation Table, which contains physical device addresses with their corresponding logical identifiers.
- 3740 Format Conversion utility—aids in the conversion of 3740 key entry program levels into DE/RPG source programs.
- Diskette Compress Utility—rearranges data sets to make one contiguous space out of the unused space between data sets.
- Key Entry Utility—permits the user to create formats for simple data entry functions using the IBM 3740 key entry string language.
- System Status Utility—displays system status information such as the number and sizes of partitions and names of programs currently being executed.

The *5280 Sort/Merge* consists of a Sort program and a Merge program. The Sort program sorts a single diskette data set into either ascending or descending sequence, using parameters entered at the keyboard or read from diskette. Records can be selected, omitted, or reformatted, and work space and data set space are allocated automatically. Four output formats are available: Full Record, Address Out (a data set of four-byte relative record numbers), Record Subset (a data set containing user-specified data fields), and Index/Key (a data set with records consisting of a key and a relative record number). The Merge program combines records from two sorted diskette data sets into another data set, using parameters entered at the keyboard or read from diskette. It supports multi-volume data sets.

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The Batch Data Transfer/Inquiry program provides for batch data transfer to a host system or terminal and inquiry to a host system. It supports SNA/SDLC communications as an LU1-type terminal to a System/370, 303X, or 4300 Series computer with CICS/VS and IMS/VS, or BSC communications with a System/370, 303X, or 4300 with CICS/VS, IMS/VS (as a 3741), and VSE/POWER, or with

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Sub-model	Bytes of Main Storage	Diskette 1 Drives	Diskette 2D Drives	Purchase Price	Monthly Maint.	Monthly Rental Charge*	Monthly Lease Charge (2-Yr. Lease)*
C01	64K	1	0	7,329	37.00	249	214
C02	64K	2	0	8,457	48.00	299	257
C03	64K	3	0	9,585	59.00	349	300
C04	64K	4	0	10,713	70.00	399	343
C05	64K	0	1	8,003	45.00	272	233
C06	64K	1	1	9,131	56.00	322	276
C07	64K	2	1	10,259	67.00	372	319
C08	64K	3	1	11,387	78.00	422	362
C10	64K	0	2	9,805	64.00	345	295
C11	64K	1	2	10,933	75.00	395	338
C12	64K	2	2	12,061	86.00	445	381
C15	64K	0	3	11,607	83.00	418	357
C16	64K	1	3	12,735	94.00	468	400
C20	64K	0	4	13,409	102.00	491	419
D01	96K	1	0	8,001	39.00	274	235
D02	96K	2	0	9,129	50.00	324	278
D03	96K	3	0	10,257	61.00	374	321
D04	96K	4	0	11,385	72.00	424	364
D05	96K	0	1	8,675	47.00	297	254
D06	96K	1	1	9,803	58.00	347	297
D07	96K	2	1	10,931	69.00	397	340
D08	96K	3	1	12,059	80.00	447	383
D10	96K	0	2	10,477	66.00	370	316
D11	96K	1	2	11,605	77.00	420	359
D12	96K	2	2	12,733	88.00	470	402
D15	96K	0	3	12,279	85.00	443	378
D16	96K	1	3	13,407	96.00	493	421
D20	96K	0	4	14,081	104.00	516	440
E01	128K	1	0	8,673	41.00	299	256
E02	128K	2	0	9,801	52.00	349	299
E03	128K	3	0	10,929	63.00	399	342
E04	128K	4	0	12,057	74.00	449	385
E05	128K	0	1	9,347	49.00	322	275
E06	128K	1	1	10,475	60.00	372	318
E07	128K	2	1	11,603	71.00	422	361
E08	128K	3	1	12,731	82.00	472	404
E10	128K	0	2	11,149	68.00	395	337
E11	128K	1	2	12,277	79.00	445	380
E12	128K	2	2	13,405	90.00	495	423
E15	128K	0	3	12,951	87.00	468	399
E16	128K	1	3	14,079	98.00	518	442
E20	128K	0	4	14,953	106.00	541	461
F01	160K	1	0	9,345	43.00	324	277
F02	160K	2	0	10,473	54.00	374	320
F03	160K	3	0	11,601	65.00	424	363
F04	160K	4	0	12,729	76.00	474	406
F05	160K	0	1	10,019	51.00	347	296
F06	160K	1	1	11,147	62.00	397	339
F07	160K	2	1	12,275	73.00	447	382
F08	160K	3	1	13,403	84.00	497	425
F10	160K	0	2	11,821	70.00	420	358
F11	160K	1	2	12,949	81.00	470	401
F12	160K	2	2	14,077	92.00	520	444
F15	160K	0	3	13,623	89.00	493	420
F16	160K	1	3	14,751	100.00	543	463
F20	160K	0	4	15,425	109.00	566	482
H01	224K	1	0	10,689	48.00	374	322
H02	224K	2	0	11,817	58.50	424	365
H03	224K	3	0	12,945	69.00	474	408
H04	224K	4	0	14,073	79.50	524	451
H05	224K	0	1	11,363	56.50	397	341
H06	224K	1	1	12,491	67.00	447	384
H07	224K	2	1	13,619	77.50	497	427
H08	224K	3	1	14,747	88.00	547	470
H10	224K	0	2	13,165	75.50	470	403
H11	224K	1	2	14,293	86.00	520	446
H12	224K	2	2	15,421	96.50	570	489
H15	224K	0	3	14,967	94.50	543	465
H16	224K	1	3	16,095	105.00	593	508
H20	224K	0	4	16,769	113.00	616	527
J01	288K	1	0	12,033	52.50	424	365
J02	288K	2	0	13,161	63.00	474	408
J03	288K	3	0	14,289	73.50	524	451
J04	288K	4	0	15,417	84.00	574	494
J05	288K	0	1	12,707	60.50	447	384
J06	288K	1	1	13,835	71.00	497	427
J07	288K	2	1	14,963	81.50	547	470
J08	288K	3	1	16,091	92.00	597	513
J10	288K	0	2	14,509	79.50	520	446
J11	288K	1	2	15,637	90.00	570	489
J12	288K	2	2	16,765	100.50	620	532
J15	288K	0	3	16,311	98.50	593	508
J16	288K	1	3		109.00	643	551
J20	288K	0	4	18,113	117.50	666	570

