# IBM 5280 Distributed Data Systems
## Models 5285, 5286 & 5288
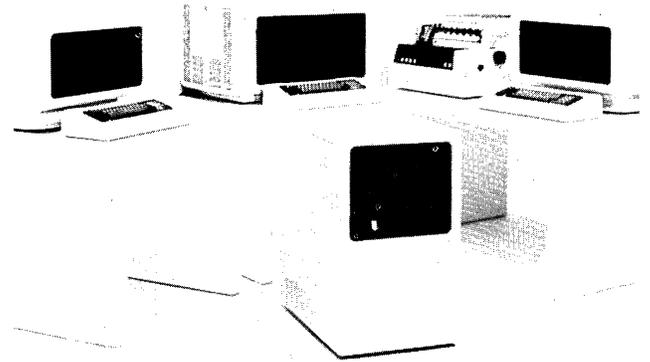
## ■ PROFILE

**Function** ● user-programmable, single- or multiterminal, small-scale system supporting local and distributed (5285/5288 only) mode data entry, inquiry, RJE and applications program tasks.

**Architectures Supported** ● 5285/5288 attach to S/370, 303X, 4300 series in BSC or SNA/SDLC distributed architectures in point-to-point or multipoint configurations ● attaches to 8100 Information System via DPPX/BASE or via 3270 Emulation under SDLC ● BSC 3741-type key-to-diskette data entry system, 3780-type terminal, or S/3-type MRJE ● SNA/SDLC operation as LU-1-type terminal ● 5286 attaches in noncommunicating mode to Series/1, Systems/3/32/36/38/370, 303X, 4331, 8100, and non-IBM systems.

**Communications** ● 5285/5288 run under CICS/VS and ACF/VTAM on DOS/VSE, or CICS/VS, IMS/VS, ACF/VTAM, and ACF/TCAM on OS/VS distributed host supported networks ● single-line, 600 to 4800 bps, half-duplex BSC/SDLC, ASCII/EBCDIC code facilities; not supported on multiterminal 5285 systems or on 5286 ● 3270 emulation via 5285/5288; BSC/SDLC.
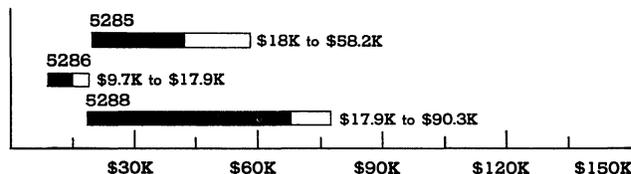
**Operating System** ● 5280 SCP provides operating system facilities with up to 8 partitions; maximum 4 foreground or 7 background ● sequential, direct, and key-indexed data set organization.

## PURCHASE PRICE RANGE

hardware & software ██████████

5-yr maint/serv fee ☐━━━━━☐

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       5285
       ████████☐ $18K to $58.2K
5286
██☐ $9.7K to $17.9K
       5288
       ██████☐ $17.9K to $90.3K
   |      |      |      |      |
  $30K   $60K   $90K   $120K  $150K
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**IBM 5280 PURCHASE PRICING** bar graphs cover price ranges between "small" and "large" configurations for software and hardware products (solid bars), and for associated 5-year maintenance/service fees (open bars) ● **5285 small system** consists of 5285 Model EO5 with 128K of RAM, single diskette, SCP, 1920-character display, a model 3402 diskette expansion (2D), a model 5281 ZOO display and associated keyboard, a 5285 keyboard, a Model 1210 terminal interface, a Model 1240 remote diskette attachment, a 3701 EIA RS-232C interface, a Model 1152 printer attachment, and a Model 5217C2 printer; **large system** includes Model EO5 with 1920-character display, a Model 3410 Disk System, 3 Model 3402 Diskettes, 3 Model 5281 ZOO displays and associated keyboards, a 5285 keyboard, 4 Model 1240 remote diskette attachments, 4 Model 1210 terminal interfaces, a Model 3701 RS-232C interface, a Model 1152 printer attachment, and 2 Model 5217C2 printers ● **5286 small system** consists of 5286 D10 Dual Programmable Data Station with 96K bytes of RAM, 2 diskette drives, and 2 keyboards; **large system** adds a Model 1215 terminal interface, a Model 1240 remote diskette attachment, a Model 5282 dual data station, and 4 keyboards ● **5288 small system** consists of Model 5288 CO5 with 64K bytes of RAM, a single diskette, 2 Model 5281 ZOO displays with associated keyboards, 2 Model 3402 diskette drives, 2 Model 1240 remote diskette attachments, a Model 1255 terminal interface, a Model 1280 terminal interface, a Model 1152 printer attachment, and 2 Model 5217C2 printer, and a Model 3701 RS-232C communication interface; **large system** consists of Model 5288 JO5 with 288K bytes of RAM, a single diskette, SCP, 4 Model 5281 ZOO displays and associated keyboards, a Model 1255 terminal interface, 3 Model 1280 terminal interfaces, a Model 1155 printer attachment, a Model 2680 printer cable-through, 4 Model 5224-2 printers, 2 Model 3410 disk drives, and a Model 3701 RS-232C interface ● Note: all prices are for single-quantity purchase; discounts will lower actual purchase price.

The IBM 5280 clustered terminal system supports data entry, inquiry, RJE, and local processing applications, but suffers from slow auxiliary storage devices and inefficient job handling.

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**Database Management** ● supports sequential data set organization; sequential, direct by relative record number, and key index/value accessing.

**Transaction Processing Management** ● locally through 5280 SCP ● distributed through host CICS or IMS which acts as terminal-oriented transaction monitor with file processing facilities ● supports send and receive, batch and inquiry tasks.

**Support Software** ● DE/RPG and assembler; host compiled COBOL ● diskette data set maintenance utilities ● sort/merge ● 3740-to-5280 Program Conversion ● data entry/edit support.

**Processor** ● separate microprocessor controls applications processing, keyboard/display, diskettes, printers, and communications ● 64K- to 288K-byte RAM ● 246K- to 9.7M-byte diskette ● 10M- to 70M-byte disk ● 7 printers on 5285 and up to 8 printers on 5288 systems.

**Terminals/Workstations** ● up to 4 keyboard-display terminals per system.

**First Delivery** ● 1980.

**Systems Delivered** ● unknown.

**Comparable Systems** ● functionally comparable to number of small-scale systems or programmable terminals marketed by many vendors for local/remote processing tasks; IBM orientation towards distributed processing in relation to host systems makes 5280 to S/370 relations somewhat akin to Datapoint 1800 to ARC, DEC PDT-11 to PDP-11, etc configurations.

**Vendor** ● International Business Machines (IBM) Corporation, Information Systems Group ● National Accounts Division; 1133 Westchester Avenue, White Plains, NY 10604; 914-696-1900 ● National Marketing Division; 4111 Northside Parkway, Atlanta, GA 30327; 404-238-2000.

**Canadian Distribution** ● IBM Canada Limited; 3500 Steeles Avenue East, Markham, ON L3R 2Z1 ● 416-474-2111.

**Distribution** ● worldwide through local IBM sales/service offices.

**GSA Schedule** ● listed.

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## Models 5285, 5286 & 5288

## ■ ANALYSIS

The 5280 is one of many general-purpose clustered terminal systems that support data entry, inquiry, RJE, and local application processing. Three versions are offered: the 5285, 5286, and 5288. All are user-programmable, have their own rudimentary operating system, support diskette storage, and attach slaved terminals that also support their own diskettes. Application software support consists of DE/RPG compiler and an assembler, plus host-compiled COBOL. The 5285 and 5286 both support host communication, allowing attachment to such hosts as S/370, 303X, and 4300 series. They also support disks. The 5286 provides local processing but no communication facility, nor does it support disks.

The viability of systems like the 5280 is questionable especially in light of the alternatives. Specifically, the personal computer with its first-rate operating systems, extended RAM facilities, hard disk storage, mountains of packaged software application packages, and a communication facility provides very strong competition for the 5280. As for interactive processing, users have a host of protocol emulation packages to choose from which make the personal computer emulate an IBM 3270. In fact, some of the newer protocol emulators allow uploading/downloading of files—something not offered with native-mode 3270 operation.

On the plus side, the 5280 does offer extended auxiliary storage and supports local multiprogramming. Depending on the configuration, the 5280 can be equipped with up to 9.7M bytes of diskette or up to 70M bytes of disk storage. Although neither of these devices are particularly fast, somewhat better performance can be achieved through hard disk. The diskettes, for example, have an average access time of 243 milliseconds and the disks have an access time ranging from 16.6 (cylinder-to-cylinder) to 205 milliseconds. Average access time is 85 milliseconds (102 cylinders).

While the operating system, called the System Control Program (SCP), supports up to 8 partitions in a multiprogramming environment, its method for servicing interrupts is inefficient (see Limitations). In addition, the common system utilities are main-storage resident, reducing the RAM available for processing applications.

Once a viable product, the 5280 has been upstaged by the advent of personal computers, specifically the IBM PC. Users should strongly consider the PC to service 5280-like applications because it offers far greater benefits.

