

IBM CORPORATION  
GENERAL SYSTEMS DIVISION  
P.O. BOX 2150, ATLANTA, GEORGIA 30301

General Systems Division  
P.O. Box 2150, Atlanta, Georgia 30301

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**IBM 5280 DISTRIBUTED DATA SYSTEM  
A FAMILY OF PROGRAMMABLE DISKETTE-BASED TERMINAL PRODUCTS**



PRODUCT ANNOUNCEMENT

**The IBM 5280 Distributed Data System is a new family of diskette-based products designed for the distributed processing and intelligent data entry environments.**

The 5280 is attractive to both large and small data processing users who plan to use distributed intelligent terminals as part of a new or existing IBM system network. Powerful data entry and communications capabilities enable easier implementation of customized data entry functions in both remote and centralized environments.

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### Highlights

The 5280 Distributed Data System provides a single, compatible family of devices to meet a variety of user requirements for data communications, data entry, and associated processing. Five new units are available, including single or dual keyboard/display data stations which have programmable controllers and new, compact diskette drives.

Auxiliary data stations allow a clustered system with up to 4 keyboard/displays.

Two types of printers provide a broad range of print speeds.

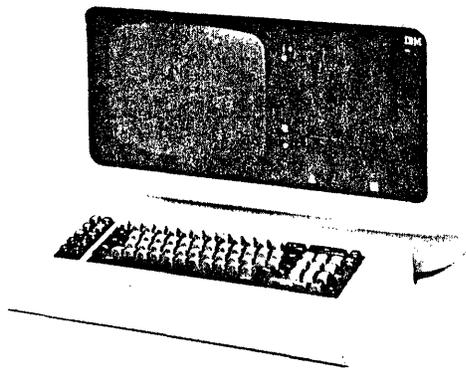
Both BSC and SNA/SDLC communications are available.

Comprehensive, high level programming support is provided for data communications, data entry, supportive processing, and utility functions.

### System Overview

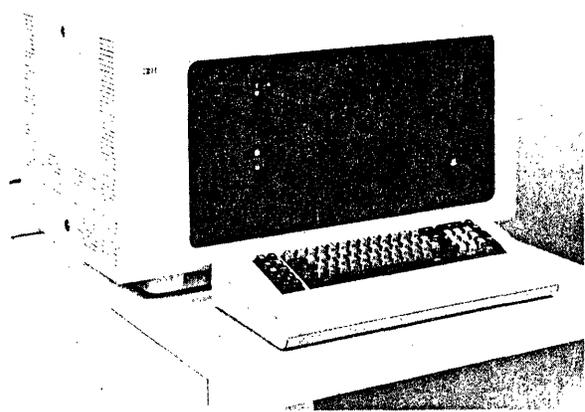
The IBM 5280 Distributed Data System consists of the following units:

- 5285 Programmable Data Station
- 5286 Dual Programmable Data Station
- 5288 Programmable Control Unit
- 5281 Data Station
- 5282 Dual Data Station
- 5225 Printer
- 5256 Printer



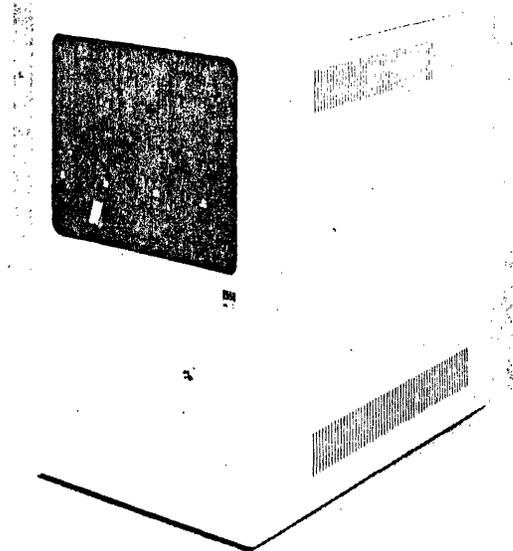
The 5285 Programmable Data Station is a single, keyboard/display station with controller and diskette drive capability.

- Tabletop
- Programmable
- 32K to 64K bytes of main storage capacity
- 480, 960, or 1920-character display size
- Contains either one or two diskette drives, providing a capacity of up to 2.4M bytes of storage
- One 5225 or 5256 Printer can be attached
- Accommodates:
  - The Communications Adapter (SDLC and BSC)  
or
  - The attachment of one auxiliary data station (5281 or 5282)
- Optional Magnetic Stripe Reader
- Optional Keylock Feature



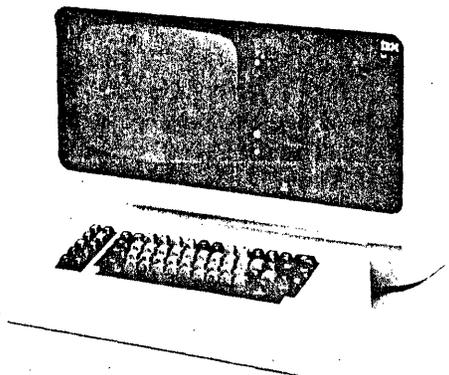
The 5286 Dual Programmable Data Station is a dual keyboard/display station with controller and diskette drive capability.

- Tabletop
- Programmable
- Single, split-screen display with two keyboards
- 32K to 64K bytes of main storage capacity
- Contains two diskette drives, providing a capacity of up to 2.4M bytes of storage
- Functions as two independent data stations
- Attaches one auxiliary data station (5281 or 5282)
- Optional Magnetic Stripe Reader
- Optional Keylock Feature



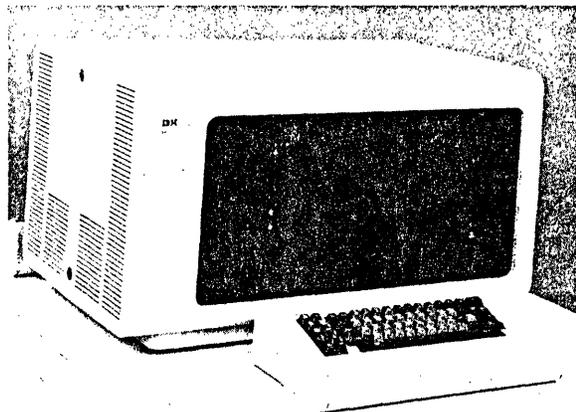
The 5288 Programmable Control Unit is a compact, floor-standing controller that can accommodate multiple keyboard/displays.

- Programmable
- 32K to 160K bytes of main storage capacity
- Contains from one to four diskette drives, providing a capacity of up to 4.8M bytes of storage
- Provides for a cluster of up to four keyboard/displays via attachment of auxiliary data stations (5281 and/or 5282)
- Provides a total system capacity of eight diskette drives (up to 9.6M bytes), including drives contained within attached auxiliary data stations
- Attaches up to five printers: four 5256 Printers, and one 5225 Printer
- Accommodates the Communications Adapter (SNA/SDLC and BSC)
- Optional Keylock feature



The 5281 Data Station is a single, auxiliary keyboard/ display

- Tabletop
- Attaches to a 5285, 5286, or 5288 at a maximum distance of 61m (200 ft)
- Functions as an independent data station
- Contains 0, 1, or 2 diskette drives, providing a capacity of up to 2.4M bytes of storage
- 480, 960, or 1920-character display size
- Optional Magnetic Stripe Reader



The 5282 Dual Data Station is a dual, auxiliary keyboard/display

- Tabletop
- Single, split-screen display with two keyboards
- Attaches to a 5285, 5286, or 5288 at a maximum distance of 61m (200 ft)
- Functions as two independent data stations
- Contains 0, 1, or 2 diskette drives, providing a capacity of up to 2.4M bytes of storage
- 480 or 960-character display size
- Optional Magnetic Stripe Reader

#### 5280 Distributed Data System Functional Capabilities Controller

The controllers in the 5285, 5286, and 5288 control all functions within the system and the optionally attached 5281 and 5282 auxiliary data stations. The controllers perform identical functions, but vary in main storage size and device attachment capability. The controllers provide processing capability, control, main storage, I/O attachment capability and communications features (optionally available on the 5285 and 5288).

#### Highlights

- Multiple microprocessors allow processing and I/O devices to operate independently
- Stored program capability
- Multiprogramming capability with up to eight main storage partitions
- Powerful and extensive data editing function
- A Communications Adapter is available for the 5285 and 5288, which provides both SDLC and BSC capability

## Diskette Drives

New, compact diskette drives, housed within the 5280 units, allow compact system packaging. Capacity per diskette ranges from 0.25M bytes to 1.2M bytes. Two types of drives are available:

- A diskette drive capable of reading/writing IBM diskette 1
- A diskette drive capable of reading/writing IBM diskette 1, 2, and 2D

The formats and capacities for the diskettes are:

### Diskette 1

Format	Bytes/ Sector	Capacity
1	128	246 KB
2	256	284 KB
3	512	303 KB

### Diskette 2

Format	Bytes/ Sector	Capacity
4	128	492 KB
5	256	568 KB
6	512	606 KB

### Diskette 2D

Format	Bytes/ Sector	Capacity
7	256	985 KB
8	512	1136 KB
9	1024	1212 KB

For data exchange with other devices and systems, the following exchange types are supported:

- Basic Exchange (Formats 1 and 4 above)
- H Exchange (Format 7 above)
- I Exchange (all of the above formats)

Diskettes can be interchanged with other IBM devices and systems that support the above exchange types, such as: System/3, System/32, System/34, System/38, Series/1, System/370, 303x, 4300, 3540, 3740, 3747, 3770, 3790, 5110, 5230, 5260, and 8100.

## Keyboard/Display

The keyboard/displays available on the 5280 system provide the following:

- High resolution for ease of reading
- Display sizes of 480, 960, or 1920-characters
- Upper/lower case 94-character EBCDIC character set, 94-character ASCII character set, and 185-character Multinational Character Set are included
- Extended highlighting provides these screen attributes:
  - Reverse Image
  - High Intensity
  - Blink
  - Underline
  - Nondisplay
  - Column Separators
- Brightness and contrast control

- Three keyboard types:
  - Data Entry
  - Data Entry with Proof Arrangement
  - Typewriter
- Keyboards provide capability to enter hexadecimal characters
- Keyboards are movable and have palm rest for operator comfort

## Communications Facilities

Data communications capability on the 5280 Distributed Data System is supported by a special feature on the 5285 Programmable Data Station and the 5288 Programmable Control Unit. A single communications line may be attached and will use either SDLC or BSC protocol based on the program or utility selected for execution.

### Highlights

- Stored program control selection of Synchronous Data Link Control (SDLC) or Binary Synchronous Communications (BSC) protocol
- Point-to-point switched or nonswitched
- Multipoint tributary operation
- Up to 4800 bps transmission speeds
- Half-duplex operation on either half-duplex or duplex (2 or 4 wire) facility
- Manual dial and manual or auto-answer dependent on modem capability
- Digital Data Service Adapter (DDSA) for connection to AT & Ts nonswitched Dataphone\* digital data service network
- DDSA for local connection to another supported device having a DDSA and using a DDSA Connector accessory cable
- Integrated modem for operation at 600/1200 BPS on switched, point-to-point nonswitched, multipoint tributary, switched network backup or switched network backup with auto-answer
- EIA interface for use with either IBM or non-IBM external modems
- Communications with a wide variety of systems and terminals in either SDLC or BSC mode

## 5256 Printer

- Attaches to the 5285 and the 5288
- Three models:
  - Model 1 40 cps
  - Model 2 80 cps
  - Model 3 120 cps
- See Note below
- Bidirectional serial matrix printing using upper/lower case 96-character EBCDIC character set
- 132 print positions per line at 10 characters per inch
- Vertical spacing is 6 or 8 lines per inch under operator control
- Forms tractor for feeding continuous forms
- Cut forms capability
- Multinational Character Set option
- Attaches via twinax cabling at a maximum distance of 1525m (5000 ft)

\*Trademark of American Telephone and Telegraph Co

- Cable Thru feature allows attachment of multiple printers (maximum: four 5256 Printers and one 5225 Printer) to a 5288 on a single twinax cable

*Note:* Rated printer speeds may be affected by the customer's program, application load, and/or forms design.

### 5225 Printer

See 5225 Printer Product Announcement Letter 680-3 dated January 10, 1980.

- New, wire matrix line printer
- Attaches to the 5285 and the 5288
- Four models
  - \*\* Model 1 280 Lpm
  - Model 2 400 Lpm
  - Model 3 490 Lpm
  - Model 4 560 Lpm

See Note below

- Horizontal spacing of 10 or 15 CPI is operator selectable
- 15 CPI capability provides condensed printing on correspondence size paper
- Available with upper/lower case 94-character sets or 184-character Multinational Character Set
- Vertical Spacing is 6 or 8 lines per inch under operator control
- Forms tractor for feeding continuous forms
- Attaches via twinax cabling at a maximum distance of 1525m (5000 ft)
- Cable Thru feature allows attachment of multiple printers (maximum: four 5256 Printers and one 5225 Printer) to a 5288 on a single twinax cable

*Note:* Rated printer speeds may be affected by the customer's program, application load, forms design, and/or the number of printers attached to the system.

### Data Security

The responsibility for the protection of data from unauthorized or accidental modification, destruction, or disclosure lies with the customer. However, the 5280 Distributed Data System offers built-in characteristics and optional features to assist the customer in data security. These characteristics include:

- Sensitive data can be entered from the keyboard without being displayed on the screen
- A Security Keylock (special feature offered on the 5285, 5286, and 5288) allows the customer to restrict system usage (including 5281 and 5282 auxiliary data stations) to a keyholder
- A Magnetic Stripe Reader (special feature) is available for each keyboard/display operator position, which may be used to enter user identification
- In a communications environment, a 5280 system can exchange identification sequences with the host, which assists the user in controlling access to data.
- Diskette media can be removed from the system and secured separately.

\*\*Maximum rated speeds at 10 CPI

### Programming Features

The IBM 5280 Distributed Data System is supported by System Control Programming and a comprehensive set of Licensed Programs which provide the functions necessary to support a wide range of distributed environments including batch and interactive communications, batch processing, transaction processing, and data entry. The following programming support is available:

- 5280 System Control Programming
- 5280 DE/RPG
- 5280 COBOL-OS/VS Host Compiler and Library
- 5280 COBOL-DOS/VSE Host Compiler and Library
- 5280 Communications Utilities
- 5280 Sort/Merge
- 5280 Utilities
- 5280 Assembler Language

### 5280 System Control Programming

System Control Programming (SCP) provides four basic system functions:

- System Configuration Program--used to describe the physical and logical configuration of a 5280 system
- Initial Program Loader--initializes the system for program execution
- PTF/Patch Program--provides the capability to apply PTFs and make program patches
- Close Failure Recovery Program--allows the user to specify an EOD (end of data) record in a diskette data set in the event of abnormal program termination

### 5280 DE/RPG

- New, easy to use programming support for
  - Interactive data entry
  - User-defined processing
  - Transcriptive (high-volume) key entry
- Uses Data Description Specification (DDS) forms for simple specification of data entry formats
- Sequence of execution of formats determined by job definition, operator selection, or dynamically, under user program control
- Display screen design capabilities
  - Prompts and data fields can be positioned anywhere on the screen except the status line
  - Multiple formats can be displayed on a single screen
  - Display attributes for prompts and data fields, including highlight, blink, reverse image, underline, nondisplay, and column separators
- High-function editing performed on a character, field, or record basis
  - Character check
  - Mandatory enter/fill
  - Data required
  - Exit key required
  - Duplication
  - Right adjust with blank or zero fill
  - Self check/generate
  - Counter arithmetic
  - Automatic field insert
  - Comparison test
  - Substitute table data for keyed data
  - Table lookup

- Range test
- Reformat field position for output record
- Set indicators on/off
- Exit to user subroutine
- Crosscheck
- Sequence check
- Picture check
- RPG III subset capability for subroutines and stand-alone programs:
  - Subset of RPG III Calculation Specification op codes
  - Uses RPG Calculation Specification Sheet
  - User-specified instruction sequence--the RPG "Cycle" does not apply
  - Available operations include:
    - Arithmetic and data manipulation
    - Branching
    - Indicator testing
    - Subroutine operations
    - I/O operations for diskette, printer, keyboard/display and communications
- Diskette data set support:
  - Sequential organization
  - Access methods are: sequential, direct by relative record number, and key indexed
  - Data sets can be shared by multiple programs
  - Automatic allocation of data sets
- Modes of operation:
  - Enter: initial data entry
  - Update: review and modify selected records
  - Verify: verify data for accuracy
  - Rerun: perform edits and checks on data set records without operator keying
- Production statistics (for enter, update, and verify modes)
  - Keystrokes
  - Records
  - Elapsed time
  - Marked records
  - Verify correction keystrokes
  - Number of jobs
- Source Entry Program
  - Included with DE/RPG Licensed Program
  - Used to create a DE/RPG source statement data set
  - Source statement parameters entered at keyboard in response to displayed prompts

#### 5280 COBOL-OS/VS Host Compiler and Library

- Support of 1974 ANS Standard COBOL X3.23-1974
- Programs are compiled on a System/370, 303x, or 4300 under OS/VS1 or OS/VS2 (MVS)
- Object programs execute on a 5285, 5286, or 5288
- Support for interactive or batch commercial application programs
- Includes data station support for interactive applications
- Object programs transferred from host to 5280 system via diskette, RJE, or user-written communications program
- Support for BSC and SNA/SDLC communications via CALL interface
- Takes advantage of existing host COBOL expertise and allows central control

#### 5280 COBOL-DOS/VSE Host Compiler and Library

- Support of 1974 ANS Standard COBOL X3.23-1974
- Programs are compiled on a System/370, 303x, or 4300 under DOS/VSE
- Object programs execute on a 5285, 5286, or 5288
- Support for interactive or batch commercial application programs
- Includes data station support for interactive applications
- Object programs transferred from host to 5280 system via diskette, RJE, or user-written communications program
- Support for BSC and SNA/SDLC communications via CALL interface
- Takes advantage of existing host COBOL expertise and allows central control

#### 5280 Sort/Merge

##### *SORT*

- Sorts a single diskette data set into ascending or descending sequence
- Parameters entered at keyboard or read from diskette data set
- Records can be selected, omitted, or reformatted
- Automatic allocation of work space and data sets
- Output is one of four formats:
  - Full record
  - Address Out: a data set of 4-byte relative record numbers
  - Record Subset: a data set containing user-specified data fields
  - Index/Key: a data set with records consisting of a key and a relative record number

##### *MERGE*

- Merge Program combines records from 2 sorted data sets into another data set
- Parameters entered at keyboard or read from a diskette data set
- Supports multivolume data sets

#### 5280 Utilities

- Diskette Initialization Utility
  - Formats a diskette according to user requirements
- Diskette/Data Set Clear Utility
  - Clears one or all data sets on a diskette in preparation for recording new data
  - Deletes all data sets on a diskette or a data set and its header label
- Diskette Label Maintenance Utility
  - Allocates new data sets
  - Deletes old data sets
  - Modifies volume and data set labels
- Diskette Label List Utility--allows the user to display or print:
  - Diskette volume labels
  - Data set labels
  - Data set names
  - Data set directories

