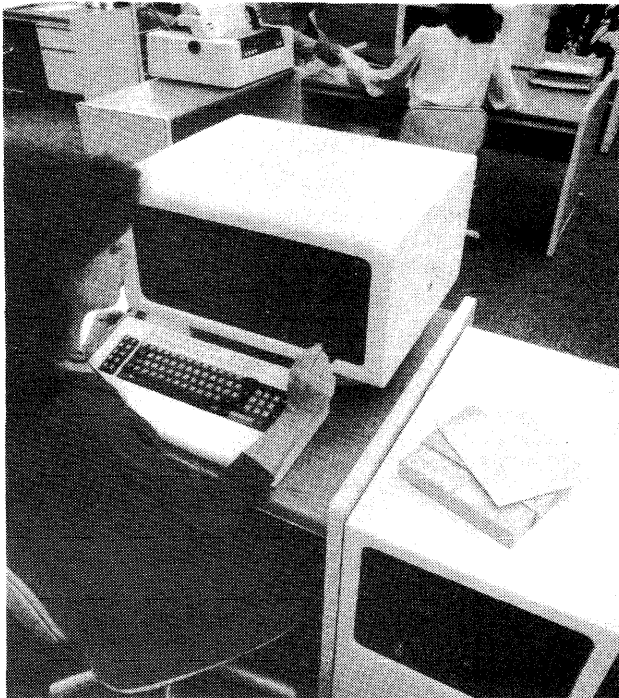


IBM 5280 Distributed Data System



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. In a smaller 5280 configuration, the processor, 32K to 64K bytes of main storage, and one or two diskette drives are all housed within one of the table-top keyboard/display stations.

MANAGEMENT SUMMARY

IBM's belated but increasingly whole-hearted endorsement of distributed data processing gained further momentum with the announcement of the 5280 Distributed Data System on January 10, 1979. A product of IBM's 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 computer. ➤

IBM's new, diskette-based intelligent terminal system is designed for distributed functions such as batch and interactive communications, intelligent data entry, batch processing, and transaction processing. A 5280 system can include from 1 to 4 keyboard/display stations, 0 to 5 printers, 1 to 8 diskette drives, and 32K to 160K bytes of memory.

CHARACTERISTICS

MANUFACTURER: International Business Machines Corporation, General Systems Division, 4111 Northside Parkway, Atlanta, Georgia 30301. Telephone (404) 238-2000.

MODEL: 5280 Distributed Data System.

DATE ANNOUNCED: January 10, 1980.

DATE OF FIRST DELIVERY: June 1980 for all units except the 5225 Printer, which is scheduled for October 1980.

DATA FORMATS

BASIC UNIT: 8-bit byte.

INSTRUCTIONS: IBM has not released any information about the 5280's instruction set to date.

MAIN STORAGE

TYPE: Semiconductor.

CYCLE TIME: Not specified to date.

CAPACITY: 32K, 48K, or 64K bytes in the 5285 Programmable Data Station or 5286 Dual Programmable Data Station; 32K, 64K, 96K, 128K, or 160K bytes in the 5288 Programmable Control Unit.

CHECKING: Not specified to date.

PROCESSORS

The controllers within the 5285 Programmable Data Station, 5286 Dual Programmable Data Station, and 5288 Programmable Control Unit control all the functions of a 5280 system, including those of any attached 5281 or 5282 auxiliary data stations. At least one of these three programmable units must be part of any 5280 system configuration. The controllers in the 5285, 5286, and 5288 perform identical processing and control functions but vary in their main storage capacities and device attachment capabilities.

IBM has revealed very few details about these controllers to date. It is known that they utilize multiple microprocessors that allow processing and I/O devices to operate independently. Other features of the controllers include a multiprogramming capability, with up to eight main storage partitions of variable size, and powerful data editing functions. The 2500 Communications Adapter, optionally ➤

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➤ IBM emphasizes that the 5280 is designed to “process business information where it begins; at a branch office down the street or across the continent, in a plant or on a loading dock.” For example, manufacturers or distributors can use the 5280 in remote sales offices to process customer orders and transmit the order information, via telephone lines, to a centralized computer system to update customer records. Retailers can use the 5280 at loading docks to match incoming merchandise with purchase orders and later transmit the corrected receiving data to a central computer to update inventory files.