The 5160 PC/XT can be equipped with a DOS 2.1 operating system; up to 640K bytes of RAM; 40K bytes of ROM, up to 720K bytes of diskette; and up to 30M bytes of hard disk storage. The PC is also offered with a color display; good database management facilities; a ROM-based cassette-level BASIC interpreter; a diskette-based Disk/Advanced BASIC, plus APL, Logo, Pascal, FORTRAN, and COBOL computers and macro assembler. Its communication facilities include TTY-terminal emulation and file-transfer operations supported by a communication utility under IBM DOS. Emulators are also offered for 5250 and 3270 terminal emulation, and BSC/SDLC protocols are supported. RJE is also supported under 3270 emulation.

The PC also supports local and remote clusters, and operates in a 3270 environment in emulation mode. The 5280 can also emulate the 3270, but is restricted to the older 3271 Model 2 controller under BSC and 3274 Model 1C under SNA/SDLC. Terminal emulation is also restricted to the older monocromatic 3277 Model 2.

The PC/XT is also price competitive. A loaded 5160-087 consisting of a base system (CPU, 128K-byte RAM, 40K-byte ROM containing Cassette-Level BASIC interpreter, 360K-byte diskette drive, 10M-byte hard disk, RS-232C interface) plus optional DOS 2.0, BASIC 2 interpreter, Pascal support, additional 512K-byte RAM, an additional 10M-byte disk drive, an additional 360K-byte diskette, color graphics monitor, an 80-cps graphics printer, SDLC communication interface, plus word processing and spreadsheet costs about $12,000. A standalone 5285 E05 with communication facilities and 128K-byte RAM, a single 2D format diskette (up to 606K-byte capacity), a 10M-byte hard disk, BSC/SDLC communication interface, no software other than SCP and no printer costs $11,588. The 80-cps Model 5222-1 (a nongraphics printer) costs $2,345.

### □ Strengths

For users that require a clustered terminal system with local processing capabilities, the 5280 satisfies the need. Its operating system, if used correctly, can satisfactorily handle up to 4 foreground jobs (i.e., keyboard applications) or up to 7 background partitions. And, a good amount of the processing can be done with minimal host/communication load. With its 3270 emulation facility, the 5280 can also take advantage of the services available to user of that popular IBM system.

For users with extensive printing requirements, the 5280 provides a good line of printers, one of which operates at 560 lpm. In addition, up to 8 printers can be attached to 5288.

The S/3 MRJE multileaving capability is another system strength. MRJE permits the concurrent transmission and reception of data to/from peripheral devices and the network via the full-duplex capabilities of the communication line.

Finally, the security capabilities offered by IBM's data encryption option offers another "strength." The security algorithm is based on the NBS Data Encryption Standard and functions with both BSC and SDLC.

### □ Limitations

A good number of the 5280's limitations have already been pointed out in the analysis. However, there are 2 principal weaknesses that require further amplification. These are poor job interrupt handling by the SCP and slow diskette access times.

The first limitation—and by far the most serious in our opinion—rests with the way partitions are serviced and interrupts are handled. The 5280 permits 8 partitions to be established. Of these up to 4 may be foreground, with a keyboard associated with each partition. The other upper-configuration limit allows 7 background and 1 foreground partition. A keyboard may have more than 1 background partition.

Partitions are serviced sequentially beginning at F1 (highest priority) and ending with the last background (lowest priority). The problem arises when an interrupt (in this case when an ATTN key is struck) occurs in a higher priority partition while a lower priority partition is being serviced. In this case, service ceases in the lower partition and control is transferred to the higher. After the interrupt has been serviced, the operating system first checks to see if any other ATTNs are queried to that partition and services them. If not, control is passed to the **next partition** in line—not to the partition that was initially interrupted. The net result of this interrupt handling scheme is that lower priority partitions receive considerably less service than they need, with the result that overall processing in general degrades.

If you're planning on running a multipartition system, keep this limitation in mind. After all, everyone can't be F1.

The next limitation rests with the slow speed of the diskettes. These units operate at 360 rpm, providing a data transfer rate of 1 byte every 32 microseconds (2 bytes on the dual-density version). With a seek time of between 40 and 80 milliseconds, track-to-track access of 5 milliseconds, head settle of 35 milliseconds, and rotational delay of 35 milliseconds, this works out to an average access time of 243 milliseconds. While this figure is not the worst we've seen for a diskette, it is something to consider if you're planning to share data sets and you anticipate constant interaction. Users can relieve this situation somewhat by opting for the optional disks, but those units aren't all that fast either. For example, the 3410 Disk Storage drive provides 256K bytes per sector, 32,768 bytes per cylinder, and 303 cylinders for programs and data. Minimum access time is 16.6 milliseconds for cylinder-to-cylinder, and average access time is 85 milliseconds (102 cylinders). The maximum access time is 205 milliseconds. The same caveats given to diskettes apply here also.

## ■ COMMUNICATIONS FACILITIES OVERVIEW

### □ Distributed Communications

The 5280 may be specified as a batch/inquiry, remote job entry, and multileaving remote job entry terminal in a point-to-point and multipoint environment. The batch/inquiry program supports

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SNA/SDLC communications as an LU1-type terminal to an S/370, 303X or 4300 running under CICS/VS or IMS/VS. The 5280 also supports BSC and communicates with the S/370, 303X, and 4300 under CICS/VS, IMS/VS or VSE POWER. BSC may also be used to interface with S/3/32/34. Communications in BSC or SNA/SDLC environments are supported on the programmable 5285/5288 models. The programmable dual display 5286 will not, however, support communications.

A 5280 to 3270 emulation program offered with the 5285/5288 emulator selected 3270 control units. Under BSC, a 3271 Model 2 running on multipoint nonswitched or multipoint nonswitched with switched network backup is emulated. For SNA/SDLC, the 3274 Model 1C operating on point-to-point or multipoint nonswitched, or point-to-point switched is emulated for both BSC and SDLC, the 3270 emulation is performed for the same keyboards/display; and printer as follows: 3277-2 keyboard/displays; 5280 data entry/typewriter/proof keyboards with up to 24 program function keys; 3284/3286/3288 BSC printers; 3287 SNA LU 1 and 3 printer.

## ☐ Distributed Configurations

The 5280 may be configured to handle data entry, remote batch/inquiry/printing, remote job entry, and local data processing. To meet these device needs, the 5280 provides 11 basic components—the 5285 Programmable Data Station; the 5286 Dual Programmable Data Station; the 5281 Data Station; the 5282 Dual Data Station; the 5288 Programmable Control Unit; and the 5217, 5222, 5224, 5225, 5242, and 5256 printers.

These components function as building blocks which can be arranged to meet the processing requirement. For example, a Local Data Entry configuration could consist of a 5281 Data Station; 5288 Programmable Control Unit; and a 5217 or 5222 printer. This same configuration handles communication by adding the 2500 Communications Adapter to the 5288, and substituting the faster 5256 printer.

A Remote Batch/Inquiry or RJE application can be handled by a 5285 Programmable Data Station with the 2500 Communications Adapter, and a 5225 line printer. The 5285 can also share a 5281 or 5282, and attach 1 of the printers to provide a Local Processing Facility.

If your needs call for relatively powerful local processing with a communication capability, the 5288 can be configured to handle up to 4 5281s or 5282s and 6 diskettes; and a maximum of 8 printers. The 6 diskettes include those available with the 5281 Data Station. Unfortunately, no disks are supported by 5286.

For applications requiring greater storage capacity/faster access times, 10M bytes of disk storage (feature 3410) can be employed. Disk storage drives can be installed on the 5285, 5288, and 5281 when attached to the 5285 or 5288. The disk drive occupies 1 physical diskette drive position on these machines. A 5285 can contain up to 3 disk drives; a 5288 can contain up to 7. Note: 1 diskette drive is standard on the 5285. A 5285 system including an attached 5281 or 5282 can contain up to 3 additional diskette or disk drives in any combination. The 5282 dual data station can only contain 2 diskette drives. One diskette drive is also standard on the 5288. A 5288 system with attached 5281 and 5282 data stations can contain up to 7 additional diskette or disk drives in any combination.

## ☐ Distributed Communications Utilities

Seven different Communications Utilities allow the user to define the communications environment for operation in remote batch, inquiry, RJE, or distributed environments. These utilities consist of a Multipoint Monitor, RJE Description, Multileaving RJE, SNA RJE, SNA Data Communications, BSC Data Communications, and BSC Batch Transfer, and 3270 emulation.

**Multipoint Monitor Utility** ● responds to host polling and selects local terminal; no communications program need be loaded into memory.

**RJE Description Preparations Utility** ● defines Multileaving RJE (MRJE) or SNA RJE execution utility tasks ● Data Description statements define SNA Data Communications, BSC Data Communications, BSC Batch Transfer, or BSC Online Test execution utility tasks.

**Multileaving RJE (MRJE) Utility** ● allows 5280 to function as remote job entry S/3-type terminal with S/370 hosts under JES 2, 3, and RES ● printer, punch, card reader and console may operate concurrently; printer streams directed to printer, display or diskette; punch data streams go to diskettes.

**SNA RJE (SRJE) Utility** ● allows 5280 to function as RJE workstation in SNA/SDLC environment; no other communications program can be implemented while SRJE is running.