- Diskette Copy Utility
  - Image Copy: copies the entire contents of a diskette
  - Volume Copy: copies and compresses active data sets
  - Data Set Copy: copies the contents of up to 4 data sets to an output data set
  - Specify Record Copy: copies the contents of a data set between "from-to" relative record numbers
  - Specify Key Copy: copies records with user-specified keys
  - Single Drive Data Set Copy: copies a data set from one diskette to another using only one diskette drive.
- Diskette Print Utility
  - Prints all records in a data set
  - Prints all records from all data sets on a diskette
  - Prints all records in a data set between user-specified relative record numbers
  - Prints all records in a data set matching user-specified keys
- Resource Allocation Utility
  - Provides the means to display, alter, or delete the logical device identifier and physical address of an existing entry, or add an entry to the resource allocation table
- 3740 Format Conversion Utility
  - Converts 3740 key entry program levels into DE/RPG source programs
- Diskette Compress Utility
  - Moves diskette data sets together, freeing any unused space between them for additional allocation
- Key Entry Utility
  - Provides the capability to create formats for basic key entry functions using the IBM 3740 key entry string language
- System Status Utility
  - Displays certain system information such as number and sizes of partitions and names of programs currently being executed
  - Displays system configuration information recorded on an IPL diskette

#### 5280 Communications Utilities

The Communications Utilities provides the following basic facilities:

- Batch Data Transfer/Inquiry
- SNA/SDLC Remote Job Entry (SRJE)
- MULTI-LEAVING Remote Job Entry (MRJE)
- Communications Configuration and Job Description

The general support for communications includes:

- Communications Adapters (#2500) on the 5285 Programmable Data Station and 5288 Programmable Control Unit
- Single communications line
- Synchronous Data Link Control (SDLC) as part of System Network Architecture (SNA)
- Binary Synchronous Communications (BSC)
- Communications Access Methods
- 960 and 1920 character display screens only
- Direct device support and diskette data management
- Application program facility via DE/RPG, COBOL, and Assembler Language

- Program operation concurrent with other applications

#### Batch Data Transfer/Inquiry

- Batch data transfer to a host system or terminal
- Inquiry to a host system
- SNA/SDLC communications as a LU1 type terminal to System/370, 303x, 4300 with CICS/VS and IMS/VS
- BSC communications with System/370, 303x, 4300 with CICS/VS, IMS/VS (as a 3741), VSE/POWER and System/3/32/34 RPG II, System/3 CCP, System/34 SSP-ICF, 3740, 5260, Series/1 RPS, and another 5280
- Minimum of 32K bytes of main storage for BSC
- Minimum of 64K bytes of main storage for SNA/SDLC

#### SNA/SDLC Remote Job Entry (SRJE)

- Single LU-LU session supports one each: console, reader, punch, and printer
- SNA support on the host is via ACF/VTAM and ACF/NCP/VS to RES, JES2, JES3, and VSE/POWER
- Printer streams can be directed to either a printer or diskette
- Punch data streams are directed to diskette
- Minimum of 64K bytes of main storage

#### MULTI-LEAVING Remote Job Entry (MRJE)

- Full MULTI-LEAVING support of concurrent device operation includes one each: console, reader, punch, and printer
- Expansion of blanks and duplicate characters from the host
- BSC support on host as a System/3 MRJE work station for RES, JES2 and JES3
- Printer data streams can be directed to either a printer or diskette
- Punch data streams are directed to diskette
- Minimum of 48K bytes of main storage on the 5285, or 64K bytes of main storage on the 5288

#### Communications Configuration and Job Description

- Preparation of communications environments via job step prompts
- Descriptions are stored on diskette by job name
  - Used to initiate communications link with the host or terminal
  - Initiation with the host may be either dynamic or predetermined for operator convenience

#### 5280 Assembler Language

- Contains an assembler and the 3740 ACL Conversion Aid Program
- The assembler is used to create stand-alone programs. It provides features such as:
  - Mnemonic operation codes
  - Symbolic referencing of storage addresses
  - Automatic storage assignment
  - Address displacement calculation
  - Symbolic data representation
  - Binary and decimal arithmetic
  - Operand expressions
  - Source program listing

- Cross reference listing
  - Error checking and diagnostic messages
- The 3740 ACL Conversion Aid Program assists the user in converting 3740 ACL (Application Control Language) programs into 5280 Assembler Language



## IBM 5280 System Control Programming Program Number 5708-SC1

The system control programming (SCP) programs perform the system control functions that are basic to a 5280 Distributed Data System. They enable the user to perform the IPL process, configure the system, recover data if a system or power failure occurs, and apply a fix to IBM-supplied programs or user programs if an error is encountered.

The SCP consists of the initial program load (IPL) function, the system configuration program, the close failure recovery program, and the patch program.

### The Initial Program Load Function

The initial program load (IPL) function loads the 5280 system with information needed to execute other programs. The IPL program loads a starter system immediately after the 5280 is powered on. Once the IPL process is performed using the SCP diskette, the system configuration program can be loaded and executed.

### System Configuration Program

The system configuration program allows the user to configure, or tailor, the system's storage area and devices to meet individual business needs.

During execution of the system configuration program, the user specifies the desired characteristics of the 5280 system by responding to prompting messages. Using these responses, the 5280 creates a user-defined IPL data set.

The user-defined IPL configuration is stored on diskette and is used to IPL the system for future data processing jobs.

### Close Failure Recovery Program

If execution of a program is interrupted, a data set might remain open and the data within might not be accessible (to be read or written) until the corresponding data set label has established the correct end-of-data position. The close failure recovery program allows the user to find the last valid record in the data set. The 5280 uses this end-of-data record to update the data set label and enable the user to access the data.

### Patch Program

The patch program allows the user to correct problems that might be encountered while the 5280 system programs or user programs are used, and to display the history of the changes made to the programs. This program uses IBM-supplied *program temporary fixes* (PTFs).

### SYSTEM REQUIREMENTS

The starter system that is loaded by the IPL program runs on all models of the 5280 system. The starter system has the following characteristics.

- A 32 K storage area (with 26 K of storage for a user program)
- A single data station with a 480-character display format
- Common functions used by the 5280 system to support all programs except the key entry utility, the 3740 format conversion aid utility, and DE/RPG

Minimum partition storage requirements for each of the SCP programs are as follows:

Initial program load	No minimum requirements
System configuration	16 K
Close failure recovery	9 K
Patch	9 K

### REFERENCE MATERIAL

*IBM 5280 General Information*, GA21-9350

*IBM 5280 System Control Programming Reference/Operation Manual*, GC21-7824

Any other documentation with respect to this licensed program, including any documentation referenced herein, is provided for information purposes only and does not extend or modify these specifications.

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International Business Machines Corporation

General Systems Division  
4111 Northside Parkway N.W.  
P.O. Box 2150  
Atlanta, Georgia 30301  
(U.S.A. only)

General Business Group/International  
44 South Broadway  
White Plains, New York 10601  
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**General Systems Division  
Programming Announcement**

P681-13  
Release Date: January 16, 1981

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**IBM 5280 DISTRIBUTED DATA SYSTEM  
SUPPORT BY ACF/TCAM VERSION 2  
AVAILABLE EARLY**

Programming support of communicating models of the 5285 Programmable Data Station and the 5288 Programmable Control Unit is now available for users of ACF/TCAM Version 2 under OS/VS1 and OS/VS2. This support is included in Release 2 of the 5280 Communications Utilities (5708-DC1) licensed program (See Programming Announcement P681-11).

The 5280 is supported as an LU1 secondary station as described in the *5280 Communications Reference Manual* (SC34-0247). It is also supported as a 3741 under TCAM using BSC link protocol. The 5280 will interface to ACF/TCAM through the 5280 Communications Utilities as well as user-written DE/RPG, COBOL, and assembler programs.

**BSC MULTIPOINT MONITOR  
ANNOUNCED FOR 5280 DISTRIBUTED  
DATA SYSTEM (5708-DC1)**

The BSC Multipoint Monitor provides, for the communicating 5285 Programmable Data Station and 5288 Programmable Control Unit residing on a BSC multipoint network, the ability to respond to host polling and selection without the requirement to have a Communications Access Method (CAM)\* loaded into main memory. Use of the Multipoint Monitor prevents the host from removing the 5280 from polling lists which would thereby require reactivation at the host when communications are desired.

No communications (data transfer) with the host are possible when the Multipoint Monitor function is active. When communications are desired, normal program load procedures are used.

The Multipoint Monitor will be included in the 5280 Communications Utilities (5708-DC1) at no additional charge.

**Scheduled Availability Date: June, 1981**

L. W. Gray  
Vice President—Marketing

\* CAMs are included in 5280 Communications Utilities (5708-DC1) and 5280-3270 Emulation (5708-EM1) licensed programs.

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**General Systems Division  
Product Announcement**

681-11  
Release Date: January 16, 1981

**Immediately File Attached Sales  
Manual Text in Appropriate  
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**IBM 5280 DISTRIBUTED DATA SYSTEM  
ENHANCED**

**Included in this announcement:**

- **Additional Main Storage Capacity  
Announced for the 5280 Distributed  
Data System** pg. 1
- **Second Application Microprocessor  
Announced for the 5280 Distributed  
Data System** pg. 1
- **IBM 5280 Distributed Data System  
Printers Increased to Maximum of  
Eight** pg. 2
- **3270 Emulation Feature Announced  
for the 5280 Distributed Data System**  
pg. 3

**ADDITIONAL MAIN STORAGE CAPACITY  
ANNOUNCED FOR THE IBM 5280  
DISTRIBUTED DATA SYSTEM**

New models of the 5285 Programmable Data Station, the 5286 Dual Programmable Data Station, and the 5288 Programmable Control Unit provide expanded main storage sizes. Maximum main storage capacity is expanded to 96K on the 5285 and 5286, and to 288K on the 5288.

The 5285 is extended by five new models, with a main storage capacity of 96K. The 5286 is extended by two new models, with a main storage capacity of 96K. The 5288 is extended by 14 new models with a main storage capacity of 224K, and 14 models with a main storage capacity of 288K. These new models of the 5280 Distributed Data System offer users greater flexibility in the design and use of their systems.

**Deliveries**

First Customer Shipment (FCS) of the new models is scheduled for March, 1981.

Shipping dates will be assigned sequentially to orders entered in AAS. Orders involving multiple units are subject to an extension of schedules. A delivery schedule will be established and initial schedules will be assigned within 60 days. No delivery commitments are to be made to customers until confirmed schedules are received in the branch office.

Existing orders which are altered to the new models will be treated as new orders and are subject to deferral.

Equipment should be ordered for the location where it will be installed.

**MESs**

MES orders for model changes will be accepted immediately. First Customer Shipment of MESs will be the same as for the models designated above.

**Programming Support**

5280 System Control Programming (5708-SC1) Release 2 contains support for the new models.

**Production Category**

All models of the 5285, 5286, and 5288 are in new production.

**RPQs**

RPQs may be submitted immediately with response time (minimum 90 days) and delivery dependent upon complexity.

**Sales Compensation Plan**

Normal provisions apply.

**Model Changes**

The 5285, 5286, and 5288 are model upgradable within machine type.

**Education Allowance**

The Standard Educational Allowance (10%) applies to the 5285, 5286, and 5288 (applies to lease, rental, and purchase customers).

**IBM CONFIDENTIAL UNTIL 8:30 A. M. (EST) FRIDAY, JANUARY 16, 1981**  
*CONTACT YOUR REGION WITH QUESTIONS  
CONCERNING THIS ANNOUNCEMENT*

## Sales Manual Text

New models are included in the attached interim *GSD Sales Manual* pages.

## SECOND APPLICATION MICROPROCESSOR ANNOUNCED FOR THE IBM 5280 DISTRIBUTED DATA SYSTEM

The Second Application Microprocessor feature (#6800) provides more processing power to be used as an aid to performance improvement for the 5280 Distributed Data System. This microprocessor performs identical function and operates concurrently with the first (base) application microprocessor. It is specifically intended for those users seeking improved performance when operating in a multiprogramming mode.

### Highlights

- Adds more processing power to the 5280 Distributed Data System
- Provides potential for improved performance
- Is designed to be used in a multiprogramming environment with heavy processor utilization
- Is available for the 5285 Programmable Data Station (without communications), the 5286 Dual Programmable Data Station, and the 5288 Programmable Control Unit
- Allows assignment of each application microprocessor to specific, contiguous partitions, thereby allowing selected user programs to be serviced by a dedicated application microprocessor
- Allows assignment of both application microprocessors to all partitions, thereby allowing all concurrently executing programs to be serviced by two application microprocessors
- Provides user-selectable partition assignments via SCP function
- Does not require user application program changes
- Is field installable

The Second Application Microprocessor feature (#6800) performs applications, logic, and arithmetic. The feature is available for the 5285 Programmable Data Station (without Communications Adapter #2500), the 5286 Dual Programmable Data Station, and the 5288 Programmable Control Unit. It is designed to operate concurrently with the standard (base) application microprocessor to provide more processing power for the 5280 Distributed Data System. Both microprocessors operate independently to service active partitions. Each microprocessor can be assigned to specific, contiguous partitions by the user. This allows a specific user program(s) to be serviced by a dedicated application microprocessor. If unassigned by the user, the microprocessors are allocated to all active partitions. In this case, all concurrently executing programs will be serviced by two application microprocessors. Partition assignments are made using a 5280 System Control Programming (5708-SC1) facility.

The second application microprocessor provides potential for improved performance. It is designed to be used in a

multiprogramming environment where the base application microprocessor is heavily utilized. Heavy utilization occurs, for example, when programs are compute bound, or when foreground partitions have a high rate of "attentions" (for example: keyed record completion, user program exit). Ultimate system performance is highly dependent upon such factors as system configuration, the number of active partitions, user program processing requirements, and operating characteristics.

### Deliveries

First Customer Shipment (FCS) is scheduled for June 1981.

Existing orders of systems which are altered to add the new feature are subject to deferral.

### MESs

MES orders for field installation will be accepted immediately. First Customer Shipment of MESs will be the same as the FCS date stated above.

### Programming Support

Release 2 of 5280 System Control Programming (5708-SC1) is a prerequisite for this feature. See *GSD Programming Announcement Letter P681-11*.

### RPQs

RPQs may be submitted immediately with response time (minimum 90 days) and delivery dependent upon complexity.

### Sales Compensation Plan

Normal provisions apply.

## IBM 5280 DISTRIBUTED DATA SYSTEM PRINTERS INCREASED TO MAXIMUM OF EIGHT

Effective immediately, the maximum number of printers which can be attached to a 5288 Programmable Control Unit is increased from five to eight. The new maximum is available using the 5222, 5225, and 5256 Printers and existing 5288 printer attachment special features.

Any combination (up to eight) of 5222, 5225, and 5256 Printers can be attached to a 5288, consistent with existing printer attachment feature limitations.\* There are no hardware changes as a result of this announcement.

A summary of 5288 printer attachment special features is presented below:

### Single Twinax Printer Attachment (#1155)

Maximum number of printers that can be attached: 7

Number of 5225/5256 ports: 1

Maximum number of printers per port: 7

\*Note: Printer speeds may be affected by the customer's program, application load, forms design and/or the number of printers attached to the system.

**Multiple Twinax Printer Attachment (#1160)**

Maximum number of printers that can be attached: 8  
Number of 5225/5256 ports: 4  
Maximum number of printers per port: 7

**Single 5222 Printer Attachment (#1157)**

Maximum number of printers that can be attached: 1  
Number of 5222 ports: 1

**Multiple 5222/Twinax Printer Attachment (#1162)**

Maximum number of printers that can be attached: 8  
Number of 5225/5256 ports: 1  
Maximum number of 5225/5256 Printers per port: 7  
Number of 5222 ports: 4  
Maximum number of 5222 Printers per port: 1

**Programming Support**

5280 System Control Programming (5708-SC1) has been enhanced to allow a 5288 system configuration which includes up to eight printers. This support is included in Release 2 of 5280 System Control Programming (see Programming Announcement Letter P681-11).

**ORDERING INFORMATION FOR 5288 PRINTER ATTACHMENT SPECIAL FEATURES**

See interim *GSD Sales Manual* pages attached.

**3270 EMULATION COMMUNICATIONS ADAPTER ANNOUNCED FOR THE 5280 DISTRIBUTED DATA SYSTEM**

A new special feature, 3270 Emulation Communications Adapter (#3270) provides communications adapter capability and support for the 5280—3270 Emulation (5708-EM1) licensed program. This feature performs the same functions as the existing 5280 Communications Adapter (#2500) and provides additional hardware function in support of 5280—3270 Emulation.

The feature can be installed on a 5285 Programmable Data Station and on a 5288 Programmable Control Unit. It is mutually exclusive with the 5280 Communications Adapter (#2500).

**Deliveries**

First Customer Shipment (FCS) is scheduled for June, 1981.

Existing orders of systems which are altered to add the new feature are subject to deferral.

**MESs**

MES orders for field installation will be accepted immediately. First Customer Shipments of MESs will be the same as the FCS date stated above.

**Programming Support**

The 3270 Emulation Communications Adapter supports the 5280 Communications Utilities (5708-DC1) and the new 5280—3270 Emulation (5708-EM1) licensed programs (see Programming Announcement P681-12).

**RPOs**

RPOs may be submitted immediately with response time (minimum 90 days) and delivery dependent upon complexity.

**Educational Allowance**

The Standard Educational Allowance (10%) applies.

**Sales Compensation Plan**

Normal provisions apply.

**Sales Manual Pages**

See attached interim *GSD Sales Manual* pages for prerequisites and limitations.

*Note:* See Marketing Announcement 681-6 for prices.

**Filing Instructions—GSD Sales Manual**

<i>Remove</i>	<i>File</i>
Volume 2 (Machines)	
- Machine Section	
April 80, #61	January 81,
pgs. M5285.1	(Interim Page) Vol 2
through M5288.6	pgs. M5285.1 through
	M5288.7

L. W. Gray  
Vice President—Marketing

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**5285 PROGRAMMABLE DATA STATION**

**Purpose:** A single, tabletop, programmable keyboard/display station with standard controller and diskette capability for data entry, associated processing and/or data communications. Part of the 5280 Distributed Data System.

**Models:** 5285 models are available depending on main storage capacity and the type and number of diskette drives. The 3-character model number is determined by combining the alphabetic main storage capacity identifier (ID) with the numeric identifier (ID) for type and number of diskette drives.

To determine model number:

1. Select main storage capacity required. Corresponding ID becomes first character of model number.
2. Select type and number of diskette drives required. Corresponding ID becomes last two characters of model number.

Main Storage		Diskette		
ID	Capacity	ID	Number of Drives	
			Diskette 1	Diskette 2D
A	32K	01	1	0
B	48K	02	2	0
C	64K	05	0	1
D	96K	06	1	1
		10	0	2

Example: Main storage capacity required: 48K  
Diskette drives required: One diskette 1 and one diskette 2D

Model number: B06

**Model Changes:** Field Installable. All features may be field installed.

**Purchase Considerations**

1. The upgrade purchase prices for model changes may be greater than the purchase price differentials. The customer should carefully evaluate his future requirements when purchasing a system.
2. Replaced parts from any model change become the property of IBM.
3. Replaced parts from any Special Feature installation or removal remain the property of the customer.