The initial 5280 hardware product line consists of seven units: single and dual programmable keyboard/display stations, single and dual auxiliary (nonprogrammable) keyboard/display stations, a programmable control unit, and two 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 160K bytes of memory, four keyboard/displays, five 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 64K 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 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 stations (through the attachment of an auxiliary 5282), but a multi-station configuration cannot be equipped for communications.

The 5286 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 64K 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 160K bytes of memory and from one to four diskette ➤

➤ available for the 5285 and 5288, provides for single-line communications in either BSC or SDLC protocol.

INPUT/OUTPUT CONTROL

Multiple microprocessors within the 5285, 5286, and 5288 allow processing and I/O devices to operate concurrently.

CONFIGURATION RULES

A minimum 5280 configuration can consist of: 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, or 64K bytes of main storage and one or two diskette drives. The standard 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 or 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, and 64K 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 or 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 160K bytes of main storage (in 32K-byte increments) and from 1 to 4 diskette drives. The 5288 provides processing, control, main storage, 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; one 5225 Printer; and up to four 5256 Printers; one 2500 Communications Adapter with the appropriate line interface feature; 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 5288 by a cable up to 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 two features: the Single 5225/5256 Printer Attachment (#1155) provides a single port that permits one 5225 Printer and up to four 5256 Printers to be connected via a single twinax cable up to 5000 feet long; the Multiple 5225/5256 Printer Attachment (#1160) provides four ports that permit the attachment, via multiple twinax cables, of one 5256 Printer and up to four 5256 Printers. ➤

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PERIPHERALS/TERMINALS

MODEL	DESCRIPTION & SPEED
INTEGRATED DISPLAY	Standard component of the 5281 Data Station, 5282 Dual Data Station, 5285 Programmable Data Station, and 5286 Dual Programmable Data Station; standard display capacity is 480 characters (6 lines of 80 characters) at each operator position; optional display capacities are 960 characters (12 lines of 80 characters) or 1920 characters (24 lines of 80 characters) for the 5281 or 5285, and 960 characters (12 lines of 80 characters) for each operator position of the 5282; user-selectable character set offers choice of 94-character EBCDIC (upper/lower case), 94-character ASCII, or 185-character Multinational Character Set; 8-by-16 dot matrix; program-controlled screen attributes include reverse image, high intensity, blink, underline, nondisplay, and column separator
INTEGRATED KEYBOARD	Required component of the 5281, 5282 (two keyboards), 5285, and 5286 (two keyboards); choice of four keyboard types; 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	Optional feature for the 5281, 5282, 5285, or 5286; provides the capability to read up to 128 A.B.A. numeric characters, including control characters, from a magnetic stripe on credit cards, identification cards, and other documents.
PRINTERS	
5225	Wire matrix line printer; attaches to the 5285 or 5288; operator-selectable horizontal spacing of 10 or 15 characters/inch; operator-controlled vertical spacing of 6 or 8 lines/inch; maximum line width of 132 characters at 10 char/inch or 198 characters at 15 char/inch; choice of 95-character EBCDIC, 184-character Multinational (including ASCII graphics), or 95-character Spanish Speaking character set; 7-by-8 dot matrix; forms tractor for feeding margin-punched continuous forms; program-controlled forms skipping; connects to the 5285 or 5288 via twinax cabling at a distance of up to 5000 feet; available in four models with the following rated speeds at 10 char/inch: Model 1, 280 lpm; Model 2, 400 lpm; Model 3, 490 lpm; Model 4, 560 lpm; rated speeds at 15 char/inch are: Model 1, 195 lpm; Model 2, 290 lpm; Model 3, 355 lpm; Model 4, 420 lpm
5256	Bidirectional serial matrix printer; attaches to the 5285 or 5288; 132 print positions per line at 10 characters/inch; operator-controlled vertical spacing of 6 or 8 lines/inch; 96-character, upper/lower-case EBCDIC character set; optional Multinational Character Set; forms tractor for feeding margin-punched continuous forms, plus cut forms cabling; connects to the 5285 or 5288 via twinax cabling at a distance of up to 5000 feet; available in three models with the following rated speeds: Model 1, 40 char/sec; Model 2, 80 char/sec; Model 3, 120 char/sec

