IBM

IBM System/34
Introduction

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Introduction

Fifth Edition (March 1979)

This manual describes IBM System/34 and its data processing capabilities in today's business environment.

This introduction is intended primarily for business executives and supervisory personnel who want to know about System/34 and how it can help them meet their data processing requirements. This manual can also introduce System/34 to programmers and operators.

The reader need not have prior experience with computers. This manual includes:

- Chapter 1, an overview of System/34

- Chapter 2, a discussion of the ways System/34 might be implemented in a business

- Chapter 3, a description of each System/34 device and feature

- Chapter 4, a description of System/34 program products

- Chapter 5, an overview of System/34 operating characteristics

- Chapter 6, an overview of the support and services IBM provides for a System/34 customer

- Appendix A, a brief description of all System/34 system publications that are currently available

- A glossary, which defines data processing words and terms introduced in this manual

This manual contains the following information for planning purposes only:

- Interactive communications feature (feature number 6000 with Diskette 1 or feature number 6001 with Diskette 2D)

- SNA assembler macros

- 3262 Printer Model B1

- Work Station Control Expansion B, which permits up to 16 local work stations

- Diskette and communications support for the 5260 Retail System

- 3270 BSC data stream emulation

- Print spooling enhancements

- Interactive communications feature enhancement that supports System/34 to System/34 via SNA/SDLC

- COBOL

- COBOL language extensions for work station support and the interactive communications feature

- Work station support subroutine PRPQ

The information herein is subject to change before the products described become available.

Related Publications

- *IBM System/34 Planning Guide,* GC21-5154

- *IBM System/34 Installation Manual—Physical Planning,* GA21-9242

- *IBM System/34 System Support Program Product Licensed Program Design Objectives,* GC21-7701

- *IBM 5250 Information Display System Introduction,* GA21-9246

- *IBM System/34 COBOL Program Product Licensed Program Design Objectives,* GC21-7737

- *IBM System/34 Work Station Support Subroutines PRPQ Licensed Program Design Objectives,* GC21-7808

- *IBM System/34 Installation and Modification Reference Manual: Program Product and Physical Setup,* SC21-7689

- *Data Communications Concepts,* GC21-5169

- *IBM System/34 System Support Reference Manual,* SC21-5155

- *IBM System/34 Bibliography,* GH30-0231

For a complete description of the System/34 system publications that are available, see *Appendix A.*

LEGEND

Drawings have been added to this manual to help
explain System/34 and some programming concepts.
The following identifies and explains the use of each
symbol:

Symbol	Meaning
	Diskette
	This symbol represents the display screen and keyboard at a display station.
	This symbol represents a printer.
	The white arrow means no data flow. The arrow shows the relationship of an input or output device to the system.
	The red arrow means that data is being entered, processed, or printed.
SSP	SSP (system support program product)
	Disk
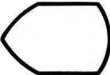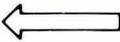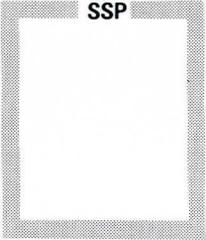
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Contents

Chapter 1. System/34 Overview

Your business, whether big or small, processes large amounts of information during its daily operations. This information must be converted from its original form, analyzed and compared with related material, and presented in a meaningful, readily available manner from which you can make sound business decisions. Frequently, a business' ability to respond to its customers depends upon that business' ability to access and analyze information. The increased complexity of information processing and the timeliness with which you must make decisions often exceed the capabilities of manual techniques. To cope with these problems, many businesses use data processing systems.

IBM System/34 is a general-purpose data processing system designed for a wide range of applications. It can handle business applications such as billing, order writing, and payroll, as well as many other types of applications. System/34 also offers the following:

- Choice of environments: System/34 can process all the data in one room, or you can move some devices to the users, who can be in several rooms or buildings; these devices can be moved as far away as 1,520 meters (5,000 feet) from the rest of the system (local work stations). You can move some devices to users in locations geographically remote from the rest of the system (remote work stations). These devices are connected to System/34 via communications lines.

- Multiprogramming: System/34 can run more than one job at a time.

- Print spooling: System/34 can save printer data for later printing, so multiple jobs, all requiring a printer or printers, can run at the same time.

- Input job queue: An operator or a procedure can place a job on the input job queue and then continue with other activities without waiting for that job to execute.

- Inquiry: While System/34 runs other jobs, you can make inquiries about information stored on the system.

- Security: The display station and system unit keylocks, the display station magnetic stripe reader, and the operator passwords discourage unauthorized access to the system. Access to files and libraries that are protected by the security function is restricted to specified users. Access to programs can be controlled by menus displayed to operators.

- Data communications: System/34 can use up to two communications lines to communicate with other systems or devices at other locations.

This publication describes all these capabilities, plus others. As you read this introduction, you will discover that System/34 is an efficient, reliable, and competent tool for your business data processing requirements.

PHYSICAL CHARACTERISTICS

IBM System/34 has the following components, all of which Chapter 3 describes.

- 5340 System Unit: The 5340 System Unit contains:
  - Processing Unit. The processing unit contains the storage and logic necessary to control the functions of the system.
  - Disk Storage. The disk is a nonremovable magnetic storage medium, which contains programs and data files for processing.
  - Diskette Drive or Diskette Magazine Drive. A diskette is a removable magnetic storage medium, which can contain programs and data files. The operator loads the contents of the diskette onto disk before processing. With the magazine drive, up to 20 diskettes can be processed without operator intervention. You can exchange diskettes with other systems or store them for later processing.

- Display Station: The display station is a work station for entering data, for inquiring into files, and for requesting jobs. System/34 has two types of display stations: the 5251 Display Station and the 5252 Dual Display Station. The display stations can be attached to the system unit as local work stations or can communicate as remote work stations with the system unit by means of communications lines. System/34 can have several display stations, but one display station attached directly to the system unit must serve as the system console. For additional information, see *Work Stations* in Chapter 2.

- Printer: The printer is an output device that prints information from the system. System/34 has two types of printers: the 5211 or 3262 Line Printer and the 5256 Character Printer. System/34 can use several 5256 Printers with either one 5211 Printer or one 3262 Printer. One printer (normally a line printer) serves as the system printer. The line printer must be attached to the system unit. The other printers can be attached to the system unit or can be attached to local or remote work stations. For additional information, see *Work Stations* in Chapter 2.

5340 System Unit

5211 Printer, 3262 Printer

5256 Printer   5251 Display Station

5252 Dual Display Station

2
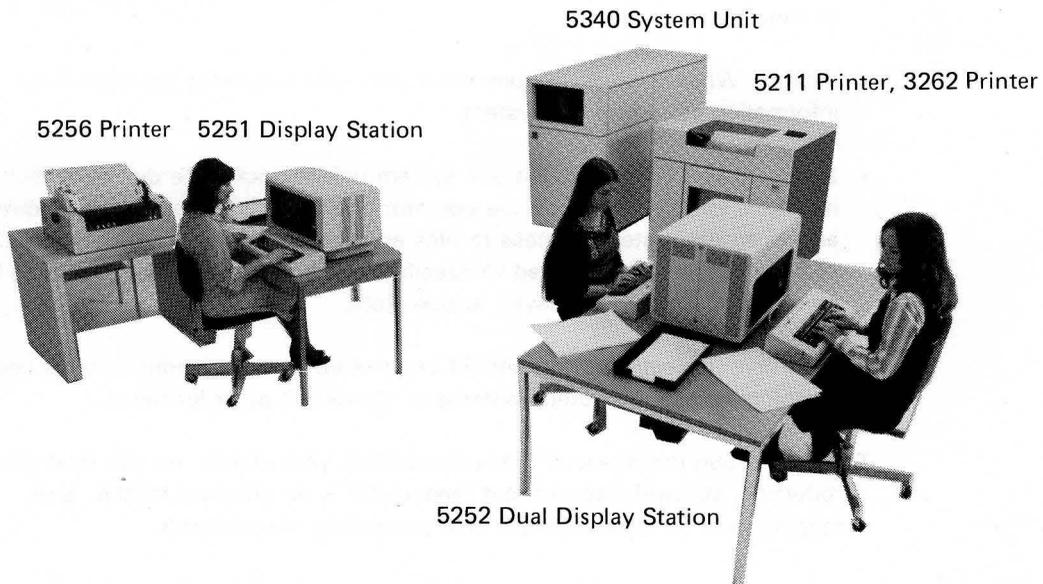
OPERATING CHARACTERISTICS

Your primary concern when installing a data processing system should be your business needs, not a need for data processing knowledge. The operation of IBM System/34 is designed with that in mind. A person responsible for bookkeeping or other clerical duties can, with minimal data processing training, become a System/34 display station operator. The system operator, however, may need more data processing expertise, depending on your applications and operating environments. Chapter 5 explains System/34 operation in greater detail.

The following functions of System/34 and its program products help make this system easy to use:

- Familiar keyboard design: The keyboard on each display station contains the same key arrangement as a typewriter plus a cluster of 10 numeric keys arranged in adding machine fashion.

- Keyboard function control and command function keys: The operator requests specific system or application functions by pressing just one or two of these keys.

- Command statements: Command statements provide simple operator communication and control. Command statements consist of control commands and procedure commands (described in Chapter 5). Operators perform frequently run system functions with these short, simple, and easy-to-use command statements.

- Utility programs: The utility programs perform many functions that are common to most data processing systems; for example, copying a file or deleting a file. Often, an operator can run a utility program by entering a single procedure command.

- Program-to-operator communication: A program communicates with an operator via messages displayed on the display screen. A program product or a user program displays these messages to guide the operator through applications, to request specific information to complete a job, to help the operator identify errors, and to inform the operator of system activity.

- Operator-to-operator communication: Operators at different display stations can send messages to each other by using a control command. This command simplifies operator communication when display stations are not close to each other.

- Menus: A menu is a list of brief job descriptions, each identified by a number. As you develop menus for your applications, you may assign a default menu to each operator. When the operator signs on, that menu is automatically displayed. The operator need only select a number from the menu to run a particular job.

Basic Concepts of System/34 Data Processing

This section is intended for readers who do not have prior experience with data processing and who may not understand data processing terminology. Other readers can skip ahead to Chapter 2.

Data processing consists of several parts: the information to be processed (INPUT), the processing of that information (PROCESS), and the results of the processing (OUTPUT). For example, an operator enters data into System/34 using a diskette. The processing unit accepts the data, processes it, and then produces a printed report.
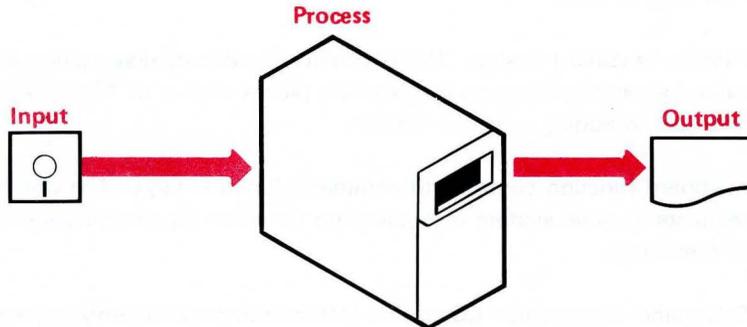
Developing and Running a Job

The elements that combine to perform the processing on System/34 are the system support program product (SSP) and the program products (PP), which are IBM-written, licensed programs; the customer program (CP); and the hardware (the physical equipment).

Before you can run System/34, you must load these programs into the system. The first program to be loaded is the SSP.
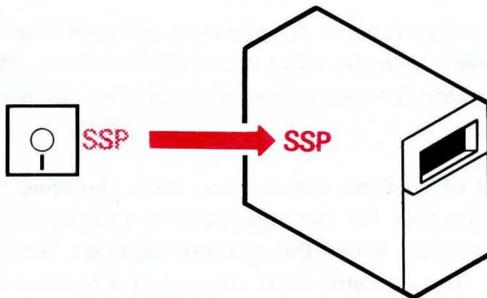
The next programs to be loaded are the program products (PP).

SSP
PP
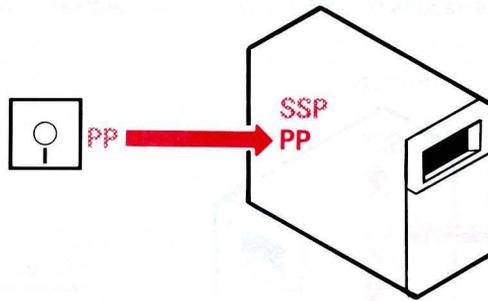
System/34 is now ready to accept the customer program (CP). The customer program is a set of instructions that directs the flow of information and the processing steps for the job. A programmer can write this program in a programming language (such as RPG II, FORTRAN IV, COBOL, or basic assembler) or develop the program using the other program products. After the programmer writes the program, an operator enters the program into the system.

SSP
PP
CP
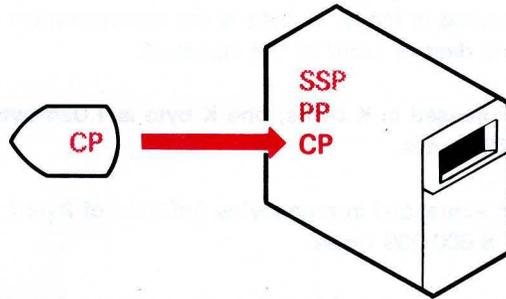
The program product (PP) then translates the customer program (CP) into machine instructions (an executable user program) that System/34 and the SSP can execute.

SSP
PP
CP
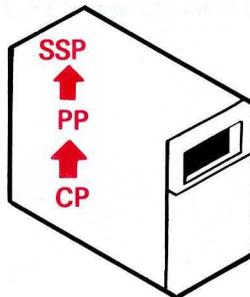
The SSP can now supervise data processing; that is, it can accept information into the system (INPUT), process the information with the customer program (CP), and then generate the results (OUTPUT) which the hardware produces.
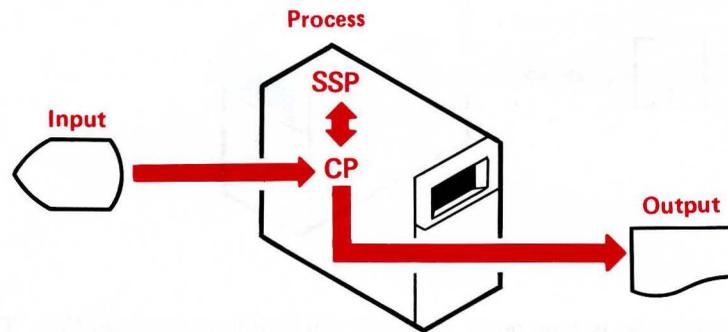
System/34 Storage

System/34 has three types of storage: main storage, disk, and diskette. Storage capacities are measured in bytes. A byte is the representation of one character (such as a numeric digit or letter of the alphabet).

Main storage capacity is expressed in K bytes; one K byte is 1,024 bytes. For example, 32K bytes is 32,768 bytes.

A disk's storage capacity is expressed in megabytes (millions of bytes); for example, 8.6 megabytes is 8,600,000 bytes.

A diskette's storage capacity is expressed in bytes; for example, 246,272 bytes. A diskette's format (the arrangement of data on the surface of the diskette) is expressed in bytes per sector. (A sector is the area of a diskette that contains one unit of data or one record.) For example, 128-byte format indicates that each sector on this diskette contains 128 bytes.

Chapter 3 further describes main storage, disk, and diskette.

Chapter 2. System/34 Business Applicability

System/34 can perform effectively in a variety of environments. As your business grows, System/34 grows with you.