**Notes**

1. Device Attachments: Appropriate special features are required to attach auxiliary data stations (5281, 5282) and some I/O units ... see "Special Features."
2. IBM 5280 System Control Programming (5708-SC1) should be ordered at equipment order entry time.
3. For physical planning information, see *IBM 5280 Planning and Site Preparation Guide*, GA21-9351.

**Highlights:**

- Multiple microprocessors provide independent processing and I/O control.
- Stored program function.
- Multiprogramming capability with multiple main storage partitions.
- Powerful and extensive data editing function.

- Multi-chip technology and compact diskette drives allow compact tabletop system packaging.
- Two types of compact diskette drives, housed within the 5285, support either IBM diskette 1 or IBM diskette 1, 2, and 2D and provide up to 2.4M bytes of storage capacity.
- Front-loading diskette drives provide convenience and ease of access.
- Movable keyboard with palm rest for operator comfort.
- Display size of 480, 960, or 1920 characters.
- Multiple data station capability and additional diskette capacity with attachment of one 5281 Data Station or one 5282 Dual Data Station.
- Printer attachment available for one 5222, 5225, or 5256 Printer.
- Security features for data asset protection.
- Independent data station operation through multiprogramming and system resource sharing.
- Communications adapters provide both SDLC and BSC capability.
- Communications programming support available for RJE, batch, and interactive communications via SNA/SDLC or BSC.

**5285 Components**

**Controller:** Provides processing capability, control, main storage, and optional I/O attachments and communications features. Controls all functions of the 5285 and an optionally attached 5281 Data Station or 5282 Dual Data Station. Multiple microprocessor architecture allows processing and I/O operations (e.g., diskette, keyboard/display, communications) to operate independently.

The 5285 provides 32K of main storage that can be expanded to a maximum of 96K. Multiprogramming capability is available through partitioned memory. The number of partitions and their size (6K minimum) are user-specified with a facility provided in 5280 System Control Programming (5708-SC1).

Special features provide for the attachment of an auxiliary data station (5281 or 5282), a printer (5222, 5225, or 5256), and the communications adapters which each provide both SDLC and BSC communications under stored program control.

**Display:** Displays up to 480 characters (six lines of 80 characters). Optionally available are display sizes of 960 characters (12 lines of 80 characters) or 1920 characters (24 lines of 80 characters). Characters are presented within an 8x16 dot matrix. The standard, upper/lower case, 94-character EBCDIC character set, 94-character ASCII character set, and the 185-character Multinational Character Set are included (see Type Catalog). The character set is user-selectable.

Extended highlighting provides screen attributes such as reverse image, high intensity, blink, underline, nondisplay, and column separator. Screen attributes are under program control and can be applied on a field basis. Brightness and contrast controls are provided to meet individual requirements.

**Keyboard:** A choice of three keyboard types provide input flexibility to meet individual user requirements: data entry, data entry with proof arrangement, and typewriter (see "Special Features" below). See Type Catalog for keyboard layout. Each keyboard has cursor movement keys, special function keys,



field exit keys, and data keys (alphabetic and numeric). All data keys are typamatic. The keyboard is movable and has a palm rest for operator comfort.

The keyboards contain only a subset of the characters in the Multinational Character Set. When the Multinational Character Set is used, the additional characters may be entered via multiple key sequence.

Typewriter Keyboards provide for direct entry of upper and lowercase characters. Data entry keyboards provide for direct entry of uppercase only. Lowercase characters may be entered via multiple key sequence.

**Diskette:** Two types of compact diskette drives are available with the 5285: a diskette drive which can read/write IBM diskette 1 and a diskette drive which can read/write IBM diskette 1, 2, and 2D. Capacity per drive ranges from .25M bytes to 1.2M bytes. The formats for the diskettes are:

**Diskette 1**

Format	Bytes/Sector	Capacity
1	128	246KB*
2	256	284KB
3	512	303KB

**Diskette 2**

Format	Bytes/Sector	Capacity
4	128	492KB
5	256	568KB
6	512	606KB

**Diskette 2D**

Format	Bytes/Sector	Capacity
7	256	985KB
8	512	1136KB
9	1024	1212KB

\*243KB when used for Basic Exchange

For diskette data exchange with other systems, the following exchange types are supported: Basic Exchange (Formats 1 and 4 above), H Exchange (Format 7 above), and I Exchange (all of the above formats). Diskettes can be interchanged with other IBM systems and devices which support a compatible diskette exchange type. Examples are the IBM System/3, System/32, System/34, System/38, Series/1, System/370, 303X, 4300, 3540, 3740, 3747, 3770, 3790, 5110, 5230, 5260, and 8100.

The instantaneous data transfer rate using IBM diskette 1 or 2 is 31.2K bytes/sec; for IBM diskette 2D: 62.5K bytes/sec. Rotational speed of both types of drives is 360 RPM. Diskette read or write is overlapped with seek. Diskette operations are overlapped with processing and other I/O device operations.

**Auxiliary Data Station:** One 5281 Data Station or 5282 Dual Data Station can be attached to the 5285 (see "Special Features" below). The 5281 or 5282 is cable attached at a maximum distance of 61 meters (200 feet). The 5285 provides control and main storage in support of the auxiliary data station. Each keyboard/display (including the 5285) is assigned to a separate partition and operates independently. Each diskette drive on the 5285 and an attached data station is available to any program and any keyboard/display.

The auxiliary data station must have the same display size(s) as the 5285. The auxiliary data station display size(s) is determined by the Auxiliary Data Station Attachment (special feature) on the 5285. *An auxiliary data station cannot be*

*attached if the 5285 has a communications adapter feature (#2500) or (#3270).*

**Printers:** One 5222 Printer, one 5225 Printer, or one 5256 Printer can be attached to the 5285 (see "Special Features").

**Security:** A nondisplay input mode allows data to be entered from the keyboard without being displayed on the screen. A security keylock (special feature) prevents keyboard entry or display of data, and on a communicating 5285, prevents initiation of communications. In addition, a communicating 5285 can exchange identification sequences with the host, which assists the user in controlling access to data. A Magnetic Stripe Reader (special feature) is available which may be used to enter user identification. This assists user program routines in auditing and controlling operator access to data. Also, diskette media can be removed from the system and secured separately.

**Communications:** The Communications Adapter (#2500) operates under stored program control and allows for either SDLC or BSC data link control over a single communications line. The feature allows the 5285 to communicate on a switched point-to-point or non-switched point-to-point or multipoint line at speeds up to 4800 bps. On a multipoint line, the 5285 operates as a tributary station.

The 3270 Emulation Communications Adapter (#3270) provides the same function as #2500 (above) and in addition, provides support for the 5280-3270 Emulation (5708-EM1) licensed program.

Connection to the line is supported by a Line Interface feature.

Operation is half-duplex mode over switched network facilities or half-duplex mode over non-switched (or equivalent private) communications lines which may be duplex or half-duplex facilities.

Switched network support includes manual dial and manual or auto-answer (where the attached modem supports this capability).

The 5285 at each termination (drop point) of a communications line must use the same clocking source (modem or business machine). Units must be set to operate at the same transmission rate, use the same transmission code, and the same two- or four-wire connection to the line. Compatible modems must be used at all terminations on a network.

The 5285 using stored program control communicates using BSC protocol with:

- A System/38 with appropriately configured BSC Adapter and subfeatures (point-to-point only).
- A System/34 equipped with #2500, #3500, or #4500.
- A System/32 equipped with #2074.
- A System/3 equipped with #2074, #2084, or #2094.
- A System/370 via an Integrated Communications Adapter, a 4331 via a Communications Adapter, or a System/370, 303X, or 4300 via a 2701 Data Adapter Unit, or a 3704/3705 Communications Controller with the Network Controller Program (ACF/NCP) or the Partitioned Emulation Program (PEP), any of which are equipped with a binary synchronous communications adapter and appropriate subfeatures.
- A Series/1 equipped with #2074, #2075, #2093/#2094.
- A 3741 Model 2 or 4.



- A 3747 Data Converter equipped with #1660.
- A 5265 communicating model (XX2).
- A 5280 equipped with #2500 or #3270.

The 5285 using stored program control communicates in SNA/SDLC mode with a System/370, 303X, or 4300 via a 3704 or 3705 Communications Controller equipped with appropriate features. See M3704 or M3705 in the *DPD Sales Manual*.

See the IBM 5280 programming pages for a description of the communications program support available, and any special feature requirements. The communications adapters are mutually exclusive and cannot be installed on a 5285 with either an attached auxiliary data station or the Second Application Microprocessor (#6800).

**Problem Determination Procedures:** Significant function has been designed into this unit to provide greater availability to the customer. This has been done through the use of the problem determination procedures and recovery routines that are easily understood and used by the operator. The procedures are described in the *IBM 5280 Machine Verification Manual*, (GA21-9357).

**Customer Set-Up (CSU):** The 5285 is designated Customer Set-Up, and offers customers ease of setup and relocation flexibility. The Customer Set-Up Allowance is two days. For additional information on CSU, refer to the General Information (GI) section of the sales manual. One copy of *IBM 5280 User's Setup Procedures* (GA21-9365) is included with each 5285.

**Customer Responsibility:** The customer is responsible for:

- Adequate site, system, and other vendor preparation.
- Obtaining a firm installation date for the start of communications facilities and services (including any required modems). The IBM Marketing Representative must assure that a firm installation date is established prior to Order Confirmation.
- Providing a desk, counter, or tabletop to support the 5285.
- Receipt, unpacking, and placement of the 5285.
- Installation and maintenance of signal cables and associated parts for attaching a 5222, 5225, 5256, 5281, or 5282 to the 5285.
- The installation and maintenance of common carrier facilities/services. For further information, see M2700 pages and "Teleprocessing" in the General Information section of the sales manual.
- Physical setup, connection of cables to communications lines/modems and IBM devices incorporating protected access areas, modem attenuation setting and checkout in accordance with instructions supplied by IBM.
- To provide an FCC registered protective circuit when attaching an integrated modem to the public switched telephone network. This registered protective circuit should be equivalent to either the CBS type coupler (for manual/automatic answering) or the CDT type coupler (for manual only answering).
- Using and following the 5280 problem determination procedures prior to calling for IBM service.
- Notifying IBM of intent to relocate and following IBM instructions for relocation of the 5285.

- Relocation of the 5285, if required, to allow IBM service access.
- When adding a 5281 or 5282 to the 5285, the customer may have to modify the system configuration specifications. See *IBM 5280 System Control Programming Reference/Operation Manual*, (GC21-7824).
- Disconnecting, packing, and removal to the customer's shipping dock at the time of discontinuance. Removal instructions and packing materials (if required) will be ordered by the Branch Office.

**Publications:** *IBM 5280 General Information*, GA21-9350 and *IBM 5280 Planning and Site Preparation Guide*, GA21-9351.

**Supplies:** For IBM diskettes and magnetically striped and encoded identification cards, see *IRD Sales Manual*.

**AAS Ordering Instructions:** The 5285 is a Computer System.

**SIU = 5285 ID = N10**

**SPECIFY**

1. Voltage (115 V AC, 1-Phase, 60 Hz): #9881 for a standard nonlocking plug (uses customer standard type receptacle) or #9880 for a locking plug (requires customer locking type receptacle).
2. A keyboard must be selected (see "Special Features").
3. Color: Pearl White only (no specify required).
4. Primary host system that will process the data captured by the 5285:

System/3	#9501
System/32	#9502
System/34	#9503
System/38	#9504
Series/1	#9505
Other GSD System	#9506
System/360	#9507
System/370-Model 138 and below	#9508
System/370-Model 145 and above	#9509
3031, 3032, 3033	#9510
4331, 4341	#9511
8100	#9512
Other DPD System	#9513
Non-IBM System	#9514
Host System Unknown	#9515
No Host System	#9516

5. Communications Cable Length (with #2500 or #3270): Required when attaching the 5285 to the communications facility. #9010 for a 6 meter (20 foot) cable or #9015 for a 12 meter (40 foot) cable. Specify this cable length only once per system.

**SPECIAL FEATURES**

**Keyboard (#4600, #4601, #4602, #4603):** One of the following must be selected:

#4600: 83-key keyboard with the EBCDIC character set, typewriter-like layout, movable, with 49 alphameric keys, 24 function keys, and 10-key numeric pad.

#4601: 66-key data entry style keyboard, movable, with 36 alphameric keys, and 30 function keys.

#4602: 66-key data entry style keyboard with proof arrangement, movable, with 36 alphameric keys, and 30



function keys. The numeric keys are arranged similar to those of an adding machine.

**#4603:** 83-key keyboard with ASCII character set, typewriter-like layout, movable, with 49 alphanumeric keys, 24 function keys, and 10-key numeric pad.

**Maximum:** One of the above.

**Optional 960-Character Display Size (#3500):** Provides a maximum display capacity of 960 characters with 12 lines of 80 characters each. This feature or the Optional 1920-Character Display Size (#3505) is required for the 5280 Communications Utilities Licensed Program (5708-DC1). **Limitations:** Cannot be installed with Optional 1920-Character Display Size (#3505) or with Auxiliary Data Station Attachment (#1200, #1210, or #1215). **Maximum:** One.

**Optional 1920-Character Display Size (#3505):** Provides a maximum display capacity of 1920 characters with 24 lines of 80 characters each. This feature or the Optional 960-Character Display Size (#3500) is required for the 5280 Communications Utilities Licensed Program (5708-DC1). **Limitations:** Cannot be installed with Optional 960-Character Display Size (#3500) or with Auxiliary Data Station Attachment (#1200, #1205, #1215, or #1220). **Maximum:** One.

**Twinax Printer Attachment (#1150):** To attach one 5225 Printer Model 1, 2, 3, or 4, or one 5256 Printer Model 1, 2, or 3. Attachment is by twinax cable. The maximum cable length is 1525 meters (5000 feet). **Limitations:** Only one printer can be attached to a 5285. Cannot be installed with 5222 Printer Attachment (#1152). **Maximum:** One.

**5222 Printer Attachment (#1152):** To attach one 5222 Printer. Attachment is by a double twisted pair cable. A 6 meter (20 foot) cable is provided with the printer. An extension cable accessory is available to provide a total cable length of up to 61 meters (200 feet) (see M5222 "Accessories"). **Limitations:** Only one printer can be attached to a 5285. Cannot be installed with Twinax Printer Attachment (#1150). **Maximum:** One.

**Auxiliary Data Station Attachment (#1200, #1205, #1210, #1215, #1220):** To attach one 5281 Data Station or one 5282 Dual Data Station to a noncommunicating 5285. *This feature also determines the display size of the auxiliary data station.* The 5281 or 5282 must have the same display size(s) as the 5285. Attachment is by cable (see M5281 or M5282 "Accessories"). The maximum cable length is 61 meters (200 feet). Only one feature may be selected.

**#1200:** To attach one 5281 Data Station with a display size of 480 characters. **Limitations:** Cannot be installed with Optional 960-Character Display Size (#3500) or Optional 1920-Character Display Size (#3505).

**#1205:** To attach one 5281 Data Station with a display size of 960 characters. **Prerequisite:** Optional 960-Character Display Size (#3500).

**#1210:** To attach one 5281 Data Station with a display size of 1920 characters. **Prerequisite:** Optional 1920-Character Display Size (#3505).

**#1215:** To attach one 5282 Dual Data Station with display sizes of 480 characters. **Limitation:** Cannot be installed with Optional 960-Character Display Size (#3500) or Optional 1920-Character Display Size (#3505).

**#1220:** To attach one 5282 Dual Data Station with display sizes of 960 characters. **Prerequisite:** Optional 960-Character Display Size (#3500).

**Maximum:** One of the above. **Limitation:** Cannot be installed with the communications adapters (#2500 or #3270).

**Remote Diskette Drive Attachment (#1240):** Required if an attached 5281 Data Station or 5282 Dual Data Station has either one or two diskette drives. A cable is required (see M5281 or M5282 "Accessories"). **Prerequisite:** Auxiliary Data Station Attachment (#1200, #1205, #1210, #1215, or #1220). **Maximum:** One.

**Magnetic Stripe Reader (#4950):** Provides the capability of reading numeric encoded information from a magnetic stripe on a wide range of credit cards, identification cards and documents. The magnetic stripe may be encoded with up to 128 ABA numeric characters, including control characters. This feature enhances system data security by providing the ability to read an operator identification card without being displayed. See *IRD Sales Manual* for magnetically striped and encoded identification cards. **Limitations:** Valid for numeric-only data. Cannot be installed with the Elapsed Time Counter (#3610). **Prerequisite:** Magnetic Stripe Reader Adapter/Elapsed Time Counter (#4955 or #4960). **Maximum:** One.

**Elapsed Time Counter (#3610):** Used to measure elapsed real time. It is required for SNA operations under the 5280 Communications Utilities (5708-DC 1) and 5280—3270 Emulation (5708-EM1) Licensed Programs. It is required by DE/RPG (5708-DE1) and the Key Entry Utility (part of the 5280 Utilities—5708-UT1) if the user desires to maintain the elapsed time production statistic. **Limitation:** Cannot be installed with the Magnetic Stripe Reader Adapter/Elapsed Time Counter (#4955) or (#4960). **Maximum:** One.

**Magnetic Stripe Reader Adapter/Elapsed Time Counter (#4955, #4960):** Provides the Elapsed Time Counter and control for from one to three Magnetic Stripe Readers (#4950). The Elapsed Time Counter is used to measure elapsed real time.

**#4955:** For a noncommunicating 5285, provides the Elapsed Time Counter and control for up to three Magnetic Stripe Readers (#4950) on the 5285 and on an attached 5281 Data Station or 5282 Dual Data Station. The Elapsed Time Counter is required by DE/RPG (5708-DE1) and the Key Entry Utility (part of 5280 Utilities—5708-UT1) if the user desires to maintain the elapsed time production statistic. **Limitations:** Cannot be installed with the Elapsed Time Counter (#3610), the Communications Adapter (#2500) or the 3270 Emulation Communications Adapter (#3270).

**#4960:** For a communicating 5285, provides the Elapsed Time Counter and control for one Magnetic Stripe Reader (#4950). The Elapsed Time Counter is required for SNA operations under the 5280 Communications Utilities (5708-DC1) and 5280—3270 Emulation (5708-EM1) Licensed Programs. It is required by DE/RPG (5708-DE1) and the Key Entry Utility (part of the 5280 Utilities—5708-UT1) if the user desires to maintain the elapsed time production statistic. **Limitations:** Cannot be installed with the Elapsed Time Counter (#3610) or the Auxiliary Data Station Attachment (#1200, #1205, #1210, #1215, or #1220). **Prerequisite:** Communications Adapter (#2500) or 3270 Emulation Communications Adapter (#3270).



**Maximum:** One of the above.

**Security Keylock (#6340):** Provides a single, key-operated switch with three positions for controlling operations on the 5285 and on an attached 5281 Data Station or 5282 Dual Data Station:

"Lock" position prevents operator entry and display of data and prevents initiation of communications.

"Local" position allows operator entry and display of data.

"Normal" position allows initiation of communications in addition to operator entry and display of data.