➤ drives with a total capacity of up to 4.8 megabytes. It can control a cluster of up to four keyboard/displays through the attachment of auxiliary data stations (5281 or 5282). The 5288 can also accommodate the communications adapter and up to five printers (four 5256's and one 5225). 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 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.

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.

MASS STORAGE

INTEGRATED DISKETTE DRIVES: The only mass storage facilities currently available for the 5280 system are ➤

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▷ The 5225 Printer is a new 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 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 previously announced serial matrix printer that can be attached to either the 5285 or the 5288. It 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. Customer shipments will begin in June 1980 for all units except the 5225 Printer, which is scheduled for October 1980. The minimum 5280 configuration, a 32K-byte 5285 Programmable Data Station with one diskette drive, can be purchased for \$5,630 or leased for \$166 per month on a 2-year lease.

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. Communication with the System/38, however, is not currently supported because the required software for the System/38 has not been announced to date.

The 5280's designers clearly paid considerable attention to data security provisions. Sensitive data can be entered ▷

▶ the diskette (floppy disk) drives, which are standard components of the three units that contain programmable controllers and optional components of the two auxiliary keyboard/display units.

Two types of diskette drives are available for the 5280 system: 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.

The 5285 Programmable Data Station contains either one or two diskette drives, which can be either Diskette 1 or Diskette 2D drives (or one of each). Thus, the maximum diskette storage capacity of the 5285 is 2.4 megabytes.

The 5286 Dual Programmable Data Station contains two diskette drives of either the Diskette 1 or Diskette 2D type, for a maximum capacity of 2.4 megabytes. The two types of diskette drives may not be intermixed on a 5286.

The 5288 Programmable Control Unit contains from one to four diskette drives in any mixture of the Diskette 1 and Diskette 2D types, for a maximum capacity of 4.8 megabytes. The 5288 can also access the diskette drives in the attached 5281 and/or 5282 auxiliary data stations, permitting a maximum system total of 8 diskette drives and 9.6 megabytes.

The 5281 Data Station and the 5282 Dual Data Station can each contain 0, 1, or 2 diskette drives in any combination of the Diskette 1 and Diskette 2D types, for a maximum capacity of 2.4 megabytes.

Three recording formats are available for each of the three types of IBM diskettes, as tabulated below:

Diskette Type	Format	Bytes per Sector	Capacity, Bytes
1 28	246K		
	2	256	284K
	3	512	303K
2 28	492K		
	5	256	568K
	6	512	606K
2D	7	128	985K
	8	256	1136K
	9	512	1212K

For exchanging diskette data between the 5280 and other system, 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.

INPUT/OUTPUT UNITS

See the Peripherals/Terminals table on the third page of this report. ▶

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➤ 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 seven separately priced licensed programs. The software is oriented toward the support of data entry, transaction processing, batch processing, and both batch and interactive communications.

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. The 5280 COBOL compiler is scheduled for availability in February 1981, whereas the other software products will be available with the first 5280 hardware shipments in June 1980.

Three utility packages complete the initial 5280 software complement. The 5280 Utilities consist of 11 routines to perform straightforward 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.

➤ COMMUNICATIONS CONTROL

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 stored-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 5285's, 5288's, 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/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 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 DDS Adapter. These devices are described in the following paragraphs.