SYSTEM OPERATING ENVIRONMENTS

System/34 can operate in:

- A centralized environment, where all System/34 equipment and operators are concentrated in one location

- A work station environment, where one or more operator devices are located away from the system unit

- A distributed data processing environment, where System/34 communicates with remote devices or systems.

This chapter describes these environments generally. The *Planning Guide* further describes System/34 operating environments and requirements for each.

Centralized Environments

In centralized data processing environments, all data processing occurs in one location. Most centralized environments are batch operating environments; that is, the system processes a batch of data as opposed to individual transactions or records. A centralized environment requires only one printer and one display station, and usually only one job runs at a time. However, some centralized systems may have additional display stations and printers and options, such as multiprogramming and print spooling. Chapter 4 describes multiprogramming and print spooling.

In centralized (batch) data processing, the processing area (department) receives the input, in its original form, from the originating area. Operators in the processing area then enter the input into the system either (1) via work stations or (2) via diskettes created on a separate key entry device, such as a 3741 Data Entry Station. Then the system processes the input and produces the desired output for distribution to the functional area that needs it.

Some applications require centralized data processing because of the nature of the job or because this environment (1) is easier to implement and operate, and (2) provides efficient processing with centralized control. A centralized environment also provides a base from which you can expand to a work station data processing environment.

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Work Station Environments

Work station environments bring the capabilities of the system to the user, rather than bringing the user's data to the system. Work station environments generally are more flexible in their operations. Multiple users can enter and retrieve data concurrently, which gives them the information when and where they need it. System/34 offers you the capability to add such devices as display stations and printers as work stations.

A major advantage of work stations is that the different areas using the system do not have to transfer information among themselves. They all have access to the most current, correct information in the system. Direct entry of the data from a work station reduces transcribing and transferring forms and documents. For example, if you update your inventory as it changes, current inventory information is always available instead of being days or weeks out of date. By reducing obsolete data, work stations reduce the possibility of data processing errors and business procedure errors.

By bringing the capabilities of the system to the user, work stations improve service to your customers. With work stations, you can update your files as changes occur, providing accurate information quickly. You can also start processing information sooner, providing better service to your customers. For example, if you enter an order when and where you receive it, you can process it more quickly and provide faster service to your customers.

Another advantage of work stations is that they reduce errors in the handling of data. With work stations, the people who use the data enter it; these people can more easily discover and correct errors than can users in a central data processing area.

You can use display stations as work stations, and you can use them for inquiry, data entry, and job processing.

Inquiry

In inquiry, a display station operator asks the system for information contained in a disk file (for example, an inventory file). An operator can use inquiry to obtain file information that provides immediate answers for particular business situations. Inquiry can run concurrently with other tasks in the system.
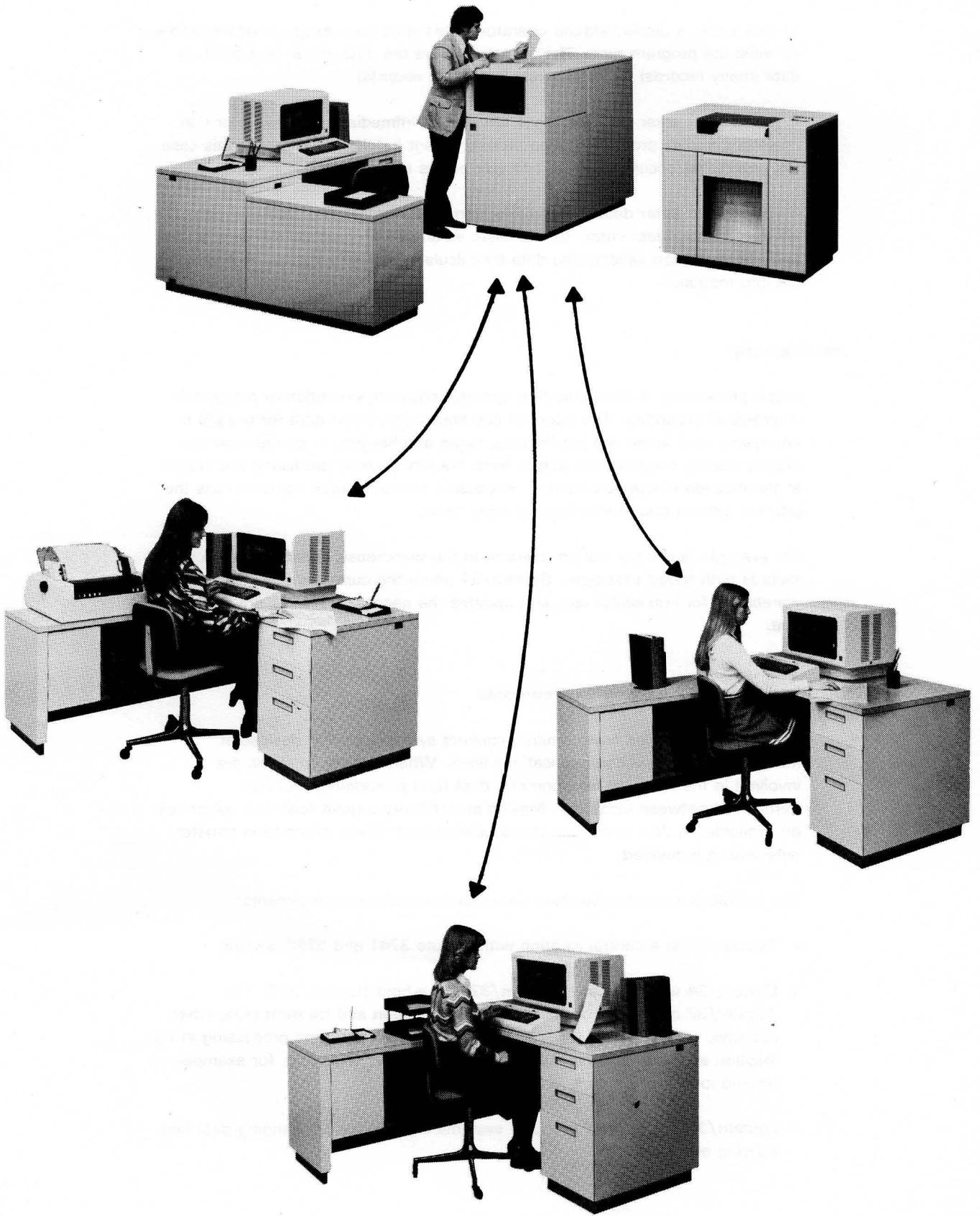
Data Entry

In data entry, a display station operator enters data for a program either before or while the program runs. The operator enters the data either as a batch of data (many records) or interactively (individual records).

If you have to enter data that does not require immediate processing or that requires complex processing, you probably want batch data entry. In this case, the processing occurs after the operator enters all the data.

If you have to enter data that requires immediate processing, you probably want interactive data entry. In this case, as an operator enters the data, a data entry program can validate the data by calculations, comparisons, or displaying file information.

Job Processing

In job processing, a display station operator requests execution of a program or group of programs. The operator can start a job, enter data for the job if necessary, and, when the job finishes, begin another job. A printer near the display station can print the output from the job, thereby producing the output at the location where you need it. Because a display station operator runs the job, the system operator is free for other tasks.

For example, a display station operator in the warehouse updates the stock records with today's receipts. System/34 prints the current stock status in the warehouse for immediate use, and updates the necessary files at the system unit.

Distributed Data Processing Environments

Data communications environments connect systems and/or devices at multiple locations via communications lines. When remote locations are involved in the business environment, data (and processing) must be transferred between locations. Mailing and delivery require time that might not be available. A data communications environment offers information transfer whenever it is needed.

The following examples illustrate data communications environments:

* System/34 at a central location with remote 3741 and 5250 devices.

* System/34 with a remote System/32 and a host System/370. The System/32 can perform processing at its location and transmit data, when required, to the System/34. The System/34 also performs processing at its location and then communicates with the System/370 using, for example, remote job entry support.

* System/34 as part of a group of systems and devices exchanging data and running programs.

Data Base

Host System:
S/370
S/34
S/3

3262/5211 Printer

5340 System Unit

5251 Display Station

5251 Display Station
(model 1 or model 11)

5256 Printer

5251 Display Station
(model 2 or model 12)

5252 Display Station
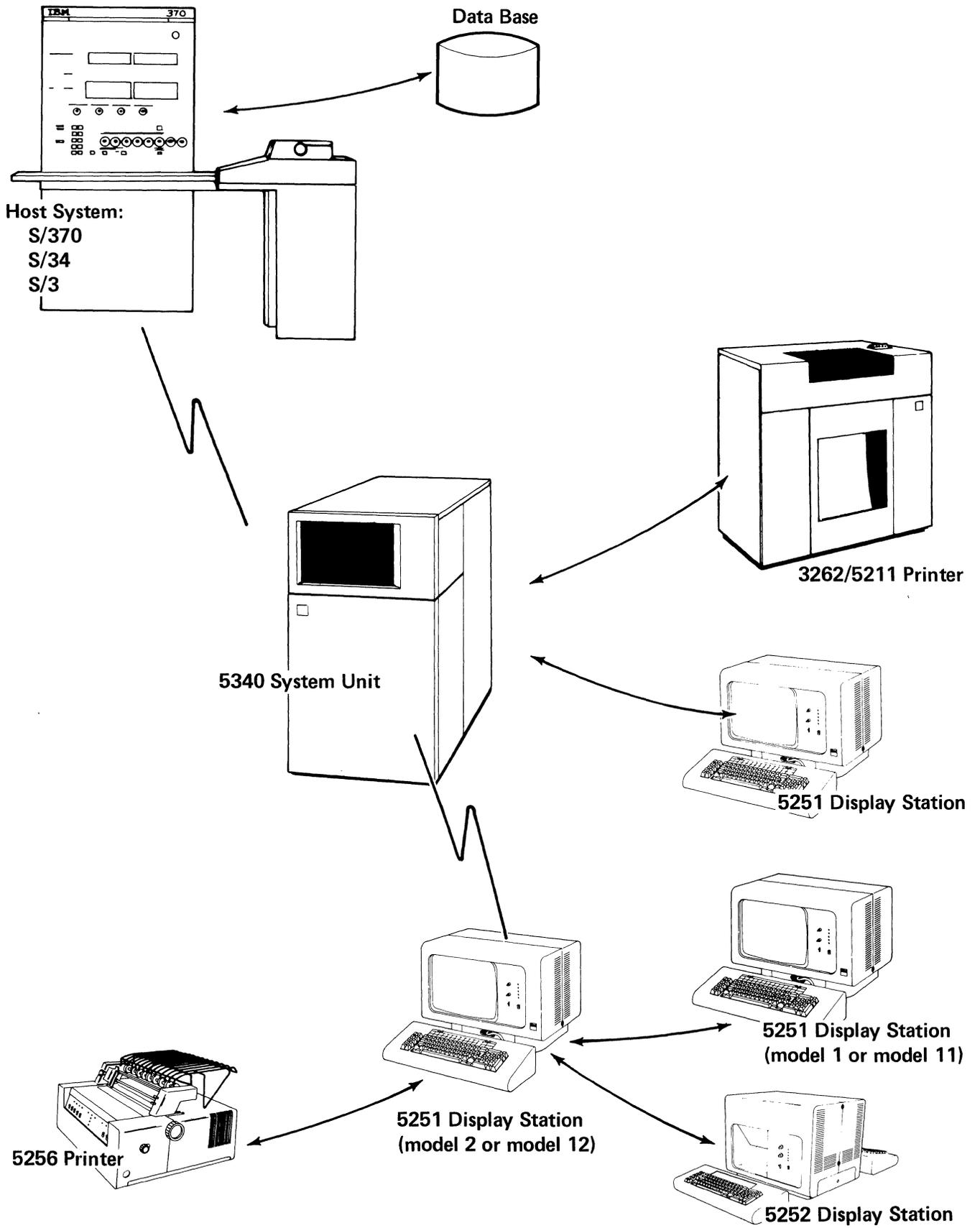
GROWTH CAPABILITIES

As the data processing needs of your business change and grow, you need a system that can also change and grow. System/34 offers you a variety of functions and devices which provide excellent opportunity for growth. This means that you can expand your system in function and capacity as your immediate data processing needs expand; and you can also plan and implement your long-range objectives without great disruption of your business operations.

System Hardware

You can change your System/34 devices to meet the demand for increased capacity and performance. The disk, diskette, printer, and main storage all have growth capabilities needed to meet your increasing requirements. Chapter 3 describes all the System/34 hardware in detail.

When the number of your applications increases and your data files grow larger and more numerous, you can increase disk storage capacity. Disk storage varies from approximately 8.6 million bytes to approximately 128.4 million bytes.

As you store more data and programs on disk and, therefore, you need to store more information, faster, on diskettes, you can get diskettes with greater capacity. Diskette capacities vary from approximately 246,000 bytes to approximately 1,200,000 bytes.

As you process more diskettes on your System/34, the optional diskette magazine drive can decrease the time spent handling them. While under program control, the diskette magazine drive can process up to 20 diskettes (in two magazines) or 3 individual diskettes without manual intervention.

As your printing needs increase, you can get either a faster printer or additional printers. Printing speeds vary from 40 characters per second to 650 lines per minute.

When your processing needs increase, you might want options such as additional work stations, multiprogramming, or data communications (all described in this chapter). To use these options more effectively, you may need to increase your main storage capacity. Main storage capacity varies from 32K bytes to 128K bytes.

Work Stations (Local and Remote)

A work station is any device that allows a user to transmit data to or receive data from a computer, or both. (The devices communicate via directly attached cables and/or via communications lines, depending on the location of the specific device.) Work stations can include the following devices:

- 5251 Display Station (Models 1, 2, 11, and 12)

- 5252 Dual Display Station

- 5256 Printer (Models 1, 2, and 3)

- Other devices, such as 3741 Data Entry Station (Models 2 and 4)

Local Work Stations

Four cable connectors are provided on the system unit to enable work stations up to 1520 meters (5000 feet) from the system unit to be directly attached to the system unit. The first connector must be dedicated to the attachment of a display station to be used as the system console. A 6-meter (20-foot) cable is provided for this attachment. The remaining connectors may be used to directly attach the 5251 Model 1 and 11 Display Stations, the 5252 Dual Display Stations, and the 5256 Printers (Models 1, 2, and 3) to the system unit.

A Cable Thru feature, which is available on each of these work stations, enables up to seven local work stations to be attached to the system unit by means of a single system cable. The maximum number of local work stations that can be attached to the system unit (including the system console, and a 5256 system printer) is 8. If you add Work Station Control Expansion B, the maximum is 16. A 5252 Dual Display Station counts as two stations because it has two keyboards.

The 5251 Models 2 and 12 Display Stations use communications lines and SNA protocol to communicate with System/34.

By adding a Cluster feature, you can attach up to four additional work stations to a remote work station. A Dual Cluster feature is also available. The Dual Cluster feature allows you to attach up to eight additional work stations to a remote work station. The cluster features are mutually exclusive. The additional work stations can be up to 1520 meters (5000 feet) from the remote work station.

A maximum of 64 devices (remote work stations and work stations attached to remote work stations) can be addressed over communications lines by the System/34.

The following are the work stations that attach to the remote work stations:
- 5251 Display Station, Models 1 and 11
- 525? Dual Display Station
- 5256 Printer

The System/34 can also have other devices, such as the 3741 Data Entry Station, attached via communications lines.

Multiprogramming

Multiprogramming allows the system to run more than one job concurrently. As your business grows and you run more jobs that require more efficient use of the processing unit, you can use multiprogramming so that one job runs while another job waits for data. Chapter 4 describes System/34 multiprogramming.