Two unique keys are provided: One allows selection of "Lock"/"Local"; the other allows selection of "Lock"/"Normal". On a noncommunicating 5285, both operating positions ("Local" and "Normal") provide "Local" position operation. **Maximum:** One.

**Second Application Microprocessor (#6800):** A microprocessor which performs identical function and operates concurrently with the first (base) application microprocessor. This feature provides more processing power and is designed as an aid to performance improvement in a multiprogramming environment which has heavy processor utilization. **Limitation:** Cannot be installed with the Communications Adapter (#2500) or the 3270 Emulation Communications Adapter (#3270). **Maximum:** One.

**Communications Adapter (#2500):** Required to attach a communications line via appropriate interface or modem. In conjunction with stored program control, this feature permits the 5285 to function on a switched or non-switched public, or private communications line. The adapter provides both BSC and SDLC. The proper line protocol is enabled at program execution time. The adapter also provides a 1200 bps clocking capability for use with the 1200 bps Integrated Modem (#5500, #5501, #5502, #5507, #5508) or an external modem. A Communications Utilities (5708-DC1) parameter activates this capability. **Limitation:** Cannot be installed with Auxiliary Data Station Attachment (#1200, #1205, #1210, #1215, or #1220) or the Second Application Microprocessor (#6800) or the 3270 Emulation Communications Adapter (#3270). **Prerequisites:** [1] A line interface special feature consisting of one of the 1200 bps Integrated Modems (#5500, #5501, #5502, #5507, or #5508), EIA Interface (#3701) or DDS Adapter (#5650 or #5651) must be ordered; [2] See the Programming section of the sales manual for 5280 Communications Utilities Licensed Program (5708-DC1) minimum system and feature requirements. See "Specify" for required communications cable length. See "Additional Communications Information" for Mandatory Specify Codes. **Maximum:** One.

**3270 Emulation Communications Adapter (#3270):** Supports the 5280—3270 Emulation (5708-EM1) licensed program, and in conjunction with stored program control, permits the 5285 to function on a switched or nonswitched public or private communications line. This adapter is required to attach to a communications line via the appropriate interface or modem and provides both BSC and SDLC. The proper line protocol is enabled at program execution time. The adapter also provides a 1200 bps clocking capability for use with the 1200 bps Integrated Modem (#5500, #5501, #5502, #5507, #5508) or an external modem. A Communications Utilities (5708-DC1) parameter activates this capability. Keyboard interpretation functions are provided in support of the 5280—3270 Emulation licensed program. **Limitation:** Cannot be installed with Communications Adapter (#2500), Auxiliary

Data Station Attachment (#1200, #1205, #1210, #1215, or #1220), or the Second Application Microprocessor (#6800). **Prerequisites:** [1] A line interface special feature consisting of one of the 1200 bps Integrated Modems (#5500, #5501, #5502, #5507, or #5508), EIA Interface (#3701), or DDS Adapter (#5650 or #5651) must be ordered; [2] Optional 1920-Character Display Size (#3505); [3] See the programming section of the sales manual for 5280 Communications Utilities (5708-DC1) and 5280-3270 Emulation (5708-EM1) minimum system and feature requirements. See "Specify" for required communications cable length. See Additional Communications Information for Mandatory Specify Codes. **Maximum:** One

#### Line Interfaces

One of the following line interface features must be ordered for the type of communication facility and modem to be used.

**EIA Interface (#3701):** Provides the appropriate cable and interface logic necessary to attach an external modem (either an IBM or non-IBM modem meeting RS-232C characteristics). Non-IBM modems may be attached subject to the Multiple Suppliers System Policy. **Limitation:** Cannot be installed with Digital Data Service (DDS) Adapter feature (#5650 or #5651) or 1200 bps Integrated Modem (#5500, #5501, #5502, #5507, #5508). **Prerequisites:** Communications Adapter (#2500) or 3270 Emulation Communications Adapter (#3270) and Power Supply Expansion (#5810). **Maximum:** One.

**Digital Data Service (DDS) Adapter (#5650 for Point-to-Point Operation...#5651 for Multipoint Operation):** An adapter for SDLC or BSC data transmission at speeds of 2400 or 4800 bps over AT & T non-switched Data-Phonet digital data service. The DDS Adapter provides the appropriate cable and interface to the DDS channel service unit, the customer site termination of the DDS network.

The DDS Adapter may also be used to locally connect a 5285 to another supported device which has a compatible DDS Adapter. This connection requires a special DDS Adapter Connector (see "Accessories") and supports point-to-point connections only. The maximum length of the connection is the sum of the modem cable lengths supported by the two devices. No modem or channel service unit is required. **Limitation:** Cannot be installed with EIA Interface (#3701) or 1200 bps Integrated Modem (#5500, #5501, #5502, #5507, or #5508). **Prerequisite:** Communications Adapter (#2500) or the 3270 Emulation Communications Adapter (#3270). **Maximum:** One.

**1200 bps Integrated Modem (#5500, #5501, #5502, #5507, #5508):** A modem for SDLC or BSC data transmission at 600/1200 bps over non-switched or switched facilities. Half-speed operation at 600 bps is indicated via a 5280 Communications Utilities (5708-DC1) parameter. Available in five different versions: #5500—non-switched, #5501—switched with auto-answer, #5502—switched without auto-answer, #5507—non-switched with Switched Network Backup manual answer capability, and #5508—non-switched with Switched Network Backup Auto-answer capability. The non-switched versions (#5500, #5507, #5508) provide a cable for attachment directly to a non-switched (2 or 4-wire) line, Type 3002. The switched with auto-answer versions (#5501 and #5508) provide a cable for attachment to the switched network via an FCC registered protective circuitry of the CBS type (or equivalent) provided by the user. The switched with manual answer versions (#5502 and #5507) provide a cable for

† Trademark of American Telephone and Telegraph Co (AT & T)



attachment to the switched network via an FCC registered protective circuitry of the CDT type (or equivalent) provided by the user. The devices communicating with the 5285 must also be equipped with a compatible 1200 bps modem. Limitation: Cannot be installed with EIA Interface (#3701) or Digital Data Service (DDS) Adapter (#5650 or #5651). Prerequisites: Communications Adapter (#2500) or the 3270 Emulation Communications Adapter (#3270). Power Supply Expansion (#5810) is required for #5501 and #5508. Maximum: One.

Power Supply Expansion (#5810): Additional power for communications. Required for EIA Interface (#3701) and 1200 bps Integrated Modem (#5501 and #5508). Maximum: One.

Additional Communications Information

Mandatory Specify Codes for Communications: One selection must be specified from each of the following tables. Entries selected from Tables E and F will be used to preset hardware functions during manufacture. Selection from each of the other tables should be based on prime usage.

Table A — Line Control

Table with 2 columns: Line Control type and code. BSC #9400, SDLC #9401

Table B — Transmission Code

Table with 2 columns: Transmission Code type and code. EBCDIC #9060, ASCII #9061

Table C — Prime Usage

Table with 2 columns: Prime Usage type and code. System/360 3031 or S/370 #9570, Mdl 138 & Below 3032, 3033, or S/370 #9277, Mdl 145 & Up #9278, 4300 #9596, Series/1 #9599, S/3 #9580, S/32 #9591, S/34 #9593, S/38 #9594, 3740/3747 #9579, 5260 #9600, 5280 #9598, Other IBM #9275, Non-IBM #9276

Table D — Transmission Rate

Table with 2 columns: Transmission Rate type and code. 600 bps #9750, 1200 bps #9751, 2000 bps #9752, 2400 bps #9753, 4800 bps #9754

Table E — Network Attachment

Table with 2 columns: Network Attachment type and code. Point-to-Point (non-switched) #9481, Point-to-Point (switched) #9483, Multipoint Tributary #9482, Local Attach #9485

Table F — Line Facility Attachment

Table with 2 columns: Line Facility Attachment type and code. Duplex (4-wire only) #9391, Half Duplex #9392

Table G — Host Application

Table with 2 columns: Host Application type and code. RJE, MRJE, SRJE #9440, CICS/VS #9441, IMS/VS #9442, Other #9443

IBM Modems: One IBM modem can be attached to the Communications Adapter (#2500) or 3270 Emulation Communications Adapter (#3270). Prerequisite: EIA Interface (#3701).

Table with 2 columns: Modem and Speed (bps). 3863 2400, 3864 4800, 3872 2400/1200, 3874 4800/2400

Note: The 5285 does not support Automatic Call Originate (#1091) on the 3872 or 3874. For communication capabilities, product utilization and special features, see M2700, M3863, M3864, M3872, and M3874 pages.

Customer Responsibilities: The customer must be advised, in writing, of certain responsibilities related to the installation and maintenance of common carrier facilities/services as well as the IBM equipment. For further information, see M2700 pages and "Teleprocessing" in the General Information sections of the sales manual.

IBM Data Encryption Devices: An IBM 3845 or 3846 Data Encryption Device may be attached between the 5285 Communications Adapter and the external modem. Prerequisite: EIA Interface (#3701).

Note: Refer to M2700, M3845, and M3846 pages for information on 3845 or 3846 configuration and communication capability. The IBM 3845 or 3846 device operating with SDLC will not operate with NRZI transmission mode.

Communications References

- See the System Programming pages of the DP Sales Manual for possible restrictions with DP products.
See M2700 pages for additional information concerning modems, communications facility, machine attachment requirements, terminal intermix, operating capabilities, and customer responsibilities.
Refer to the IBM Data Communications Handbook ZZ20-1939 for information concerning external modems attachable to the IBM 5285 Communications Adapter. This handbook also contains information related to common carrier facilities and tariffs.
Refer to the IBM 5280 Planning and Site Preparation Guide, GA21-9351 for physical planning information.

Communications Cable: A communications cable length is required. See "Specify."

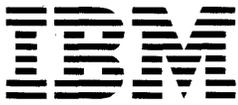
ACCESSORIES

Keylock, Keys: The 5285 with Security Keylock #6340 is shipped with two unique keys. Additional keys may be purchased from IBM. (Vendor will supply additional keys only to original purchaser.) With each order of quantity of one, the customer receives two keys (one key of each type). Order via MSORDER (Category = Accessories/Supplies) (Group Code = DP Supply Order) on AAS. Key identification numbers must accompany each order. Specify P/N 4177799. Allow 6 to 8 weeks for delivery.



**DDS Adapter Connector:** A specially designed connector allows the cable from a 5285 DDS Adapter to be connected to the cable of another supported device which has a compatible DDS Adapter. This provides for the local connection of two devices without the use of any modems or channel service units. Only one DDS Adapter Connector is required per connection. The maximum length of the connection is the sum of the modem cable lengths of the two devices. This is a purchase only item. Order via MSORDER (Category = Accessories/Supplies; Group Code = DP Supply Order) on AAS. Specify P/N 4236967. Allow 6 to 8 weeks for delivery. **Maximum:** One per connection. **Field Installable:** Yes.

**Display Screen Filter (#3300):** An optically coated glass filter which attaches to the display, specifically designed to aid operator comfort by reducing reflected glare and providing improved display readability. Character contrast may also be enhanced. The filter is a CSU accessory. For shipment with the machine, order by feature number on AAS. For shipment to the field, order by feature number via MSORDER on AAS.



5286 DUAL PROGRAMMABLE DATA STATION

Purpose: A dual, tabletop, programmable keyboard/display station with standard controller and diskette capability for data entry and associated processing. Part of the IBM 5280 Distributed Data System.

Models:

Model	Main Storage	Diskette	
		Diskette 1	Diskette 2D
A02	32K	2	0
A10	32K	0	2
B02	48K	2	0
B10	48K	0	2
C02	64K	2	0
C10	64K	0	2
D02	96K	2	0
D10	96K	0	2

Model Changes: Field Installable. All features may be field installed.

Purchase Considerations

1. The upgrade purchase prices for model changes may be greater than the purchase price differentials. The customer should carefully evaluate his future requirements when purchasing a system.
2. Replaced parts from any model change become the property of IBM.
3. Replaced parts from any Special Feature installation or removal remain the property of the customer.

Notes

1. Device Attachments: Appropriate special features are required to attach an auxiliary data station (5281 or 5282) and some I/O units ... see "Special Features."
2. IBM 5280 System Control Programming (5708-SC1) should be ordered at equipment order entry time.
3. For physical planning information, see *IBM 5280 Planning and Site Preparation Guide*, GA21-9351.

Highlights:

- Single, split-screen CRT display with two keyboards.
- Functions as two independent programmable data stations.
- Provides two operator positions; each with keyboard, diskette, and display area.
- Multiple microprocessors provide processing and independent I/O control.
- Stored program function.
- Multiprogramming capability with multiple main storage partitions.
- Powerful and extensive data editing function.
- Multi-chip technology and compact diskette drives allow compact, tabletop system packaging.
- Diskette drives housed within the 5286 support either IBM diskette 1 or IBM diskette 1, 2, and 2D and provide up to 2.4M bytes of storage capacity.
- Movable keyboards have palm rest for operator comfort.
- 480-character display size at each operator position.

- Additional data station capability and diskette capacity available with attachment of a 5281 Data Station or a 5282 Dual Data Station.
- Security features for data asset protection.
- Independent data station operation through multiprogramming and system resource sharing.

5286 Components

Controller: Provides processing capability, control, main storage, and optional auxiliary data station capability. Controls all functions of the 5286 and an optionally attached 5281 Data Station or 5282 Dual Data Station. Multiple microprocessor architecture allows processing and I/O operations (diskette, keyboard/display) to operate independently.

The 5286 provides 32K of main storage capacity that can be expanded to a maximum of 96K. Multiprogramming capability is available through partitioned memory. The number of partitions and their size (6K minimum) are user-specified with a facility provided in 5280 System Control Programming (5708-SC1).

Display: Displays up to 480 characters at each operator position...six lines of 80 characters. Characters are presented within an 8x16 dot matrix. The standard, upper/lower case, 94-character EBCDIC character set, 94-character ASCII character set, and the 185-character Multinational Character Set are included (see Type Catalog). The character set is user-selectable. Both operator positions must use the same character set.

Extended highlighting provides screen attributes such as reverse image, high intensity, blink, underline, nondisplay, and column separator. Screen attributes are under program control and can be applied on a field basis. Brightness and contrast controls are provided. Each control affects both operator positions.

Keyboards: A choice of three keyboard types provide input flexibility to meet individual user requirements: data entry, data entry with proof arrangement, and typewriter (see "Special Features" below). Both 5286 keyboards must be the same type. The keyboards are movable and have a palm rest for operator comfort. See Type Catalog for keyboard layout.

Each keyboard has cursor movement keys, special function keys, field exit keys, and data keys (alphabetic and numeric). All data keys are typamatic. The keyboards contain only a subset of the characters in the Multinational Character Set. When the Multinational Character Set is used, the additional characters may be entered via multiple key sequence.

Typewriter keyboards provide for direct entry of upper and lowercase characters. Data entry keyboards provide for direct entry of lowercase only. Lowercase characters may be entered via multiple key sequence.

Diskette: Two types of compact diskette drives are available with the 5286: a diskette drive which can read/write IBM diskette 1 and a diskette drive which can read/write IBM diskette 1, 2, and 2D. Capacity per drive ranges from .25M bytes to 1.2M bytes. The formats for the diskettes are:

Diskette 1

Format	Bytes/Sector	Capacity
1	128	246KB*
2	256	284KB
3	512	303KB



**Diskette 2**

Format	Bytes/Sector	Capacity
4	128	492KB
5	256	568KB
6	512	606KB

**Diskette 2D**

Format	Bytes/Sector	Capacity
7	256	985KB
8	512	1136KB
9	1024	1212KB

\*243KB when used for Basic Exchange

For diskette data exchange with other systems, the following exchange types are supported: Basic Exchange (Formats 1 and 4 above), H Exchange (Format 7 above), and I Exchange (all of the above formats). Diskettes can be interchanged with other IBM systems and devices which support a compatible diskette exchange type. Examples are the IBM System/3, System/32, System/34, System/38, Series/1, System/370, 303X, 4300, 3540, 3740, 3747, 3770, 3790, 5110, 5230, 5260, and 8100.

The instantaneous data transfer rate using IBM diskette 1 or 2 is 31.2K bytes/sec; for IBM diskette 2D: 62.5K bytes/sec. Rotational speed of both types of drives is 360 RPM. Diskette read or write is overlapped with seek. Diskette operations are overlapped with processing and other I/O device operations.

**Auxiliary Data Station:** One 5281 Data Station or 5282 Dual Data Station can be attached to the 5286 (see "Special Features" below). The 5281 or 5282 is cable attached at a maximum distance of 61 meters (200 feet). The 5286 provides control and main storage in support of the auxiliary data station. Each keyboard/display (including the 5286) is assigned to a separate partition and operates independently. Each diskette drive on the 5286 and attached data station is available to any program and any keyboard/display. *The auxiliary data station must have the same display size(s) (480-character) as the 5286.* The auxiliary data station display size(s) is determined by the Auxiliary Data Station Attachment (special feature) on the 5286.

**Security:** A nondisplay input mode allows data to be entered from the keyboard without being displayed on the screen. A security keylock (special feature) prevents keyboard entry or display of data. A Magnetic Stripe Reader (special feature) is available which may be used to enter user identification. This assists user program routines in auditing and controlling operator access to data.

**Problem Determination Procedures:** Significant function has been designed into this unit to provide greater availability to the customer. This has been done through the use of the problem determination procedures and recovery routines that are easily understood and used by the operator. The procedures are described in the *IBM 5280 Machine Verification Manual*, (GA21-9357).

**Customer Set-Up (CSU):** The 5286 is designated Customer Set-Up and offers customers ease of setup and relocation flexibility. The Customer Set-Up Allowance is two days. For additional information on CSU, refer to the General Information (GI) section of the sales manual. One copy of *IBM 5280 User's Setup Procedures* (GA21-9365) is included with each 5286.

**Customer Responsibility:** The customer is responsible for:

- Adequate site, system, and other vendor preparation.
- Providing a desk, counter, or tabletop to support the 5286.
- Receipt, unpacking, and placement of the 5286.
- Installation and maintenance of signal cables and associated parts for attaching a 5281 or a 5282 to the 5286.
- Physical setup, switch setting, and checkout in accordance with instructions provided by IBM.
- Using and following the 5280 problem determination procedures prior to calling for IBM service.
- Notifying IBM of intent to relocate and following IBM instructions for relocation of the 5286.
- Relocation of the 5286, if required, to allow IBM service access.
- When adding a 5281 or 5282 to the 5286, the customer may have to modify the system configuration specifications. See *IBM 5280 System Control Programming Reference/Operation Manual* (GC21-7824).
- Disconnecting, packing, and removal to the customer's shipping dock at the time of discontinuance. Removal instructions and packing materials (if required) will be ordered by the Branch Office.

**Publications:** *IBM 5280 General Information*, GA21-9350 and *IBM 5280 Planning and Site Preparation Guide*, GA21-9351.