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

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▷ The 5280 effectively supersedes the 3740 Data Entry System, IBM's earlier key-to-diskette system. IBM made this point clear by announcing a 25 percent purchase price cut on most components and features of the 3740 system on the same day it announced the 5280. Introduced in 1973, the 3740 had been progressively upgraded 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.

GSD's new distributed data system naturally invites comparison with the 8100 Information System, the distributed processing system 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, includes 29 megabyte of hard disk storage, and sells for \$25,200—more than four times the \$5,630 purchase price of a minimum 5280 system. 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, Nixdorf, and Pertec. Competitive systems with capabilities generally similar to those of the 5280 include the Datapoint 1500 and 1800, the Four-Phase System IV series, the Inforex System 7000, the Mohawk Series 21, the Nixdorf 600/15 and 600/25, and the Pertec XL20. In comparisons with systems such as these, the 5280 generally appears to rank near the low end in terms of both price and functional capabilities. As a result, a flurry of new low-end products and/or price reductions can be expected from the competing vendors during the coming months. □

▶ 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-232C 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 a 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 (PTF's) 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

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► 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 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, and an optional source listing on either printer or 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.

The 5280 COBOL language is an implementation of 1974 ANS Standard COBOL, X.23-1974. It provides support for both interactive and batch commercial application programs, as well as limited data station support for interactive applications. Support for BSC and SDLC communications is provided via a CALL interface.

The 5280 Assembler is used to create stand-alone programs which will run on a 5285, 5286, or 5288. Features of the Assembler include mnemonic operation codes, symbolic addresses, symbolic data representation, automatic storage assignments, address displacement calculation, operand expressions, binary and decimal arithmetic, a source program listing, a cross-reference listing, error checks, and diagnostic messages. The 3740 ACL Conversion Aid Program is supplied along with the Assembler to aid the user

in converting ACL programs written for the IBM 3740 Data Entry System into 5280 Assembler Language.

UTILITIES: IBM currently offers three licensed programs in this category for the 5280 system: the 5280 Utilities, the 5280 Sort/Merge, and the 5280 Communications Utilities.

The 5280 Utilities consist of 11 programs with the following names and functions:

- Diskette Initialization Utility—formats a diskette according to the user's requirements.
- Diskette/Data Set Clear Utility—clears one or all data sets on a diskette in preparation for the recording of new data.
- 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 devices addresses with their corresponding logical identifiers.
- 3740 Format Conversion utility—aims 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.

The 5280 Communications Utilities consist of four basic facilities: Batch Data Transfer/Inquiry, SNA/SDLC Remote Job Entry (SRJE), Multi-Leaving Remote Job Entry (MRJE), and Communications Configuration and Job Description. These programs provide software support for a 5285 Programmable Data Station or 5288 Programmable Control Unit equipped with the 2500 Communi- ►

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► communications Adapter and communicating over a single line in either BSC or SDLC mode. The communications programs operate concurrently with other applications. Only the 960-character and 1920-character display sizes are supported.

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 LUI-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 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.

PRICING

POLICY: 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.

The current Agreement for Lease or Rental of IBM Machines provides users with a single contract on which they can specify mixtures of rental and leased equipment, each with various terms. CPU's rented under the plan can be terminated or downgraded on 90 days' notice, and all other rented equipment can be terminated or downgraded on 30 days' notice. Base terms and extension terms are specified for each piece of equipment obtained through a leasing agreement. The basic lease term is two years, followed by one-year extension terms.

MAINTENANCE: 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 a.m. 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.

SOFTWARE: The 5280 System Control Programming (SCP) is supplied with the hardware at no additional cost. All the other current IBM programs for the 5280 are licensed separately and offered at fixed monthly license fees, as listed under "Software Prices."

INSTALLATION AND TESTING: All components of the 5280 system are designated as "customer set-up" machines. The customer set-up allowance is two days for the 5281, 5282, 5285, 5286, and 5288. For the 5225 and 5256 Printers, the customer set-up allowance is two days when the printer is installed concurrently with a 5280 system and one day when the printer is added to a previously installed 5280 system.