**SNA Data Communications Utility** ● supports send/receive batch, and inquiry tasks in SNA/SDLC environment ● up to 4 SNA data communications utilities operating under the same IMS or CICS subsystem may run concurrently ● multiple transmit, receive, and inquiry functions may be executed as single job ● data transmitted from diskette or disk and keyboard.

**BSC Data Communications Utility** ● supports send/receive batch and inquiry tasks ● 5280 appears to DOS/VSE POWER host as 3741 or 3780 terminal ● multiple transmit, receive, and inquiry functions may be executed as single job ● data transmitted from diskette or disk and keyboard.

**BSC Batch Transfer Utility** ● supports batch send/receive operations on 5280 as 3741 terminal ● multiple transmits and receive may run as single job.

**3270 Emulation** ● allows 5285/5288 to function as IBM 3270 terminal using BSC/SDLC ● provides device emulation, BSC/SDLC transfer, and BSC/SDLC program interface.

**3270 Batch Transfer Utility** ● supports transmit/receive of graphic data records to host using 3270 interactive protocals in BSC network ● user-written program must be provided on host system.

# ■ SOFTWARE

## ☐ Terms & Support

**Terms** ● with the exception of bundled 5280 System Control Programming (SCP), all software incurs continuous monthly support or license fee charges.

**Support** ● 5280-resident software is supported under IBM Central and Local Programming Services; host-resident COBOL facilities supported under IBM Central and Hot-line telephone assistance services ● 30-day testing period provided with all 5280-related software.

## ☐ Programming Overview

The 5280 supports data entry, inquiry, and RJE tasks in conjunction with host systems and local applications in a multiprogramming environment. The 5280 System Control Program (SCP) services applications on a fixed-partition basis, with partitions serviced sequentially based on partition number. All foreground partitions are serviced before background partitions. SCP also reacts to interrupts from higher-priority partitions, transferring control to them.

Up to 8 application partitions, plus partitions for common functions, are supported. An application partition can range from at least 6K up to the maximum available main storage. Foreground partitions are associated with keyboard functions; since a maximum of 4 keyboards are supported by 5280, there can be only 4 foreground partitions. Background partitions are not associated with a particular keyboard. Programs operating in background are normally independent in nature and require minimal operation interaction.

The common area contains information and functions that can be used by any device or program. Depending on the common function option selected, the area will use about 6K, 15K, or 16K bytes of user storage. Typical common functions are operations that attach a partition to a keyboard, load a program into a partition, display machine check and I/O error codes, request owner ID and allowing access to access-protected disks/diskettes.

Users employing optional disk storage should not have to modify programs, procedures, or data sets when transferring data from diskettes or disk. However, assembler language programs, COBOL programs which access multivolume data sets, user

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programs that use physical device addresses, and user programs that assume a maximum allocation of data sets may need to be modified. In addition, keep in mind that some IBM programs contain different or modified prompts when referring to disk. Thus, procedure control language procedures using these programs may need to be modified.

The BSC and SNA data communications utilities allow data sets to be transferred directly to the printer. Also, all BSC and SNA communication access methods cancel themselves (if optioned) at the successful completion of a job. This allows the next communication utility to load its associated communication access method (CAM) without requiring the operator to cancel previous CAMs.

On the procedure control language, a procedure can CALL another procedure. Up to 12 levels of nesting are allowed. The called procedure executes in the same partition as the procedure issuing the CALL. Control returns to the calling procedure. For menu utilities, the user can optionally specify the minimum size partition into which a program can be loaded. The menu utility also allows multiple menu configuration record data sets to reside on a single diskette or disk. The advantage of this is that the entire contents of multiple diskettes can be transferred to disk with no conversion required. Menus can also be printed.

The data set display utility allows a data set record search based upon a user-specified value. Character-string searches are also permitted.

## ☐ Operating System

### 5280 System Control Programming (SCP)

Provides operating system-type facilities for 5280 Distributed Data System via 4 program modules implemented by display prompts ● Initial Program Load (IPL) contains system configuration specifications required to complete power-on sequences and system initialization ● System Configuration allows user to generate IPL by specifying requirements; describes both logical and physical 5280 system parameters ● PTF/Patch allows for implementation of IBM-supplied program corrections or updates, or of user program revisions via program temporary fixes (PTFs) or program patches ● sequential, direct and keyed sequential data set organization/retrieval ● Close Failure Recovery allows for access to data that would otherwise be lost due to not properly closing data sets ● supports up to 8 partitions, 4 of which can be foreground ● bundled 5280 SCP program number is 5708-SC1:

| | NA mo | NC prch |
|---|---|---|

## ☐ Database Management

The database management facility is fairly rudimentary, and is part of the SCP. Only sequential data set organizations are supported; data sets are sequential as entered, sequential by key value, and sequential by an indexed data set. Access methods are sequential, direct by relative record number, and key indexed. The data set organization and access methods are defined by the user program.

Diskette/disk data sets can be shared. Data sets can be labeled as shared read or shared read/write (update) to allow multiple programs to access the same data set. If users do not wish to share a data set, a lock-out facility is available.

## ☐ Communications/Networks

Communications in BSC or SNA/SDLC environments is supported on programmable 5285 or 5288 members of the 5280 Distributed Data System family; the programmable dual-display 5286 will not, however, support communications. (See 5280 Hardware section for particulars on host communications environment and interfacing.)

### 5280 Communications Utilities

Provides preparation and execution communications utilities for 5280 operations in remote batch, inquiry, RJE, or distributed terminal environments ● Multipoint Monitor utility provides response to host polling and selections without requiring communications program to be loaded into memory ●

Communications Configuration preparation utility allows user to define 5280 communications environment; configurations entered control access method when executing communications programs ● RJE Description preparation utility defines Multi-Leaving RJE or SNA RJE execution utility tasks ● Data Description preparation utility defines SNA Data Communications, BSC Data Communications, BSC Batch Transfer, or BSC Online Test execution utility tasks ● Multi-Leaving RJE (MRJE) execution utility allows the 5280 to function as remote job entry S/3-type terminal with S/370-type hosts; 5280 is always remote workstation which must initiate transmission, and no other communications program may be run while in this mode; MRJE supports transmission of 5280 keyboard input or disk/diskette data to remote host and the reception of host transmissions onto 5280 diskette, printer, or display; MRJE requires minimum 48K-byte memory ● SNA RJE (SRJE) execution utility allows the 5280 to function as RJE workstation in SNA/SDLC environment; while SRJE is running on 5280, no other communications program may be implemented; SRJE supports transmission of 5280 keyboard input and disk/diskette data to remote host, and the reception of host transmissions onto 5280 disk/diskette, printer, or display ● SNA Data Communications execution utility supports both send and receive batch, and inquiry tasks on 5280 in SNA/SDLC environment; up to 4 SNA data communications utilities operating with the same IMS or CICS database/data communications host subsystem can be run concurrently; multiple transmit, receive, and inquiry functions may be executed as single job; 5280 keyboard and disk/diskette batch transmissions, and keyboard-only inquiry transmissions to host are supported; host transmissions to 5280 disk/diskette, printer, or display are supported ● BSC Data Communications execution utility supports send and receive batch, and inquiry tasks on 5280 in BSC environment; 5280 appears to host as 3741 or 3780 (for DOS/VSE POWER hosts) terminal; 5280 keyboard, disk/diskette, or mag stripe reader, batch inputs to host, and keyboard-only inquiry to host transmissions are supported; host transmissions to 5280 disk/diskette, printer, or display are supported; multiple transmit, receive, and inquiry functions may be executed as single job ● BSC Batch Transfer execution utility supports disk/diskette batch send/receive operations on 5280 as 3741 terminal; multiple send and receive operations may be executed as single job ● BSC communications requires 5285/5288 with minimum of 32K bytes, disk/diskette drive, and 960-character display; MRJE requires a minimum of 48K and SNA/SDLC a minimum of 64K bytes of memory ● 5280 Communications Utilities program number is 5708-DC1:

| | $27 mo | $900 prch |
|---|---|---|

**5280 to 3270 Emulation Program** ● 3270 emulation via 5285/5288 ● emulates 3271 Model 2 under BSC on multipoint nonswitched or multipoint nonswitched with switched network backup; emulates 3274 Model 1C under SNA/SDLC on point-to-point or multipoint nonswitched, or point-to-point switched ● keyboard/display and printer emulation of 3277-2, 3284, 3286, 3287, 3288 ● emulation program consists of 3270 BSC/SDLC communication access method (CAM); BSC program interface for DE/RPG and 5280 COBOL; SRJE/CAM; plus following utilities: batch transfer, BSC/SDLC display/print, and 3270 device emulation configuration:

| | 53 | 1,700 |
|---|---|---|

## ☐ Program Development/Languages

**5280 DE/RPG** ● provides RPG compiler and source entry programs enabling users to write 5280 data entry and applications programs on the 5280 system; source program generates DE/RPG statements via extensive DDS-type display prompting for ease of program entry ● DE/RPG data entry display formatting features provide for data field, prompt, or message highlighting via intensity, blink, reverse video, underscore, column separator, and/or non-display attributes; for defining data and prompt areas on the display screen; and for the display of