**Supplies:** For IBM diskettes and magnetically striped and encoded identification cards, see *IRD Sales Manual*.

**AAS Ordering Instructions:** The 5286 is a Computer System.

SIU = 5286 ID = N20

**SPECIFY**

1. Voltage (115 V AC, 1-Phase, 60 Hz): #9881 for a standard nonlocking plug (uses customer standard type receptacle) or #9880 for a locking plug (requires customer locking type receptacle).
2. Two keyboards must be selected (see "Special Features").
3. Color: Pearl White only (no specify required).
4. Primary host system that will process the data captured by the 5286:

System/3	#9501
System/32	#9502
System/34	#9503
System/38	#9504
Series/1	#9505
Other GSD System	#9506
System/360	#9507
System/370-Model 138 and below	#9508
System/370-Model 145 and above	#9509
3031, 3032, 3033	#9510
4331, 4341	#9511
8100	#9512
Other DPD System	#9513
Non-IBM System	#9514
Host System Unknown	#9515
No Host System	#9516

**SPECIAL FEATURES**

**Keyboard (#4600, #4601, #4602, #4603):** Two of the following must be selected. Both must be the same type.

#4600: 83-key keyboard with the EBCDIC character set, typewriter-like layout, movable, with 49 alphameric keys, 24 function keys, and 10-key numeric pad.

#4601: 66-key data entry style keyboard, movable, with 36 alphameric keys, and 30 function keys.

#4602: 66-key data entry style keyboard with proof arrangement, movable, with 36 alphameric keys, and 30 function keys. The numeric keys are arranged similar to those of an adding machine.

#4603: 83-key keyboard with ASCII character set, typewriter-like layout, movable, with 49 alphameric keys, 24 function keys, and 10-key numeric pad.

**Maximum:** Two of the above.

**Auxiliary Data Station Attachment (#1200, #1215):** To attach one 5281 Data Station or one 5282 Dual Data Station. Attachment is by cable (see M5281 or M5282 "Accessories"). The maximum cable length is 61 meters (200 feet). Only one feature may be selected.

#1200: To attach one 5281 Data Station with a display size of 480 characters.

#1215: To attach one 5282 Dual Data Station with display sizes of 480 characters.

**Maximum:** One of the above.

**Remote Diskette Drive Attachment (#1240):** Required if an attached 5281 Data Station or 5282 Dual Data Station has either one or two integrated diskette drives. A cable is required (see M5281 or M5282 "Accessories"). **Prerequisite:** Auxiliary Data Station Attachment (#1200 or #1215). **Maximum:** One.

**Magnetic Stripe Reader (#4950):** Provides the capability of reading numeric encoded information from a magnetic stripe on a wide range of credit cards, identification cards, and documents. The magnetic stripe may be encoded with up to 128 ABA numeric characters, including control characters. This feature enhances system data security by providing the ability to read an operator identification card without being displayed. See *IRD Sales Manual* for magnetically striped and encoded identification cards. **Limitations:** Valid for numeric-only data. If only one Magnetic Stripe Reader is used with the 5286, it will be assigned to and can only be used in conjunction with the keyboard located on the side of the 5286 which has the power switch. **Prerequisite:** Magnetic Stripe Reader Adapter/Elapsed Time Counter (#4955). **Maximum:** Two.

**Magnetic Stripe Reader Adapter/Elapsed Time Counter (#4955):** Provides the following:

The Magnetic Stripe Reader Adapter provides control for up to four Magnetic Stripe Readers (#4950) on the 5286 and an attached 5281 Data Station or 5282 Dual Data Station.

The Elapsed Time Counter is used to measure elapsed real time. It is required by DE/RPG (5708-DE1) and the Key Entry Utility (part of the 5280 Utilities—5708-UT1) if the user desires to maintain the elapsed time production statistic. **Limitation:** Cannot be installed with the Elapsed Time Counter feature (#3610). **Maximum:** One.

**Elapsed Time Counter (#3610):** Used to measure elapsed real time. It is required by DE/RPG (5708-DE1) and the Key Entry Utility (part of the 5280 Utilities—5708-UT1) if the user desires to maintain the elapsed time production statistic. **Limitation:** Cannot be installed with the Magnetic Stripe Reader Adapter/Elapsed Time Counter (#4955). **Maximum:** One.

**Security Keylock (#6340):** Provides a single, key operated switch for controlling operations on the 5286 and an attached 5281 Data Station or 5282 Dual Data Station. Prevents operator entry and display of data when in a locked position. **Maximum:** One.

**Second Application Microprocessor (#6800):** A microprocessor which performs identical function and operates concurrently with the first (base) application microprocessor. This feature provides more processing power and is designed as an aid to performance improvement in a multiprogramming environment which has heavy processor utilization. **Maximum:** One.

**ACCESSORIES**

**Keylock, Keys:** The 5286 with Security Keylock #6340 is shipped with two unique keys. Additional keys may be purchased from IBM. (Vendor will supply additional keys only to original purchaser.) With each order of quantity of one, the customer receives two keys (one key of each type). Order via MSORDER (Category = Accessories/Supplies) (Group Code = DP Supply Order) on AAS. Key identification numbers must accompany each order. Specify P/N 4177799. Allow 6 to 8 weeks for delivery.



5288 PROGRAMMABLE CONTROL UNIT

Purpose: Provides processing, control, main storage, diskette storage, communications features and device attachment capabilities for the IBM 5280 Distributed Data System. Allows attachment of multiple 5281 Data Stations and/or 5282 Dual Data Stations and 5222, 5225 and 5256 Printers.

Models: 5288 models are available depending on main storage capacity and the type and number of diskette drives. The 3-character model number is determined by combining the alphabetic main storage capacity identifier (ID) with the numeric identifier (ID) for type and number of diskette drives.

To determine model number:

- 1. Select main storage capacity required. Corresponding ID becomes first character of model number.
2. Select type and number of diskette drives required. Corresponding ID becomes last two characters of model number.

Table with columns: Main Storage (ID, Capacity), Diskette (ID, Diskette 1, Diskette 2D). Rows include A (32K), C (64K), D (96K), E (128K), F (160K), H (224K), J (288K) with various diskette configurations.

Example: Main storage capacity required: 64K
Diskette drives required: Two diskette 1 and one diskette 2D
Model number: C07

Model Changes: Field Installable. All features may be field installed.

Purchase Considerations

- 1. The upgrade purchase prices for model changes may be greater than the purchase price differentials. The customer should carefully evaluate his future requirements when purchasing a system.
2. Replaced parts from any model change become the property of IBM.
3. Replaced parts from any Special Feature installation or removal remain the property of the customer.

Notes

- 1. Device Attachments: Appropriate special features are required to attach auxiliary data stations (5281, 5282) and some I/O units ... see "Special Features."
2. IBM 5280 System Control Programming (5708-SC1) should be ordered at equipment order entry time.
3. For physical planning information, see IBM 5280 Planning and Site Preparation Guide, GA21-9351.

Highlights:

- System flexibility allows specification of configuration to meet specific user requirements for data entry, associated processing, and communications.
• Base unit contains controller, main storage, and diskette drive capability.
• Multiple microprocessors provide processing and independent I/O control.
• Stored program function.
• Multiprogramming capability with up to eight main storage partitions.
• Powerful and extensive data editing function.
• Compact diskette drives housed within the 5288 support IBM diskette 1 or IBM diskette 1, 2, and 2D providing up to 4.8M bytes of storage capacity.
• Addition of optional diskette storage capacity within attached 5281 Data Stations and/or 5282 Dual Data Stations provide a total system capacity of eight diskette drives with 9.6M bytes of storage.
• Maximum of four keyboard/displays with attachment of 5281 and/or 5282 data stations.
• Attachment capability for up to eight printers.
• Security features for data asset protection.
• Independent data station operation through multiprogramming and system resource sharing.
• Communications adapters provide both SDLC and BSC capability.
• Communications programming support available for RJE, batch, and interactive communications via SNA/SDLC or BSC.

5288 Components

Controller: Provides processing capability, control, main storage and optional I/O attachments and communications features. Controls all functions of the 5288 and attached 5281 Data Stations, 5282 Dual Data Stations, 5222, 5225 and 5256 Printers. Multiple microprocessor architecture allows processing and I/O operations (e.g., diskette, keyboard/display, communications) to operate independently.

The 5288 provides 32K of main storage that can be expanded to a maximum of 288K. Multiprogramming capability is available through a partitioned memory. The number of partitions (up to eight) and their size (6K to 64K) are user-specified with a facility provided in 5280 System Control Programming (5708-SC1).

Special features provide for the attachment of 5281 and 5282 Data Stations (maximum: four keyboards), and 5222, 5225, and 5256 Printers (maximum: eight printers). The communications adapters (special features) each provide both SDLC and BSC communications under stored program control.

Diskette: Two types of compact diskette drives are available with the 5288: a diskette drive which can read/write IBM diskette 1 and a diskette drive which can read/write IBM diskette 1, 2, and 2D. Capacity per drive ranges from .25M bytes to 1.2M bytes. The formats for the diskettes are:



**Diskette 1**

Format	Bytes/Sector	Capacity
1	128	246KB*
2	256	284KB
3	512	303KB

\*243KB when used for Basic Exchange

**Diskette 2**

Format	Bytes/Sector	Capacity
4	128	492KB
5	256	568KB
6	512	606KB

**Diskette 2D**

Format	Bytes/Sector	Capacity
7	256	985KB
8	512	1136KB
9	1024	1212KB

For diskette data exchange with other systems, the following exchange types are supported: Basic Exchange (Formats 1 and 4 above), H Exchange (Format 7 above), and I Exchange (all of the above formats). Diskettes can be interchanged with other IBM systems and devices which support a compatible diskette exchange type. Examples are the IBM System/3, System/32, System/34, System/38, Series/1, System/370, 303X, 4300, 3540, 3740, 3747, 3770, 3790, 5110, 5230, 5260, and 8100.

The instantaneous data transfer rate using IBM diskette 1 or 2 is 31.2K bytes/sec; for IBM diskette 2D: 62.5K bytes/sec. Rotational speed of both types of drives is 360 RPM. Diskette read or write is overlapped with seek. Diskette operations are overlapped with processing and other I/O device operations.

**Auxiliary Data Stations:** The 5281 Data Station and the 5282 Dual Data Station can be attached to the 5288 in any combination to provide a maximum of 4 keyboards. In Chart A below, all possible combinations are presented. Each vertical column represents a valid combination of machine type quantities. At least one 5281 or 5282 must be attached.

**Chart A**

Machine	Quantity							
	1	2	3	4	1	2	0	0
5281	1	2	3	4	1	2	0	0
5282	0	0	0	0	1	1	1	2

For maintenance purposes, one auxiliary data station (designated as the "First Auxiliary Data Station") must be installed within sight of, and have easy access to, the 5288. This data station is attached via the First Auxiliary Data Station Attachment (special feature). All other data stations are attached via an Auxiliary Data Station Attachment, Additional (special feature). **Each data station requires a separate attachment.** Each data station is cable attached (see M5281 or M5282 "Accessories"). The maximum cable length is 61 meters (200 feet).

The display size (480, 960 or 1920 characters) of attached data stations is determined by the 5288 auxiliary data station attachment (special feature). *All data stations must have the same display size(s).* The 5280 Communications Utilities licensed program (5708-DC1) requires a display size(s) of 960 or 1920 characters.

Each attached 5281 or 5282 can have zero, one or two diskette drives. These drives are designated "remote" (from the 5288). A cable is required (see M5281 or M5282 "Accessories").

The maximum number of diskette drives on a 5288 system is eight, in any combination of diskette 1 and diskette 2D drives. If the base 5288 contains one or two drives, the maximum number of remote drives is six. If the base 5288 contains three or four drives, the maximum number of remote drives is four.

Remote diskette drives are attached via a Remote Diskette Drive Attachment (#1300, #1301, or #1302). Chart B below presents all valid diskette drive quantity and location combinations with respective special feature attachment requirements.

**Chart B**

These Combinations	Require	These Special Features*		
		Number of Drives		
		Base 5288	Remote	
		#1300	#1301	#1302
1 or 2	0			
1 or 2	1	X		
1 or 2	2	X		
1 or 2	3	X	X	
1 or 2	4	X	X	
1 or 2	5	X	X	X
1 or 2	6	X	X	X
3 or 4	0			
3 or 4	1		X	
3 or 4	2		X	
3 or 4	3		X	X
3 or 4	4		X	X

\* Note: If an attachment services two diskette drives, the drives may be in the same or different data stations.

**Printers:** The 5222, 5225, and 5256 Printers are available for attachment to the 5288. A maximum of eight printers can be attached (see "Special Features").

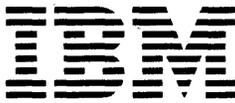
**Security:** A nondisplay input mode on attached 5281 Data Stations and 5282 Dual Data Stations allows data to be entered from the keyboard without being displayed on the screen. A Security Keylock (special feature) prevents keyboard entry or display of data on all auxiliary data stations and, on a communicating 5288, prevents initiation of communications. In addition, a communicating 5288 can exchange identification sequences with the host, which assists the user in controlling access to data. A Magnetic Stripe Reader (special feature) is available for the 5281 and 5282 which may be used to enter user identification. This assists user program routines in auditing and controlling operator access to data.

**Communications:** The Communications Adapter (#2500) operates under stored program control and allows for either SDLC or BSC data link control over a single communications line. This feature allows the 5288 to communicate on a switched point-to-point, non-switched point-to-point or multipoint line at speeds up to 4800 bps. On a multipoint line, the 5288 operates as a tributary station.

The 3270 Emulation Communications Adapter (#3270) provides the same function as #2500 (above) and in addition, provides support for the 5280—3270 Emulation (5708-EM1) licensed program.

Connection to the line is supported by a Line Interface feature.

Operation is half-duplex mode over switched network facilities, or half-duplex mode over non-switched (or equivalent private) communications lines which may be duplex or half-duplex facilities.



Switched network support includes manual dial and manual or auto-answer (where the attached modem supports this capability).

The 5288 at each termination (drop point) of a communications line must use the same clocking source (modem or business machine). Units must be set to operate at the same transmission rate, use the same transmission code and the same two or four-wire connection to the line. Compatible modems must be used at all terminations on a network.

The IBM 5288 using stored program control communicates using BSC protocol with:

A System/38 with appropriately configured BSC adapter and subfeatures (point-to-point only).

A System/34 equipped with #2500, #3500, or #4500.

A System/32 equipped with #2074.

A System/3 equipped with #2074, #2084, or #2094.

A System/370 via an Integrated Communications Adapter, a 4331 via a Communications Adapter, or a System/370, 303X, or 4300 via a 2701 Data Adapter Unit, or a 3704/3705 Communications Controller with the Network Control Program (ACF/NCP) or the Partitioned Emulation Program (PEP), any of which are equipped with a binary synchronous communications adapter and appropriate subfeatures.

A Series/1 equipped with #2074, #2075, #2093/#2094.

A 3741 Model 2 or 4.

A 3747 Data Converter equipped with #1660.

A 5265 communicating model (XX2).

A 5280 equipped with #2500 or #3270.

The IBM 5288 using stored program control communicates in SNA/SDLC mode with a System/370, 303X, or 4300 via a 3704 or 3705 Communications Controller equipped with appropriate features. See M3704 or M3705 in the *DPD Sales Manual*.

See the IBM 5280 programming pages for a description of the communications program support available and any special feature requirements.

**Problem Determination Procedures:** Significant function has been designed into this unit to provide greater availability to the customer. This has been done through the use of the problem determination procedures and recovery routines that are easily understood and used by the operator. The procedures are described in the *IBM 5280 Machine Verification Manual*, (GA21-9357).

**Customer Set-Up (CSU):** The 5288 is designated Customer Set-Up, and offers customers ease of setup and relocation flexibility. The Customer Set-Up Allowance is two days. For additional information on CSU, refer to the General Information (GI) section of the sales manual. One copy of *IBM 5280 User's Setup Procedures* (GA21-9365) is included with each 5288.

**Customer Responsibility:** The customer is responsible for:

- Adequate site, system, and other vendor preparation.
- Obtaining a firm installation date for the start of communication facilities and services (including any required modems). The IBM Marketing Representative must assure that a firm installation date is established prior to Order Confirmation.

- Receipt, unpacking, and placement of the 5288.
- Installation and maintenance of signal cables and associated parts for attaching a 5222, a 5225, a 5256, a 5281, or a 5282 to the 5288.
- The installation and maintenance of common carrier facilities/services. For further information, see M2700 pages and "Teleprocessing" in the General Information (GI) section of the sales manual.
- Physical setup, connection of cables to communications lines/modems and IBM devices incorporating protected access areas, modem attenuation setting and checkout in accordance with instructions supplied by IBM.
- Using and following the 5280 problem determination procedures prior to calling for IBM service.
- Notifying IBM of intent to relocate and following IBM instructions for relocation of the 5288.
- Relocation of the 5288, if required, to allow IBM service access.
- When adding a 5281 or 5282 to the 5288, the customer may have to modify the system configuration specifications. See *IBM 5280 System Control Programming Reference/Operation Manual*, (GC21-7824).
- Disconnecting, packing, and removal to the customer's shipping dock at the time of discontinuance. Removal instructions and packing materials (if required) will be ordered by the Branch Office.

**Publications:** *IBM 5280 General Information*, GA21-9350 and *IBM 5280 Planning and Site Preparation Guide*, GA21-9351.

**Supplies:** For IBM diskettes, see *IRD Sales Manual*.

**Minimum Configuration:** Any model of the 5288 with one 5281 Data Station or one 5282 Dual Data Station.

**AAS Ordering Instructions:** The 5288 is a Computer System.

**SIU = 5288 ID = N30**

**SPECIFY**

1. Voltage (115 V AC, 1-Phase, 60 Hz): #9881 for a standard nonlocking plug (uses customer standard type receptacle) or #9880 for a locking plug (requires customer locking type receptacle).
2. Color: Pearl White only (no specify required).
3. Primary host system that will process the data captured by the 5288:

System/3	#9501
System/32	#9502
System/34	#9503
System/38	#9504
Series/1	#9505
Other GSD System	#9506
System/360	#9507
System/370-Model 138 and below	#9508
System/370-Model 145 and above	#9509
3031, 3032, 3033	#9510
4331, 4341	#9511
8100	#9512
Other DPD System	#9513
Non-IBM System	#9514
Host System Unknown	#9515
No Host System	#9516



4. Communications Cable Length (with #2500 or #3270): Required for attaching the 5288 to the communications facility. #9010 for a 6 meter (20 foot) cable or #9015 for a 12 meter (40 foot) cable. Specify this cable length only once per system.

#### SPECIAL FEATURES

**First Auxiliary Data Station Attachment (#1245, #1250, #1255, #1260, or #1265):** to attach the first auxiliary data station (5281 Data Station or 5282 Dual Data Station). *This feature also determines the display size of the auxiliary data station.* All data stations must have the same display size(s). Attachment is by cable (see M5281 or M5282 "Accessories"). The maximum cable length is 61 meters (200 feet). One feature must be selected.

#1245: To attach one 5281 Data Station with a display size of 480 characters. **Limitation:** Cannot be installed with Auxiliary Data Station Attachment, Additional (#1275, #1280, or #1290).

#1250: To attach one 5281 Data Station with a display size of 960 characters. **Limitation:** Cannot be installed with Auxiliary Data Station Attachment, Additional (#1270, #1280, or #1285).