*Rental and lease charges include maintenance.

Special features for 5288 Programmable Control Unit:

1245	Attachment for one 480-character 5281 Data Station	NC	NC	NC	NC
1250	Attachment for one 960-character 5281 Data Station	112	1.00	6	5
1255	Attachment for one 1920-character 5281 Data Station	225	1.50	15	13
1260	Attachment for one 480-character 5282 Dual Data Station	112	1.00	6	5
1265	Attachment for one 960-character 5282 Dual Data Station	225	1.50	15	13
1270	Attachment for one additional 480-character 5281 (prerequisite: 1245 or 1260)	654	2.00	18	15
1275	Attachment for one additional 960-character 5281 (prerequisite: 1250 or 1265)	767	2.50	25	21
1280	Attachment for one additional 1920-character 5281 (prerequisite: 1255)	879	3.00	33	28
1285	Attachment for one additional 480-character 5282 (prerequisite: 1245 or 1260)	767	2.50	25	21
1290	Attachment for one additional 960-character 5282 (prerequisite: 1250 or 1265)	879	3.00	33	28
1300	Remote Diskette Drive Attachment, First (required for first and second remote drives when base 5288 has 1 or 2 drives)	213	1.00	6	5
1301	Remote Diskette Drive Attachment, Second (required for first and second remote drives when base 5288 has 3 or 4 drives, or for third and fourth remote drives when base 5288 has 1 or 2 drives)	970	4.50	31	26
1302	Remote Diskette Drive Attachment, Third (required for third and fourth remote drives when base 5288 has 3 or 4 drives, or for fifth and sixth remote drives when base 5288 has 1 or 2 drives)	213	1.00	6	5
1155	Single 5225/5256 Twinax Printer Attachment (provides a single port for attaching from 1 to 5	540	2.00	15	13