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*MO: monthly charge, including service. PRCH: one-time purchase fee. NA: not applicable. NC: no charge. Prices current as of May 1985.*

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multiple formats concurrently • DE/RPG character/field/record editing features include character checking via acceptable shifts (alpha and alpha-only, numeric and numeric-only, digits-only, and hexadecimal); field check against specified self-check modulus or character pattern; auto duplicating fields from previous records or other sources; conditionally bypassing fields; field validation based on sequence, range of values, tables or arithmetic expressions; auto data insertion of a constant, a specifically defined field, or results of an arithmetic expression; substituting table for field data; and performing arithmetic calculations • DE/RPG data entry capability also includes facilities for providing production statistics on a job and workstation basis; and an RPG III Calculation Specification subset for complex editing, formatted printing, expanded arithmetics, and master data set access that may be used in conjunction with 5280 Communications Utilities • DE/RPG application programming facilities consist of an RPG III subset for arithmetic calculations, data move/compare, branching, indicator and bit testing, subroutine operation, and disk/diskette, printer, display terminal, and communications I/O; sequence of operations is user defined, and RPG cycle does not apply; noninteractive programs may be written for background partition mode operation • 5280 DE/RPG requires 9K bytes for compiler, 13K for source program, either dual single-density or single double-density diskette, 5280 SCP, and 5280 Utilities facilities • DE/RPG program number is 5708-DE1:

| | $16 mo | $550 prch |
|---|---|---|

**5280 Format Design Aid** • creates DE/RPG source code from display image entered by user at a 5280 Display Station • provides multiple format and T FILE processing support for data entry programs; supports 480/960/1920-character displays; provides listing and/or sequencing of generated source code • requires 48K/64K/64K-byte storage on 5285/5286/5288 • program number is 5798-RCR; program charge is for 12 months:

| | NA | 600 |
|---|---|---|

**5280 Assembler** • provides control statements and instructions enabling users to write 5280 programs on the 5280 system • instructions describe arithmetic and logical operations, branching, I/O operations, and internal partition data transfers • control statements define storage allocation, data areas, and prompts • ACL-to-assembler conversion package for running 3740 programs on 5280 • requires 9K bytes of memory, diskette drive, 5280 SCP, and 5280 Utilities • assembler program number is 5708-AS1:

| | 55 | 1,750 |
|---|---|---|

**COBOL** • IBM S/370-type host system COBOL compilers for generating 5280 machine language load programs • COBOL facilities include Nucleus, Workstation Support, Data Communications, Language Feature, I/O Feature, and Debugging Features modules • Nucleus provides punctuation characters, arithmetic operators, OF and IN qualifier connectives, plurals of figurative constants, comparison of nonnumeric operands, and levels 01 to 49 facilities; also provides PERFORM verb and higher-level forms of ACCEPT, ADD, COMPUTE, DISPLAY, DIVIDE, IF, MOVE, MULTIPLY, and SUBTRACT • Workstation Support module consists of language extension with set of verbs and syntax to control display terminal; user may program for such functions as data entry, inquiry, and file update, providing appropriate display prompts, data field positioning, attributes, etc • Data Communications under COBOL employs a CALL interface for BSC or SNA/SDLC remote station data transfers in conjunction with Communications Utility • Language Feature allows the definition and processing of fixed-length 3D tables, the division of COBOL programs into segments that may overlay one another, text copying from library to a program, and the transfer of control from one COBOL program to another within a partition • I/O Feature permits COBOL interaction with sequential, relative, and indexed data files; records may be read, written, revised, and deleted within a COBOL program • Debugging Feature includes compile-time storage maps and execution-time snapshots of data areas, flow trace to identify last statement executed before abnormal termination, and other error checking and debugging aids • COBOL load programs require minimum of 16K bytes on 5280 • program number is 5708-CB1 for OS/VS hosts and 5708-CB2 for DOS/VSE processors:

| | 214 | 5,950 |
|---|---|---|

## ☐ Other Facilities

**5280 Utilities** • provides various diskette, key entry, conversion, allocation, and status functions • Diskette/Disk Compress Utility rewrites existing data sets to place all unallocated space into contiguous area that can be used for storage of additional data sets • Diskette/Disk Copy Utility provides data copy facility from one area to another area on a diskette/disk or from diskette/disk to diskette/disk; image copy function copies entire contents of one diskette/disk onto another; volume copy function copies data sets from one diskette/disk onto another; data set copy function combines up to 4 data sets into a new data set or adds data to an existing data set; specify copy record function copies data beginning with first and ending with last relative record number specified by user into another data set; specify key copy function copies records specified by user keys; and single drive data set copy function allows single drive system to copy data sets from one diskette to another via memory buffer and diskette interchange operations • Diskette/Disk Data Set Clear Utility clears data set(s) for the recording of new data or the rewrite of remaining data sets; data cleared may be recovered or optionally erased so that it cannot be recovered • Diskette/Disk Initialization Utility performs surface analysis and formats diskette/disk to user specifications • Diskette/Disk Label Maintenance Utility allocates new data set space, deletes old data sets, and modifies volume and data set labels • Diskette/Disk Label List Utility prints or displays contents of label • Diskette/Disk Print Utility prints all data set records; prints only specified data set(s); prints data beginning with first and ending with last user-specified relative record number; or prints records specified by user keys • Key Entry Utility provides user with programming facilities to write simple data entry programs using IBM 3740 Key Entry String Language • 3740 Format Utility converts existing 3740 formats into DE/RPG source programs • Resource Allocation Utility changes or deletes physical device address logical identifiers • Systems Status Utility provides methods to review system activity, or to print or display IPL system configuration • menu facility allows creation and use of menus; creates data set and stores menu titles describing it • Display Utility provides way to scan through a data set • requires from 9K to 11K bytes of memory • 5280 Utilities program number is 5708-UT1:

| | $8 mo | $250 prch |
|---|---|---|

**5280 Sort/Merge** • provides facilities to sort records in a data set into specified sequence and then merge the sorted records into another data set without altering the original data set • Full Record Sort facilities place the entire sorted data set into a new data set • Address Out facilities sort user-specified relative record number data sets in order and then writes them into new data set • Record Subset facilities sort records containing selected fields in order and then writes them into new data set • Index/Key facilities sort user-keyed records in order along with relative record numbers of original data set and then writes them into an index/key data set • Merge program combines records from 2 diskette data sets into another diskette data set without altering the original data sets; may be employed for multivolume data sets • Command Data Set Display program displays or prints contents of sort/merge command data set • requires minimum of 16K bytes of memory • 5280 Sort/Merge program number is 5708-SM1:

| | 16 | 400 |
|---|---|---|

**3740-to-5280 Program Conversion** • various software facilities are available with the 5280 for the conversion and use of 3740 programs • 5280 Key Entry Utility provides facilities for writing data entry programs using 3740 Key Entry String Language • 5280 Format Utility converts existing 3740 formats into DE/RPG source programs; functions that may not be converted and must be programmed by DE/RPG source statements include online and off-line field totals, field and record selection, constant insertion, printer formatting and control, and edit control • 5280 Assembler ACL conversion package allows 3740 users to convert to 5280 assembler language; although the languages are somewhat similar, certain parts of the programs may have to be rewritten • the IBM Diskette 1 format initialized at 128 bytes per sector is employed on both 3740 and 5280 and allows for the basic exchange of data sets.

**5280 Construction Data Entry/Edit Support** • provides 5280 off-line data entry and editing support for System/34 Construction Management and Accounting System (CMAS/34) •

# IBM 5280 Distributed Data Systems
## Models 5285, 5286 & 5288

builds transaction files for batch input to CMAS/34 payroll, accounts payable, job costing, and general ledger systems • program number is 5798-RBZ; program charge is for 12 months:

| | NA | 50 |
|---|---|---|

# ■ HARDWARE

## ☐ Terms & Support

**Terms** • members of 5280 family available on purchase, 30-day rental, or 2-year lease basis • lease/purchase agreements • volume discounts for 5285, 5286, and 5288 are 10 percent for 6 to 19 units; 13 percent for 20 to 49 units; 16 percent for 50 to 99 units; and 19 percent for 100 or more units • rental or lease plans provide for unlimited use.

**Support** • IBM markets and supports the 5280 through a nationwide network of local offices • maintenance is bundled into rental or lease charges and priced separately for purchased units; basic monthly maintenance charges cited in the text provide for service availability on a Monday through Friday, 7:00 AM to 6:00 PM, 9 consecutive hour basis; various extensions to such service for weekends and before/after standard hours are quoted at percentage premiums over the basic rate; full 24-hour, 7-day per week service adds 47% premium to cited basic rates • the 5280 is designated as a Customer Setup Unit (CSU) and may be unpacked, positioned, connected, and checked out by the customer to minimize time required to go online • IBM offers at extra cost various classroom or self-study courses on 5280 operations and functions.

## ☐ 5280 Distributed Data Systems

Configurations of the 5280 are based on the 5285 Programmable Data Station, the 5286 Dual Programmable Data Station, or the 5288 Programmable Control Unit. Depending on the programmable 5280 controller, the system may be configured with the satellite 5281 Data Station or 5282 Dual Data Station; the 5222, 5224, 5225, and/or 5256 Printer; and communications facilities.