A preinstallation testing allowance is also offered for the three programmable units of the 5280 system. The allowance is 8 hours per 5285, 4 hours per 5286, and 8 hours per 5288. This allowance is applicable to only the first two units of each type installed by any one customer.

Communicating 5280 units (i.e., 5285's and 5288's equipped with the 2500 Communications Adapter) are eligible for an additional "on-site allowance" (OSA) of seven days each for any combination of the first three communicating 5285 and/or 5288 units installed within an enterprise, together with all devices attached to the 5285 and/or 5288 units.

EQUIPMENT: The following configurations show the 5280 system in its minimum configuration and in a representative single-keyboard system with dual diskette drives, printer, and communications.

MINIMUM SYSTEM: Consists of a 5285 Model A01 Programmable Data Station with 32K bytes of main storage, one Diskette 1 drive, and keyboard. Purchase price is \$5,630, and 2-year lease price is \$166 per month.

TYPICAL SYSTEM: Consists of a 5285 Model C10 Programmable Data Station with 64K bytes of main storage, two Diskette 2D drives, keyboard, communications adapter, and 120-cps 5256 Model 3 Printer. Purchase price is \$16,660, and 2-year lease price is \$517 per month. ■

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EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Monthly Rental Charge*	Monthly Lease Charge (2-Yr. Lease)*
PROGRAMMABLE DATA STATIONS					
5285	Programmable Data Station:				
	A01 With 32K and one Diskette 1 drive	\$5,280	\$42.00	\$183	\$155
	A02 With 32K and two Diskette 1 drives	6,280	52.00	224	190
	A05 With 32K and one Diskette 2D drive	5,880	50.00	200	170
	A06 With 32K, one Diskette 1, and one Diskette 2D drive	6,880	60.00	241	205
	A10 With 32K and two Diskette 2D drives	7,480	68.00	259	220
	B01 With 48K and one Diskette 1 drive	5,680	43.00	196	166
	B02 With 48K and two Diskette 1 drives	6,680	53.00	237	201
	B05 With 48K and one Diskette 2D drive	6,280	51.00	213	181
	B06 With 48K, one Diskette 1, and one Diskette 2D drive	7,280	61.00	254	216
	B10 With 48K and two Diskette 2D drives	7,880	69.00	272	231
	C01 With 64K and one Diskette 1 drive	5,880	44.00	204	173
	C02 With 64K and two Diskette 1 drives	6,880	54.00	245	208
	C05 With 64K and one Diskette 2D drive	6,480	52.00	221	188
	C06 With 64K, one Diskette 1, and one diskette 2D drive	7,480	62.00	263	223
	C10 With 64K and two Diskette 2D drives	8,080	70.00	280	238
5286	Dual Programmable Data Station:				
	A01 With 32K and two Diskette 1 drives	7,100	48.00	224	190
	A10 With 32K and two Diskette 2D drives	8,300	64.00	259	220
	B01 With 48K and two Diskette 1 drives	7,500	49.00	237	201
	B10 With 48K and two Diskette 2D drives	8,700	65.00	272	231
C01	C01 With 64K and two Diskette 1 drives	7,700	50.00	245	238
	C10 With 64K and two Diskette 2D drives	8,900	66.00	280	238
Keyboards for 5285 and 5286 (one required for each operator position):					
	4600 83-key EBCDIC Keyboard	350	4.00	13	11
	4601 66-key Data Entry Keyboard	350	4.00	13	11
	4602 66-key Data Entry Keyboard with Proof Arrangement	350	4.00	13	11
	4603 83-key ASCII Keyboard	350	4.00	13	11
Special features for 5285 and 5286 (except as noted):					
	3500 960-Character Display Size (for 5285 only)	100	0.50	6	5
	3501 1920-Character Display Size (for 5285 only)	200	0.50	12	10
	1150 5225/5256 Printer Attachment (for 5285 only)	480	1.50	12	10
	1200 Attachment for one 480-character 5281 Data Station	580	1.50	14	12
	1205 Attachment for one 960-character 5281 Data Station (for 5285 only)	680	2.00	20	17
	1210 Attachment for one 1920-character 5281 Data Station (for 5285 only)	780	2.50	26	22
	1215 Attachment for one 480-character 5282 Dual Data Station	680	2.00	20	17
	1220 Attachment for one 960-character 5282 Dual Data Station (for 5285 only)	780	2.50	26	22
	1240 Remote Diskette Drive Attachment (required if an attached 5281 or 5282 has either 1 or 2 diskette drives)	190	0.50	6	5
	4950 Magnetic Stripe Reader (4955 or 4960 is a prerequisite)	380	2.00	12	10
	4955 Magnetic Stripe Reader Adapter/Elapsed Time Counter (for 5286 or non-communicating 5285)	570	2.00	18	15
	4960 Magnetic Stripe Reader Adapter/Elapsed Time Counter (for communicating 5285)	228	0.50	7	6
	3610 Elapsed Time Counter (measures elapsed real time)	100	0.50	6	5
	6340 Security Keylock	40	—	—	—