Data Communications

To further enhance your System/34, you can add up to two communications adapter features. Each adapter allows you to add one communications line to your System/34. The communications lines allow your system to communicate with another System/34 and to run jobs and exchange data with a larger system. The communications lines also allow you to exchange data with such devices as a 3741 Data Entry Station, a System/32, or remote work stations.

Remote work stations use communications lines to connect to System/34 using SNA and SDLC. Remote work stations allow you to operate interactively with the System/34 just as with local work stations.

The advantage of data communications is that you can communicate with a device at virtually any location. Since the communications adapter can use telephone lines, you can set up data communications any place a telephone line is accessible.

See *Communications Adapter* in Chapter 3 for more information on the System/34 communications hardware, and see *Data Communications* in Chapter 4 for information on the System/34 programming support.

This chapter describes the IBM equipment that comes with System/34 and the IBM equipment that you can add to System/34.

SYSTEM UNIT

Processing Unit

Every System/34 has a processing unit housed within the 5340 System Unit.
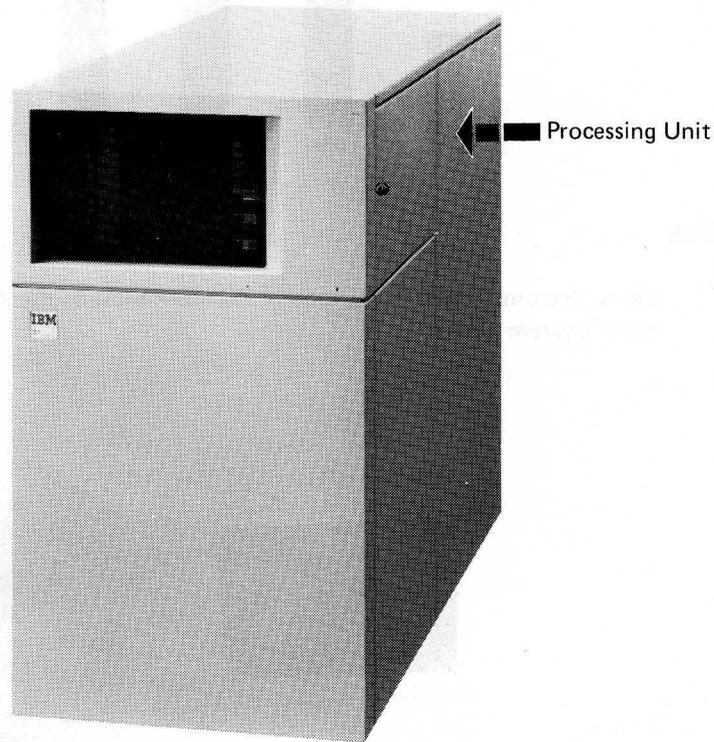
◄■ Processing Unit

The System/34 processing unit contains processors, which control the system, and main storage. Main storage contains the IBM-written programs (described in Chapter 4) and user programs that the system brings in from disk for execution.

Every System/34 has a minimum of 32K (32,768) bytes of main storage. You can obtain additional main storage to increase the capacity to 48K (49,152), 64K (65,536), 96K (98,304), or 128K (131,072) bytes. The amount of main storage available for user programs depends on the amount of storage required by the SSP functions (such as print spooling and multiprogramming) you implement on the system. (See the *Planning Guide*, GC21-5154, for detailed information on the available main storage for user programs.)

Main Storage

32K 48K 64K 96K 128K
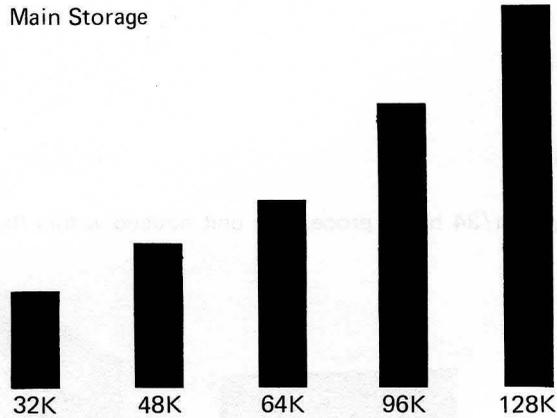
Disk

Every System/34 has either one or two disk storage devices housed within the 5340 System Unit.
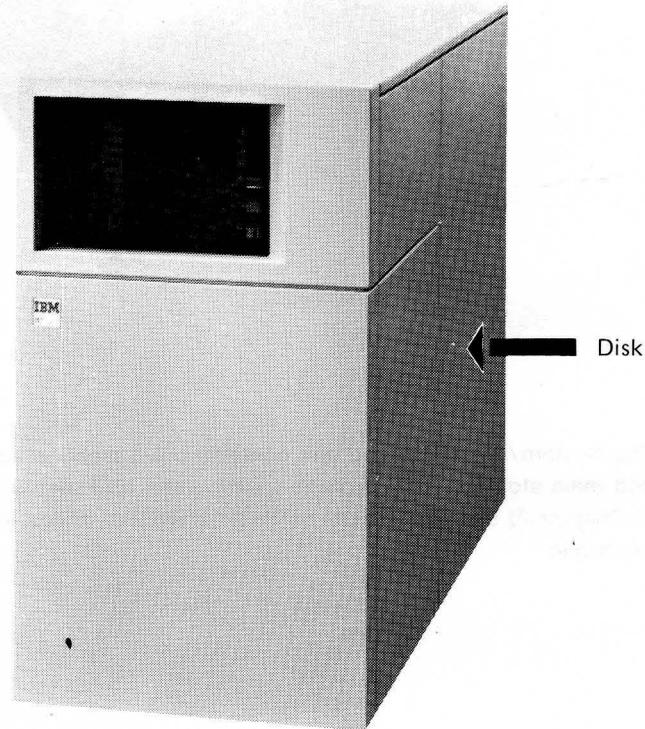
Disk

The disk provides quick-access magnetic storage for programs and data files. Disk storage has five *approximate* capacities:

- 8,600,000 bytes (8.6 megabytes)

- 13,200,000 bytes (13.2 megabytes)

- 27,100,000 bytes (27.1 megabytes, two disk storage devices)

- 63,900,000 bytes (63.9 megabytes)

- 128,400,000 bytes (128.4 megabytes, two disk storage devices)

These capacities represent space available for all programs and data files, including program products and system files. The space available for your programs and data files depends on the space required by the program products and the functions (such as print spooling and multiprogramming) you implement on the system.

The following chart relates access time to capacity:

Capacity in megabytes
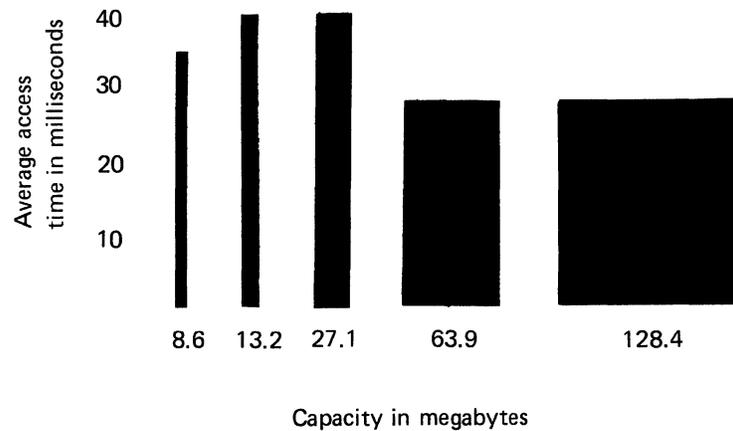
Diskette

A diskette is a thin, flexible magnetic disk enclosed permanently in a protective jacket. To use diskettes, you insert them in the diskette drive on the front of the 5340 System Unit.
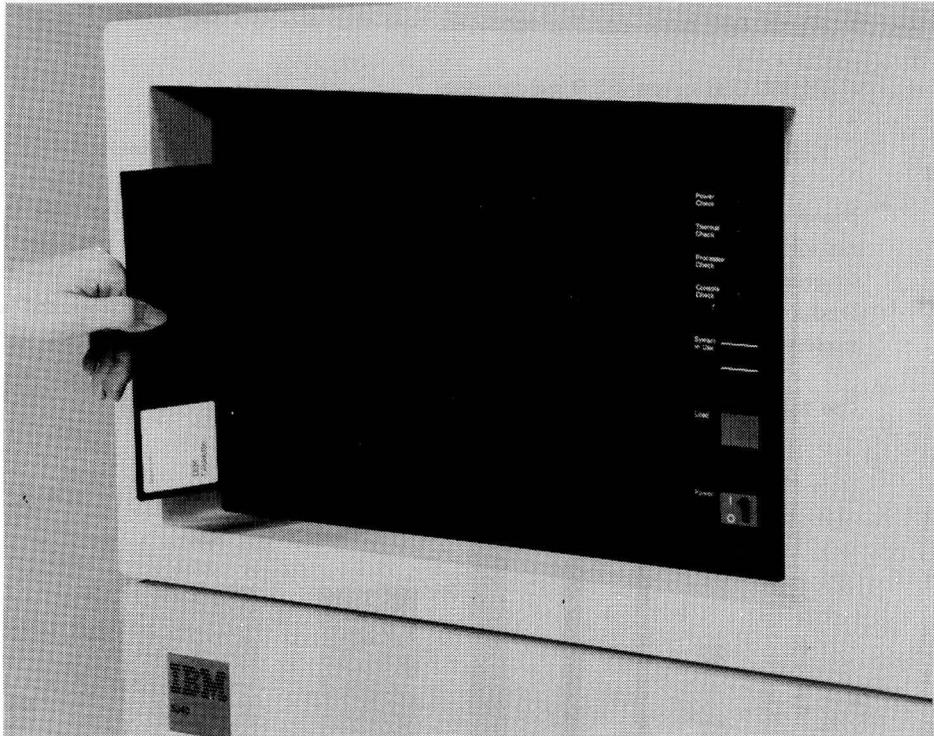
The diskette provides disk storage backup and separate storage of data that might otherwise take up needed space on the disk. Before you can process data or execute a program that is on diskette, you must move the data or program onto disk. Once you have moved the data or program onto disk you can leave it there. Diskettes can also provide input from another device or system that uses diskettes, such as a 3741 Data Entry Station.

System/34 offers Diskette 1 and Diskette 2D diskettes, with each type having two formats. A Diskette 1 in the 128-byte format can contain 246,272 bytes of data; in the 512-byte format, it can contain 303,104 bytes of data.

The Diskette 2D, in addition to having two recording surfaces, is a double-density diskette; that is, it contains twice as much information in the same area as a single-density diskette. In the 256-byte format, Diskette 2D can contain 985,088 bytes of data; in the 1,024-byte format, it can contain 1,212,416 bytes of data. The largest capacity diskette stores more than four times more data than the smallest capacity diskette. Larger capacity diskettes also decrease the time required to transfer data files to or from the disk.

	Diskette 1	Diskette 2D	

```
Diskette 1      |   Diskette 2D

                |              ■    1,200,000

                |                   1,000,000
                |         ■
                |                     800,000

                |                     600,000

                |                     400,000
       ■    ■   |         ■    ■      200,000
      128  512  |        256  1024
```
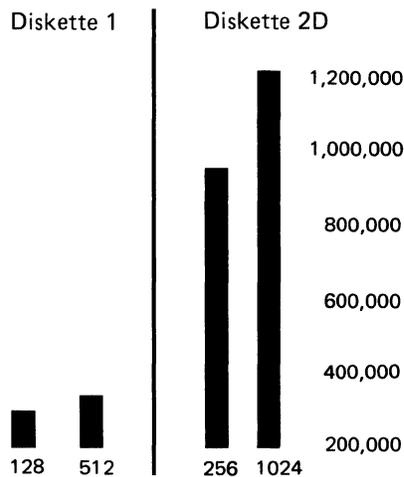
You can exchange Diskette 1's between two System/34's or between System/34 and other systems or devices that produce compatible diskettes (for example, System/32). Diskettes are compact and easy to store, and you can mail them to other locations. Diskettes are a reliable storage medium that many other systems and devices use. These qualities—reliability, compactness, and exchangeability—and the choice of capacities combine to make diskettes an efficient and versatile data storage medium.

The two types of diskettes (Diskette 1 and Diskette 2D) require different drive mechanisms for reading and writing. The drive for Diskette 2D can also read and write a Diskette 1; the drive for the Diskette 1, however, can read and write only Diskette 1.

System/34 has an optional diskette magazine drive that can read from and write on Diskette 1 and Diskette 2D. The diskette magazine drive has five slots; two of them hold magazines and three hold individual diskettes. A magazine is a container that holds up to 10 diskettes.

The diskette magazine drive is a sequential save/restore device. Typically, processing begins with the first diskette in the first magazine slot and automatically proceeds, diskette by diskette, through the first magazine, then on to the second. The three individual diskette slots can be used for smaller jobs such as 3740 data entry. Processing of two or three individual diskettes can also take place without operator intervention.

Up to 24 megabytes of data can be written on two magazines before operator intervention is required.

The time required to save a data file or an entire disk is greatly reduced with the diskette magazine drive because its data transfer rate is twice as fast as the fastest version of the single diskette drive.

PRINTERS

Each System/34 requires one printer. The two types of printers available are the 5211 or 3262 Line Printer and the 5256 Character Printer. Either type can serve as the system printer. You can address up to fifteen 5256 Printers attached to the system unit (including the system printer if it is a 5256) and up to fifty-six 5256 Printers attached to remote display stations (see *Work Stations* in Chapter 2). The data rate of your communications equipment must be considered when you determine the number of remote printers to be used. For each job, you can specify whether to print the results on the system printer or on another printer. Both types of printers offer you a choice of printing speeds and forms sizes, thus providing both flexibility and growth potential.

The characteristics of the System/34 printers are as follows:

	5211	**3262**	**5256**
Characters per line:	132	132	132
Lines per 25.4 mm (one inch):	6 or 8	6 or 8	6 or 8
Speed:	160 or 300 lines per minute	650 lines per minute	40, 80, or 120 characters per second
Character set:	38, 42, 48, 64, 96, or 188	48, 64, 96, or 188	96 or 188

The outward appearance of the 5211 and 3262 Printers is similar.

Both the 5211 Printer and the 3262 Printer are line printers; that is, they print one complete line at a time, using up to 132 characters per line. Speeds of the 5211 and the 3262 will vary depending on character set size, the number of characters, and the form skips associated with the output to be printed. The printers can print an original copy with up to five carbon copies using paper from 3.5 inches to 15.25 inches wide (16 inches wide on the 3262) and from 3 inches to 14 inches long.

The printers use flexible steel print belts that are easily changed by the operator. These inexpensive belts provide a range of character sets and print speeds. The 5211 Printer has interchangeable print belts with 38, 42, 48, 64, 96, or 188 graphic characters. The 3262 Printer has interchangeable print belts with 48, 64, 96, or 188 graphic characters. The 188-character Multinational print belt contains special and accented characters, such as u, ü, U, and Ü.

Note: The 5211 and 3262 print belts are not interchangeable.

The 5211 and the 3262 also have translation capability, which lets you combine characters when speed rather than accenting is important. In the preceding example, u, ü, U, and Ü can all be equated to a single representation (U) in a translation table. The translation capability also lets you print, for example, all uppercase when the data is both uppercase and lowercase. An uppercase only print belt allows faster printing.

You can order a 5211 Printer with a maximum print speed of either 160 or 300 lines per minute or a 3262 Printer with a maximum print speed of 650 lines per minute. (See *Form Design Reference Guide for Printers*, GA24-3488, for detailed information about forms design.)