The 5285 is a tabletop programmable data station with a single keyboard and display. This data station can support 7 printers, communication, and either an IBM 5281 or 5282 auxiliary data station; it also supports all licensed programs offered for the system. The 5285 must have at least 1 diskette drive; 1 additional diskette or disk drive can be added. When either a 5281 or 5282 auxiliary data station is attached, the 5282 can support combinations of additional diskette and/or disk drives, up to a maximum of 3 additional drives. The available display sizes are 960 and 1920 characters. The maximum storage size is 128K.

The 5286 is a tabletop programmable data station with a split screen and two keyboards. It allows two operators seated at the same data station to simultaneously share the system. Each operator has a 480-character display, a keyboard, and diskette drive. The keyboards must be of the same type. The 5286 can support either a 5281 or 5282 auxiliary data station and all licensed programs except the Communications Utilities (5708-DC1) and the 5280 to 3270 Emulation Licensed Program (5708-EM1). The 5286 has a minimum of 2 diskette drives (both of these must be the same type). When either a 5281 or 5282 auxiliary data station is attached, the 5286 can support a maximum of 2 additional diskette drives. The 5286 does not support disk drives. The maximum storage size is 96K.

The 5288 is a floorstanding programmable control unit, and must have at least 1 diskette drive and at least 1 attached 5281 or 5282 auxiliary data station. A maximum of 3 additional diskette or disk drives can be added. The maximum storage size is 288K. When additional 5281 or 5282 auxiliary data stations are attached, the 5288 can support combinations of additional diskette and/or disk drives, up to a maximum of 7 additional drives. The 5288 also supports a maximum of 8 printers (in combinations that include up to 4 5217, 5222, and 5242 printers, and up to 8 5224, 5225, and 5256 printers). The 5288 supports all licensed programs offered for the system.

**5285 Configurations** • 5285 Programmable Data Station with 64K/96K/128K-byte memory supporting single 5281 Data Station or 5282 Dual Data Station (1 to 3 keyboard display terminals per system), and up to 7 printers in non-communicating configurations; diskette storage for 246K to 4.8M bytes on single/dual 5285 and/or 5281/5282 drives (1 to 4 drives per system) • 1 diskette is standard on the 5285; 1 additional drive position is available • a 10M-byte disk can be substituted for optional diskettes on the 5285 and 5281; a 5285 with attached 5281 displays can contain up to 3 10M-byte disks (5282 only supports diskettes); disks/diskettes can be mixed in any combination • 5285 Programmable Data Station with 64K-/96K-byte memory supporting up to 7 printers and communications; diskette storage for 246K to 2.4M bytes on single/dual 5285 drives.

**5286 Configurations** • 5286 Programmable Dual Data Station with 64K-/96K-byte memory supporting single 5281 Data Station or 5282 Dual Data Station (2 to 4 keyboard display terminals per system) in noncommunicating-only configuration; diskette storage for 246K to 4.8M bytes on single/dual 5286 and/or 5281/5282 drives (1 to 4 drives per system).

**5288 Configurations** • 5288 Programmable Control Unit with 64K/96K/128K/160K/224K/228K-byte memory supporting up to 4 5281 Data Stations or 5282 Dual Data Stations (intermixed, with 1 to 4 keyboard display terminals per system), up to 7 printers (intermixed), single 5225 Printer, and communications; diskette storage facilities for 246K to 9.7M bytes on single/dual/tri/quad 5288 and/or single/dual 5281/5282 drives (1 to 8 drives per system) • 1 diskette is standard on the 5288; up to 3 physical drive positions are available • a 10M-byte disk can be substituted for optional diskettes on the 5288 and 5281; a 5288 with attached 5281 displays can contain up to 7 10M-byte disks; disks/diskettes can be mixed in any combination.

## ☐ 5280 Programmable Control Units

### Application Microprocessors

**Application Microprocessor** • performs applications, arithmetic, and logic; services peripheral devices; supports up to 8 partitions • employs variable time slices (60 milliseconds for key entry, CAM and DE/RPG; 4 milliseconds for DE/RPG in rerun mode; 12 milliseconds for all other jobs) • controls microprocessors servicing diskettes, printers, and communications • 64K- to 288K-byte RAM • 246K- to 9.7M-byte diskette • 10M- to 70M-byte disk • up to 8 printers • in dual microprocessor configurations, each can be user-assigned to specific contiguous partitions; alternatively, each microprocessor can be assigned to all partitions.

**6800 Microprocessor** • optional microprocessor for use with 5285/5286/5288 systems • cannot be used with 2500 Communications Adapter on 5285:

| | $61/$52 mo | $1,285 prch | $2.50 maint |
|---|---|---|---|

### 5285 Programmable Data Station

**Configuration** • programmable tabletop keyboard display terminal with 64K/96K/128K memory; integral single-/dual-diskette drives and modular keyboard • a single 10M-byte disk can be used in place of second diskette • model changes field installable • can attach 1 5281/5282 via 2500 adapters • can attach 1 5217, 5222, 5242 or up to 7 5224, 5225, and/or 5226 printers via 5285 twinax printer attachment (feature number 1150) • can attach a IBM 5217 Model C2, 5222, or 5242 Model 2 printer via start/stop printer attachment (feature number 1152).

**Diskette Storage** • integral single/dual drives available in IBM Diskette 1 only format and/or Diskette 1, 2, and 2D (1/2/2D) format • Diskette 1 format provides 246K/284K/303K bytes per diskette capacity for 128/256/512 bytes per sector • Diskette 2 format provides 492K/568K/606K bytes per diskette capacity for 128/256/512 bytes per sector • Diskette 2D format provides

*MO: first figure is monthly charge for short-term rental; second figure is for 2-year lease. Both include prime-shift maintenance. PRCH: purchase price. MAINT: monthly charges for prime-shift maintenance. NA: not available. NC: no charge. All prices are for single quantity; discounts are offered. Prices current as of May 1985.*

# IBM 5280 Distributed Data Systems
## Models 5285, 5286 & 5288

985K/1.1M/1.2M bytes per diskette for 256/512/1024 bytes per sector.

**Disk Storage** • nonremovable 10M-byte disk drive; substituted for second diskette drive (see Disk/Diskette section for details).

**Display** • 8x16 matrix • 480-character at 6-line x 80-character format standard; 960-/1920-character at 12-/24-line x 80-character optional; all display screens in multiple terminal systems must have same size format • 94-character EBCDIC/ASCII sets; 185-character Multinational set.

**Keyboards** • 4600, 4601, 4602, and 4603.

**Communications** • 600 to 4800 bps • half-duplex BSC/SDLC • ASCII/EBCDIC code • point-to-point/multipoint • not supported in multiterminal 5285 plus 5281 or 5282 configurations (see Communications section for other particulars) • IBM 3270 Emulation Communications Adapter provides aforementioned functions, plus supports 5280 to 3270 Emulation licence program (5708-EM1).

**5285 C01** • programmable data station with 64K memory and single Diskette 1 format drive:

| | | |
|---|---|---|
| $343/$292 mo | $6,213 prch | $46.00 maint |

**5285 C05** • programmable data station with 64K memory and single Diskette 1/2/2D format drive:

| | | |
|---|---|---|
| 374/318 | 6,463 | 53.50 |

**5285 D01** • programmable data station with 96K memory and single Diskette 1 format drive:

| | | |
|---|---|---|
| 377/321 | 6,526 | 48.00 |

**5285 D05** • programmable data station with 96K memory and single Diskette 1/2/2D format drive:

| | | |
|---|---|---|
| 408/347 | 6,776 | 56.00 |

**5285 E01** • programmable data station with 128K memory and single Diskette 1 format drive:

| | | |
|---|---|---|
| 410/349 | 6,839 | 50.00 |

**5285 E05** • programmable data station with 128K memory and single 1/2/2D format drive:

| | | |
|---|---|---|
| 442/376 | 7,089 | 58.00 |

3500 Display • 960-character 5285 display:

| | | |
|---|---|---|
| 6/5 | 112 | 1.00 |

3505 Display • 1920-character 5285 display:

| | | |
|---|---|---|
| 19/17 | 225 | 1.00 |

## 5286 Programmable Dual Data Station

**Configuration** • programmable tabletop dual keyboard and split-screen dual display terminal with 64K/96K memory, integral dual diskette drives (1 per keyboard/display), and modular keyboards • user-specified 6K-byte partitions • attaches 1 5281 or 5282 • model changes field installable.

**Diskette Storage** • integral dual drives with formats identical to 5285 diskettes. (See Disk/Diskette Storage section for other particulars.)

**Disk Storage** • none.

**Display** • 8x16 matrix • dual 480-character at 6-line x 80-character format; all display screens in multiple terminal systems must have same size format • 94-character EBCDIC/ASCII sets; 185-character Multinational set.