PROGRAMMABLE CONTROL UNITS

5288	Submodel	Bytes of Main Storage	Diskette 1 Drives	Diskette 2D Drives	Purchase Price	Monthly Maint.	Monthly Rental Charge*	Monthly Lease Charge (2-Yr. Lease)*
	A01	32K	1	0	5,900	34.00	183	155
	A02	32K	2	0	6,900	44.00	224	190
	A03	32K	3	0	7,900	54.00	265	225
	A04	32K	4	0	8,900	64.00	306	260
	A05	32K	0	1	6,500	42.00	200	170
	A06	32K	1	1	7,500	52.00	241	205
	A07	32K	2	1	8,500	62.00	282	240
	A08	32K	3	1	9,500	72.00	324	275
	A10	32K	0	2	8,100	60.00	259	220
	A11	32K	1	2	9,100	70.00	300	255
	A12	32K	2	2	10,100	80.00	341	290
	A15	32K	0	3	9,700	78.00	318	270
	A16	32K	1	3	10,700	88.00	359	305
	A20	32K	0	4	11,300	96.00	376	320
	C01	64K	1	0	6,500	36.00	204	173
	C02	64K	2	0	7,500	46.00	245	208
	C03	64K	3	0	8,500	56.00	286	243
	C04	64K	4	0	9,500	66.00	327	278
	C05	64K	0	1	7,100	44.00	221	188
	C06	64K	1	1	8,100	54.00	263	223
	C07	64K	2	1	9,100	64.00	304	258
	C08	64K	3	1	10,100	74.00	345	293
	C10	64K	0	2	8,700	62.00	280	238
	C11	64K	1	2	9,700	72.00	321	273
	C12	64K	2	2	10,700	82.00	362	308
	C15	64K	0	3	10,300	80.00	339	288

*Rental and lease charges include maintenance.

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EQUIPMENT PRICES (Continued)