#1255: To attach one 5281 Data Station with a display size of 1920 characters. **Limitation:** Cannot be installed with Auxiliary Data Station Attachment, Additional (#1270, #1275, #1285, or #1290).

#1260: To attach one 5282 Dual Data Station with display sizes of 480 characters. **Limitation:** Cannot be installed with Auxiliary Data Station Attachment, Additional (#1275, #1280, or #1290).

#1265: To attach one 5282 Dual Data Station with display sizes of 960 characters. **Limitation:** Cannot be installed with Auxiliary Data Station Attachment, Additional (#1270, #1280, or #1285).

**Maximum:** One of the above.

**Auxiliary Data Station Attachment, Additional (#1270, #1275, #1280, #1285, #1290):** To attach one 5281 Data Station or one 5282 Dual Data Station. *This feature also determines the display size of the auxiliary data station.* All data stations must have the same display size(s). The 5281 and 5282 can be attached in any combination to provide a maximum of four keyboards. See Chart A above for valid combinations of machine type quantities. Attachment is by cable. The maximum cable length is 61 meters (200 feet).

#1270: To attach one 5281 Data Station with a display size of 480 characters. **Limitation:** Cannot be installed with Auxiliary Data Station Attachment, Additional (#1275, #1280, or #1290). **Prerequisite:** First Auxiliary Data Station Attachment (#1245 or #1260).

#1275: To attach one 5281 Data Station with a display size of 960 characters. **Limitation:** Cannot be installed with Auxiliary Data Station Attachment, Additional (#1270, #1280, or #1285). **Prerequisite:** First Auxiliary Data Station Attachment (#1250 or #1265).

#1280: To attach one 5281 Data Station with a display size of 1920 characters. **Limitations:** Cannot be installed with Auxiliary Data Station Attachment, Additional (#1270, #1275, #1285, or #1290). **Prerequisite:** First Auxiliary Data Station Attachment (#1255).

#1285: To attach one 5282 Dual Data Station with display sizes of 480 characters. **Limitation:** Cannot be installed with Auxiliary Data Station Attachment, Additional (#1275, #1280, or #1290). **Prerequisite:** First Auxiliary Data Station Attachment (#1245 or #1260).

#1290: To attach one 5282 Dual Data Station with display sizes of 960 characters. **Limitation:** Cannot be installed with Auxiliary Data Station Attachment, Additional (#1270, #1280, or #1285). **Prerequisite:** First Auxiliary Data Station Attachment (#1250 or #1265).

**Maximum:** Three of the above.

#### Auxiliary Data Station Diskette Drives

Diskette drives housed within a 5281 Data Station or 5282 Dual Data Station are designated as "remote" (from the 5288). Remote diskette drives require the following 5288 attachment special features. If an attachment services two diskette drives, the drives may be in the same or different data stations.

Consult Chart B above for valid diskette drive quantities and location combinations with respective special feature requirements. A cable is required. See M5281 or M5282 "Accessories."

**Remote Diskette Drive Attachment, First (#1300):** Required to attach diskette 1 or diskette 2D drives housed within a 5281 or 5282. When the base 5288 contains one or two diskette drives, this feature is required to attach the first and second remote diskette drives. **Maximum:** One.

**Remote Diskette Drive Attachment, Second (#1301):** Required to attach diskette 1 or diskette 2D drives housed within a 5281 or 5282. When the base 5288 contains one or two diskette drives, this feature is required to attach the third and fourth remote diskette drives. When the base 5288 contains three or four diskette drives, this feature is required to attach the first and second remote diskette drives. **Maximum:** One.

**Remote Diskette Drive Attachment, Third (#1302):** Required to attach diskette 1 or diskette 2D drives housed within a 5281 or 5282. When the base 5288 contains one or two diskette drives, this feature is required to attach the fifth and sixth remote diskette drives. When the base 5288 contains three or four diskette drives, this feature is required to attach the third and fourth remote diskette drives. **Prerequisite:** Remote Diskette Drive Attachment, Second (#1301). **Maximum:** One.

#### Printers

Attachment of the 5222, 5225, and 5256 Printers is provided by one of four special features. Up to eight printers, in any combination, may be attached consistent with special feature limitations. Printer speeds may be affected by the customer's program, application load, forms design and/or the number of printers attached to the system.

**Single Twinax Printer Attachment (#1155):** Provides a single port for the attachment of 5225 (Model 1, 2, 3, or 4) and/or 5256 (Model 1, 2, or 3) printers to a single twinax port. A maximum of seven printers can be attached. The maximum cable length is 1525 meters (5000 feet). **Prerequisite:** If multiple printers are attached, each printer on the cable, except the last, requires a Cable Thru feature (#2680). **Limitation:** Cannot be installed with the Multiple Twinax Printer Attachment (#1160), the Single 5222 Printer Attachment (#1157), or the Multiple 5222/Twinax Printer Attachment (#1162). **Maximum:** One.



**Multiple Twinax Printer Attachment (#1160):** Provides four ports for attaching, via twinax cable, 5225 (Model 1, 2, 3, or 4) and/or 5256 (Model 1, 2, or 3) printers. A maximum of eight printers can be attached. The maximum cable length is 1525 meters (5000 feet). **Prerequisite:** If multiple printers are attached to one port, each printer on the cable, except the last, requires a Cable Thru feature (#2680). **Limitation:** Cannot be installed with the Single Twinax Printer Attachment (#1155), the Single 5222 Printer Attachment (#1157), or the Multiple 5222/Twinax Printer Attachment (#1162). A maximum of seven printers can be attached to a single port (using Cable Thru feature). **Maximum:** One.

**Single 5222 Printer Attachment (#1157):** Provides a single port for the attachment of one 5222 Printer. Attachment is by a double twisted pair cable. A 6 meter (20 foot) cable is provided with the printer. An extension cable accessory is available to provide a total cable length of up to 61 meters (200 feet) (see M5222 "Accessories"). **Limitation:** Cannot be installed with the Multiple 5222/Twinax Printer Attachment (#1162), the Single Twinax Printer Attachment (#1155), or the Multiple Twinax Printer Attachment (#1160). **Maximum:** One.

**Multiple 5222/Twinax Printer Attachment (#1162):** Attaches up to eight printers. Provides four 5222 Printer ports and one twinax printer (5225/5256) port. A single 5222 Printer can be attached to each 5222 port. Each 5222 printer is attached by a double twisted pair cable. A 6 meter (20 foot) cable is provided with each printer. An extension cable accessory is available to provide a maximum cable length of up to 61 meters (200 feet) (see M5222 "Accessories"). From one to seven twinax printers (5225 Model 1, 2, 3, or 4 and/or 5256 Model 1, 2, or 3) can be attached to the twinax port, using a single twinax cable. The maximum cable length is 1525 meters (5000 feet). **Prerequisite:** If multiple printers are attached to the twinax printer port, each printer on the cable, except the last, requires a Cable Thru feature (#2680). **Limitation:** Cannot be installed with the Single 5222 Printer Attachment (#1157), the Single Twinax Printer Attachment (#1155), or the Multiple Twinax Printer Attachment (#1160). A maximum of seven printers can be attached to the twinax port (using Cable Thru feature). **Maximum:** One.

**Magnetic Stripe Reader Adapter/Elapsed Time Counter (#4955):** Provides the following:

The Magnetic Stripe Reader Adapter provides control for up to four Magnetic Stripe Readers (#4950) on attached 5281 Data Stations and/or 5282 Dual Data Stations.

The Elapsed Time Counter is used to measure elapsed real time. It is required for SNA operations under the 5280 Communications Utilities (5708-DC1) and 5280—3270 Emulation (5708-EM1) Licensed Programs. It is required by DE/RPG (5708-DE1) and the Key Entry Utilities (part of 5280 Utilities—5708-UT1) if the user desires to maintain the elapsed time production statistic. **Limitation:** Cannot be installed with the Elapsed Time Counter feature (#3610). **Maximum:** One.

**Elapsed Time Counter (3610):** Used to measure elapsed real time. It is required for SNA operations under the 5280 Communications Utilities (5708-DC1) and 5280—3270 Emulation (5708-EM1) Licensed Programs. It is required by DE/RPG (5708-DE1) and the Key Entry Utility (part of 5280 Utilities—5708-UT1) if the user desires to maintain the elapsed time production statistic. **Limitation:** Cannot be installed with the Magnetic Stripe Reader Adapter/Elapsed Time Counter (#4955). **Maximum:** One.

**Security Keylock (#6340):** Provides a single, key operated switch with three positions for controlling operations on all attached 5281 Data Stations and 5282 Dual Data Stations:

"Lock" position prevents operator entry and display of data and prevents initiation of communications.

"Local" position allows operator entry and display of data.

"Normal" position allows initiation of communications in addition to operator entry and display of data.

Two unique keys are provided: one allows selection of "Lock"/"Local"; the other allows selection of "Lock"/"Normal". On a noncommunicating 5288, both operating positions ("Local" and "Normal") provide "Local" position operation. **Maximum:** One.

**Second Application Microprocessor (#6800):** A microprocessor which performs identical function and operates concurrently with the first (base) application microprocessor. This feature provides more processing power and is designed as an aid to performance improvement in a multiprogramming environment which has heavy processor utilization. **Maximum:** One.

**Communications Adapter (#2500):** Required to attach a communications line via appropriate interface or modem. In conjunction with stored program control, this feature permits the 5288 to function on a switched or non-switched public, or private communications line. The adapter provides both BSC and SDLC. The proper line protocol is enabled at program execution time. The adapter also provides a 1200 bps clocking capability for use with the 1200 bps Integrated Modem (#5500, #5501, #5502, #5507, #5508) or an external modem. A Communications Utilities (5708-DC1) parameter activates this capability. **Prerequisites:** [1] A line interface special feature consisting of one of the 1200 bps Integrated Modems (#5500, #5501, #5502, #5507, or #5508), EIA Interface (#3701) or DDS Adapter (#5650 or #5651) must be ordered; [2] See the Programming section of the sales manual for 5280 Communications Utilities Licensed Program (5708-DC1) minimum system and feature requirements. **Limitations:** Cannot be installed with the 3270 Emulation Communications Adapter (#3270).

See "Specify" for required communications cable length. See "Additional Communications Information" for Mandatory Specify Codes. **Maximum:** One.

**3270 Emulation Communications Adapter (#3270):** Supports the 5280—3270 Emulation (5708-EM1) licensed program, and in conjunction with stored program control, permits the 5288 to function on a switched or nonswitched public or private communications line. This adapter is required to attach to a communications line via the appropriate interface or modem and provides both BSC and SDLC. The proper line protocol is enabled at program execution time. The adapter also provides a 1200 bps clocking capability for use with the 1200 bps Integrated Modem (#5500, #5501, #5502, #5507, #5508) or an external modem. A Communications Utilities (5708-DC1) parameter activates this capability. Keyboard interpretation functions are provided in support of the 5280—3270 Emulation licensed program. **Limitation:** Cannot be installed with Communications Adapter (#2500). **Prerequisites:** [1] A line interface special feature consisting of one of the 1200 bps Integrated Modems (#5500, #5501, #5502, #5507, or #5508), EIA Interface (#3701), or DDS Adapter (#5650 or #5651) must be ordered; [2] Attached 5281 Data Station(s) with a display size of 1920 characters (5288



feature #1255, #1280); [3] See the programming section of the sales manual for 5280 Communications Utilities (5708-DC1) and 5280-3270 Emulation (5708-EM1) minimum system and feature requirements. See "Specify" for required communications cable length. See Additional Communications Information for Mandatory Specify Codes. **Maximum:** One.

**Line Interfaces**

One of the following line interface features must be ordered for the type of communication facility and modem to be used.

**EIA Interface (#3701):** Provides the appropriate cable and interface logic necessary to attach an external modem (either an IBM or non-IBM modem meeting RS-232-C characteristics). Non-IBM modems may be attached subject to the Multiple Suppliers System Policy. **Limitation:** Cannot be installed with Digital Data Service (DDS) Adapter feature (#5650 or #5651) or 1200 bps Integrated Modem (#5500, #5501, #5502, #5507, or #5508). **Prerequisite:** Communications Adapter (#2500) or 3270 Emulation Communications Adapter (#3270). **Maximum:** One.

**Digital Data Service (DDS) Adapter (#5650 for Point-to-Point Operation...#5651 for Multipoint Operation).** An adapter for SDLC or BSC data transmission at speeds of 2400 or 4800 bps over AT & T non-switched Data-Phonet digital data service. The DDS Adapter provides the appropriate cable and interface to the DDS channel service unit, the customer site termination of the DDS network.

The DDS Adapter may also be used to locally connect a 5288 to another supported device which has a compatible DDS Adapter. This connection requires a special DDS Adapter Connector (see "Accessories") and supports point-to-point connections only. The maximum length of the connection is the sum of the modem cable lengths supported by the two devices. No modem or channel service unit is required. **Limitation:** Cannot be installed with EIA Interface (#3701) or 1200 bps Integrated Modem (#5500, #5501, #5502, #5507, or #5508). **Prerequisite:** Communications Adapter (#2500) or 3270 Emulation Communications Adapter (#3270). **Maximum:** One.

**1200 bps Integrated Modem (#5500, #5501, #5502, #5507, #5508).** A modem for SDLC or BSC data transmission at 600/1200 bps over non-switched or switched facilities. Half-speed operation at 600 bps is indicated via a 5280 Communications Utilities (5708-DC1) parameter. Available in five different versions: #5500—non-switched, #5501—switched with auto-answer, #5502—switched without auto-answer, #5507—non-switched with Switched Network Backup manual answer capability, #5508—non-switched with Switched Network Backup Auto answer capability. The non-switched versions (#5500, #5507, and #5508) provide a cable for attachment directly to a non-switched (2 or 4-wire) line, Type 3002. The switched with auto-answer versions (#5501 and #5508) provide a cable for attachment to the switched network via an FCC registered protective circuitry of the CBS type (or equivalent) provided by the user. The switched with manual answer versions (#5502 and #5507) provide a cable for attachment to the switched network via an FCC registered protective circuitry of the CDT type (or equivalent) provided by the user. The devices communicating with the 5288 must also be equipped with a compatible 1200 bps modem. **Limitation:** Cannot be installed with EIA Interface (#3701) or Digital Data Service (DDS) Adapter (#5650 or #5651). **Prerequisite:** Communications Adapter

(#2500) or 3270 Emulation Communications Adapter (#3270). **Maximum:** One.

**Additional Communications Information**

**Mandatory Specify Codes for Communications:** One selection must be specified from each of the following tables. Entries selected from Tables E and F will be used to preset hardware functions during manufacture. Selection from each of the other tables should be based on prime usage.

**Table A — Line Control**

BSC	#9400
SDLC	#9401

**Table B — Transmission Code**

EBCDIC	#9060
ASCII	#9061

**Table C — Prime Usage**

System/360	#9570
3031 or S/370	
Mdl 138 & Below	#9277
3032, 3033, or S/370	
Mdl 145 & Up	#9278
4300	#9596
Series/1	#9599
S/3	#9580
S/32	#9591
S/34	#9593
S/38	#9594
3740/3747	#9579
5260	#9600
5280	#9598
Other IBM	#9275
Non-IBM	#9276

**Table D — Transmission Rate**

600 bps	#9750
1200 bps	#9751
2000 bps	#9752
2400 bps	#9753
4800 bps	#9754

**Table E — Network Attachment**

Point-to-Point (non-switched)	#9481
Point-to-Point (switched)	#9483
Multipoint Tributary	#9482
Local Attach	#9485

**Table F — Line Facility Attachment**

Duplex (4-wire only)	#9391
Half Duplex	#9392

**Table G — Host Application**

RJE, MRJE, SRJE	#9440
CICS/VS	#9441
IMS/VS	#9442
Other	#9443

**IBM Modems:** One IBM modem can be attached to the Communications Adapter (#2500) or the 3270 Emulation Communications Adapter (#3270). **Prerequisite:** EIA Interface (#3701).

†Trademark of American Telephone and Telegraph Co. (AT & T)



<i>Modem</i>	<i>Speed (bps)</i>
3863	2400
3864	4800
3872	2400/1200
3874	4800/2400

AAS. Specify P/N 4236967. Allow 6 to 8 weeks for delivery.  
**Maximum:** One per Digital Data Service (DDS) Adapter.  
**Field Installable:** Yes.

**Note:** The 5288 does not support Automatic Call Originate (#1091) on the 3872 or 3874. For communication capabilities, product utilization and special features see M2700, M3863, M3864, M3872, and M3874 pages.

**Customer Responsibilities:** The customer must be advised, in writing, of certain responsibilities related to the installation and maintenance of common carrier facilities/services as well as the IBM equipment. For further information, see M2700 pages and "Teleprocessing" in the General Information section of the sales manual.

**IBM Data Encryption Devices:** An IBM 3845 or 3846 Data Encryption Device may be attached between the 5288 Communications Adapter and the external modem.  
**Prerequisite:** EIA Interface (#3701).

**Note:** Refer to M2700, M3845, and M3846 pages for information on 3845 or 3846 configuration and communication capability. The IBM 3845 or 3846 device operating with SDLC will not operate with NRZI transmission mode.

#### **Communications References:**

- See the System Programming pages of the *DP Sales Manual* for possible restrictions with DP products.
- See M2700 pages for additional information concerning modems, communications facility, machine attachment requirements, terminal intermix, operating capabilities and customer responsibilities.
- Refer to the *IBM Data Communications Handbook ZZ20-1939* for information concerning external modems attachable to the IBM 5288 Communications Adapter. This handbook also contains information related to common carrier facilities and tariffs.
- Refer to the *IBM 5280 Planning and Site Preparation Guide*, GA21-9351 for physical planning information.

**Communications Cable:** A communications cable length is required. See "Specify."

#### **ACCESSORIES**

**Keylock, Keys:** The 5288 with Security Keylock #6340 is shipped with two unique keys. Additional keys may be purchased from IBM. (Vendor will supply additional keys only to original purchaser.) With each order of quantity of one, customer receives two keys (one key of each kind). Order via MSORDER (Category = Accessories/Supplies) (Group Code = DP Supply Order) on AAS. Key identification numbers must accompany each order. Specify P/N 4177799. Allow 6 to 8 weeks for delivery.

**DDS Adapter Connector:** A specially designed connector allows the cable from a 5288 DDS Adapter to be connected to the cable of another supported device which has a compatible DDS adapter. This provides for the local connection of two devices without the use of any modems or channel service units. Only one DDS Adapter Connector is required per connection. The maximum length of the connection is the sum of the modem cable lengths of the two devices. *This is a "purchase only" item.* Order via MSORDER (Category = Accessories/Supplies) (Group Code = DP Supply Order) on



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**General Systems Division  
Programming Announcement**

P681-5

Release Date: January 16, 1981

Immediately File Attached Sales  
Manual Text in Appropriate  
Sales Manual Section

Distribution:  
GS Managers (Sales/CE/SE/Admin.)  
Marketing Representatives  
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**5280 FORMAT DESIGN AID (5798-RCR)  
FDP ANNOUNCED**

The 5280 Format Design Aid offers the 5280 user the ability to create DE/RPG source code by simply entering the desired display image at a 5280 Display Station. The FDP automatically creates DE/RPG "Z" and "A" specifications. This capability will significantly reduce the time to develop data entry programs, and hence improve application development productivity.