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		Purchase Price	Monthly Maint.	Monthly Rental Charge*	Monthly Lease Charge (2-Yr. Lease)*
	printers via a single twinax cable)				
1157	Single 5222 Printer Attachment	460	2.50	16	14
1160	Multiple 5225/5256 Twinax Printer Attachment (provides 4 ports for attaching, via twinax cable, up to 5 printers)	755	3.00	21	18
1162	Multiple 5222/Twinax Printer Attachment	802	3.50	27	23
3300	Display Screen Filter	70	—	—	—
3610	Elapsed Time Counter	112	1.00	6	5
4955	Magnetic Stripe Reader Adapter/Elapsed Time Counter (controls up to 4 Magnetic Stripe Readers on attached 5281 and/or 5282 data stations)	642	2.50	21	18
6340	Security Keylock	43	—	—	—
6800	Second Application Microprocessor	1,285	2.50	48	41
AUXILIARY DATA STATIONS					
5281	Data Station:				
Z00	With no diskette drive	2,295	13.50	73	63
Z01	With one Diskette 1 drive	3,636	25.50	129	111
Z02	With two Diskette 1 drives	4,764	36.00	179	154
Z05	With one Diskette 2D drive	4,310	34.00	152	130
Z06	With one Diskette 1 drive and one Diskette 2D drive	5,438	44.50	202	173
Z10	With two Diskette 2D drives	6,112	53.00	225	192
5282	Dual Data Station:				
Z00	With no diskette drive	2,604	15.00	79	68
Z01	With one Diskette 1 drive	3,945	27.50	136	116
Z02	With two Diskette 1 drives	5,073	38.00	186	159
Z05	With one Diskette 2D drive	4,450	34.00	149	127
Z06	With one Diskette 1 drive and one Diskette 2D drive	5,747	46.00	209	178
Z10	With two Diskette 2D drives	6,421	54.50	232	197
Keyboards for 5281 and 5282 (one required for each operator position):					
4600	83-key EBCDIC Keyboard	379	4.00	15	13
4601	66-key Data Entry Keyboard	379	4.00	15	13
4602	66-key Data Entry Keyboard with Proof Arrangement	379	4.00	15	13
4603	83-key ASCII Keyboard	379	4.00	15	13
Special features for 5281 and 5282:					
3300	Display Screen Filter	70	—	—	—
4950	Magnetic Stripe Reader	428	2.50	15	13
PRINTERS					
5222	Printer:				
Mdl. 1	80 cps at 10 cpi; 80 cps at 15 cpi	2,605	29.00	129	110
5224	Printer:				
Mdl. 1	140 lpm at 10 cpi; 95 lpm at 15 cpi	6,395	45.00	300	255
Mdl. 2	240 lpm at 10 cpi; 175 lpm at 15 cpi	7,280	53.00	342	291
5225	Printer:				
Mdl. 1	280 lpm at 10 cpi; 195 lpm at 15 cpi	12,710	87.00	465	396
Mdl. 2	400 lpm at 10 cpi; 290 lpm at 15 cpi	14,680	122.00	531	452
Mdl. 3	490 lpm at 10 cpi; 355 lpm at 15 cpi	16,310	150.00	591	503
Mdl. 4	560 lpm at 10 cpi; 420 lpm at 15 cpi	17,830	178.00	649	552
5256	Printer:				
Mdl. 1	40 characters per second	4,605	38.50	217	185
Mdl. 2	80 characters per second	4,820	42.00	247	210
Mdl. 3	120 characters per second	5,035	47.50	268	228
Special features for the Printers:					
1470	Audible Alarm (signals operator when manual intervention is required due to one of nine error conditions; for 5225 and 5265 printers only)	50	—	—	—
2680	Cable Thru (permits multiple printers to be connected to a single twinax cable; required on each printer except the last; for 5225 and 5265 printers only)	119	1.00	4	3
4450	Forms Stand (for 5222, 5224 and 5256 printers only)	54	—	—	—
6100	Rear Document Insert Device (for 5222 only)	130	0.50	7	6
COMMUNICATIONS					
2500	Communications Adapter (for 5285 or 5288 only)	1,015	9.50	67	57
3270	3270 Emulation Communications Adapter (for 5285 or 5288 only)	2,040	14.50	100	85
3701	EIA Interface (provides RS-232-C interface for an external modem)	372	1.50	16	14
5500	1200-bps Integrated Modem, non-switched	686	4.00	22	19
5501	1200-bps Integrated Modem, switched with auto answer	744	3.50	32	27
5502	1200-bps Integrated Modem, switched without auto answer	686	3.50	22	19
5507	1200-bps Integrated Modem, non-switched with SNBU manual answer	744	4.00	33	28
5508	1200-bps Integrated Modem, non-switched with SNBU auto answer	947	4.50	36	31
5650	Digital Data Service Adapter; Point-to-Point	873	1.50	31	26
5651	Digital Data Service Adapter, Multipoint	873	1.50	31	26
5810	Power Supply Expansion (required on 5285 if 5501 or 5508 is installed)	79	1.50	4	3

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SOFTWARE PRICES

		Basic Monthly License Charge
5708-AS1	Assembler	$ 38
5708-CB1	Cobol-OS/VS Host Compiler and Library	144
5708-CB2	Cobol-DOS/VSE Host Compiler and Library	144
5708-DC1	Communications Utilities	23
5708-DE1	DE/RPG	12
5708-EM1	5280-3270 Emulation	46
5708-SC1	System Control Programming (SCP)	NC
5708-SM1	Sort/Merge	12
5708-UT1	Utilities	7
5798-NZH	OS/6 Communications and File Conversion System	143
5798-RBZ	5280 Contract Data Entry/Edit Support	50
5798-RCR	5280 Format Design Aid	600**
5798-RDF	5280 Distribution Order Subsystem	35

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**Available on a one-time charge only.■

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System/3/32/34 RPG II, System/3 CCP, System/34 SSP-ICF, Series/1 RPS, a 3740, a 5260, or another 5280. The minimum main storage required is 32K bytes for BSC communications and 64K bytes for SNA/SDLC.