**Keyboards** • 4600, 4601, 4602, and 4603.

**Communications** • noncommunicating system.

**5286 C02** • programmable dual data station with 64K memory and dual Diskette 1 format drives:

| | | |
|---|---|---|
| $411/$350 mo | $8,263 prch | $56.00 maint |

**5286 C10** • programmable dual data station with 64K memory and dual Diskette 1/2/2D format drives:

| | | |
|---|---|---|
| 474/403 | 8,763 | 72.50 |

**5286 D02** • programmable dual data station with 96K memory and dual Diskette 1 format drives:

| | | |
|---|---|---|
| 445/379 | 8,576 | 58.50 |

**5286 D10** • programmable dual data station with 96K memory and dual Diskette 1/2/2D format drives:

| | | |
|---|---|---|
| 508/432 | 9,076 | 74.50 |

## 5288 Programmable Control Unit

**Configuration** • programmable floor console controller with 64K/96K/128K/160K/224K/288K-byte memory and integral single/dual/tri/quad diskette drives • 10M-byte disks can be used in place of optional diskettes • single twinaxial printer attachment (feature 1155) provides single port for attachment of 5224 Models 1 or 2, 5225 Models 1, 2, 3, or 4, and 1 or 5256 Models 1, 2, or 3; maximum of 7 printers can be attached • multiple start/stop twinaxial printer attachment (feature 1162) attaches up to 8 printers; provides 4 start/stop (5242) printer ports and 1 twinaxial printer (5224, 5225, 5256) port • up to 7 twinaxial printers can be attached to twinaxial port using single twinaxial cable • cable-through allows multiple printers to attach to single port.

**Diskette Storage** • integral drives with formats identical to 5285 diskettes (see Disk/Diskette section for details).

**Disk Storage** • nonremovable 10M-byte disk drive; substituted for 3 diskette drives (see Disk/Diskette section for details).

**Communications** • same as Model 5285.

**Diskette Storage** • integral single/dual/tri/quad drives with formats identical to 5285 diskettes. (See 5285 Diskette Storage section for other particulars.)

**5288 C01** • programmable control unit with 64K memory and single Diskette 1 format drive:

| | | |
|---|---|---|
| $342/$293 mo | $6,913 prch | $39.50 maint |

**5288 C05** • programmable control unit with 64K memory and single Diskette 1/2/2D format drive:

| | | |
|---|---|---|
| 375/319 | 7,163 | 47.50 |

**5288 D01** • programmable control unit with 96K memory and single Diskette 1 format drive:

| | | |
|---|---|---|
| 376/322 | 7,226 | 41.50 |

**5288 D05** • programmable control unit with 96K memory and single Diskette 1/2/2D format drive:

| | | |
|---|---|---|
| 408/348 | 7,476 | 50.00 |

**5288 E01** • programmable control unit with 128K memory and single Diskette 1 format drive:

| | | |
|---|---|---|
| 409/350 | 7,539 | 44.00 |

**5288 E05** • programmable control unit with 128K memory and single Diskette 1/2/2D format drive:

| | | |
|---|---|---|
| 441/377 | 7,789 | 52.00 |

**5288 F01** • programmable control unit with 160K memory and single Diskette 1 format drive:

| | | |
|---|---|---|
| 445/379 | 7,852 | 46.50 |

**5288 F05** • programmable control unit with 160K memory and single Diskette 1/2/2D format drive:

| | | |
|---|---|---|
| 476/405 | 8,102 | 54.00 |

**5288 H01** • programmable control unit with 224K memory and single Diskette 1 format drive:

| | | |
|---|---|---|
| 509/436 | 8,478 | 51.00 |

**5288 H05** • programmable control unit with 224K memory and single Diskette 1/2/2D format drive:

| | | |
|---|---|---|
| 541/463 | 8,728 | 59.00 |

**5288 J01** • programmable control unit with 288K memory and single Diskette 1 format drive:

| | | |
|---|---|---|
| 577/494 | 9,104 | 55.50 |

**5288 J05** • programmable control unit with 288K memory and single Diskette 1/2/2D format drive:

| | | |
|---|---|---|
| 607/520 | 9,354 | 63.50 |

## ☐ Communications

The 5285/5288 controllers allow either BSC/SDLC data communication over a single link. Controllers can communicate

# IBM 5280 Distributed Data Systems
## Models 5285, 5286 & 5288

over switched point-to-point or nonswitched point-to-point/ multipoint lines at speeds to 4800 bps. On a multipoint line, the 5285/5288 operate as a tributary station. The 3270 Emulation Communications Adapter (number 3270) offered with the 5285/5288, provides the same function as the Model 2500, plus supports the 5280 to 3270 Emulation licensed program (5708-EM 1).

Controllers operate half-duplex over switched and nonswitched lines. Switched network support includes manual dial and manual or auto-answer. On a multipoint network, each 5285/5288 must use the same clocking source (modem or business machine). Units must also operate at the same transmission rate, use the same transmission code, and the same 2- or 4-wire connection to the line.

The 5285/5288 controllers using stored program control and BSC protocol communicate with IBM Series 1, System/3, System/32, System/34, System/36, and System/38. Communication with S/370 is via an Integrated Communications Adapter; the 4331 also requires a communication adapter. The S/370, 303X, or 4300 requires a 2701 Data Adapter or a 3704, 3705, 3725 communications Controller operating under ACF/NCP or Partitioned Emulation Program (PEP).

The 5285/5288 using stored program control and SDLC communicate with the IBM 4331 and S/370 via the same communications adapter or front-end communications controller as with BSC. In addition, attachment to the 8100 with DPPX/BASE and/or under 3270 emulation is also permitted. The 3270 Emulation Communications Adpater provides a 1200-bps clocking capability for use with an integrated 1200-bps modem or external modem.

## BSC Communications

**3270-Type BSC Communications** • 5280 appears as IBM 3271 Model 2 when communicating with IBM S/370-type hosts.

**3741-Type BSC Communications** • 5280 appears as IBM 3741 Data Entry System when communicating with another 5280, a 3740, or a 5265 Point Of Sale terminal, or with the following hosts: IBM Series/1 with RPS; IBM S/3 with CCP or RPG II; IBM S/32 with RPG II; IBM S/34 with SSP-ICF or RPG II; IBM S/370-type processors in DOS/VSE environment with BTAM or CICS or in OS/VS environment with BTAM, TCAM, CICS, or IMS.

**3780-Type BSC Communications** • 5280 appears as IBM 3780 Communications Terminal when communicating with IBM S/370-type hosts with DOS/VSE POWER.

**S/3 MRJE-Type BSC Communications** • 5280 appears as S/3 MRJE workstation when communicating with IBM S/370-type host with OS/VS1 RES, OS/VS2 JES2, or OS/VS2 JES3.

## SNA Communications

**Logical Unit SNA Communications** • 5280 appears as LU1-type terminal when communicating with S/370-type processors in DOS/VSE environment with ACF/VTAM, CICS, or POWER; or in OS/VS environments with ACF/VTAM, ACF/TCAM, CICS, IMS, RES, or JES • LU 1, 2, 3 for 3270 emulation.

## Communications Modules

**2500 Communications Adapter** • required on 5285/5288 for attachment of BSC or SNA communications line via modem or other interface • provides 1200-bps clocking for integral or external modem • cannot be used on 5285 with satellite data station attachment:

| $90/$77 mo | $1,015 prch | $9.50 maint |
|---|---|---|

**3270 Emulation Communications Adapter** • supports 5280 to 3270 Emulation licensed program (5708-EM 1); used in conjunction with stored program contrast on 5285/5288 • permits 5285/5288 to function on switched or nonswitched public or private lines to a System/34 or System/38 • required to attach to communication line via adapter interface or modem and supports BSC and SDLC • adapter provides 1200-bps clock for use with integrated 1200-bps modem or external modem •

cannot be used with 2500 communications adapter:

| 136/116 | 2,040 | 14.00 |
|---|---|---|

**3701 EIA Interface** • EIA RS-232C, CCITT V.24/V.28 interface for attachment of external IBM or non-IBM modem, or other compatible data communications modules • requires 2500 adapter; cannot be used with 5650/5651 DDS adapter or integral modem:

| 20/18 | 372 | 1.50 |
|---|---|---|

**5650 DDS Adapter** • BSC or SDLC adapter for point-to-point operation over AT&T DDS network • requires 2500 adapter; cannot be used with 3701 EIA interface or integral modem:

| 35/28 | 873 | 1.50 |
|---|---|---|

**5651 DDS Adapter** • BSC or SDLC adapter for multipoint operation over AT&T DDS network • requires 2500 adapter; cannot be used with 3701 EIA interface or integral modem:

| 35/28 | 873 | 1.50 |
|---|---|---|

**5501 Integrated Modem** • 600-/1200-bps switched line integral modem with auto-answer • requires 2500 adapter and 5810 power supply (5285 only); cannot be used with 3701 EIA interface, 5650/5651 DDS adapter, or other integral modem:

| 36/29 | 744 | 3.50 |
|---|---|---|

**5508 Integrated Modem** • 600-/1200-bps nonswitched line integral modem with switched network backup auto-answer • requires 2500 adapter and 5810 power supply (5285 only); cannot be used with 3701 EIA interface, 5650/5651 DDS adapter, or other integral modem:

| 41/35 | 947 | 4.50 |
|---|---|---|

**3863 Model 1 Modem** • 1200-/2400-bps nonswitched line external modem • requires 3701 EIA interface:

| 102/87 | 2,685 | 13.00 |
|---|---|---|

**3863 Model 2 Modem** • 1200-/2400-bps switched line external modem with auto-answer • requires 3701 EIA interface:

| 110/94 | 2,935 | 13.00 |
|---|---|---|

**3864 Model 1 Modem** • 2400-/4800-bps nonswitched line external modem • requires 3701 EIA interface:

| 176/150 | 3,715 | 21.00 |
|---|---|---|

**3864 Model 2 Modem** • 2400-/4800-bps switched line external modem with auto-answer • requires 3701 EIA interface:

| 188/160 | 3,925 | 22.00 |
|---|---|---|

**3868 Model 2 Modem** • 4800-bps rackmounted modem • half-/full-duplex over 4-wire nonswitched facilities • point-to-point/multipoint • requires 3701 EIA interface and 3866 multimodem enclosure:

| 165/NA | 3,340 | 12.50 |
|---|---|---|

**3872 Modem** • 1200-/2400-bps switched/nonswitched point-to-point/multipoint external modem • requires 3701 EIA interface:

| 153/NA | 2,975 | 19.00 |
|---|---|---|

**3845/3846 Data Encryption Device** • provides for communications security under NBS Data Encryption Standard (DES) algorithm; 3845 consists of external tabletop configuration, while 3846 may be used for integral rackmount installation.