Note: A numeric print belt (13 characters on a 48-character belt) can be used in conjunction with the 5211 Printer Model 2 (300 lines per minute) to support the OCR numeric A- and B-fonts. Printed output can be read by the IBM 3886 Optical Character Reader.

5256 Printer
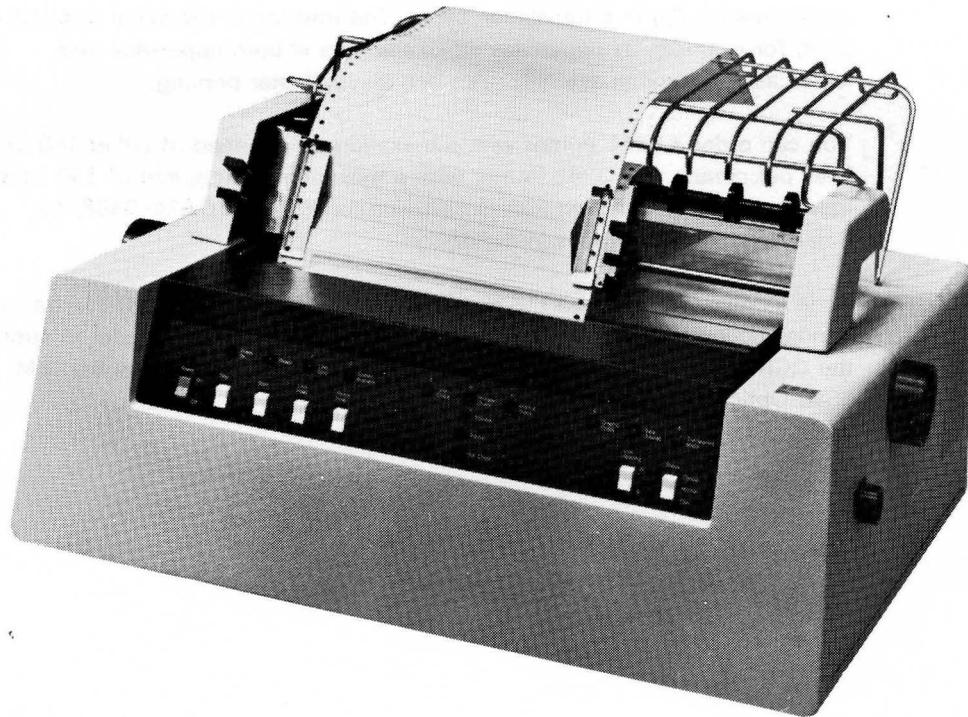
The 5256 Printer is a serial printer; that is, it prints one character at a time and prints bidirectionally (left to right and right to left). It can print an original with up to five carbon copies. The 5256 Printer can print on continuous forms and on individual, precut forms. The precut forms can vary from 6 inches to 14-1/2 inches wide and from 3 inches to 14 inches long. The continuous forms can vary from 3 inches to 15 inches wide and from 3 inches to 14 inches long. (See *Form Design Reference Guide for Printers*, GA24-3488, for detailed information about forms design.) The 5256 prints up to 132 characters per line at either 6 or 8 lines per inch. The character set consists of 96 graphic characters. (A multinational character set is also available. For additional information, see the index entry *multinational character set*.) You can order 5256 Printers (Models 1, 2, and 3) with a maximum print speed of 40, 80, or 120 characters per second, respectively. The average printing rate depends on the format of the printed data on the page. For example, if all of the lines have 120 characters in positions 1 through 120, the respective printing speeds are approximately 20, 40, and 60 lines per minute.

5251 DISPLAY STATION

The 5251 Display Station is offered in four models:

- Model 1 is a local work station with a 960-character display.

- Model 2 is a remote communicating work station with a 960-character display.

- Model 11 is a local work station with a 1,920-character display.

- Model 12 is a remote communicating work station with a 1,920-character display.

Models 1 and 11 may also be attached to remote Models 2 and 12.

Every System/34 requires one 5251 Display Station (Model 1 or 11) or one half of a 5252, which functions as the system console; using this system console, the system operator controls the system and receives system messages. This display station can also be used to enter data. The maximum number of local work stations is eight (16 can be attached when Work Station Control Expansion B is used). The maximum number of remote work stations, including work stations attached to remote work stations, is 64. The local work stations and the remote work stations can operate concurrently with the system console (see *Work Stations* in Chapter 2). The ability to add display stations as work stations provides great growth potential and accommodates a variety of operating environments. With the Keylock feature, you can lock the display stations to discourage unauthorized persons from using them.

A Magnetic Stripe Reader, which is available for all models of the display station, provides the capability of reading numeric encoded information from a magnetic stripe. The stripe may be used on a wide range of credit cards, operator identification badges, and other magnetically encoded documents. The magnetic stripe may be encoded with up to 128 ABA numeric characters, including control characters.

Work Station Control Expansion A is required when a Magnetic Stripe Reader is attached to any local display station (5251 Models 1 or 11, or 5252). The Expanded Function feature is required on any remote display station (5251 Models 2 or 12) that has a Magnetic Stripe Reader or has a Magnetic Stripe Reader on any attached display station. Two Magnetic Stripe Readers can be attached to a 5252.

Note: Work Station Control Expansion A is not required if Work Station Control Expansion B is on the system.

5252 DUAL DISPLAY STATION

The 5252 Dual Display Station is functionally equivalent to two 5251 Display Station Model 1s. The 5252 screen has a capacity of 960 characters arranged in 12 rows of 80 characters each. The 5252 Dual Display Station has two display screens and two keyboards. Each screen/keyboard acts as an independent unit. The 5252 is attached to the system unit or attached to a remote display station. One-half of a 5252 attached to the system unit can be the system console.

Keyboard (5251/5252 Display Stations)

An operator enters data, control information, and requests for system functions from the keyboard. The keyboard consists of:

• Typewriter-like keys to enter alphabetic and numeric data
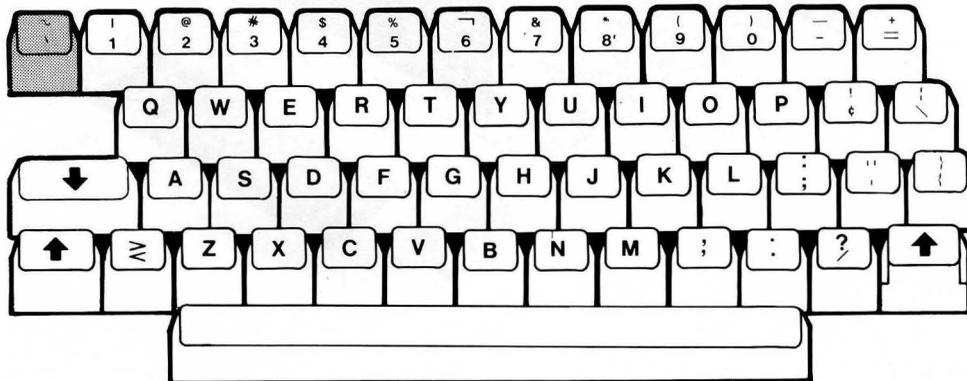
Note: With the Multinational Character Set feature, entering the tilde (~) or grave accent (`) will cause that character and the following character to be combined and later displayed as an accented character.

Pressing the CMD key and then the grave accent key allows you to enter the hexadecimal value of any valid character.

- Numeric keys in an adding machine format for high-speed entry of numeric data
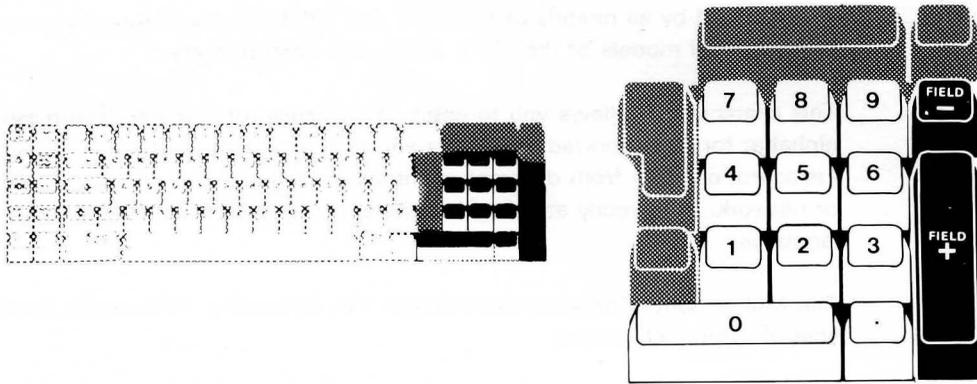
- Function control keys to request system functions

- Cursor positioning keys
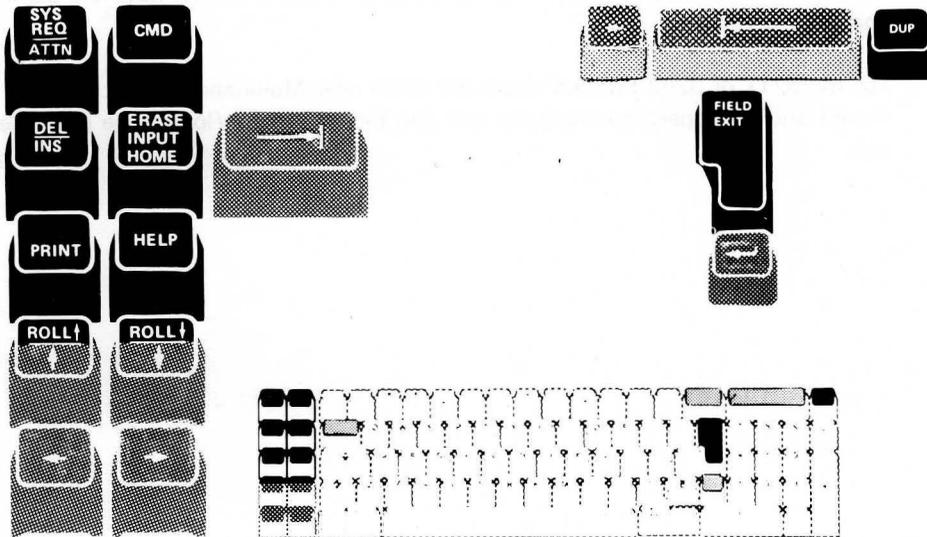
In addition, using the SSP, the operator can use the upper row of typewriter-like keys as command function keys. In this way, the operator can execute a particular program function by pressing the command key and the proper key (in upper or lowercase).

A 188-character Multinational Character Set is available; these characters can be displayed by all models of the 5251 and 5252 Display Stations and can be printed by all models of the 5211, 3262, and 5256 printers.

This character set allows you to enter and process a full upper/lowercase alphabet for all supported languages and allows a mixture of keyboard/displays from different countries or languages on the same system or network. All directly attached keyboard/displays must be of the same language.
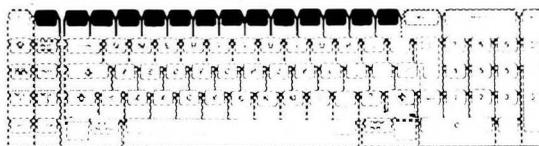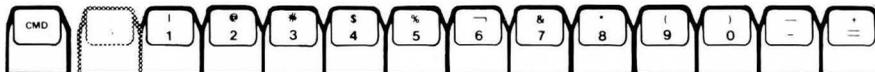
The Multinational Character Set includes 112 alphabetic, 10 numeric, and 66 special symbol characters.

Data conversion is required for most applications that communicate or transfer data with systems and/or machines that do not have the multinational character set.

Multinational Control on the 5340 is required to use the Multinational Character Set on local work stations. All work stations on a system must have the same character set.

For the 5211 or 3262 Printers, there are three new Multinational print belts: the 64 and 96 uppercase character belt and the 188 upper/lowercase character belt.

Display Screen (5251/5252 Display Stations)

The display screen is similar to a television screen and is designed to assist the operator. It displays input data (as an operator keys it), output, data files, and operator messages.

The display screen available can display a maximum of 960 characters arranged in 12 rows with 80 characters per row (5251 Display Stations Models 1 and 2 and the 5252 Dual Display Station) or a maximum of 1,920 characters arranged in 24 rows with 80 characters per row (5251 Display Stations Models 11 and 12). User programs can define special displays such as high-intensity fields, reverse-image fields (dark characters on lighted background), and blinking fields. Such displays draw the operator's attention to important information. Multinational (accented) characters can also be displayed.

For additional information on these display stations, see *5250 Information Display System Introduction*.

COMMUNICATIONS ADAPTER

A communications adapter allows System/34 to communicate with other systems or devices via BSC (binary synchronous communications) or SDLC (synchronous data link control), depending on program control. With a communications adapter and the system support program product, System/34 becomes part of a communications network. That is, System/34 transmits and receives information over communications lines attached to other systems or devices. System/34 can have one or two communications adapters.

The following illustration shows one of the possible combinations of uses for two communications adapters.
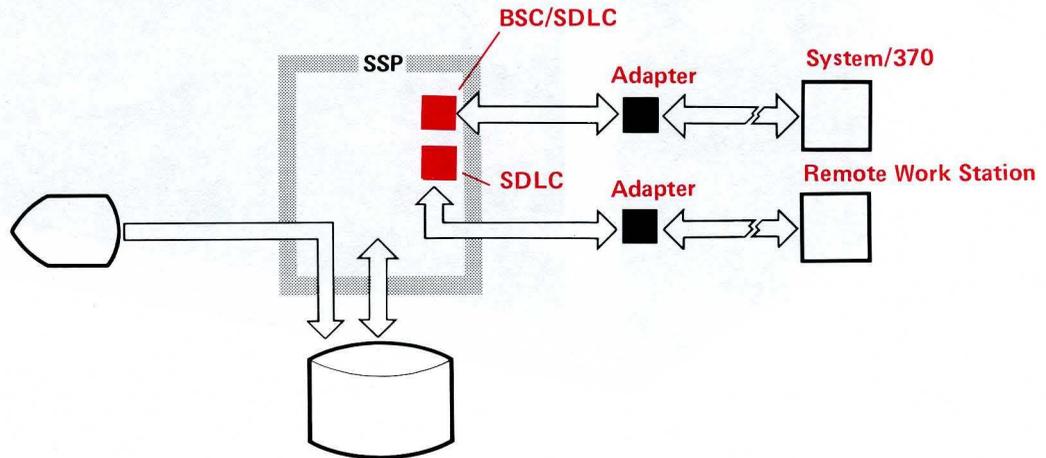
The communications adapters can use half-duplex communication (one direction at a time), with either two-wire or four-wire facilities. Each communications adapter supports data rates from 600 to 9,600 bits per second (8 bits equal 1 byte). The maximum data rate flow with both lines operating concurrently is 9,600 bits per second.

The ability to communicate with other systems and add remote work stations helps your system change and grow as your processing needs change and grow.