The SNA/SDLC Remote Job Entry (SRJE) facility permits the 5280 system to function as an RJE terminal consisting of one console, one reader, one punch, and one printer. Printer data streams can be directed to either a printer or diskette, while punch data streams are directed to diskette. SNA support on the host computer is via ACF/VTAM and ACF/NCP/VS to RES, JES2, JES3, and VSE/POWER. The minimum main storage requirement on the 5280 is 64K bytes.

The Multi-Leaving Remote Job Entry (MRJE) facility permits the 5280 system to function as an RJE terminal with full multi-leaving support for concurrent device operation of one console, one reader, one punch, and one printer. Printer data streams can be directed to either a printer or diskette, while punch data streams are directed to diskette. BSC support on the host computer treats the 5280 as a System/3 MRJE workstation for RES, JES2, and JES3. The minimum main storage requirement is 48K bytes on a 5285 or 64K bytes on a 5288.

The Communications Configuration and Job Description program is used to prepare communications environments via job step prompts. Descriptions are stored on diskette by job name, and are used to initiate the communications link with the host computer or another terminal. Initiation of the link with the host may be either dynamic or predetermined for operator convenience.

The 5280—3270 Emulation licensed program allows the 5280 Distributed Data System to function as selected 3270 control units and devices to existing host applications. The program consists of the following: the 3270 Device Emulation Program, the 3270 Batch Transfer Utility, and the 3270 Program Interface.

The 3270 Device Emulation Program allows the 5280 to appear to the host as a 3274 Model 1C Control Unit under SNA/SDLC or as a 3271 Model 2 Control Unit under BSC. With the 3270 Device Emulation Program, the 1920-character 5281 Data Station (attached to a 5288 Programmable Control Unit) and the 1920-character 5285 Programmable Data Station appear to a host system as a 3277 Model 2 Display Station with selected features. The 5280 Distributed Data System's printers are also emulated to appear as the 3284 Model 2, the 3286 Model 2, and the 3288 Model 2 printer under BSC and the 3287 Printer Models 1 and 2 under SNA/SDLC. Host system communication subsystems that are supported include System/370 IMS/VS, CICS/VS, TSO, and System/3 Model 15D CCP.

The following BSC host system support is provided for the 5280—3270 Device Emulation Program:

- IMS/VS with BTAM under OS/VS1 or OS/VS2 (MVS)
- IMS/VS with ACF/VTAM under OS/VS1 or OS/VS2 (MVS)
- CICS with BTAM under OS/VS1 or OS/VS2 (MVS)
- CICS/VS with ACF/TCAM under OS/VS1 or OS/VS2 (MVS)
- CICS/VS with BTAM under DOS/VSE or DOS/VS
- CICS/VS with ACF/VTAM under OS/VS1 or OS/VS2 (VMS)
- TSO with ACF/VTAM under OS/VS2 (MVS)*
- System/3 Model 15D under CCP

(Note: *TSO does not support printers. All of the above systems, with the exception of the System/3, are also supported when under control of VM/370.)

The following SNA/SDLC host system support is provided for the 5280—3270 Device Emulation Program:

- IMS/VS with ACF/VTAM under OS/VS1 or OS/VS2 (MVS)
- CICS/VS with ACF/VTAM under OS/VS1 or OS/VS2 (MVS)
- CICS/VS with ACF/TCAM under OS/VS1 or OS/VS2 (MVS)
- CICS/VS with ACF/VTAM under DOS/VS or DOS/VSE
- TSO with ACF/VTAM under OS/VS2 (MVS)*

*TSO does not support printers.

Minimum 5285 and 5288 system configuration requirements required to support the 5280—3270 Device Emulation Program include 64K bytes of memory (96K bytes if printer is used in conjunction with a keyboard/display), the 3270 Emulation Communications Adapter, and a display size of 1920 characters.

The 3270 Batch Transfer Emulation Utility enables the user to transmit and receive batch data when communicating with a host system via 3270 BSC protocols. Record lengths can be a maximum of 1918 bytes. Transaction IDs and how they are used during transmission may be specified. A user program is required at the host to send or receive batch data.

The 3270 Program Interface provides the 5280 user with a program-to-program interface using 3270 BSC protocols. Up to seven concurrent sessions are supported, with each session representing a different 3270 device address. The user application interface is through DE/RPG and Cobol.

PRICING

IBM offers the 5280 system on a purchase, 24-month lease, or rental basis. The warranty period is three months. The standard IBM lease or rental contract entitles the customer to unlimited usage each month. Prime-shift maintenance is included in the lease or rental price. The purchase option accrual equals 45 percent of the monthly charge up to 50 percent of the purchase price. IBM's standard educational allowance of 10 percent applies to the 5280 system for lease, rental, and purchase customers.