3845 Model 11A • single half-duplex encryption unit for both BSC and SDLC operations:

| 201/NA | 2,765 | 6.00 |
|---|---|---|

3845 Model 12A • dual half-duplex data encryption unit for both BSC and SDLC operations:

| 325/NA | 4,535 | 8.00 |
|---|---|---|

3846 Model 12A • dual half-duplex rackmount data encryption unit for both BSC and SDLC operations:

| 256/NA | 3,550 | 4.00 |
|---|---|---|

**3866 Multimodem Enclosure** • provides housing, powering, and cooling for 3868 Models 1 to 4 modems • up to 12 single-width modem packs (3868 Model 1) or up to 6 double-width modem packs (3868 Models 2, 3, and 4) can be housed:

| 46/NA | 1,020 | 9.00 |
|---|---|---|

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5810 Power Supply ● expansion power unit required for 3701 EIA interface and 5501/5508 integral modem operation on 5285 Programmable Data Station:

| 4/3 | 79 | 1.50 |
|---|---|---|

### ☐ Disks/Diskettes

All members of the 5280 family employ diskettes for auxiliary storage (refer to Distributed Systems and Display Terminals for configurations). In addition, the 5281, 5285, and 5288 can also be fitted with 10M-byte disk systems in lieu of the optional diskettes. The disks can be factory installed or retrofitted to existing units. The price of the diskette is included as part of data station/controller package (see Programmable Control Units section); the disk subsystems and monthly maintenance are priced separately.

**Diskette Storage** ● integral single/dual drives available in IBM Diskette 1 only format and/or Diskette 1, 2, and 2D (1/2/2D) format ● Diskette 1 format provides 246K/284K/303K bytes per diskette capacity for 128/256/512 bytes per sector ● Diskette 2 format provides 492K/568K/606K bytes per diskette capacity for 128/256/512 bytes per sector ● Diskettes 2D format provides 985K/1.1M/1.2M bytes per diskette for 256/512/1024 bytes per sector ● data transfer rates are 31.2K bytes per second for Diskette 1 and 2 formats, and 62.5 bytes per second for Diskette 2D format; average access time is 243 milliseconds ● 360-rpm rotational speed ● read or write overlapped with seek; diskette operations overlapped with processing and other I/P operations ● system configuration drives do not require the same formats:

| NA/NA mo | NA prch | NA maint |
|---|---|---|

**3401 Diskette Drive** ● reads/writes Diskette 1; requires appropriate remote disk/diskette attachment (number 1240 on 5285/5286 or numbers 1300, 1301, or 1302 on 5288):

| 67/57 | 1,000 | 9.50 |
|---|---|---|

**3402 Diskette 2D Drive** ● reads/writes Diskette 1, 2, and 2D; requires appropriate remote disk/diskette attachment (number 1240 on 5285/5286 or number 1300, 1301, or 1302 on 5288):

| 99/84 | 1,250 | 16.50 |
|---|---|---|

**Disk Storage Drive** ● nonremovable, disk storage medium ● 9,928,704 bytes total capacity ● 256 bytes per sector; 32,768 bytes per cylinder; 303 cylinders for programs and data ● minimum access time 16.6 milliseconds (cylinder-to-cylinder); average access time 85 milliseconds (102 cylinders); maximum access time 205 milliseconds ● 3600-rpm rotational speed:

| 403/343 | 4,500 | 42 |
|---|---|---|

**4400 Remote Disk Prerequisite** ● required when attaching 3410 disk storage drive to 5281 data station:

| NC/NC | NC | NC |
|---|---|---|

### ☐ Display Terminals

5281 and/or 5282 keyboard display stations are employed as operator terminals on 5288-based systems and on 5285-/5286-based systems in conjunction with keyboard display facilities of these programmable data stations. All display screen size formats must be identical in multiterminal configurations; satellite or auxiliary 5281/5282 disk/diskette formats do not, however, have to conform to drives employed on 5285/5286/5288 system control units. All models within a class may be field upgraded/downgraded. Replaced parts from any model change, however, must be returned to IBM.

The 5281 is a single, tabletop auxiliary keyboard-display which attaches to a 5282, 5286, or 5288. The 5281 shares the functions of the programmable device to which it is attached, and can be located up to 200 feet from the controlling unit. When attached to a 5285 or 5288, the 5281 can contain 1 or 2 10M-byte disk storage drives. The 5281 can contain 0, 1, or 2 diskette drives, with a total capacity of 2.4M bytes. Any combination of disk/diskette drives is allowed, but when attached to the 5286, only diskettes can be used. The use of disk/diskette drives requires that the 5285, 5286, or 5288 have a remote disk/diskette drive attachment.

The 5282 is a dual, tabletop auxiliary keyboard-display which attaches to the 5285, 5286, or 5288. It employs a single,

split-screen CRT with 2 keyboards. The 5282 shares the functions of the programmable device to which it is attached, and can be located up to 200 feet from the controlling unit. The 5282, like the 5181, can contain 0, 1, or 2 diskette drives but does not support disks. Total diskette capacity is 2.4M bytes. If the 5282 employs diskettes, the 5285, 5286, or 5288 must have a remote diskette drive attachment.

### 5281 Data Station

**Configuration** ● tabletop keyboard display terminal with integral single/dual diskette drives or up to 2 disk drives and modular keyboard ● model changes field installable.

**Diskette Storage** ● integral single/dual drives with formats identical to (but not necessarily conforming to) those of the 5285/5286/5288. (See Disks/Diskettes section for other particulars.)

**Disk Storage** ● nonremovable 10M-byte direct-access storage device; up to 2 permitted but none required (See Disks/Diskettes section for details).

**Display** ● 8x16 matrix ● 480/960/1920 characters at 6/12/24 lines x 80 characters; display size format set by control unit ● 94-character EBCDIC/ASCII sets; 185-character Multinational set.

**Keyboards** ● 4600, 4601, 4602, and 4603.

**5281 Z00** ● data station with no diskette facilities:

| $100/$85 mo | $2,295 prch | $13.50 maint |
|---|---|---|

### 5282 Dual Data Station

**Configuration** ● tabletop dual keyboard and single display terminal with integral single/dual diskette drives (1 maximum per keyboard display) and modular keyboards ● model changes are field installable.

**Diskette Storage** ● integral single/dual drives with formats identical to (but not necessarily conforming to) those of the 5285/5286/5288. (See Disks/Diskettes section for other particulars.)

**Disk Storage** ● none.

**Display** ● single, split-screen display; functions as 2 independent display stations ● displays 480 or 960 characters at 6 or 12 lines x 80 characters; 8x16 dot matrix ● display size format set by control unit ● 94-character EBCDIC/ASCII sets; 185-character Multinational set.

**Keyboards** ● 4600, 4601, 4602, and 4603.

**5282 Z00** ● dual data station with no diskette facilities:

| $108/$92 mo ˙ | $2,604 prch | $15.00 maint |
|---|---|---|

### 5280 Data Station Attachment

Auxiliary or satellite data stations are attached to programmable 5285/5286/5288 control units via the following interfaces ● display size format is also determined, and satellite diskettes supported by these controller attachment features ● maximum cable length is 200 feet.