**Highlights**

- Generates DE/RPG source code for data entry programs from format images created at the display screen.
- Provides multiple format support for data entry programs.
- Provides TFILE processing support for data entry programs.
- Documents formats as they are created.
- Generates DE/RPG source code for menu programs from fixed format images created at the display screen.
- Documents menu programs as they are created.
- Provides a listing and/or sequencing of the generated DE/RPG source code.
- Provides support for the 1920, 960, and 480 character displays.

After the FDP is used to create the DE/RPG "Z" and "A" specifications for the screen formats, the DE/RPG Source Entry Program (SYSSEP) can be used to modify the source program to include such things as user exits for more complex applications.

**Specified Operating Environment**

- *System Requirements*  
The minimum configurations required to perform the functions of this FDP as delivered from the Program Information Department (PID) are as follows:

5285 Programmable Data Station  
Minimum main storage  
required: 48K  
Diskette drives  
required: two diskette 1D or  
one diskette 2D

5288 Programmable Data Station  
Minimum main storage  
required: 64K  
Diskette drives  
required: two diskette 1D or  
one diskette 2D  
Data station required: a 5281 or 5282

5286 Programmable Data Station  
Minimum main storage  
required: 64K  
Diskette drives  
required: two diskette 1D or  
one diskette 2D

The 5280 Format Design Aid requires a 30K partition.

- *Programming Systems*  
This Field Developed Program (FDP) requires the following programming for execution, maintenance, and modifications:  
5280 System Control Programming 5708-SC1  
5280 Utilities 5708-UT1  
5280 DE/RPG 5708-DE1

This FDP is written using the 5280 DE/RPG programming language. Release 1 of the above programming was used to test this FDP. Subsequent releases may affect the functioning of this FDP.

**Industry:** Cross  
**Language:** 5280 DE/RPG  
**Programming System:** Does not apply  
**Scheduled Availability from PID:** January 23, 1981  
**SECOM Key:** 5798RCROO

**Marketing Support**  
*Available Now:*  
Announcement Notice GB30-1548  
*Available After January 23, 1981*  
Program Description/  
Operations Manual SB30-1549

CONTACT YOUR REGION WITH QUESTIONS  
CONCERNING THIS ANNOUNCEMENT

An invalid form number response will result if orders for publications available after January 23, 1981 are entered prior to that date.

*Note:* Ordering instructions are in the Availability Notice and will be in a subsequent update to the *GSD Guide for Ordering Programs*. Documentation can be ordered from Mechanicsburg.

**Filing Instructions—GSD Sales Manual**

*Remove*

*File*

**Volume 1 (Marketing)**

**— Price Section**

Prog. Price Addendum January 81	Prog. Price Addendum January 81
Vol 1 Rev 2 Add 1 pgs. v and vi	Vol 1 Rev 2 Add 2 pgs. v and vi



**L. W. Gray**  
**Vice President—Marketing**

PROGRAMMING PRICE ADDENDUM  
 JANUARY 81  
 VOL 1 REV 2 ADD 2

PROGRAM NUMBER	FEAT NUM	PROGRAM/FEATURE DESCRIPTION	AVAIL	U (---- CHARGES ----) Y PROC MONTHLY OT	W (--- PROGRAM SERVICES ---) PP TP I CS LS LA	RP	PD	IL
	#6050	Diskette 2D @ 1024 bytes/sector		N				
5714-UT1		Interactive Data Base Utilities - Source Entry Utilities (SEU) - Screen Design Aid (SDA) - Data File Utility (DFU) - Query Utility	Now Now 03/81 Now Now	\$65	C 1 Y *	*	N/A	CE N
	#9001	Licensed M/R - Programs, MGS Files, Command Definitions, UDS Applications		N				
	#6050	Diskette 2D @ 1024 bytes/sector		N				
5799-BEP		System/38 Log Recovery (PRPQ P84042)	03/81	\$50	C 1 Y *	*	N/A	SE N
	#9049	Diskette 2 @ 128 bytes/sector		N				
**5280 PROGRAMMING**								
5708-EM1		5250-3270 Emulation	06/81		1 Y *	*	N/A	CE N
	#9510	Basic License		\$35	C			
	#9511	DSL0		\$26	C			
	#2924	Dskt 1 @ 256 b/s (#9510 is prerequisite)		N				
**5520 PROGRAMMING**								
5611-SS1		Administrat Processing Prog Lic M/R Code	Now	\$309	C 1 Y *	*	N/A	CE N
	#9248	Diskette 2D @ 512 B/S - Model 20	Now					
	#9348	Diskette 2D @ 512 B/S - Model 30	Now					
	#9448	Diskette 2D @ 512 B/S - Model 40	Now					
	#9548	Diskette 2D @ 512 B/S - Model 50	Now					
*****END OF ADDENDUM NUMBER 1*****								
**5280 PROGRAMMING**								
5798-RCR		5280 Format Design Aid	01/16/81	\$600	1 1 N	02/28/82	N/A	N N
	#9043	Diskette 1 @ 512 bytes/sector		N				
*****END OF ADDENDUM NUMBER 2*****								

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**General Systems Division  
Programming Announcement**

P681-12  
Release Date: January 16, 1981

**Immediately File Attached Sales  
Manual Text in Appropriate  
Sales Manual Section**

**Distribution:**  
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**IBM Internal Use Only**

**IBM 5280-3270 EMULATION (5708-EM1)  
ANNOUNCED**

A new licensed program, IBM 5280-3270 Emulation (5708-EM1) allows the 5280 Distributed Data System to appear as selected 3270 Control Units and devices. The operating environments supported are:

- *3270 Device Emulation under System Network Architecture/Synchronous Data Link Control (SNA/SDLC) and Binary Synchronous Communications (BSC)*

The 3270 Device Emulation Utility allows the 5280 to appear as selected 3270 control units and devices to existing host applications.

- *3270 Batch Transfer—BSC*  
Using this utility program, the 5280 user can transmit and receive batch data over a 3270 BSC network using 3270 line protocols. An appropriate user-written program is required at the host. Only graphic data (hex characters '40'-'FF') can be transmitted.
- *3270 Program Interface—BSC*  
This provides an interface for a user-written program in the 5280, written in DE/PRG or COBOL, to exchange records with a user-written program in a host system using 3270 BSC protocols. Only graphic data can be transmitted.

**Highlights**

**3270 Device Emulation  
Control Unit**

- The 5280 appears to the host as a 3274 Model 1C Control Unit under SNA/SDLC or as a 3271 Model 2 Control Unit under BSC.

**Display/Keyboard**

- The 1920-character 5281 Data Station (attached to a 5288 Programmable Control Unit) and the 1920-character 5285 Programmable Data Station appear to a host system as a 3277 Model 2 Display Station with selected features.
- Typewriter, data entry, and data entry with proof arrangement keyboards are supported. 3270 Program Function keys are supported.
- The Local Print Key function is supported in SNA/SDLC and BSC.

**Printer**

- The 3270 Printer Emulation Utility allows the 5222, 5225, and 5256 Printers to appear as the 3284-2, 3286-2, or 3288-2 Printer in BSC, or the 3287 Model 1 and 2 Printer in SNA/SDLC.

**3270 BSC Batch Transfer Utility Program**

- Data on a 5280 diskette can be sent to (or received from) an appropriately written host application program. Only graphic data can be transmitted.
- This utility is designed for batch transfer and limits the interference to other interactive sessions on the line. As a result, transfer of a data set can take more time than a normal batch transfer operation.
- The transmission and reception of multivolume diskette data sets is supported.
- Unsolicited host operator messages are handled by the 5280 display while the utility program is in operation.
- Logon to an interactive host is allowed prior to starting Batch Transfer.
- The use of a user-provided record identifying character in the data stream permits distinguishing user data from system messages.
- Fixed length, blocked or unblocked records up to 1918 bytes are supported.

**3270 BSC Program Interface**

- Read/write level of interface on a logical record basis is available in an interactive mode using DE/RPG and COBOL.
- The DE/RPG or COBOL application program provides a 1920-character Device (Image) Buffer and a 4096-character, or less, Data Stream Buffer.
- User-written programs must be provided at both ends of the communications link with careful consideration given to the application design and the characteristics of the communications subsystem.

## General Description

The 5280-3270 Emulation licensed program consists of the following five basic parts:

- 3270 Device Emulation Program—BSC and SNA/SDLC
- 3270 Batch Transfer Utility—BSC
- 3270 Program Interface—BSC
- Communications Access Method—BSC
- Communications Access Method—SNA/SDLC

The user describes, through parameters, the actual operating environment.

## 3270 Device Emulation Program—BSC and SNA/SDLC

Host system communication subsystems that are supported are: System/370 IMS/VS, CICS/VS, TSO, and System/3 Model 15D CCP.

### Control Unit

The 3270 Device Emulation Program allows the 5280 to appear to a host system as a 3274 Model 1C (SNA/SDLC) or a 3271 Model 2 (BSC) Control Unit.

Device emulation of the 3270 allows the 5280 to reside on the same communications link that supports a 3274 Model 1C or 3271 Model 2 Control Unit. Since this program provides data stream translation, host application programs will generally require little or no changes to support the 5280 as a 3270. Performance, however, may be degraded.

### Display/Keyboard

The 1920-character 5281 Data Station (attached to a 5288 Programmable Control Unit) and the 1920-character 5285 Programmable Data Station appear to a host system as a 3277 Model 2 Display Station with selected features. Features not supported include: ASCII, Magnetic Stripe Reader, Light Pen, and the Copy Command (from the host).

Certain keys are in different locations on the 5280 keyboards. The EBCDIC typewriter, data entry, and data entry with proof arrangement keyboards and the EBCDIC transmission codes are supported. Function keys on the 3277 will be mapped onto the 5280 keyboard to provide for equivalent function: i.e., Field Mark, Erase Input, PA, and PF keys. Up to 24 PF keys are supported. The host initiated local copy (print) is supported for SNA/SDLC. The local print key function is supported for SNA/SDLC and BSC.

### Printer

The 3270 Printer Emulation Utility provides to the 5280 user a method of using a 5280 printer as if it were a 3270 printer. The data to be printed is transmitted from the host system. The 3270 printers emulated are 3284-2, 3286-2, and 3288-2 in BSC. The 3287 Printer (Models 1 and 2) is supported in SNA/SDLC. Special features available on these printers are not supported.

The 5280 printers supported are the 5222, 5225, and 5256. The 5280 printers will print characters that match 3270 printer characters where it is physically possible. Characters that do not match will print a standard default character. Users that must print all characters

exactly as on a 3270 printer can do so by using a printer with the multinational character set. Upper and lower case printing is supported on all printers and vertical forms control is supported as on the 3287 and 3288 Printers.

The Printer Emulation Utility operates in either a foreground or background partition, and a maximum of five printer emulations may be active at one time.

The printers may operate in local mode, systems mode (entirely under host control) or shared mode. In SNA, the printer is shared between brackets, and in BSC it is shared between EOTs.

Data that is transmitted from the host will be supported in one of three formats:

- BSC—3270 (DSC) data stream compatible
- SNA/SDLC LU1 (SCS) SNA character string
- SNA/SDLC LU3 (DSC) data stream compatible

When the Printer Emulation Utility receives an SNA LU1 data stream, it will use the SCS control codes to format the printed page.

## 3270 Batch Transfer—BSC

The 3270 Batch Transfer Emulation Utility will enable the user to transmit and receive batch data when communicating with a host system via 3270 BSC. Record lengths can be a maximum of 1918 bytes. Transaction IDs and how they are to be used during transmission may be specified. It is possible to transmit and receive single or multiple volume data sets containing graphic text (hex characters '40'-'FF') only. Unsolicited messages and interactive logon/logoff can also be handled. The utility executes in a foreground partition. A user program is required at the host to send or receive batch data.

## 3270 Program Interface—BSC

This function provides the 5280 user with a program-to-program interface that uses 3270 BSC protocols. The 5280 application program that uses this function appears to the host system as a 3271 Model 2 device. Up to seven concurrent sessions are supported. Each session represents a different 3270 device address.

The user application interface for this function is through DE/RPG and COBOL. The DE/RPG support for the 3270 program interface will provide a new parameter on the DEVICE keyword. The user will specify 'COMM3270' as the device type. A file defined with this device code may be accessed from the calculation specifications using READ, WRITE, OPEN, and CLOSE operations.

The COBOL support is implemented by use of the COBOL CALL routines. A COBOL program interfaces to the 3270 CAM through library routines. Communications are initiated by activating the CALL verbs that open and close data sets and read or write records.

The user is responsible for providing the programs at both ends of the communication link. Careful design of

these programs is necessary with a full understanding of 3270 BSC protocol and the host communications subsystem.

### BSC Considerations

For BSC, the 5280-3270 Emulation licensed program emulates the following devices: 3271 Model 2 Control Unit, 3277 Model 2 (1920 character) Display Station, and 3284-2, 3286-2, and 3288-2 Printers. The maximum receive buffer size supported is 4096 bytes. This includes 3270 line control characters.

BSC error status to the host may be generated under somewhat different conditions than the 3271. User host programs dependent upon specific link level 3270 BSC error status may require modification.

Primary operation is on nonswitched multipoint communications facilities. Switched network back-up (SNBU) may be utilized if the associated modems and application programs support this capability.

The following BSC host system support is provided for 5280-3270 Device Emulation:

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

*Note:* All of the above systems (except System/3) are also supported when under control of VM/370.

### SNA/SDLC Considerations

For SNA/SDLC, the 5280-3270 Emulation licensed program emulates the following devices: 3274 Model 1C Control Unit as an LU2 device, the 1920-character 3277 Model 2 Display Station, and the 3287 Printer (Models 1 and 2).

Operation is on point to point switched as well as nonswitched point to point or multipoint communications facilities. The point to point switched capability is a function of the 5280-3270 Emulation licensed program (not a function of the 3274).

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

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

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

### Specified Operating Environment System Requirements

The minimum 5280 system configuration required to support the 5280-3270 Device Emulation capabilities is:

- A 5285 with 64K\*\* bytes of main storage capacity, the 3270 Emulation Communications Adapter (#3270)\*\*\*, and Optional 1920-Character Display Size (#3505). SNA support requires, in addition, either the Elapsed Time Counter (#3610), or the Magnetic Stripe Reader Adapter/Elapsed Time Counter (#4960).

or

- A 5288 with 64K\*\* bytes of main storage capacity, the 3270 Emulation Communications Adapter (#3270)\*\*\*, and a 5281 Data Station with a display size of 1920 characters. SNA support requires, in addition, either the Elapsed Time Counter (#3610) or the Magnetic Stripe Reader Adapter/Elapsed Time Counter (#4955).

Refer to the *IBM 5280-3270 Emulation Reference Manual* (availability to be announced in a future PRL) for required main storage requirements of other functions.

### Programming Requirements

*The then current release of 5280 System Control Programming (5708-SC1)*

and

*the then current release of 5280 Communications Utilities (5708-DC1)*

### 5280 Communications Support Compatibility

The 5280-3270 Emulation licensed program can coexist on a 5280 system with other non-communicating programs. Running a 3270 Emulation program concurrently with Transcriptive (i.e. high keying rate) Key Entry (TKE) may degrade TKE performance. No other 5280 communications programs can run concurrently.

**Scheduled availability from PID:** June, 1981

### Educational Allowance

The Standard Educational Allowance Plan applies.

### Customer Responsibilities

IBM may provide marketing assistance, in accordance with the Marketing and Service Guidelines in the GI Section of the *GSD Sales Manual*, in the installation of IBM Licensed Programs. However, the responsibility of providing accurate ordering information, personnel selection and training, installation, and continued day-to-day operation lies solely with the customer.

Installation of 5280 Distributed Data System Licensed Programs is a customer responsibility.

\* TSO does not support printers

\*\* 96K if a printer is used in conjunction with the keyboard/display

\*\*\*See Product Announcement 681-11

**Program Use During Customer Preinstallation Testing**

The 5280-3270 Emulation (5708-EM1) Licensed Program will be available to customers for preinstallation testing on IBM Test Center Systems in accordance with IBM's Program Testing Policy.

**Programming RPQs**

PRPQs will not be accepted at this time.

**Sales Compensation Plan**

Normal provisions apply.

**Marketing Publications**

**(Available from Mechanicsburg)**

*IBM 5280-3270 Emulation Licensed Program Design Objectives*, GC34-0383.

**Sales Manual Text**

See interim *GSD Sales Manual* pages.

*Note:* See Marketing Announcement 681-6 for prices.

**Ordering Information:** Detailed ordering information is attached.

**Filing Instructions—GSD Sales Manual**

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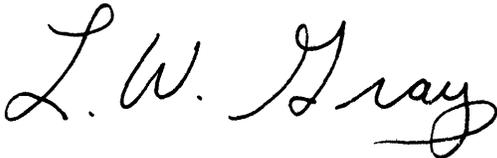
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Volume 3 (Programming)

- Programming Section

(No Removals)

January 81,  
(Interim Page) Vol 3  
pgs. 5280 2.10.1 through  
5280 2.10.3



L. W. Gray  
Vice President—Marketing

**ORDERING INFORMATION FOR IBM  
5280-3270 EMULATION**

Type	Model	Scheduling	Stackable
5708	EM1	Normal	No

To become a licensed user, select the feature number of the desired license type:

Feature Number	License Type
9510	Basic
9511	Distributed Systems License Option (DSLO)

**BASIC MATERIAL**

(Must be ordered with #9510; not available with #9511 (DSLO))

**Licensed Basic Machine-Readable Material:**

Distribution of the basic machine-readable material (object code) requires entry of the following feature number:

Feature Number	Distribution Medium	Diskette Requirement
2924 (9510 is prerequisite)	Diskette 1@ 256 bytes/ sector	None*

\* Diskettes are supplied by IBM and remain the property of IBM.

The basic machine-readable material will be shipped only to customer locations ordering the basic license (Feature #9510). Code updates will be shipped (on IBM-supplied diskettes) only to locations which have the basic license.

**Documentation**

Memo, Program Directory, and one copy of each document listed will be supplied automatically with the basic machine-readable material to locations which have the basic license.

**Unlicensed Documentation**

IBM 5280-3270 Emulation Licensed Program Specifications

**RELATED OPTIONAL MATERIAL**

(One copy available at no additional charge to users with the Basic License).

**Licensed Documentation (Order by feature number)\*\***

Feature Number	Description
7040	IBM 5280-3270 Emulation Program Logic Manual
7050	IBM 5280-3270 Emulation Assembly Listings (Microfiche)

\*\* Form numbers, feature numbers and prices for additional copies will be announced in a future PRL.