For purchased, leased or rented systems, the 5280 system is under maintenance group D. The minimum period of maintenance service is 9 consecutive hours between 7:00 a.m. and 6:00 p.m. Monday through Friday. Charges for maintenance coverage outside this period are based upon the following percentages of the minimum monthly maintenance charge (MMC) added to the MMC:

	Consecutive hours				
	9*	12	16	20	24
Monday-Friday (until 8:00 a.m. Saturday)	10	12	14	16	18
Saturday (until 8:00 a.m. Sunday)	4	5	7	8	9
Sunday (until 8:00 a.m. Monday)	5	7	9	11	12

*Outside of the hours 7:00 to 6:00 p.m.

For users without a maintenance contract, the 5280 system is maintained under per-call class 2. Under this class the per-call charge during regular hours is $77.00 per hour, and during off hours the charge is $89.00 per hour. The hourly rate for systems engineering service is $57.00.

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PROGRAMMABLE DATA STATIONS

		Purchase Price	Monthly Maint.	Monthly Rental Charge*	Monthly Lease Charge (2-Yr. Lease)*
5285	Programmable Data Station:				
A01	With 32K and one Diskette 1 drive	$ 5,958	$ 44.00	$226	$192
A02	With 32K and two Diskette 1 drives	7,086	54.50	276	235
A05	With 32K and one Diskette 2D drive	6,632	52.50	249	211
A06	With 32K, one Diskette 1 drive, and one Diskette 2D drive	7,760	63.00	299	254
A10	With 32K and two Diskette 2D drives	8,434	71.50	322	273
B01	With 48K and one Diskette 1 drive	6,409	45.00	242	206
B02	With 48K and two Diskette 1 drives	7,537	55.50	292	249
B05	With 48K and one Diskette 2D drive	7,083	53.50	265	225
B06	With 48K, one Diskette 1 drive, and one Diskette 2D drive	8,211	64.00	315	268
B10	With 48K and two Diskette 2D drives	8,885	72.50	338	287
C01	With 64K and one Diskette 1 drive	6,630	46.00	251	213
C02	With 64K and two Diskette 1 drives	7,758	56.50	301	256
C05	With 64K and one Diskette 2D drive	7,304	54.50	274	232
C06	With 64K, one Diskette 1 drive, and one diskette 2D drive	8,432	65.00	324	275
C10	With 64K and two Diskette 2D drives	9,106	73.50	347	294
D01	With 96K and one Diskette 1 drive	7,302	48.00	276	235
D02	With 96K and two Diskette 1 drives	8,430	58.50	326	278
D05	With 96K and one Diskette 2D drive	7,976	56.50	299	254
D06	With 96K, one Diskette 1 drive, and one Diskette 2D drive	9,104	67.00	349	297
D10	With 96K and two Diskette 2D drives	9,778	75.50	372	316
5286	Dual Programmable Data Station:				
A02	With 32K and two Diskette 1 drives	8,008	50.50	276	235
A10	With 32K and two Diskette 2D drives	9,356	67.00	322	273
B02	With 48K and two Diskette 1 drives	8,459	51.50	292	249
B10	With 48K and two Diskette 2D drives	9,807	68.50	338	287
C02	With 64K and two Diskette 1 drives	8,680	52.50	301	256
C10	With 64K and two Diskette 2D drives	10,028	69.50	347	294
D02	With 96K and two Diskette 1 drives	9,352	54.50	326	278
D10	With 96K and two Diskette 2D drives	10,700	71.00	372	316

Keyboards for 5285 and 5286 (one required for each operator position):

4600	83-key EBCDIC Keyboard	379	4.00	15	13
4601	66-key Data Entry Keyboard	379	4.00	15	13
4602	66-key Data Entry Keyboard with Proof Arrangement	379	4.00	15	13
4603	83-key ASCII Keyboard	379	4.00	15	13

Special features for 5285 and 5286 (except as noted):

		Purchase Price	Monthly Maint.	Monthly Rental Charge*	Monthly Lease Charge (2-Yr. Lease)*
1150	5224/5225/5256 Twinax Printer Attachment (for 5285 only)	540	2.00	15	13
1152	5222 Printer Attachment	460	2.50	16	14
1200	Attachment for one 480-character 5281 Data Station	654	2.00	18	15
1205	Attachment for one 960-character 5281 Data Station (for 5285 only)	767	2.50	25	21
1210	Attachment for one 1920-character 5281 Data Station (for 5285 only)	879	3.00	33	28
1215	Attachment for one 480-character 5282 Dual Data Station	767	2.50	25	21
1220	Attachment for one 960-character 5282 Dual Data Station (for 5285 only)	879	3.00	33	28
1240	Remote Diskette Drive Attachment (required if an attached 5281 or 5282 has either 1 or 2 diskette drives)	213	1.00	6	5
3300	Display Screen Filter	70	—	—	—
3500	960-Character Display Size (for 5285 only)	112	1.00	6	5
3505	1920-Character Display Size (for 5285 only)	225	1.00	15	13
3610	Elapsed Time Counter (measures elapsed real time)	112	1.00	6	5
4950	Magnetic Stripe Reader (4955 or 4960 is a pre-requisite)	428	2.50	15	13
4955	Magnetic Stripe Reader Adapter/Elapsed Time Counter (for 5286 or non-communicating 5285)	642	2.50	21	18
4960	Magnetic Stripe Reader Adapter/Elapsed Time Counter (for communicating 5285)	256	1.00	7	6
6340	Security Keylock	43	—	—	—
6800	Second Application Microprocessor	1,285	2.50	48	41