Submodel	Bytes of Main Storage	Diskette 1 Drives	Diskette 2D Drives	Purchase Price	Monthly Maint.	Monthly Rental Charge*	Monthly Lease Charge (2-Yr. Lease)*
Programmable Control Unit: (Continued)							
C16	64K	1	3	11,300	90.00	380	323
C20	64K	0	4	11,900	98.00	398	338
D01	96K	1	0	7,100	38.00	225	191
D02	96K	2	0	8,100	48.00	266	226
D03	96K	3	0	9,100	58.00	307	261
D04	96K	4	0	10,100	68.00	348	296
D05	96K	0	1	7,700	46.00	243	206
D06	96K	1	1	8,700	56.00	284	241
D07	96K	2	1	9,700	66.00	325	276
D08	96K	3	1	10,700	76.00	366	311
D10	96K	0	2	9,300	64.00	301	256
D11	96K	1	2	10,300	74.00	342	291
D12	96K	2	2	11,300	84.00	384	326
D15	96K	0	3	10,900	82.00	360	306
D16	96K	1	3	11,900	92.00	401	341
D20	96K	0	4	12,500	102.00	419	356
E01	128K	1	0	7,700	40.00	246	209
E02	128K	2	0	8,700	50.00	287	244
E03	128K	3	0	9,700	60.00	328	279
E04	128K	4	0	10,700	70.00	369	314
E05	128K	0	1	8,300	48.00	264	224
E06	128K	1	1	9,300	58.00	305	259
E07	128K	2	1	10,300	68.00	346	294
E08	128K	3	1	11,300	78.00	387	329
E10	128K	0	2	9,900	66.00	322	274
E11	128K	1	2	10,900	76.00	364	309
E12	128K	2	2	11,900	86.00	405	344
E15	128K	0	3	11,500	84.00	381	324
E16	128K	1	3	12,500	94.00	422	359
E20	128K	0	4	13,100	102.00	440	374
F01	160K	1	0	8,300	42.00	267	227
F02	160K	2	0	9,300	52.00	308	262
F03	160K	3	0	10,300	62.00	349	297
F04	160K	4	0	11,300	72.00	391	332
F05	160K	0	1	8,900	50.00	285	242
F06	160K	1	1	9,900	60.00	326	277
F07	160K	2	1	10,900	70.00	367	312
F08	160K	3	1	11,900	80.00	408	347
F10	160K	0	2	10,500	68.00	344	292
F11	160K	1	2	11,500	78.00	385	327
F12	160K	2	2	12,500	88.00	426	362
F15	160K	0	3	12,100	86.00	402	342
F16	160K	1	3	13,100	96.00	443	377
F20	160K	0	4	13,700	104.00	461	392

Special features for 5288 Programmable Control Unit:

1245	Attachment for one 480-character 5281 Data Station	0	0.00	0	0
1250	Attachment for one 960-character 5281 Data Station	100	0.50	6	5
1255	Attachment for one 1920-character 5281 Data Station	200	1.00	12	10
1260	Attachment for one 480-character 5282 Dual Data Station	100	0.50	6	5
1265	Attachment for one 960-character 5282 Dual Data Station	200	1.00	12	10
1270	Attachment for one additional 480-character 5281 (prerequisite: 1245 or 1260)	580	1.50	14	12
1275	Attachment for one additional 960-character 5281 (prerequisite: 1250 or 1265)	680	2.00	20	17
1280	Attachment for one additional 1920-character 5281 (prerequisite: 1255)	780	2.50	26	22
1285	Attachment for one additional 480-character 5282 (prerequisite: 1245 or 1260)	680	2.00	20	17
1290	Attachment for one additional 960-character 5282 (prerequisite: 1250 or 1265)	780	2.50	26	22
1300	Remote Diskette Drive Attachment, First (required for first and second remote drives when base 5288 has 1 or 2 drives)	190	0.50	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)	860	4.00	24	20
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)	190	0.50	6	5
1155	Single 5225/5256 Printer Attachment (provides a single port for attaching from 1 to 5 printers via a single twinax cable)	480	1.50	12	10
1160	Multiple 5225/5256 Printer Attachment (provides 4 ports for attaching, via twinax cable, up to 5 printers)	670	2.50	18	15
4955	Magnetic Stripe Reader Adapter/Elapsed Time Counter (controls up to 4 Magnetic Stripe Readers on attached 5281 and/or 5282 data stations)	570	2.00	18	15
3610	Elapsed Time Counter	100	0.50	6	5
6340	Security Keylock	40	—	—	—

*Rental and lease charges include maintenance.