**1210 Attachment** ● allows attachment of single 5281 with 1920-character display to 5285 ● requires 3505 1920-character display feature on 5285; cannot be used with 5285 having communications capability:

| $43/$37 mo | $879 prch | $3.00 maint |
|---|---|---|

**1215 Attachment** ● allows attachment of single 5282 with 480-character dual displays to 5285/5286 ● cannot be used with 5285 having communications capability or 960-/1920-character displays:

| 32/27 | 767 | 2.00 |
|---|---|---|

**1255 Attachment** ● allows attachment of first 5281 with 1920-character display to 5288 ● can only be used in conjunction with other 5288 1920-character display attachments:

| 19/17 | 225 | 1.50 |
|---|---|---|

**1280 Attachment** ● allows attachment of additional 5281 with

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1920-character display to 5288 • requires 1255 attachment feature:

| | 43/37 | 879 | 3.00 |
|---|---|---|---|

1240 Remote Diskette Attachment • allows attachment of 5281/5282 with diskette drive facilities to 5285/5286:

| | 6/5 | 213 | 1.00 |
|---|---|---|---|

1300 Remote Diskette Attachment • allows attachment of first remote 5281/5282 drive to 5288 without diskette facilities or of first and second remote drives when 5288 is equipped with single or dual integral drives:

| | 6/5 | 213 | 1.00 |
|---|---|---|---|

1301 Remote Diskette Attachment • allows attachment of second remote 5281/5282 drive to 5288 without diskette facilities, or of third and fourth remote drives when 5288 is equipped with single or dual integral drives, or of first and second remote drives when 5288 is equipped with tri or quad integral drives:

| | 40/34 | 970 | 4.00 |
|---|---|---|---|

1302 Remote Diskette Attachment • allows attachment of fifth and sixth remote 5281/5282 drive to 5288 with single or dual integral drives, or of third and fourth remote drive when 5288 is equipped with tri or quad integral drives:

| | 6/5 | 213 | 1.00 |
|---|---|---|---|

## 5280 Data Station Keyboards

The following outlines modular keyboard arrangements that may be configured with 5281/5282 nonprogrammable and 5285/5286 programmable data stations • dual display 5282/5286 data stations must employ the same type keyboard.

4600 Keyboard • 83-key typewriter-type keyboard with EBCDIC character set, cursor and numeric keypads, and 24 function keys:

| $15/$13 mo | $379 prch | $4.00 maint |
|---|---|---|

4601 Keyboard • 66-key data entry-type keyboard with cursor keypad, embedded numeric keyboard, and 30 function keys:

| 15/13 | 379 | 4.00 |
|---|---|---|

4602 Keyboard • 66-key data entry-type keyboard with proof arrangement, cursor keypad, embedded numeric keypad, and 30 function keys:

| 15/13 | 379 | 4.00 |
|---|---|---|

4603 Keyboard • 83-key typewriter-type keyboard with ASCII character set, cursor and numeric keypads, and 24 function keys:

| 15/13 | 379 | 4.00 |
|---|---|---|

## ☐ Printers

**5217 Model C2 Printer** • 60-cps bidirectional matrix-impact tabletop printer • 96 EBCDIC/ASCII/Multinational character set • 10/12/15 cpi; 4 lpi to 24 lpi • single-sheet hand fed paper; pin-feed continuous forms optional • 15.3-inch wide paper; 15.4-inch wide paper pin-to-pin:

| NA/NA mo | $4,425 prch | $52.50 maint |
|---|---|---|

7850 Continuous Forms Feed Device • variable-width tractor for feeding continuous forms • required for multipage printing:

| NA/NA | 325 | 8.00 |
|---|---|---|

**5222 Model 1 Printer** • 80-cps bidirectional matrix-impact tabletop printer • 95/184 EBCDIC/ASCII/Multinational character sets • 132/198 columns at 10/15 cpi • 6 or 8 lpi • 15-inch tractor feed; 3- to 15-inch continuous or 5.75- to 15-inch precut, 1- to 4-part form paper:

| 152/129 | 2,345 | 34.00 |
|---|---|---|

**5224 Printers** • 140- to 240-lpm matrix-impact tabletop printer • 95/184 Multinational character sets • 132-/198-column at 10/15 cpi • 6 or 8 lpi.

5224 Model 1 Printer • 140/95 lpm at 10/15 cpi:

| 369/314 | 6,395 | 53.00 |
|---|---|---|

5224 Model 2 Printer • 240/175 lpm at 10/15 cpi:

| 422/359 | 7,280 | 62.00 |
|---|---|---|

**5225 Printers** • 195- to 560-lpm 7x8 matrix-impact floor console printer • 95/184 EBCDIC/ASCII/Multinational character sets • 132/198 columns at 10/15 cpi • 6 or 8 lpi • 18-inch tractor feed; 3- to 17.7-inch continuous, 1- to 6-part form paper.

5225 Model 1 Printer • 280/195 lpm at 10/15 cpi:

| 586/499 | 12,075 | 119.00 |
|---|---|---|

5225 Model 2 Printer • 400/290 lpm at 10/15 cpi:

| 669/569 | 13,945 | 167.00 |
|---|---|---|

5225 Model 3 Printer • 490/355 lpm at 10/15 cpi:

| 744/633 | 15,495 | 206.00 |
|---|---|---|

5225 Model 4 Printer • 560/420 lpm at 10/15 cpi:

| 815/694 | 16,940 | 246.00 |
|---|---|---|

**5242 Model 2 Printer** • 40-/160-cps bidirectional matrix-impact tabletop printer • 95 EBCDIC character set • 10/15 cpi; 132/198 characters per line; 1 lpi to 12 lpi • tractor-feed multipart fanfold paper 3 to 15 inches wide; 4-part continuous forms acceptable:

| NA/NA | 2,975 | 61.00 |
|---|---|---|

3250 Document Insertion Device • allows insertion of single sheets or 4-part forms:

| NA/NA | 105 | 1.00 |
|---|---|---|

**5256 Printers** • 40- to 120-cps bidirectional 7x8 matrix-impact tabletop printer • 96/188 EBCDIC/ASCII/Multinational character sets • 132 columns at 10 cpi • 6 or 8 lpi • 15-inch tractor feed; 3- to 15-inch continuous or 5.75- to 15-inch precut, 1- to 4-part form paper.

5256 Model 1 Printer • 40 cps:

| 274/233 | 3,110 | 53.00 |
|---|---|---|

5256 Model 2 Printer • 80 cps:

| 310/264 | 3,255 | 58.00 |
|---|---|---|

5256 Model 3 Printer • 120 cps:

| 337/287 | 3,400 | 66.00 |
|---|---|---|

## 5280 Printer Attachments:

1150 Attachment • allows attachment of up to 7 5224, 5225, and 5256 printers to a single port on the 5285; requires 2680 cable-through feature on all except 5256 • maximum cable length is 5,000 feet:

| 19/17 | 540 | 2.00 |
|---|---|---|

1152 Start/Stop Printer Attachment • allows attachment of a 5217 Model C2, 5222 Model 1, or 5242 Model 2 printers to a 5285:

| 20/18 | 530 | 2.00 |
|---|---|---|

1155 Attachment • provides single port for attachment of 1 to 7 printers to 5288 in cable-through configuration; up to 6 5224/5256 printers and single 5225 printer may be interfaced • maximum cable length is 5,000 feet • requires 2680 cable-through feature for multiple printer attachment:

| 19/17 | 540 | 2.00 |
|---|---|---|

1162 Start/Stop Twinax Printer Attachment • provides single port for attachment of up to 7 printers to 5288 in cable-through configuration; up to 6 5224/5256 printers and a single 5225 printer can be connected • up to 4 5217 Model C2, 5222 Model 1 and/or 5242 Model 2 printers can be attached • requires 2680 cable-through feature for multiple printer attachment to single port:

| 34/29 | 925 | 3.00 |
|---|---|---|

2680 Cable-Through • allows multiple 5217C2, 5222, 5224, 5225, 5226, 5242, and 5256 printers to be connected to a single 5288 port via 1162 attachment feature • allows multiple 5224, 5225, and 5256 printers to be connected to a single 5285 port via 1162 attachment feature:

| 4/3 | 119 | 2.00 |
|---|---|---|

## ☐ Other 5280 Peripherals & Attachments

**3610 Elapsed Time Counter** • real-time counter required for SNA operations and/or for elapsed time measurements if production statistics are to be maintained on 5285/5286/5288

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systems ● cannot be used with 4955/4960 elapsed time counter/mag stripe reader attachment features:

| | | |
|---|---|---|
| $6/$5 mo | $112 prch | $1.00 maint |

**4950 Magnetic Stripe Reader** ● provides mag stripe read capability for 128 ABA numeric and control characters encoded on credit or ID cards for 5281/5282 data stations or 5285/5286 programmable units ● requires 4955/4960 adapter feature; cannot be used with 3610 counter feature:

| | | |
|---|---|---|
| 19/17 | 428 | 2.00 |

**4955 Mag Stripe Reader Adapter/Elapsed Time Counter** ● provides both mag stripe adapter and real-time counter facilities for 5285/5286/5288 systems ● required in lieu of 3610 counter for elapsed time production statistics measurements; required in lieu of 3610 on 5288 for SNA operations ● adapter supports up to 4 data station 4950 mag stripe readers ● cannot be used with

3610 counter or 4960 adapter/counter:

| | | |
|---|---|---|
| 26/22 | 642 | 2.00 |

**4960 Mag Stripe Reader Adapter/Elapsed Time Counter** ● provides both mag stripe adapter and real-time counter facilities for 5285 system ● required in lieu of 3610/4955 counter for both SNA operations and elapsed time production statistics measurements ● adapter supports single data station 4950 mag stripe reader ● cannot be used with 3610 counter or 4955 adapter/counter:

| | | |
|---|---|---|
| 7/6 | 256 | 1.00 |

**6340 Keylock** ● provides lock/local/normal keylock security for 5285/5288 systems:

| | | |
|---|---|---|
| 43/NA | 43 | NC |

● **END**