PROGRAMMABLE CONTROL UNITS

5288 Programmable Control Unit:

Sub-model	Bytes of Main Storage	Diskette 1 Drives	Diskette 2D Drives				
A01	32K	1	0	6,657	35.50	224	193
A02	32K	2	0	7,785	46.00	274	236
A03	32K	3	0	8,913	57.00	324	279
A04	32K	4	0	10,041	68.00	374	322
A05	32K	0	1	7,331	43.00	247	212
A06	32K	1	1	8,459	54.00	297	255
A07	32K	2	1	9,587	65.00	347	298
A08	32K	3	1	10,715	76.00	397	341
A10	32K	0	2	9,133	62.00	320	274
A11	32K	1	2	10,261	73.00	370	317
A12	32K	2	2	11,389	84.00	420	360
A15	32K	0	3	10,935	81.00	393	336
A16	32K	1	3	12,063	92.00	443	379
A20	32K	0	4	12,737	100.00	466	398

*Rental and lease charges include maintenance.

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Sub-model	Bytes of Main Storage	Diskette 1 Drives	Diskette 2D Drives	Purchase Price	Monthly Maint.	Monthly Rental Charge*	Monthly Lease Charge (2-Yr. Lease)*
C01	64K	1	0	7,329	37.00	249	214
C02	64K	2	0	8,457	48.00	299	257
C03	64K	3	0	9,585	59.00	349	300
C04	64K	4	0	10,713	70.00	399	343
C05	64K	0	1	8,003	45.00	272	233
C06	64K	1	1	9,131	56.00	322	276
C07	64K	2	1	10,259	67.00	372	319
C08	64K	3	1	11,387	78.00	422	362
C10	64K	0	2	9,805	64.00	345	295
C11	64K	1	2	10,933	75.00	395	338
C12	64K	2	2	12,061	86.00	445	381
C15	64K	0	3	11,607	83.00	418	357
C16	64K	1	3	12,735	94.00	468	400
C20	64K	0	4	13,409	102.00	491	419
D01	96K	1	0	8,001	39.00	274	235
D02	96K	2	0	9,129	50.00	324	278
D03	96K	3	0	10,257	61.00	374	321
D04	96K	4	0	11,385	72.00	424	364
D05	96K	0	1	8,675	47.00	297	254
D06	96K	1	1	9,803	58.00	347	297
D07	96K	2	1	10,931	69.00	397	340
D08	96K	3	1	12,059	80.00	447	383
D10	96K	0	2	10,477	66.00	370	316
D11	96K	1	2	11,605	77.00	420	359
D12	96K	2	2	12,733	88.00	470	402
D15	96K	0	3	12,279	85.00	443	378
D16	96K	1	3	13,407	96.00	493	421
D20	96K	0	4	14,081	104.00	516	440
E01	128K	1	0	8,673	41.00	299	256
E02	128K	2	0	9,801	52.00	349	299
E03	128K	3	0	10,929	63.00	399	342
E04	128K	4	0	12,057	74.00	449	385
E05	128K	0	1	9,347	49.00	322	275
E06	128K	1	1	10,475	60.00	372	318
E07	128K	2	1	11,603	71.00	422	361
E08	128K	3	1	12,731	82.00	472	404
E10	128K	0	2	11,149	68.00	395	337
E11	128K	1	2	12,277	79.00	445	380
E12	128K	2	2	13,405	90.00	495	423
E15	128K	0	3	12,951	87.00	468	399
E16	128K	1	3	14,079	98.00	518	442
E20	128K	0	4	14,953	106.00	541	461
F01	160K	1	0	9,345	43.00	324	277
F02	160K	2	0	10,473	54.00	374	320
F03	160K	3	0	11,601	65.00	424	363
F04	160K	4	0	12,729	76.00	474	406
F05	160K	0	1	10,019	51.00	347	296
F06	160K	1	1	11,147	62.00	397	339
F07	160K	2	1	12,275	73.00	447	382
F08	160K	3	1	13,403	84.00	497	425
F10	160K	0	2	11,821	70.00	420	358
F11	160K	1	2	12,949	81.00	470	401
F12	160K	2	2	14,077	92.00	520	444
F15	160K	0	3	13,623	89.00	493	420
F16	160K	1	3	14,751	100.00	543	463
F20	160K	0	4	15,425	109.00	566	482
H01	224K	1	0	10,689	48.00	374	322
H02	224K	2	0	11,817	58.50	424	365
H03	224K	3	0	12,945	69.00	474	408
H04	224K	4	0	14,073	79.50	524	451
H05	224K	0	1	11,363	56.50	397	341
H06	224K	1	1	12,491	67.00	447	384
H07	224K	2	1	13,619	77.50	497	427
H08	224K	3	1	14,747	88.00	547	470
H10	224K	0	2	13,165	75.50	470	403
H11	224K	1	2	14,293	86.00	520	446
H12	224K	2	2	15,421	96.50	570	489
H15	224K	0	3	14,967	94.50	543	465
H16	224K	1	3	16,095	105.00	593	508
H20	224K	0	4	16,769	113.00	616	527
J01	288K	1	0	12,033	52.50	424	365
J02	288K	2	0	13,161	63.00	474	408
J03	288K	3	0	14,289	73.50	524	451
J04	288K	4	0	15,417	84.00	574	494
J05	288K	0	1	12,707	60.50	447	384
J06	288K	1	1	13,835	71.00	497	427
J07	288K	2	1	14,963	81.50	547	470
J08	288K	3	1	16,091	92.00	597	513
J10	288K	0	2	14,509	79.50	520	446
J11	288K	1	2	15,637	90.00	570	489
J12	288K	2	2	16,765	100.50	620	532
J15	288K	0	3	16,311	98.50	593	508
J16	288K	1	3		109.00	643	551
J20	288K	0	4	18,113	117.50	666	570