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EQUIPMENT PRICES (Continued)

		<u>Purchase Price</u>	<u>Monthly Maint.</u>	<u>Monthly Rental Charge*</u>	<u>Monthly Lease Charge (2-Yr. Lease)*</u>
AUXILIARY DATA STATIONS					
5281	Data Station:				
	Z00 With no diskette drive	2,035	13.00	59	50
	Z01 With Diskette 1 drive	3,225	24.50	106	90
	Z02 With two Diskette 1 drives	4,225	34.50	147	125
	Z05 With one Diskette 2D drive	3,825	32.50	124	105
	Z06 With one Diskette 1 and one Diskette 2D drive	4,825	42.50	165	140
	Z10 With two Diskette 2D drives	5,425	50.50	182	155
5282	Dual Data Station:				
	Z00 With no diskette drive	2,310	14.50	65	55
	Z01 With one Diskette 1 drive	3,500	26.00	112	95
	Z02 With two Diskette 1 drives	4,500	36.00	153	130
	Z05 With one Diskette 2D drive	4,100	34.00	129	110
	Z06 With one Diskette 1 and one Diskette 2D drive	5,100	44.00	171	145
	Z10 With two Diskette 2D drives	5,700	52.00	188	160
Keyboards for 5281 and 5282 (one required for each operator position):					
	4600 83-key EBCDIC Keyboard	350	4.00	13	11
	4601 66-key Data Entry Keyboard	350	4.00	13	11
	4602 66-key Data Entry Keyboard with Proof Arrangement	350	4.00	13	11
	4603 83-key ASCII Keyboard	350	4.00	13	11
Special feature for 5281 and 5282:					
	4950 Magnetic Stripe Reader	380	2.00	12	10
PRINTERS					
5225	Printer:				
	Mdl. 1 280 lpm at 10 cpi; 195 lpm at 15 cpi	11,650	75.00	371	315
	Mdl. 2 200 lpm at 10 cpi; 290 lpm at 15 cpi	13,450	106.00	424	360
	Mdl. 3 490 lpm at 10 cpi; 355 lpm at 15 cpi	14,950	131.00	471	400
	Mdl. 4 560 lpm at 10 cpi; 420 lpm at 15 cpi	16,350	155.00	518	440
5256	Printer:				
	Mdl. 1 40 char/sec	5,200	34.50	188	160
	Mdl. 2 80 char/sec	5,800	40.50	213	181
	Mdl. 3 120 char/sec	6,250	48.50	231	197
Special features for 5225 and 5256 Printers:					
	1470 Audible Alarm (signals operator when manual intervention is required due to one of nine error conditions)	50	—	—	—
	2680 Cable Thru (permits multiple printers to be connected to a single twinax cable; required on each printer except the last)	115	1.00	4	3
	4450 Forms Stand (for 5256 only)	54	—	—	—
COMMUNICATIONS					
	2500 Communications Adapter (for 5285 or 5288 only)	900	9.00	53	45
	3701 EIA Interface (provides RS-232C interface for an external modem)	330	1.00	13	11
	5650 Digital Data Service Adapter: Point-to-Point	840	1.00	24	20
	5651 Digital Data Service Adapter, Multipoint	840	1.00	24	20
	5500 Integrated Modem, non-switched	660	3.50	19	16
	5501 Integrated Modem, switched with auto answer	660	3.00	25	21
	5502 Integrated Modem, switched without auto answer	660	3.00	19	16
	5507 Integrated Modem, non-switched with SNBU manual answer	660	3.50	26	22
	5508 Integrated Modem, non-switched with SNBU auto answer	840	4.00	29	25
	5810 Power Supply Expansion (required on 5285 if 5501 or 5508 is installed)	70	1.00	4	3

SOFTWARE PRICES

	<u>Basic Monthly License Charge</u>
5280 System Control Programming (SCP)	No charge
5280 DE/RPG	\$ 8
5280 COBOL-OS/VS Host Compiler and Library	110
5280 COBOL-DOS/VSE Host Compiler and Library	110
5280 Communication Utilities	15
5280 Sort/Merge	8
5280 Utilities	4
5280 Assembler	25

*Rental and lease charges include maintenance.