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**IBM 5280—3270 EMULATION (5708-EM1)**

IBM 5280—3270 Emulation allows the 5280 Distributed Data System to appear as selected 3270 control units and devices. The operating environments supported are:

- 3270 Device Emulation under System Network Architecture/Synchronous Data Link Control (SNA/SDLC) and Binary Synchronous Communications (BSC). The 3270 Device Emulation Utility allows the 5280 to appear as selected 3270 control units and devices to existing host applications.
- 3270 Batch Transfer—BSC. Using this utility program, the 5280 user can transmit and receive batch data over a 3270 BSC network using 3270 line protocols. An appropriate user-written program is required at the host. Only graphic data (hex characters '40'-'FF') can be transmitted.
- 3270 Program Interface—BSC. This provides an interface for a user-written program in the 5280, written in DE/RPG or COBOL, to exchange records with a user-written program in a host system using 3270 BSC protocols. Only graphic data can be transmitted.

**Highlights****3270 Device Emulation****Control Unit:**

- The 5280 appears to the host as a 3274 Model 1C Control Unit under SNA/SDLC or as a 3271 Model 2 Control Unit under BSC.

**Display/Keyboard:**

- The 1920-character 5281 Data Station (attached to a 5288 Programmable Control Unit) and the 1920-character 5285 Programmable Data Station appear to a host system as a 3277 Model 2 Display Station with selected features.
- Typewriter, data entry, and data entry with proof arrangement keyboards are supported. 3270 Program Function keys are supported.
- The Local Print Key function is supported in SNA/SDLC and BSC.

**Printer:**

- The 3270 Printer Emulation Utility allows the 5222, 5225, and 5256 Printers to appear as the 3284 Model 2, 3286 Model 2, or 3288 Model 2 Printer in BSC, or the 3287 Model 1 and 2 Printer in SNA/SDLC.

**3270 BSC Batch Transfer Utility Program**

- Data on a 5280 diskette can be sent to (or received from) an appropriately written host application program. Only graphic data can be transmitted.
- This utility is designed for batch transfer and limits the interference to other interactive sessions on the line. As a result, transfer of a data set can take more time than a normal batch transfer operation.
- The transmission and reception of multivolume diskette data sets is supported.
- Unsolicited host operator messages are handled by the 5280 display while the utility program is in operation.
- Logon to an interactive host is allowed prior to starting Batch Transfer.

- The use of a user-provided record identifying character in the data stream permits distinguishing user data from system messages.
- Fixed length, blocked or unblocked records up to 1918 bytes are supported.

**3270 BSC Program Interface**

- Read/write level of interface on a logical record basis is available in an interactive mode using DE/RPG and COBOL.
- The DE/RPG or COBOL application program provides a 1920-character Device (Image) Buffer and 4096-character, or less, Data Stream Buffer.
- User-written programs must be provided at both ends of the communications link with careful consideration given to the application design and the characteristics of the communications subsystem.

**Description**

The 5280—3270 Emulation licensed program consists of the following five basic parts:

- 3270 Device Emulation Program—BSC and SNA/SDLC
- 3270 Batch Transfer Utility—BSC
- 3270 Program Interface—BSC
- Communications Access Method—BSC
- Communications Access Method—SNA/SDLC

**3270 Device Emulation Program—BSC and SNA/SDLC**

Host system communication subsystems that are supported are: System/370 IMS/VS, CICS/VS, TSO, and System/3 Model 15D CCP.

**Control Unit:**

The 3270 Device Emulation Program allows the 5280 to appear to a host system as a 3274 Model 1C (SNA/SDLC) or a 3271 Model 2 (BSC) Control Unit.

Device emulation of the 3270 allows the 5280 to reside on the same communications link that supports a 3274 Model 1C or 3271 Model 2 Control Unit. Since this program provides data stream translation, host application programs will generally require little or no changes to support the 5280 as a 3270. Performance, however, may be degraded.

**Display/Keyboard:**

The 1920-character 5281 Data Station (attached to a 5288 Programmable Control Unit) and the 1920-character 5285 Programmable Data Station appear to a host system as a 3277 Model 2 Display Station with selected features. Features not supported include: ASCII, Magnetic Stripe Reader, Light Pen, and the Copy Command (from the host).

Certain keys are in different locations on the 5280 keyboards. The EBCDIC typewriter, data entry, and data entry with proof arrangement keyboards and the EBCDIC transmission codes are supported. Function keys on the 3277 will be mapped onto the 5280 keyboard to provide for equivalent function: i.e., Field Mark, Erase Input, PA, and PF keys. Up to 24 PF keys are supported. The host initiated local copy (print) is supported for SNA/SDLC. The local print key function is supported for SNA/SDLC and BSC. The magnetic stripe reader and the light pen are not supported.

**Printer:**

The 3270 Printer Emulation Utility provides to the 5280 user a method of using a 5280 printer as if it were a 3270 printer. The data to be printed is transmitted from the host system. The 3270 printers emulated are 3284 Model 2, 3286 Model 2, and 3288 Model 2 in BSC. The 3287 Printer (Models 1 and 2) is supported in SNA/SDLC. Special features available on these printers are not supported.

The 5280 printers supported are the 5222, 5225, and 5256. They will print characters that match 3270 printer characters where it is physically possible. Characters that do not match will print a standard default character. Users that must print all characters exactly as on a 3270 printer can do so by using a printer with the multinational character set. Upper and lower case printing is supported on all printers and vertical forms control is supported as on the 3287 and 3288 Printers.

The Printer Emulation Utility operates in either a foreground or background partition, and a maximum of five printer emulations may be active at one time.

The printers may operate in local mode, systems mode (entirely under host control) or shared mode.

**3270 Batch Transfer—BSC**

The 3270 Batch Transfer Emulation Utility will enable the user to transmit and receive batch data when communicating with a host system via 3270 BSC. Record lengths can be a maximum of 1918 bytes. Transaction IDs and how they are to be used during transmission may be specified. It is possible to transmit and receive single or multiple volume data sets containing graphic text (hex characters '40'-'FF') only. Unsolicited messages and interactive logon/logoff can also be handled. The utility executes in a foreground partition. A user program is required at the host to send or receive batch data.

**3270 Program Interface—BSC**

This function provides the 5280 user with a program-to-program interface that uses 3270 BSC protocols. The 5280 application program that uses this function appears to the host system as a 3271 Model 2 device. Up to seven concurrent sessions are supported. Each session represents a different 3270 device address.

The user application interface for this function is through DE/RPG and COBOL. The DE/RPG support for the 3270 program interface will provide a new parameter on the DEVICE keyword. The user will specify 'COMM3270' as the device type. A file defined with this device code may be accessed from the calculation specifications using READ, WRITE, OPEN, and CLOSE operations.

The COBOL support is implemented by use of the COBOL CALL routines. A COBOL program interfaces to the 3270 CAM through library routines. Communications are initiated by activating the CALL verbs that open and close data sets and read or write records.

**BSC Considerations:** Primary operation is on nonswitched multipoint communications facilities. Switched network back-up (SNBU) may be utilized if the associated modems and application programs support this capability.

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

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

\*TSO does not support printers.

*Note:* All of the above systems (except System/3) are also supported when under control of VM/370.

**SNA/SDLC Considerations:** Operation is on point-to-point switched as well as nonswitched point-to-point or multipoint communications facilities. The point-to-point switched capability is a function of the 5280—3270 Emulation licensed program (not a function of the 3274).

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

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

\*TSO does not support printers.

**Specified Operating Environment**

*System Requirements:* The minimum 5280 system configuration required to support the 5280—3270 Device Emulation capabilities is:

A 5285 with 64K\*\* bytes of main storage capacity, the 3270 Emulation Communications Adapter (#3270), and Optional 1920-Character Display Size (#3505). SNA support requires, in addition, either the Elapsed Time Counter (#3610) or the Magnetic Stripe Reader Adapter/Elapsed Time Counter (#4960).

OR

A 5288 with 64K\*\* bytes of main storage capacity, the 3270 Emulation Communications Adapter (#3270), and a 5281 Data Station with a display size of 1920 characters. SNA support requires, in addition, either the Elapsed Time Counter (#3610) or the Magnetic Stripe Reader Adapter/Elapsed Time Counter (#4955).

Refer to the *IBM 5280—3270 Emulation Reference Manual* (availability to be announced in a future PRL) for required main storage requirements of other functions.



*Programming Requirements:* The current release of 5280 System Control Programming (5708-SC1) and the current release of 5280 Communications Utilities (5708-DC1)

\*\* 96K bytes if a printer is used in conjunction with the keyboard/display

**5280 Communications Support Compatibility:** The 5280—3270 Emulation licensed program can coexist on a 5280 system with other non-communicating programs. Running a 3270 Emulation program concurrently with Transcriptive (i.e., high keying rate) Key Entry (TKE) may degrade TKE performance. No other 5280 communications programs can run concurrently.

**Selected Publications**

IBM 5280—3270 Emulation Licensed Program Design Objectives GC34-0383

IBM 5280—3270 Emulation Reference Manual\*

**Ordering Information**

Refer to the *GSD Guide for Ordering Programs* ZZ60-0034.

\* Availability to be announced in a future PRL.



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**General Systems Division  
Programming Announcement**

**Distribution:**  
GS Managers (Sales/CE/SE/Admin.)  
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**IBM Internal Use Only**

**IBM 5280 DISTRIBUTED DATA SYSTEM  
RELEASE 2 PROGRAMMING  
ANNOUNCED AND AVAILABLE**

Release 2 of the following 5280 programs is now available from PID:

- 5280 System Control Programming (5708-SC1)
- 5280 Assembler Language (5708-AS1)
- 5280 Communications Utilities (5708-DC1)
- 5280 DE/RPG (5708-DE1)
- 5280 Sort/Merge(5708-SM1)
- 5280 Utilities (5708-UT1)

**Highlights**

**System Control Programming (SCP)**

The System Configuration Program has been modified to support the following:

- Second Application Microprocessor feature (#6800). Prompts are provided to allow the user to specify the partitions to be serviced by each application microprocessor.
- New maximum of eight printers on the 5288 Programmable Control Unit. New support allows the 5288 to be configured with up to eight printers.
- Additional main storage capacity on the 5288 Programmable Control Unit. New support allows configurations of the 5288 with up to 288K of main storage capacity.

**Communications Utilities**

The 5280 is now supported by ACF/TCAM Version 2. Programming support of communicating models of the 5285 Programmable Data Station and the 5288 Programmable Control Unit is now available for users of ACF/TCAM Version 2 under OS/VS1 and OS/VS2.

The 5280 communicates to ACF/TCAM as an LU1 secondary station using SNA/SDLC and as a 3741 using BSC link protocol as described in the 5280 *Communications Reference Manual* (SC34-0247). The 5280 will interface to ACF/TCAM through the 5280 Communications Utilities as well as user-written DE/RPG, COBOL, and Assembler Language programs.

New support provided in the Communications Access Methods (CAMs) allows the user to display Communications Control Block (CCB) status during execution of DE/RPG, COBOL, and Assembler Language programs.

The CCB Status Display function has been implemented in the CAMs (except for SYBSBCBA), and has resulted in increased minimum main storage partition sizes as follows:

CAM	Release 1	Release 2
SYBSBCR	9K	11K
SYBSCEX	18K	21K*
SYSSNAD	22K	25K
SYSSNAR	21K	24K
SYSSNAU	22K	25K

\* 19K if a 130-byte CAM I/O buffer is used.

The increase in the minimum partition sizes to contain the above CAMs may require system reconfiguration.

**DE/RPG**

The "next job" name can now be specified at program execution time. The *name* parameter in the EOJ keyword specifies the object program to be executed upon completion of the current program. This parameter can be a constant name (specified at compile time) or a variable name. Use of a variable name allows the program name to be specified at program execution time via keyboard entry or program logic.

Variable-length records are now supported for communications data transmission. The Length field on the Data Description Specifications form will be used to specify a record length for each communication file (COMM) record. The length specified determines the record length to be transmitted during a WRITE operation. The record length may be less than or equal to the length specified on the file description statement.

Multivolume data sets are now supported using index data sets created by the Sort/Merge Licensed Program (5708-SM1). DE/RPG will use the volume sequence number now included in the index data sets created by the Address out and Index/key sort options of the Sort program. Individual volume indexes created by the Sort program will contain the volume sequence number, and can therefore be merged into a single index data set.

Compiler source error handling has been improved. Compiler source errors will now be classified into three (rather than two) categories: *Informational Error*, *Error*, and *Severe Error*. *Informational Errors* will not cause a compiler halt. *Errors* will normally cause a compiler halt, but may be bypassed at user option. *Severe Errors* will always cause a compiler halt. Upon completion of compilation, the display screen will show a count of the number of *Informational* and *Error* messages detected by the compiler. All errors will be listed.

#### **Sort/Merge**

For Address out and Index key sorts, the output data set records will contain a volume number when the input data set is a volume of a multivolume data set. Individual-volume output data sets can be merged to form a master index data set in support of multivolume data sets.

#### **Utilities**

##### *Print Utility*

The Print Utility will now support and control the printing of multivolume data sets when using the Data Set Print option. Multiple volumes can be printed without restarting the utility. Volume sequence control will be provided. If the data set contains printer control information, Volume 1 must be the first volume printed.

The Print Utility has been enhanced to allow double spacing in addition to single spaced printing.

##### *System Status Utility*

The System Status Utility will now provide for the display or printing of resource allocation table entries contained on an IPL diskette. The logical device address and its corresponding physical device address will be displayed/printed for each partition and system-shared entry.

##### *Diskette Copy Utility*

Image Copy and Volume Copy now allow the user the option to copy over existing data on an output diskette.

##### *Diskette/Data Set Clear Utility*

The Diskette/Data Set Clear Utility has been enhanced to allow the user to drop or free an unexpired (date protected) data set.

##### *Diskette Label Maintenance Utility\**

The Diskette Label Maintenance Utility has been enhanced to allow the user to delete an unexpired (date protected) data set.

*\*Note:* In addition to this enhancement to the Diskette Label Maintenance Utility, a new capability is now available in the Verification Diskette, allowing access to the diskette header labels similar to that allowed on the IBM 3740. For more information, refer to the *5280 Machine Verification Manual* (GA21-9357-1).

#### **Program Currency**

For purposes of Program Services, Release 1 of these programs will be considered current until May 13, 1981. After that date, all Program Services will be withdrawn. Central Service and Local Service will no longer be provided, and Customer Engineering programming assistance will be available at the applicable CE hourly rates.

#### **Programming RPQs**

PRPQs will not be accepted at this time.

#### **Publications**

A list of 5280 system publications is attached.

*For new users:* PID will include the documentation associated with the programs that have been ordered.

*For current users:* PID will include the formal unlicensed documentation with the program package until February 13, 1981.

All users should have a current SLSS subscription so they will automatically receive publications from Mechanicsburg.

#### **Ordering Instructions**

*New Users:* Ordering information for new users is in the *GSD Guide for Ordering Programs* (ZZ60-0034).

*Current Users:* Current users will be sent an announcement package which includes a memorandum announcing the availability of Release 2, a preprinted Program Reorder Form (PRF), and ordering instructions.



L. W. Gray  
Vice President—Marketing

**CURRENT IBM 5280 DISTRIBUTED DATA SYSTEM PUBLICATIONS**

**Denotes Current Publications Available From PID**

	<b>Form Number</b>	<b>Current TNL</b>
<b>General</b>		
5280 Executive Brochure	G580-0274-0	None
5280 Product Flyer	G580-0275-0	None
5280 Communications Brochure	G580-0276-1	None
5280 General Information	GA21-9350-2	None
5280 Planning and Site Preparation Guide	GA21-9351-2	None
5280 Marketing and SE Guide	ZZ60-0598-0	None
5280 Facts Folder	G360-0069-0	None
5280 System Concepts	GA21-9352-2	None
5280 Functions Reference Manual	GA21-9353-0	GN20-9557
5280 Operator's Guide	GA21-9364-0	GN20-9566
Insert Tabs for 5280 Operator's Guide	GX21-9366-0	None
5280 Message Manual	GA21-9354-2	None
5280 Machine Verification Manual	GA21-9357-1	None
5280 User's Setup Procedures	GA21-9365-0	GN20-9567
5280 Cable Assembly Manual	GA21-9341-1	None
5280 Master Index	GA21-9356-1	None
5280 Keyboard Template	GX21-9360-0	None
5280 Data Entry Keytop Graphics	GX21-9355-0	None
5280 Typewriter Keytop Graphics	GX21-9358-0	None
5225 Printer Operator's Guide	GA34-0054-0	None
5225 Models 1, 2, 3, and 4 Customer Setup	GA34-0085-0	None
5256 Printer Operator's Guide	GA21-9260-2	None
5256 Printer Setup Procedure	GA21-9290-2	None
<b>System Control Programming</b>		
5280 System Control Programming Reference/Operation Manual	GC21-7824-0*	GN21-8201
5280 System Control Programming Specifications	GC21-7797-1*	None
5280 System Control Programming Support Logic Manual	SY21-0585-0	SN21-8202
<b>Assembler Language</b>		
5280 Assembler Language Reference Manual	SC21-7790-0*	SN20-9582
5280 Assembler Language Licensed Program Specifications	GC21-7801-0*	None
<b>Communications Utilities</b>		
5280 Communications Reference Manual	SC34-0247-2*	None
5280 Communications Utilities Licensed Program Specifications	GC34-0249-1*	None
5280 Communications Utilities Support Logic Manual	LY34-0166-0*	LN34-1637
<b>DE/RPG</b>		
5280 DE/RPG Reference Manual	SC21-7787-1*	SN21-8196
5280 DE/RPG Licensed Program Specifications	GC21-7798-0*	None
5280 Introduction to DE/RPG	SC21-7803-1	None
5280 DE/RPG User's Guide	SC21-7804-0	SN21-8195
5280 DE/RPG Problem Determination Procedures for the Programmer	SC21-7852-0	None
5280 DE/RPG Debugging Template and Reference Card	GX21-9363-1	None
5280 Data Description Specifications	GX21-9362-1	None
5280 General Utility Specifications	GX21-9361-1	None
RPG Calculation Specifications	GX21-9093-3	None
<b>COBOL</b>		
5280 COBOL Language Reference Manual	GL23-0031-0	None
5280 COBOL Programmer's Guide	SL23-0032-0	None
5280 COBOL Host Compilers Problem Determination Guide	SL23-0043-0	None
5280 OS/VS COBOL Licensed Program Design Objectives	GL23-0027-0	None
5280 DOS/VSE COBOL Licensed Program Design Objectives	GL23-0028-0	None
<b>Sort/Merge</b>		
5280 Sort/Merge Reference/Operation Manual	SC21-7789-0*	SN21-8197
5280 Sort/Merge Licensed Program Specifications	GC21-7800-0*	None
5280 Sort/Merge Support Logic Manual	LY21-0579-0*	LN21-8198

**Utilities**

5280 Utilities Reference/Operation Manual	SC21-7788-1*	SN21-8199
5280 Utilities Licensed Program Specifications	GC21-7799-0*	None
5280 Utilities Support Logic Manual	LY21-0578-1*	None

**Licensed Program Microfiche**

The following microfiche has been changed to support Release 2. For customers, these documents are available only from PID.

5280 Assembler Language Assembly Listings	LJB5-0006-1*	None
5280 Communications Utilities Assembly Listings	LJB5-0005-1*	None
5280 DE/RPG Assembly Listings	LJB5-0002-1*	None
5280 Sort/Merge Assembly Listings	LJB5-0004-1*	None
5280 Utilities Assembly Listings	LJB5-0003-1*	None