1255 MAGNETIC CHARACTER READER
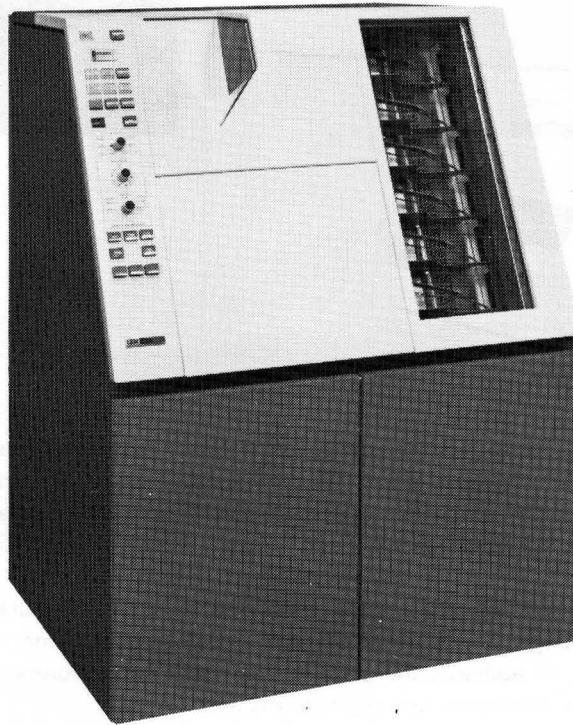
The 1255 Magnetic Character Reader reads and sorts documents that are inscribed with magnetic ink (for example, checks). The 1255 is designed for banking and finance applications. System/34, together with a 1255, provides an economical processing system to support the requirements of small and medium-sized banks, as well as branch banks of large banking systems.

The 1255 has the following characteristics:

- Reads and validates the magnetic ink inscribed data line characters as defined by the attaching system's application program

- Processes mixed paper and card documents

- Reads and/or sorts at the following rates:
  - Model 1: up to 500 6-inch documents per minute into six stackers
  - Model 2: up to 750 6-inch documents per minute into six stackers
  - Model 3: up to 750 6-inch documents per minute into 12 stackers

Note: Actual sorting and processing speeds of all three models depends on the length of the document and the complexity of the program. For more information concerning the 1255 and its programming, see *IBM 1255 Models 1, 2, and 3 Magnetic Character Reader Component Description,* GA21-3542 and *IBM System/34 1255 Magnetic Character Reader Reference Manual,* SC21-7740.

5260 RETAIL SYSTEM
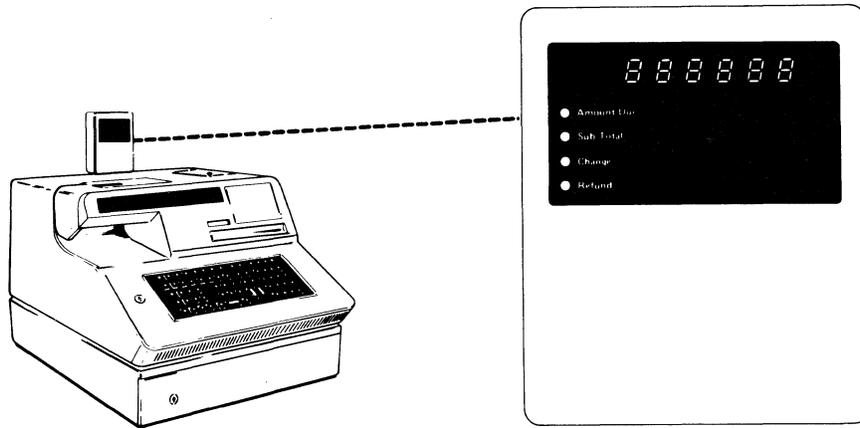
The IBM 5260 Retail System consists of point-of-sale terminals that help provide data processing answers for the operational and accounting areas of retailing. Point-of-sale terminals provide traditional cash register functions as well as data collection capabilities.

The terminal provides cash register functions, such as accumulating totals, calculating change, printing cash receipts or sales checks, and maintaining control totals. In addition, the point-of-sale terminal performs calculations, such as taxes, discounts, and quantity prices.

As a point-of-sale collection device, the terminal gathers timely information about transactions as they take place. The collected information is valuable for such things as controlling inventory and calculating commissions. Data collected on the terminal is stored on a diskette. The information accumulated on the diskette can be sent to the System/34 by means of a 5260 data communications feature, or the diskette can be entered directly into the System/34 for processing.

Chapter 4. System/34 Program Products

IBM System/34 program products are licensed programs that help you make maximum use of System/34. Program products satisfy specific data processing requirements (for example, sort a file or compile a program). This chapter describes the following System/34 program products and their uses:

- System support program product

- Utilities program product

- RPG II

- FORTRAN IV

- COBOL X3.23-1968 (PRPQ)

- COBOL X3.23-1974

- Basic assembler and macro processor

- Work station support subroutines (PRPQ)

The licensed program design objectives contain additional information on each program product (see *Related Publications* in the *Preface*).

SYSTEM SUPPORT PROGRAM PRODUCT

The SSP (system support program product) provides the basic data processing and control functions for System/34. The SSP executes programs, processes commands and data from display stations, manages the disk and diskette, and sends requested information to the printer(s) and display screen(s). All other System/34 program products are designed to operate in an environment that includes the System/34 SSP or its equivalent. The SSP also supports the operator/system interface that Chapter 5 describes.

In addition, the SSP can also:

- Provide operator and programmer guidance through the optional help function

- Control and manage the 1255 Magnetic Character Reader (described in Chapter 3)

- Run more than one job at a time (multiprogramming)

- Save information for later printing instead of waiting for the printer(s) (print spooling)

- Allow an operator to enter a job and to continue work without waiting for the job to run (input job queue)

- Restrict the use of the system by unauthorized persons (security)

- Restrict access to data files and/or program libraries (security)

- Allow an operator to initiate jobs only from specific job menus (security)

- Support two communications lines that can communicate concurrently with remote systems or devices (data communications)

- Provide remote work stations (data communications)

- Perform some basic functions, such as deleting or copying a file (system utilities)

- Prepare FORTRAN IV, COBOL, and basic assembler programs for execution (overlay linkage editor)

The following paragraphs describe these optional functions (except 1255) in more detail.

Help Function

Help is an optional SSP utility that aids the operator in executing many of the System/34 functions. The help function prompts the operator to enter the correct parameters to run the SSP, utility programs, programming languages, data communications, and service aids procedures. In addition, help provides descriptive text for SSP commands, OCL statements, and procedure control expressions.

The help function operates on both the 1920- and the 960-character display screen.

Many of the procedures now on the System/34 require the operator to enter from 1 to 10 parameters in a specified order. The help function prompts the operator to enter the correct parameters in their proper order. Help also provides a convenient reference for system commands, OCL statements, and procedure control expressions.

The operator evokes the help utility either by pressing the HELP key while the display station is in the command mode or by entering the name HELP on the display screen.

Specific help can be requested by keying the word HELP, a space, and the name of the procedure command for which prompting is desired; for example, HELP FROMLIBR may be keyed.

Multiprogramming

System/34 can run more than one job at a time via a capability called *multiprogramming*, which you use in conjunction with the SSP.

As you run more jobs, you require more efficient use of the processing unit. But when a system processes jobs consecutively, the processing unit may have to wait for completion of input and output operations. Input and output operations take a much longer time to execute than processing operations because they rely on mechanical devices. Multiprogramming reduces the processing unit waiting time.

In System/34 multiprogramming, more than one program can reside in main storage, and more than one program can execute concurrently. While one program waits for input or output to complete, another program executes instructions. For example, a job may begin executing and, while it waits for the printer to print, the system might start executing instructions from another job.

When the printer finishes printing and the second job waits for input or output, the system continues processing the first job.

When the system waits, as the previous paragraph describes, and the next program requires more storage than that already available, the system can remove a program from main storage and save it on disk (swap it out). For example, when both program A and program B wait for output to complete, and program C is ready to begin execution, the system swaps out program A.
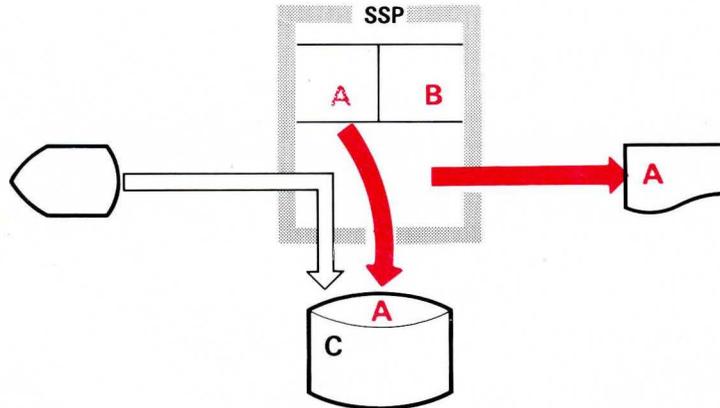
The SSP can then start processing program C in the main storage area formerly occupied by the swapped-out program A.
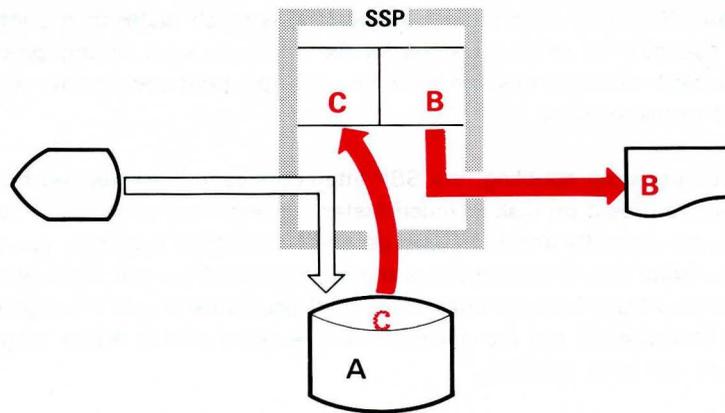
When program C finishes processing or waits, the system swaps program A back in and program A continues processing. Swapping can provide more efficient use of storage and the processing unit, because the processing unit spends less time waiting and more time running, enabling you to get increased production from your system.

When you have work stations, you probably want multiprogramming. Work station requests can share the available time of the processing unit with each other and with the jobs executing from the central data processing area.

Print Spooling

System/34 can save printer output on disk for later printing via an SSP capability called *print spooling*.

When your processing needs increase, efficient job execution becomes more important. But since main storage processing is much faster than printing, the system spends a lot of time waiting for the printer to print already processed data. To help minimize this lost time, you can use print spooling for any printer attached to the system.

When you use print spooling, the SSP intercepts each line intended for a printer and stores it on disk (a much faster process than printing). If you run two jobs concurrently and both jobs generate output for a printer, you can spool the print data from one job and print the data from the other or spool the print data from both for later printing. If programs A and B are going to execute concurrently and are going to use the same printer, either program A or B must use print spooling.

For example, the SSP has completed processing job B and is now ready to print the output, but the system printer is busy with job A. At the same time, job C is ready for input to the processor.
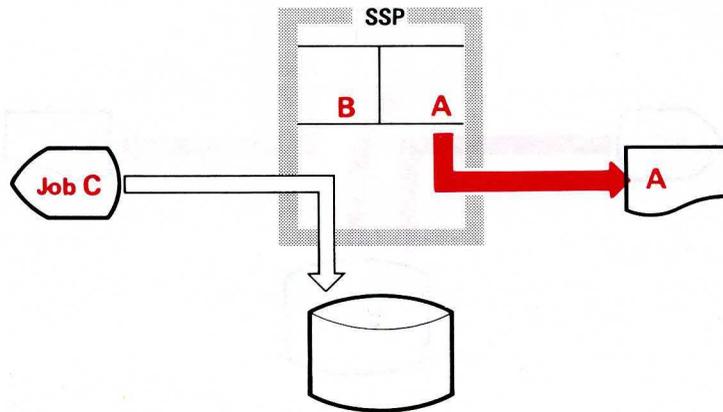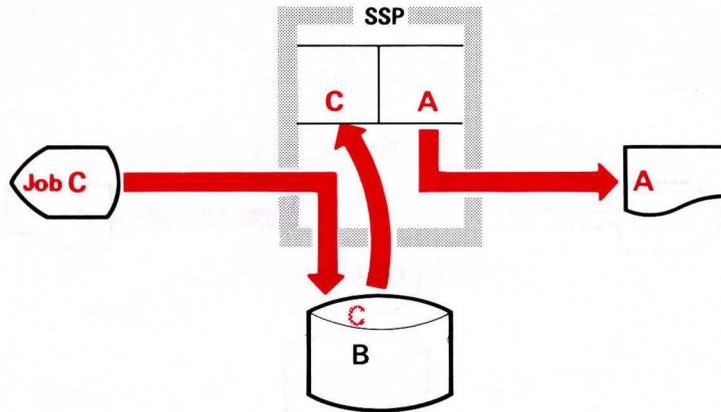

To speed up processing, the SSP spools data from job B onto the disk during the execution of program B.
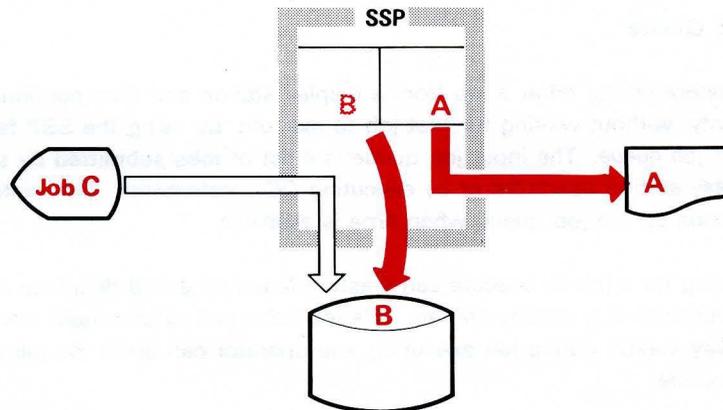
Now, the SSP can accept and begin processing job C.

The system operator controls the printing of spooled data on all printers, can copy the contents of the spool file to a data file, and can request multiple copies of the printed output without running the job again. A display station operator has the same capabilities but is limited to controlling jobs initiated at that display station. A display station operator cannot control jobs that spool data to the system printer.

Input Job Queue

An operator can enter a job from a display station and then continue with other activity, without waiting for that job to execute, by using the SSP facility called *input job queue*. The input job queue is a list of jobs submitted by system and display station operators or by executing OCL statements. The system will run the jobs on the job queue when time is available.

Waiting for a job to execute can waste needed time and decrease the productivity of a display station. If a job does not require input from the display station during job execution, the operator can place the job on the input job queue.

The system operator controls the execution of the queued jobs and gives them priority processing as required.

The programmer can code the OCL to call a procedure, enter data in the first program, and cause the remainder of the job to be placed in the job queue.

Security

Because work stations increase the number of people and locations that have access to the system, you may want to restrict access to information stored in the system. System/34 has the following devices and options that help maintain the security of your information:

- Keylock on system unit and/or display stations

- Passwords

- Magnetic stripe reader on display stations

- Restricted access to files and libraries

- Restricted access to programs by predefined menus

Keylocks help prevent unauthorized persons from gaining access to your System/34 and display stations. You can have keylocks on your system unit, display stations, or both. When a system or display station has a keylock, the user must have a key to unlock the unit. This allows you to issue keys only to persons you want to have access to these units.

Security passwords help prevent unauthorized persons from gaining access to the system. You can assign passwords that display station operators must enter before they operate the system.

The magnetic stripe reader can be used as an enhancement to password security. You must insert a magnetically coded badge into a magnetic stripe reader before you can key in your user ID and password. The magnetic stripe reader can also be used to enter data into data fields in user-defined formats.

You can restrict access to files and libraries. Each file or library can have an owner and a user list. Access is restricted to the owner and users on the user list. Violation of the access rules results in an error message and a processing halt. You can optionally have successful accesses to protected files and libraries logged. This will provide an audit trail.