*Rental and lease charges include maintenance.

Special features for 5288 Programmable Control Unit:

1245	Attachment for one 480-character 5281 Data Station	NC	NC	NC	NC
1250	Attachment for one 960-character 5281 Data Station	112	1.00	6	5
1255	Attachment for one 1920-character 5281 Data Station	225	1.50	15	13
1260	Attachment for one 480-character 5282 Dual Data Station	112	1.00	6	5
1265	Attachment for one 960-character 5282 Dual Data Station	225	1.50	15	13
1270	Attachment for one additional 480-character 5281 (prerequisite: 1245 or 1260)	654	2.00	18	15
1275	Attachment for one additional 960-character 5281 (prerequisite: 1250 or 1265)	767	2.50	25	21
1280	Attachment for one additional 1920-character 5281 (prerequisite: 1255)	879	3.00	33	28
1285	Attachment for one additional 480-character 5282 (prerequisite: 1245 or 1260)	767	2.50	25	21
1290	Attachment for one additional 960-character 5282 (prerequisite: 1250 or 1265)	879	3.00	33	28
1300	Remote Diskette Drive Attachment, First (required for first and second remote drives when base 5288 has 1 or 2 drives)	213	1.00	6	5
1301	Remote Diskette Drive Attachment, Second (required for first and second remote drives when base 5288 has 3 or 4 drives, or for third and fourth remote drives when base 5288 has 1 or 2 drives)	970	4.50	31	26
1302	Remote Diskette Drive Attachment, Third (required for third and fourth remote drives when base 5288 has 3 or 4 drives, or for fifth and sixth remote drives when base 5288 has 1 or 2 drives)	213	1.00	6	5
1155	Single 5225/5256 Twinax Printer Attachment (provides a single port for attaching from 1 to 5	540	2.00	15	13