You can restrict access to programs and prevent compilation of new programs by predefining the menu to be automatically displayed to each operator at sign on. Using the menu security function, you can restrict an operator to the execution of only those jobs associated with a menu (or chained menus). This prevents the operator from invoking any other jobs, SSP commands, or entering OCL statements.
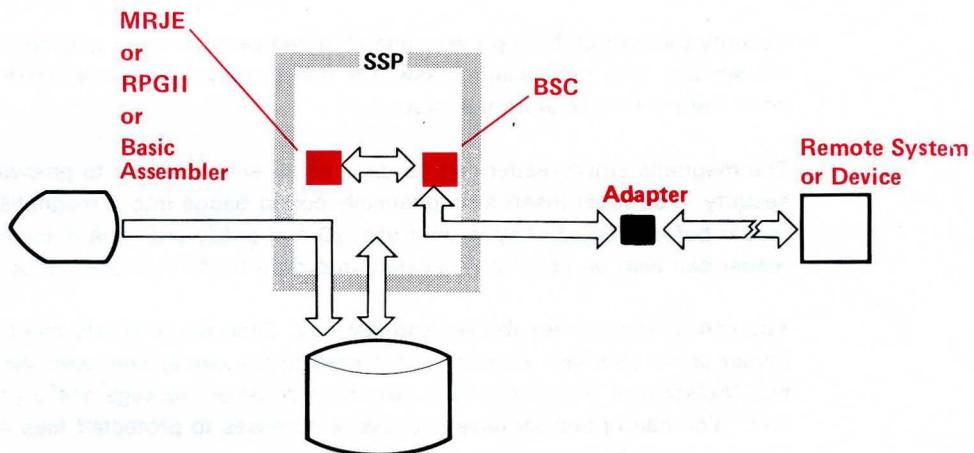
Data Communications

Data communications is the transmission of data via communications lines between systems and/or devices at remote locations. If you have a communications adapter, System/34 becomes part of a data communications network using BSC (binary synchronous communications) or SDLC (synchronous data link control). One major difference between BSC and SDLC is the devices supported by each. The *Planning Guide* lists the devices and provides a more detailed description of System/34 data communications.

System/34 can have two communications lines operating concurrently. The communications lines can be any combination of BSC and SDLC.

The BSC support in RPG II is used to communicate with another system or device, such as the 3741 Data Entry Station.

RPG II, basic assembler, and the MRJE (MULTI-LEAVING remote job entry) utility provide support for BSC. RPG II and basic assembler programs can transmit data to and receive data from any of the supported devices using BSC. The MRJE utility enables you to submit jobs to a host System/370 under the control of HASP II, ASP, RES, or JES2 and receive the results of the jobs at the System/34.

System/34 SSP includes two facilities for communication to a host System/370 via SNA and SDLC:

- The SRJE (SNA remote job entry) utility enables you to submit jobs to a host System/370 under the control of RES, JES2, or POWER/VS and receive the results of the jobs at the System/34.

- SNA assembler macros, provided with the basic assembler program product, allow you to develop a program (or subroutine) that can communicate with an application program running on a System/370 under the control of IMS/VS or CICS/VS.

More than one System/34 program can use the SNA/SDLC communications facility to a System/370 concurrently.
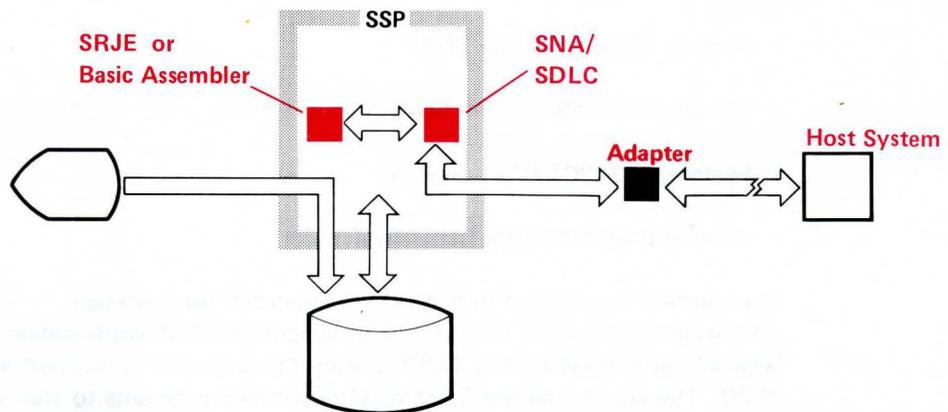
Interactive Communications Feature

Interactive communications support is available as a feature (feature number 6000 with Diskette 1 or feature number 6001 with Diskette 2D) of the SSP. Using the interactive communications feature, you can develop programs or subroutines that communicate interactively with programs on other systems or on the same System/34. This feature provides a common interface between special subsystems that communicate with the following:

- System/3 Model 15 CCP (via BSC)

- System/370 IMS/VS IRSS (via BSC)

- System/370 CICS/VS (via BSC)

- Other BSC systems and devices, including another System/34 (via BSC)

- Another System/34 (via SNA)

- System/370 IMS/VS (via SNA)

- System/370 CICS/VS (via SNA)

- Another program on the same System/34

The interface is provided through basic assembler work station macroinstructions, RPG II work station support, COBOL work station support (available in Release 5), and COBOL using the work station support subroutines PRPQ. The support allows System/34 application programs to start and execute programs in the remote system and to send and receive variable-length data streams.

In addition, a subsystem that emulates a 3270 BSC data stream is provided. System/34 emulation of the 3270 allows a System/34 to be added to an existing BSC telecommunications network of 3270 Information Display Systems. Data exchanged between the network and the System/34 may be formatted so that the user written application programs running on System/34 need not be concerned with converting the data to the 3270 format. The subsystem performs the conversion.

The *Planning Guide* contains more details about the Interactive Communications feature.

SSP Utilities

The SSP utilities perform many of the routine, but necessary, functions that every user needs. These utilities eliminate your need to write programs that perform these common functions. Some utilities manage disk files and programs on disk. Other utilities initialize, copy, and manage files on diskettes. Other utilities control the security feature, format the display screen, and specify system information (such as the date and number of lines printed per page).

Overlay Linkage Editor

The overlay linkage editor prepares FORTRAN IV, COBOL, and basic assembler programs for execution. These programs, after the program product processes them, require further processing before the system runs them. The overlay linkage editor performs this additional processing.

UTILITIES PROGRAM PRODUCT

The Utilities Program Product assists in creating and maintaining your data files and programs on disk. The Utilities Program Product contains the following:

- DFU (data file utility)

- SEU (source entry utility)

- Sort utility

- Work station utility

- SDA (screen design aid utility)

Data File Utility

With DFU, you can create, maintain, inquire into, and print your files without knowing a programming language or writing a program. DFU generates a program based on the responses to a series of questions displayed on the display screen. When you print a file, for example, the responses indicate whether you want DFU to:

- Sort the file before printing it

- Select records based on values of particular fields

- Include data from a related file

- Accumulate fields and print the totals

- Make computations based on values in the fields, and print the results

Through the prompts and responses, DFU interacts with the operator to create a program that executes the requested functions. DFU is easy to use and supports simple data entry, report listing, file inquiry, and file update.
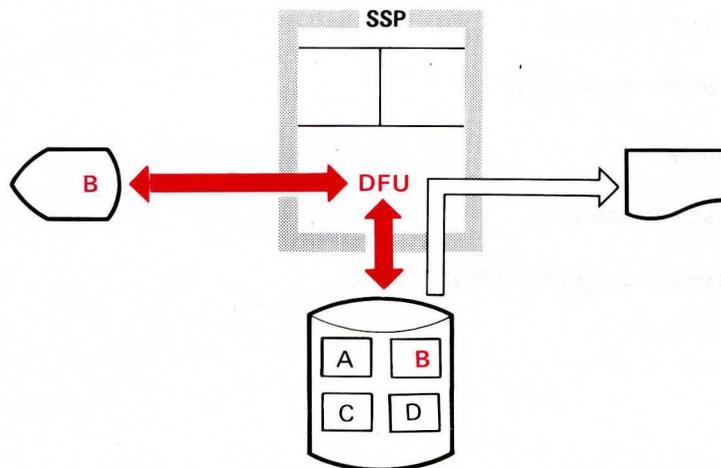
Source Entry Utility

With SEU, an operator can easily enter and maintain programs on disk. SEU provides formats that assist in entering:

- RPG II specifications, including auto report
- FORTRAN IV specifications
- COBOL specifications
- Basic assembler and macro processor programs
- Sort specifications
- Work station utility specifications
- Display screen format specifications
- 1255 utility specifications
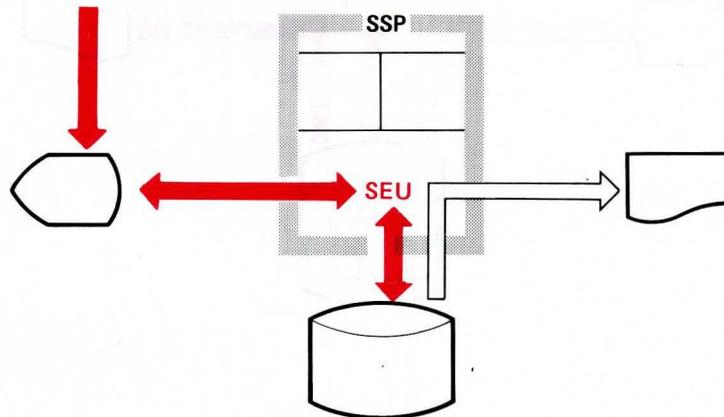
In addition, an operator enters such things as OCL (operation control language) statements in a free-form format; or you can define your own formats that help enter your own special control statements.

SEU also checks for syntax errors, such as omitting required data or entering alphabetic data in a numeric field, in RPG II statements including auto report. If SEU finds an error, SEU displays a message so the operator can correct the error before SEU stores the program on disk. SEU also allows the operator to insert or delete a statement or group of statements or to scan a group of statements for a specified sequence of characters.

Sort Utility

The sort utility arranges the records in your file according to your specifications and the data in each record.

Sort selects records from the file and places them in an output file in the order you have defined (ascending, descending, or a special order).
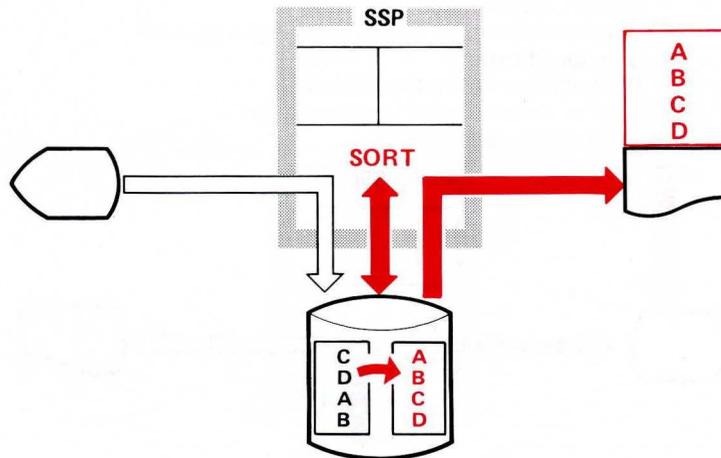
The sorted output file can contain all or some of the *fields* from each record of the original file. The sorted file can also contain all or some of the *records* from the original file. You can use sort with DFU to print the records of a file in a particular sequence without changing their sequence in the file on disk. Or sort can generate a file of the locations (addresses) of the records so you can process them in a different sequence without changing their order on disk and without creating another file with the same data.

Work Station Utility

Work station utility helps display station operators interactively enter and edit data. Prompts appear on the display screen and the operator enters the data via the keyboard. Work station utility can perform more complex editing and calculations than DFU. Rather than responding to questions as in DFU, you describe the required functions on specification sheets. By defining prompts and program logic in work station utility statements, the programmer controls the prompt sequence and subsequent data processing. Preprinted specification sheets simplify coding of work station utility statements for entry into the system. An operator can use SEU to enter these statements.

Work station utility processes each input record after initial entry, stores the results on disk, and/or displays the results on the display screen. Work station utility simplifies interactive data entry and processing, combining them into one program.

The work station utility can also be used to produce disk file inquiry and file maintenance programs.

Screen Design Aid (SDA) Utility

The System/34 programmer can use the SDA utility to create, change, and delete System/34 display screen formats and menus. On your request, the SDA utility displays information to guide you through each part of each SDA job.

The SDA utility allows you to design and change display screen formats interactively. Thus, you can:

- Review the appearance and attributes of a new or changed display screen format before the format is generated

- Avoid coding display screen format specifications

A related option of the SDA utility generates RPG II specifications to reflect display screen formats used by the RPG II program or WSU program for inquiry, update, or master file maintenance.

The SDA utility can also delete display screen formats. After you name the format to be deleted, the SDA utility scans a source member for the corresponding display screen format specifications and deletes the specifications from the source member.

PROGRAMMING LANGUAGES

A programming language is a special symbolic language that programmers use to write programs. Each programming language has unique characteristics suited for specific functions. IBM System/34 has four programming languages that provide sufficient variety to program many types of applications. A Work Station Support Subroutines PRPQ that provides full work station support for COBOL and basic assembler is also available.

- RPG II

- FORTRAN IV

- COBOL X3.23-1968 (PRPQ)

- COBOL X3.23-1974

- Basic assembler

- Work station support subroutines PRPQ

Each of the languages has preprinted specification sheets on which the programmer writes programs. These sheets, and SEU, simplify entry of program statements into the system.

The following paragraphs explain each System/34 programming language and the work station support subroutines PRPQ.

RPG II

You can use RPG II (a commercially oriented programming language) for many business data processing requirements. Programmers can learn RPG II relatively easily compared to other programming languages. The RPG II compiler translates the RPG II statements into a program that System/34 can execute. The compiler also checks for errors and prints diagnostic messages for any errors found.

System/34 RPG II contains display station support so multiple display stations can concurrently enter data into the same program. The display station can be either directly attached or remote. RPG II also includes auto report and BSC support. Auto report simplifies the defining of formats for reports printed by RPG II programs, and allows a programmer to include previously written statements in new programs. Programs can transmit data to, and receive data from, other systems or devices via the RPG II BSC support and a communications adapter.

FORTRAN IV

System/34 FORTRAN IV is a high-level programming language and a compiler. You will find FORTRAN IV is especially suited to the problem-solving requirements of scientific, engineering, mathematical, and commercial applications. The compiler contains a library of subroutines that may be used during program execution. These subroutines can perform mathematical functions, service functions, and commercial subroutines.

The main steps in processing a program written in FORTRAN IV are as follows:

1.   During the compilation step, the FORTRAN compiler analyzes the source program statements and translates them into an object module.

2.   The overlay linkage editor combines the object module with FORTRAN subroutines from the library, in addition to any user-written subroutines, to form a load module.

3.   The load module is then executed under the System/34 system support program.

System/34 FORTRAN IV contains work station support allowing a single display station to be attached to a program. Multiple programs can execute concurrently.

Work station support is provided through four predefined screen formats. Work station support allowing field formatting is available via a subroutine supplied with the FORTRAN IV program. This subroutine allows field formatting via an SSP utility.

COBOL

COBOL (common business oriented language) is a high-level programming language, similar to English, that is used for commercial data processing.

COBOL looks and reads much like ordinary business English. The programmer can use English words and conventional arithmetic symbols to direct and control the operations of the computer. The following are typical COBOL sentences:

```
ADD DIVIDENDS TO INCOME.
MULTIPLY UNIT-PRICE BY STOCK-ON-HAND
  GIVING STOCK-VALUE.
IF STOCK-ON-HAND IS LESS THAN ORDER-POINT
  MOVE ITEM-CODE TO REORDER-CODE.
```

The main steps in processing a program written in COBOL are as follows:

- The COBOL compiler analyzes the source program and translates it into an object module.

- The overlay linkage editor combines the object module with COBOL subroutines from the library, in addition to any user-written subroutines, to form a load module.

- The load module is then executed under the System/34 SSP.

Two levels of COBOL are provided on System/34:

COBOL PRPQ: Is designed according to an IBM-defined subset of the American National Standard X3.23-1968. The supported implementation levels are:

```
1 NUC 1,2
1 SEQ 1,2
2 TBL 1,3
1 RAC 0,3
1 LIB 0,2
1 SEG 0,2
```

In addition, many of the functions defined in higher levels of NUC, SEQ, and RAC are included, as are many IBM extensions. Work station support is provided.

COBOL: Will be designed according to an IBM-defined subset of the American National Standard X3.23-1974. The support language level will conform to the low intermediate level of the Federal Information Processing Standard (FIPS) COBOL. The supported implementation levels are:

```
2 NUC 1,2    1 SEG 0,2
2 TBL 1,2    2 LIB 0,2
2 SEQ 1,2    1 DEB 0,2
2 REL 0,2    1 IPC 0,2
1 INX 0,2
2 SRT 0,2
```

Support will also be provided for many features of higher levels. Among these are the ANS indexed input/output and debug modules.

Work station support via ACCEPT/DISPLAY verbs provides input/output one line at a time. Field formatting work station support and interactive communications feature support are available via the work station support subroutines PRPQ in Release 4 and via extensions to the COBOL language in Release 5.

Basic Assembler

You can use the basic assembler language for almost any type of application. Because basic assembler language is highly dependent on the system as well as the function you wish to perform, programmers require more experience to program it effectively. The assembler processor (and overlay linkage editor) translates basic assembler language statements into a program that System/34 can execute. The assembler processor also checks for errors and prints diagnostic messages for any errors found.

A programmer can write basic assembler language programs as subroutines for RPG II, FORTRAN IV, and COBOL programs, or as independent basic assembler programs. For example, the programmer can write subroutines that provide unique work station support; these subroutines are then used by RPG II, FORTRAN IV, or COBOL programs.

Included with the basic assembler language is a macro processor which processes macroinstructions. A macroinstruction is a special instruction that represents a group of basic assembler instructions which perform a specific task, such as writing a record on disk. The macro processor processes each macroinstruction, translates it into a number of basic assembler language instructions, and gives them to the assembler processor for translation into executable instructions.

You can also write your own macroinstructions to perform frequently used functions. After defining a macroinstruction once, you can easily incorporate it into basic assembler language programs.

The basic assembler and macro processor program product includes some prewritten macroinstructions; most of them perform input and output operations. These macroinstructions also support data communications (with or without the interactive communications feature) that transmit data to and receive data from other systems or devices via the communications adapter.

Work Station Support Subroutines PRPQ

These preassembled subroutines provide COBOL and basic assembler users access to work station data management and to the display station formatting capabilities of the screen format generator utility. These subroutines support single or multiple requestor programs (SRT/MRT), never-ending programs (NEP), and single or multiple acquired terminals. In addition, the subroutines can be used for reading and updating the display station local data area and the external indicators (UPSI switches).

This PRPQ also provides COBOL and basic assembler users support for access to the facilities of the interactive communications feature of the SSP.

IBM System/34 and its program products provide multiple data processing capabilities but still maintain ease of operation. The SSP includes the operating aids (described in Chapter 1) that help operators obtain maximum use of your system. Through the SSP, operators control the operation of the system or a display station by using control commands, and they run jobs by using operation control language, procedure commands, or menus.

This chapter describes operator duties and these SSP functions:

- OCL (operation control language)

- Command statements (procedure commands and control commands)

- Menus

OPERATORS

Two types of operators run the System/34: the system operator, who keeps the system running, and display station operators, who use the system for entering data, inquiring into files, and requesting jobs.

The system operator works at the system console. The system operator's responsibilities consist of controlling and managing the system functions and attending to the physical requirements of the system. The system functions include the input job queue and print spooling. The physical requirements include starting and ending system operation, inserting the proper diskettes, and keeping the proper forms in the system printer. The system operator also must handle system error situations that require operator action. The system operator can, by pressing the appropriate keys, allow the system console to function as a display station; the system operator would then also have the duties of a display station operator.

A display station operator's responsibilities vary, depending on how you use your system. If you use display stations for interactive job processing, a display station operator starts the job by entering appropriate information into the system, monitors the job while it executes, and responds to situations that may require operator action. If you use display stations to enter data, a display station operator enters and verifies the data for your particular application. If you use additional printers, a display station operator can also keep the proper forms in the printer. A display station operator can operate local or remote display stations.

OPERATION CONTROL LANGUAGE

An operator can run jobs through OCL (operation control language). OCL is a special language composed of statements that describe data processing jobs to the SSP.

The SSP requires certain information, or instructions, before it can perform a job. For example, the SSP needs the name of the procedure, the names of any files it must process, the type of output, the date printed on the output, and any additional required information. The programmer writes the OCL that describes this information to the SSP.

The System/34 SSP OCL is flexible yet relatively easy for a programmer to learn. An operator, however, instead of learning OCL, can run jobs by using *command statements* and *menus*.

COMMAND STATEMENTS

Command statements have two forms: procedure commands and control commands.

A procedure command tells the SSP to execute a procedure. A procedure is a group of OCL statements (and possibly utility control statements) that describe a specific job. The procedure can contain all the information necessary to run the job or the procedure can request additional information from the operator. Entering one procedure command is equivalent to entering all of the OCL statements in the procedure.

An operator enters procedure commands from the keyboard, and the SSP responds to the operator via the display screen. For example, if an operator keys a procedure command incorrectly or fails to enter all of the necessary information, the SSP displays a message identifying the error or requesting the missing information.

The SSP includes a number of procedure commands that control most of the system operation when using the system utilities. You can also create procedures for your programs; you assign a name to a procedure and that name becomes a procedure command. When an operator wishes to run that procedure, this procedure can be entered by command instead of all of the OCL.

Control commands are simple, often one-word statements to be used by both system and display station operators. Through these commands, operators control job execution, control printing operations, communicate with other work stations, and control the status of various devices.

MENUS

A menu is a numbered list of brief job descriptions that appears on the display screen at an operator's request. The operator enters the item number of a job and that job executes.

```
COMMAND                                                            D1
                          MENU: MENU1
    1. CALCULATE PAY              13. DAILY WORK ORDERS
    2. PRINT PAYCHECKS            14. ACCOUNTS PAYABLE
    3. PAYROLL                    15. NEW ACCOUNTS
    4. ACCOUNTS RECEIVABLE        16. MONTHLY STOCK REPORT
    5. LAST YEAR'S ACCOUNTS       17. END-OF-MONTH STATUS
    6. GROSS BUDGET               18. YEARLY STOCK REPORT
    7. RECENT ORDER ANALYSIS      19. END-OF-YEAR STATUS
    8. OLD ORDER ANALYSIS         20. REPRINT OUT-OF-STOCK ORDERS
    9. EXTERNAL BILLING           21.
   10. LUMBER ON ORDER            22.
   11. LUMBER IN STOCK            23.
   12. EMPLOYEE ACCOUNTS          24. MENU2




    ENTER NUMBER, COMMAND, OR OCL.


         _                                           <- READY
```

You define your own menus. The definition includes the name of the menu, the number of items on the menu (up to 24), and the job name and job description for each item number. You may have many different menus available to an operator. You may want to group jobs by type; for example, all payroll jobs on one menu, all sales information jobs on another menu, and all inventory jobs on a third menu. This keeps related jobs together, and operators can easily execute several related jobs consecutively. For additional information, see *Screen Design Aid Utility*.

Menus simplify the operator duties by providing, on the display screen, a list of jobs that they might run, so they do not have to know all the job names. With menus, the operator executes jobs without knowledge of procedure commands or OCL. This can increase operator confidence and simplify operator tasks.

A default menu may be assigned to each operator. When the operator signs on, that menu is automatically displayed. For information about restricting operator access to items on the menu, see the index entry *security*.

EXAMPLE

The following example illustrates the differences between OCL, command statements, and menus. You do not need to understand all of the OCL or command statements; the purpose of the example is to compare how much information the operator must key in each case.

To run your payroll, you could have three different programs to do the necessary work. The first program (PAYCALC) takes the information, such as hours worked and rate of pay, from an existing file (WEEKHRS) and calculates the weekly pay for each employee. PAYCALC saves the results, including gross pay, itemized deductions, and other related information, in a file (PAYFILE) for later use.

The second program (CHEKWRIT) uses the information from PAYFILE to print the payroll checks and to update each employee's payroll record in another file (EMPLOYEE).

The third program (PAYSUMM) summarizes the results from PAYFILE and uses this summary to update a third file (TOTLFILE) for your entire payroll record.

To run your payroll using OCL, the operator keys the following:

First program
```
// LOAD PAYCALC
// FILE NAME-PAYFILE,RECORDS-100,RETAIN-T,DISP-NEW
// FILE NAME-WEEKHRS,RETAIN-P,DISP-OLD
// RUN
```

Second program
```
// LOAD CHEKWRIT
// FORMS LINES-10,FORMSNO-CHKS
// FILE NAME-PAYFILE,RETAIN-T,DISP-OLD
// FILE NAME-EMPLOYEE,RETAIN-P,DISP-OLD
// RUN
```

Third program
```
// LOAD PAYSUMM
// FILE NAME-PAYFILE,RETAIN-S,DISP-OLD
// FILE NAME-TOTLFILE,RETAIN-P,DISP-OLD
// RUN
```

To run your payroll using procedure commands, the operator keys the
following:

First procedure
  PAYCALC[1]

Second procedure
  CHEKWRIT[1]

Third procedure
  PAYSUMM[1]

To run your payroll using a menu, the operator initially keys the menu name
(MENU1). When the menu appears, the operator selects the correct number:

First job
  1

Second job
  2

Third job
  3

---

[1]The above procedure names are the same as the program names in this example. The
procedure names and program names do not have to be the same.

Chapter 6. IBM Support and Services

EDUCATION

An IBM System/34 education program is available for:

- Executives

- User department managers

- Data processing department managers

- System operators

- Display station operators

- Programmers/implementors

IBM offers professional courses to these people, for a charge, to teach them the System/34 data processing skills associated with their jobs. The courses are available as a:

- Classroom lecture—available to all enrollees at the established course price per student.

- Self-study materials—students pace their learning with the use of manuals and machine exercises.

Courses on system concepts and features are free. These courses provide an understanding of the features, characteristics, and operating principles of IBM products and services. They may also provide information relating to installation planning requirements and data processing concepts.

Your IBM marketing representative or systems engineer can provide the details of the System/34 education curriculum as well as the locations and dates of the classroom courses.

Through proper planning and a thorough understanding of System/34 education, you should be able to implement an individualized program that best meets your System/34 education needs.

CUSTOMER ENGINEERING

IBM customer engineering is the organization that services your system. The customer engineer, as your service representative, installs your machine; responds to emergency service calls; coordinates, plans, and installs machine upgrades; and performs preventive maintenance as required.

Another member of your service team is the program support customer engineer who assists with system configuration planning, and, if required, provides program temporary fixes for the program products.

To reach your customer engineer or program support customer engineer, just call IBM Dispatch at any time, day or night, seven days a week. IBM logs your call and contacts your service representative.

SYSTEMS ENGINEERING

Skilled assistance in the detailed design and development of data processing applications is available through IBM Systems Engineering. Whether you intend to add a new application, expand an existing application, or improve your system performance, an IBM systems engineer can help.

IBM systems engineers are among the first to learn the details of the new system and to get hands-on experience; this keeps their knowledge current. Systems engineers can help you get started earlier, convert faster, and install sooner by aiding you in some of these areas:

- System analysis and design

- Application design and development

- Program design and development

- Conversion and implementation planning

- Installation evaluation and improvement

The systems engineer is a professional consultant with training and experience in installing data processing systems. General consultation and planning are free marketing services. This means the system engineer will help you plan your computer program requirements, suggest ways to write the programs more efficiently, assist in defining training requirements for your personnel so you can develop your own technical self-sufficiency, and monitor your progress toward your data processing goals. Billable systems engineering services are available when you require more detailed assistance.

Appendix A. IBM System/34 Publications Summary

System/34 Publications

Introductions

Planning Guide

Concepts and Design Guide

Install & Modification PP and Physical Setup

Installation/ Physical Plan.

Operating | SSP | SDA | DFU | SEU | Sort | WSU | RPG II | Basic Assembler | FORTRAN IV | COBOL | Hardware | 5250 | 5340 | 1255

Operators' Guides

SSP LPS

Messages Guide

Overlay Link. Editor Reference

SSP Reference

CMD Stmts Ref Summary

RPG II LPS

Basic Assembler LPS

FORTRAN IV LPS

Functions Reference

Setup Procedures

Theory/ Diagrams

1255 Reference

SSP (System) Logic

RPG II Reference

Basic Assembler Reference

FORTRAN IV Reference

COBOL PRPQ LPS

.COBOL LPDO

Maintenance

Data Communications

Data Areas and Diagnostic Aids

Utilities LPS

RPG II Logic

Basic Assembler Logic

FORTRAN IV Logic

COBOL PRPQ Supplement

COBOL Reference

Data Communications Reference

SDA Reference

DFU Reference

SEU Reference

Sort Reference

WSU Reference

WS Support Subroutines PRPQ LPDO

Attach Theory/ Maintenance

Data Communications Logic

Utilities Logic

This appendix contains a description of each System/34 manual that is currently available. The manuals are grouped by category (general information, operating information, and so forth). For a complete description of all System/34 publications see the latest *IBM System/34 Bibliography*, GH30-0231.

GENERAL INFORMATION

IBM System/34 Introduction, GC21-5153. This manual describes the IBM System/34 and its data processing capabilities in today's business environment.

IBM 5250 Information Display System Introduction, GA21-9246. This manual describes the IBM 5250 Information Display System, which includes the IBM 5251 and 5252 Display Stations and the IBM 5256 Printer.

IBM System/34 Planning Guide, GC21-5154. This manual provides information concerning the functions of System/34 and System/34 program products. The information provided can be used to plan for the type of System/34 required.

IBM System/34 Concepts and Design Guide, SC21-7742. This manual is primarily for System/34 designers, analysts, and programmers who are changing a centralized operating environment to a work station operating environment. This manual is also for the installation manager who must plan for and help with the installation of a System/34.

IBM System/34 Installation Manual—Physical Planning, GA21-9242. This manual provides physical, electrical, and environmental specifications and offers suggestions for preparing the data processing area before the system arrives.

IBM 5250 Information Display System Planning and Site Preparation Guide, GA21-9337. This manual is intended to assist in the planning and installation of an IBM 5250 Information Display System (the work stations for your System/34). It provides physical, electrical and environmental specifications and explains how to order, assemble, and install cables for the display system.

OPERATING INFORMATION

IBM System/34 Operator's Guide, SC21-5158. This manual provides the information needed to operate the System/34.

IBM 5256 Printer Operator's Guide, GA21-9260. This manual provides the information needed to operate the IBM 5256 Printer.

IBM 5251 Display Stations Models 1 and 11 and IBM 5252 Dual Display Station Operator's Guide, GA21-9248. This manual provides the information needed to operate the IBM 5251 Display Station Models 1 and 11 and the IBM 5252 Dual Display Station.

IBM 5251 Display Stations Models 2 and 12 Operator's Guide, GA21-9323. This manual provides the information needed to operate the IBM 5251 Display Stations Models 2 and 12.

IBM System/34 Displayed Messages Guide, SC21-5159. This manual lists and describes all displayed messages, including the recovery procedures for each message.

IBM 5211 Printer Models 1 and 2 Component Description and Operator's Guide, GA21-3658. This manual serves as a comprehensive reference to the major printer components, method of printing and control, and operating procedures for the IBM 5211 Printer.