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		Purchase Price	Monthly Maint.	Monthly Rental Charge*	Monthly Lease Charge (2-Yr. Lease)*
	printers via a single twinax cable)				
1157	Single 5222 Printer Attachment	460	2.50	16	14
1160	Multiple 5225/5256 Twinax Printer Attachment (provides 4 ports for attaching, via twinax cable, up to 5 printers)	755	3.00	21	18
1162	Multiple 5222/Twinax Printer Attachment	802	3.50	27	23
3300	Display Screen Filter	70	—	—	—
3610	Elapsed Time Counter	112	1.00	6	5
4955	Magnetic Stripe Reader Adapter/Elapsed Time Counter (controls up to 4 Magnetic Stripe Readers on attached 5281 and/or 5282 data stations)	642	2.50	21	18
6340	Security Keylock	43	—	—	—
6800	Second Application Microprocessor	1,285	2.50	48	41
AUXILIARY DATA STATIONS					
5281	Data Station:				
Z00	With no diskette drive	2,295	13.50	73	63
Z01	With one Diskette 1 drive	3,636	25.50	129	111
Z02	With two Diskette 1 drives	4,764	36.00	179	154
Z05	With one Diskette 2D drive	4,310	34.00	152	130
Z06	With one Diskette 1 drive and one Diskette 2D drive	5,438	44.50	202	173
Z10	With two Diskette 2D drives	6,112	53.00	225	192
5282	Dual Data Station:				
Z00	With no diskette drive	2,604	15.00	79	68
Z01	With one Diskette 1 drive	3,945	27.50	136	116
Z02	With two Diskette 1 drives	5,073	38.00	186	159
Z05	With one Diskette 2D drive	4,450	34.00	149	127
Z06	With one Diskette 1 drive and one Diskette 2D drive	5,747	46.00	209	178
Z10	With two Diskette 2D drives	6,421	54.50	232	197
Keyboards for 5281 and 5282 (one required for each operator position):					
4600	83-key EBCDIC Keyboard	379	4.00	15	13
4601	66-key Data Entry Keyboard	379	4.00	15	13
4602	66-key Data Entry Keyboard with Proof Arrangement	379	4.00	15	13
4603	83-key ASCII Keyboard	379	4.00	15	13
Special features for 5281 and 5282:					
3300	Display Screen Filter	70	—	—	—
4950	Magnetic Stripe Reader	428	2.50	15	13
PRINTERS					
5222	Printer:				
Mdl. 1	80 cps at 10 cpi; 80 cps at 15 cpi	2,605	29.00	129	110
5224	Printer:				
Mdl. 1	140 lpm at 10 cpi; 95 lpm at 15 cpi	6,395	45.00	300	255
Mdl. 2	240 lpm at 10 cpi; 175 lpm at 15 cpi	7,280	53.00	342	291
5225	Printer:				
Mdl. 1	280 lpm at 10 cpi; 195 lpm at 15 cpi	12,710	87.00	465	396
Mdl. 2	400 lpm at 10 cpi; 290 lpm at 15 cpi	14,680	122.00	531	452
Mdl. 3	490 lpm at 10 cpi; 355 lpm at 15 cpi	16,310	150.00	591	503
Mdl. 4	560 lpm at 10 cpi; 420 lpm at 15 cpi	17,830	178.00	649	552
5256	Printer:				
Mdl. 1	40 characters per second	4,605	38.50	217	185
Mdl. 2	80 characters per second	4,820	42.00	247	210
Mdl. 3	120 characters per second	5,035	47.50	268	228
Special features for the Printers:					
1470	Audible Alarm (signals operator when manual intervention is required due to one of nine error conditions; for 5225 and 5265 printers only)	50	—	—	—
2680	Cable Thru (permits multiple printers to be connected to a single twinax cable; required on each printer except the last; for 5225 and 5265 printers only)	119	1.00	4	3
4450	Forms Stand (for 5222, 5224 and 5256 printers only)	54	—	—	—
6100	Rear Document Insert Device (for 5222 only)	130	0.50	7	6
COMMUNICATIONS					
2500	Communications Adapter (for 5285 or 5288 only)	1,015	9.50	67	57
3270	3270 Emulation Communications Adapter (for 5285 or 5288 only)	2,040	14.50	100	85
3701	EIA Interface (provides RS-232-C interface for an external modem)	372	1.50	16	14
5500	1200-bps Integrated Modem, non-switched	686	4.00	22	19
5501	1200-bps Integrated Modem, switched with auto answer	744	3.50	32	27
5502	1200-bps Integrated Modem, switched without auto answer	686	3.50	22	19
5507	1200-bps Integrated Modem, non-switched with SNBU manual answer	744	4.00	33	28
5508	1200-bps Integrated Modem, non-switched with SNBU auto answer	947	4.50	36	31
5650	Digital Data Service Adapter; Point-to-Point	873	1.50	31	26
5651	Digital Data Service Adapter, Multipoint	873	1.50	31	26
5810	Power Supply Expansion (required on 5285 if 5501 or 5508 is installed)	79	1.50	4	3

*Rental and lease charges include maintenance.

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SOFTWARE PRICES

		Basic Monthly License Charge
5708-AS1	Assembler	$ 38
5708-CB1	Cobol-OS/VS Host Compiler and Library	144
5708-CB2	Cobol-DOS/VSE Host Compiler and Library	144
5708-DC1	Communications Utilities	23
5708-DE1	DE/RPG	12
5708-EM1	5280-3270 Emulation	46
5708-SC1	System Control Programming (SCP)	NC
5708-SM1	Sort/Merge	12
5708-UT1	Utilities	7
5798-NZH	OS/6 Communications and File Conversion System	143
5798-RBZ	5280 Contract Data Entry/Edit Support	50
5798-RCR	5280 Format Design Aid	600**
5798-RDF	5280 Distribution Order Subsystem	35

*Rental and lease charges include maintenance.
**Available on a one-time charge only.■