SETUP PROCEDURES

IBM 5251 Display Station Models 1 and 11 Setup Procedure, GA21-9286. This manual provides the customer with a step-by-step procedure that explains how to set up and check out the IBM 5251 Display Station offline, how to connect the display station to the system, how to set the switches, and how to perform the online checkout.

IBM 5251 Display Station Models 2 and 12 Setup Procedure, GA21-9289. This manual provides the customer with a step-by-step procedure that explains how to set up and check out the IBM 5251 Display Station offline, how to connect the display station to the communications equipment, how to set the switches, and how to perform the online checkout.

IBM 5252 Dual Display Station Setup Procedures, GA21-9288. This manual provides the customer with a step-by-step procedure that explains how to set up and check out the IBM 5252 Dual Display Station, how to connect the display station to the system, how to set the switches, and how to perform the online checkout.

IBM 5256 Printer Setup Procedure, GA21-9290. This manual provides the customer with a step-by-step procedure that explains how to set up and check out the IBM 5256 Printer offline, how to connect the printer to the system, how to set the switches, and how to perform the online checkout.

LICENSED PROGRAM SPECIFICATIONS (LPSs)

IBM System/34 System Support Program Product Licensed Program Specifications, GC21-7702. This LPS gives a brief description of the System Support Program Product.

IBM System/34 Utilities Program Product Licensed Program Specifications, GC21-7659. This LPS gives a brief description of the Utilities Program Product.

IBM System/34 RPG II Program Product Licensed Program Specifications, GC21-7669. This LPS gives a brief description of the RPG II Program Product.

IBM System/34 Basic Assembler and Macro Processor Program Product Licensed Program Specifications, GC21-7677. This LPS gives a brief description of the Basic Assembler and Macro Processor Program Product.

IBM System/34 FORTRAN IV Program Product Licensed Program Specifications, GC21-7685. This CPS gives a brief description of the FORTRAN IV Program Product.

IBM System/34 Subset 1968 ANS COBOL Compiler and Library PRPQ Licensed Program Specifications, GC21-7784. This LPS gives a brief description of the COBOL PRPQ program product.

LICENSED PROGRAM DESIGN OBJECTIVES (LPDO)

IBM System/34 System Support Program Product (SSP) Licensed Program Design Objectives, GC21-7701. This LPDO gives a brief description of the System Support Program Product.

IBM System/34 COBOL Program Product Licensed Program Design Objectives, GC21-7737. This LPDO gives a brief description of the COBOL Program Product.

IBM System/34 Work Station Support Subroutines PRPQ Licensed Program Design Objectives, GC21-7808. This LPDO gives a brief description of the Work Station Support Subroutines PRPQ.

REFERENCE INFORMATION–SYSTEM SUPPORT PROGRAM PRODUCT

IBM System/34 System Support Reference Manual, SC21-5155. This reference manual provides programmers with information needed to establish administrative and operating procedures for an IBM System/34. This manual also provides programmers with the reference information needed to identify and use the OCL statements, SSP procedures, control commands, and SSP utility programs required to perform desired functions.

IBM System/34 Installation and Modification Reference Manual: Program Products and Physical Setup, SC21-7689. This manual provides instructions for completing the planning chart and the network diagram. There are references to guide you through the physical setup of the system, procedures to perform installation or modification of the SSP (System Support Program Product, Program 5726-SS1), and procedures to add the additional program products that have been ordered.

IBM System/34 Command Statements Reference Summary, GX21-7690. This pocket size booklet contains the formats and a summary of the functions of the System/34 command statements.

IBM System/34 Overlay Linkage Editor Reference Manual, SC21-7707. This manual describes how to use the overlay linkage editor program to link edit an object module into a load module.

IBM System/34 Data Communications Reference Manual, SC21-7703. This manual provides the programmer with reference information necessary to write System/34 BSC programs and to use the MRJE (MULTI-LEAVING Remote Job Entry) and SRJE (SNA Remote Job Entry) utilities.

IBM System/34 1255 Magnetic Character Reader Reference Manual, SC21-7740. This manual provides reference information for users of the System/34 with an IBM 1255 Magnetic Character Reader attached. It describes the coding necessary to program the 1255 to run under System/34 SSP control.

REFERENCE INFORMATION—OTHER PROGRAM PRODUCTS

IBM System/34 Data File Utility Reference Manual, SC21-7656. This manual describes DFU for programmers who define and run DFU jobs to create and maintain System/34 data files.

IBM System/34 Source Entry Utility Reference Manual, SC21-7657. This manual describes how to use SEU to create and maintain source and procedure members in System/34 libraries.

IBM System/34 Sort Reference Manual, SC21-7658. This manual describes the types of sort and explains the procedures to run the sort program on the System/34.

IBM System/34 Work Station Utility Reference Manual, SC21-7663. This manual describes how to code and debug WSU programs.

IBM System/34 Screen Design Aid Programmer's Guide and Reference, SC21-7716. This manual describes how to use the screen design aid utility to create and maintain display screen formats and menus.

IBM System/34 RPG II Reference Manual, SC21-7667. This manual describes how to write, test, and maintain RPG II programs for System/34.

IBM System/34 Basic Assembler and Macro Processor Reference Manual, SC21-7705. This manual describes the basic assembler functions, coding conventions, programming conventions, and addressing. The macro processor is described and the coding of a macroinstruction is explained.

IBM System/34 FORTRAN IV Reference Manual, SC21-7706. This reference manual describes the System/34 FORTRAN IV language, compiler, and commercial subroutines.

IBM System/34 COBOL Reference Manual, SC21-7741. This manual contains reference material needed to help an experienced COBOL programmer to code, compile, and debug complete COBOL programs on the System/34. Various COBOL language functions, system dependencies, and special features are also described in detail. This reference manual is based on the 1974 ANS COBOL standard and discusses all IBM extensions.

IBM System/34 COBOL Supplement PRPQ Information Manual, GC21-7752. This manual, used in conjunction with the *IBM System/3 Subset American National Standard COBOL Reference Manual*, GC28-6452, describes how to write, test, and maintain COBOL programs for the System/34.

LOGIC INFORMATION–SYSTEM SUPPORT PROGRAM PRODUCT

IBM System/34 System Data Areas and Diagnostic Aids Handbook, LY21-0049.
This manual describes the system data areas, their locations and contents. It
describes and shows how to use the diagnostic aids available on the
System/34.

IBM System/34 System Support Program Logic Manual: System, LY21-0050.
This manual describes the functions of the system support program and how it
provides programming support to start the system, process commands, start a
job, and terminate a job.

IBM System/34 System Support Program Logic Manual: Data Communications,
LY21-0051. This manual describes the functions, characteristics, operation,
and organization of the System/34 data communications component.

LOGIC INFORMATION–OTHER PROGRAM PRODUCTS

IBM System/34 Utilities Logic Manual, LY21-0563. This manual is designed to
aid IBM service personnel in supporting the IBM System/34 Utility Program
Product. This manual serves as a recall/reference mechanism and as a guide
to listings for WSU, SDA, DFU, SEU, and Sort.

IBM System/34 RPG II Logic Manual, LY21-0565. This manual describes the
RPG II compiler and the RPG II object program that is generated by the
compiler.

IBM System/34 Basic Assembler and Macro Processor Logic Manual,
LY21-0569. This manual describes the IBM System/34 Basic Assembler and
Macro Processor program product.

IBM System/34 and IBM System/32 FORTRAN IV Logic Manual, LY21-0568.
This manual describes the FORTRAN IV compiler and the object program that
is generated by the compiler.

HARDWARE INFORMATION

IBM System/34 Functions Reference Manual, SA21-9243. This manual describes the machine instructions, status bytes, and other information needed to understand system programs from the hardware viewpoint.

IBM System/34 5340 System Unit Theory-Diagrams Manual, SY31-0458. This manual describes how the System/34 5340 System Unit works. It also describes the functions and circuits within the system unit.

IBM System/34 5340 System Unit Maintenance Manual, SY31-0457. This manual describes the removal, replacement, adjustments, service checks, and locations of all mechanical parts in the System/34 5340 System Unit.

IBM System/34 1255 Attachment Feature Theory/Maintenance, SY31-0521. This manual contains the theory and maintenance information for attachment of the IBM 1255 Magnetic Character Reader to System/34.

IBM 5250 Functions Reference Manual, SA21-9247. This manual describes the programming requirements for coding the controller in the 5251 Model 2 or 12; the controller controls all 5250 devices attached via a cluster feature (either Cluster Feature or Dual Cluster Feature). It also provides information applicable to designing configurations using the 5250 devices and to determining error-related problems in the devices.

A knowledge of SNA/SDLC is a prerequisite to using this manual.

auto report: A function of the RPG II program product that simplifies the defining of formats for printed reports and allows the inclusion of previously written statements into new programs.

basic assembler language: A programming language that experienced programmers can use to write programs, which depend on the system as well as the application.

binary synchronous communications (BSC): A flexible form of line control that provides a set of rules for transferring data over a communications line connecting two devices that use a communications adapter.

byte: The representation of a character.

character set: A group of characters used for a specific purpose; for example, the set of characters a printer can print.

COBOL: Common business oriented language. A high-level programming language, similar to English, that is used for commercial data processing.

command function keys: The 14 keys in the top row of the display station keyboard that are used with the Cmd key to request functions of program products and user programs.

command statement: A statement that requests the performance of a particular function. The two types of command statements are control commands and procedure commands.

communications adapter: A hardware feature that enables System/34 to become part of a data communications network.

communications line: A circuit, such as a leased line or a telephone circuit, used for data communications.

compiler: A program that translates a series of instructions written in a programming language into a program the system can execute.

concurrent processing: A method of processing in which two or more jobs appear to be processing at the same time. Actually, the instructions of each job are processed one at a time, but alternating in such a fashion as to make the most efficient use of the system.

control command: A command statement used by an operator to control system or display station operation.

data communications: The transmission of data between systems and/or devices over a communications line.

DFU (data file utility): Part of the Utilities Program Product that is used to create, maintain, and display or print data files.

disk: A flat, circular plate with a magnetic surface on which programs and files can be stored.

disk file: An organized collection of related records on disk that are treated as a unit.

diskette: A thin, flexible magnetic disk permanently enclosed in a semirigid, protective jacket.

diskette magazine drive: A diskette drive that holds up to 23 diskette 1's or diskette 2D's. The system can access the diskettes under SSP program control without manual intervention.

display screen: The part of a display station on which data, messages, or other information is displayed.

display station: An input/output device containing a display screen on which data is displayed, and an attached keyboard from which data is entered. It can be used to request jobs and/or enter data. A display station can be designated as the system console or as a command or data display station at system configuration time.

dual display station: An input/output device containing two keyboards, each cable-connected to a common tabletop display.

file: An organized collection of related records treated as a unit.

FORTRAN: A high-level programming language used primarily for scientific, engineering, and mathematical applications.

function control keys: Special keys on the keyboard used to request specific system functions.

half duplex: Allowing bi-directional data communications but not simultaneously.

hardware: The physical equipment, as opposed to the programming, of a system.

input: Data to be processed.

input job queue: A list of jobs on disk that are waiting to be processed by the system.

inquiry: A request (entered from a display station) for information in storage.

interactive communications feature: A feature of the System/34 SSP that provides support for interactive communications (BSC and SNA/SDLC), remote procedure initiation on the System/34, and communications line monitoring on a multipoint line (System/34 as a tributary station).

keyboard: A systematic arrangement of keys by which commands, control statements, and data are entered into a computer.

keylock: A security device that provides the operator with a lock and key that can be used to restrict use of the display station to authorized personnel.

local work station: A work station up to 1520 meters (5000 feet) from the 5340 System Unit and attached to it via a cable. Contrast with *remote work station*.

magazine: A container that holds up to ten diskettes. A magazine is inserted into a diskette magazine drive.

main storage: The general purpose storage of a computer.

megabyte: One million bytes.

menu: A displayed list of items (usually jobs) from which the operator makes a selection.

MRJE (MULTI-LEAVING Remote Job Entry): A system utility that enables you to submit jobs to a host system and to receive the job results and output data from that host system using BSC.

multiprogramming: The concurrent processing of two or more programs.

OCL (operation control language): A programming language used to identify a job and its processing requirements to the system support program product.

output: Data delivered or ready to be delivered from a device or program, usually after some processing of input data.

print belt: A belt containing the characters that the 5211/3262 Printers can print.

print spooling: A part of the system support program product that provides temporary storage of print data on disk.

procedure: A set of related OCL statements, and possibly utility control statements, that cause a specific function or set of functions to be performed.

procedure command: A command statement that runs a procedure.

processing unit: The parts of a computer that perform the processing and control functions for the system, perform operations on data, and control output.

program: A sequence of instructions written in a special form the computer can interpret. A program tells a computer where to get input, how to process it, and where to put the results.

program product: An IBM-written, licensed program for which a monthly charge is made. A program product performs functions related to processing user data.

protocol: In SNA, the sequencing rules for requests and responses by which network addressable units in a communications network coordinate and control data transfer operations and other operations.

remote work station: A work station that uses data communications to interface with the system unit. Contrast with *local work station*.

RPG II: A commercially oriented programming language specifically designed for writing application programs that meet common business data processing requirements.

SDA (screen design aid): A part of the Utilities Program Product used to create, change, and delete display screen formats and menus.

SDLC: See *synchronous data link control*.

SEU (source entry utility): A part of the Utilities Program Product used to enter and update procedures and programs.

SNA: See *systems network architecture*.

sort program: A part of the Utilities Program Product used to arrange records in a predetermined sequence according to data contained in one or more specific fields within the records.

spooling: See print spooling.

SRJE (SNA Remote Job Entry): A system utility that allows the user to submit jobs to and get results from a System/370 by means of a communications line using SNA/SDLC protocols.

swapping: Temporarily removing an active job from main storage, saving it on disk, and processing another job in the area formerly occupied by the first job.

synchronous data link control (SDLC): A discipline that manages data transfer over a communications line that connects two devices.

system console: A display station attached directly to the system unit that is designated to activate certain system functions, and control and monitor system operation, in addition to functioning as a display station.

system printer: The printer, named at system configuration time, that is used for the system and display station printed output, unless the output is specifically directed to another printer.

systems network architecture (SNA): An IBM communications protocol for controlling information transfer in a data communications network.

utility control statement: A control statement that gives a utility program information concerning the output to produce or the way the program is to perform its function.

work station: A device that lets a user transmit information to or receive information from a computer, or both, as needed to perform his or her job; for example, a display station or a printer.

work station utility: A part of the Utilities Program Product that performs an interactive data entry and edit function.

1255 Magnetic Character Reader: A machine that reads and sorts documents that are inscribed with magnetic ink.

3262 Printer: A printer that prints all characters of a line in a single operation. See also *5211 Printer*.

3741 Data Station: A key entry station used to record data onto a diskette.

5211 Printer: A printer that prints all characters of a line in a single operation. See also *3262 Printer*.

5251 Display Station: An input/output device containing a display screen on which data is displayed, and an attached keyboard from which data is entered.

5252 Dual Display Station: An input/output device containing two keyboards and two 960-character display screens, each cable-connected to a common tabletop display.

5256 Printer: A printer that prints characters one at a time.

5260 Retail System: A point-of-sale terminal that provides traditional cash register functions as well as data collection capabilities.

5340 System Unit: The part of System/34 that houses the disk, diskette drive or diskette magazine drive, processing unit, and communications adapter.

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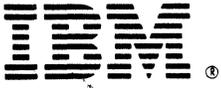● **No postage necessary if mailed in the U.S.A.**

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