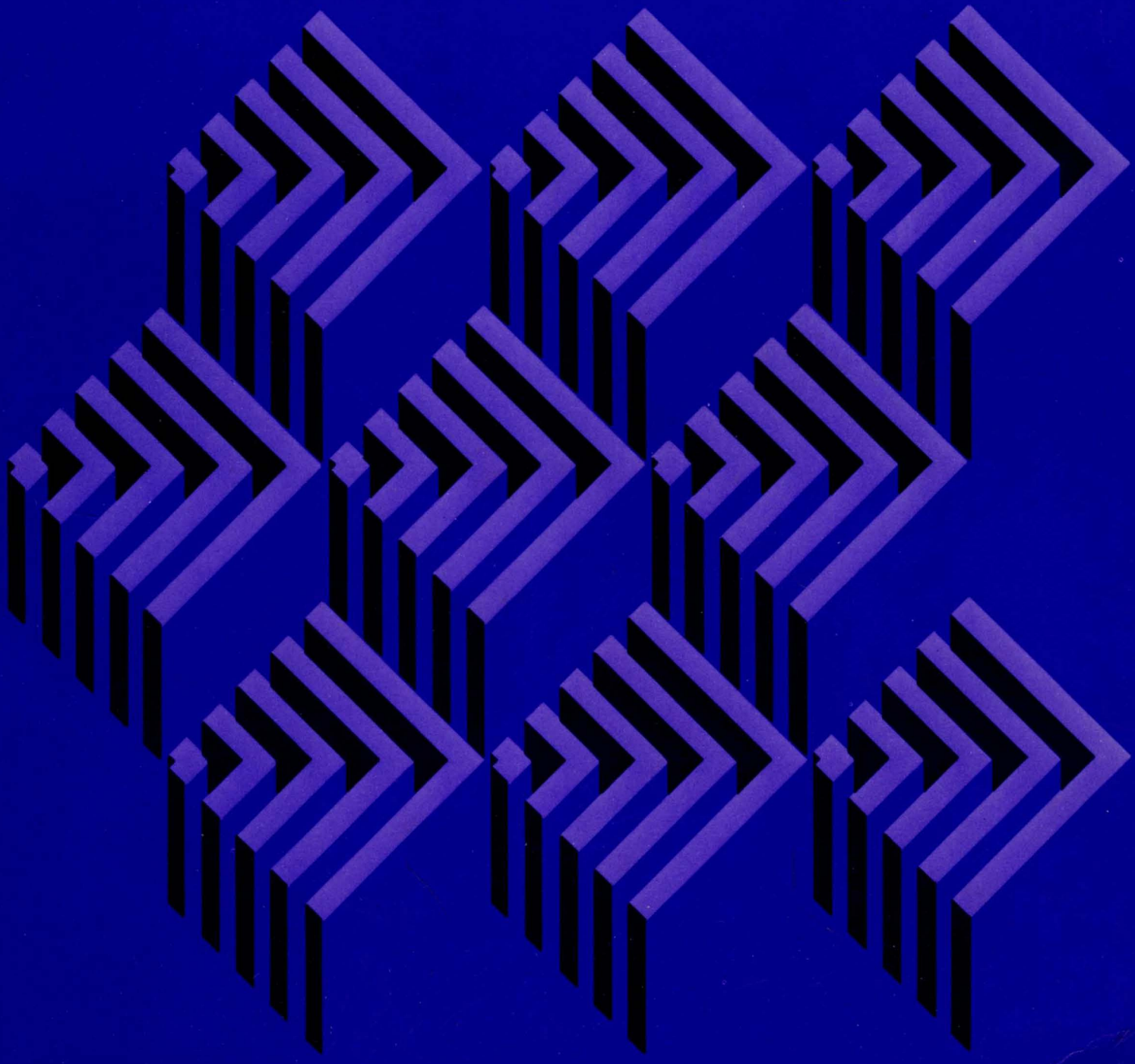
IBM Displaywriter System
General Information Manual



G544-0851-5

General Information Manual for the IBM Displaywriter System

IBM

Fifth Edition (May 1982)

The information in this manual describes all models of the IBM Displaywriter System. Your IBM representative can provide additional information regarding the date any particular component will be available or how the IBM Displaywriter System functions.

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PREFACE

PURPOSE

This manual is designed to give a general overview of the IBM Displaywriter System--a modular, diskette-based word processing system. Licensed programs provide the IBM Displaywriter System functions, such as text processing, files management, and electronic communications.

Besides providing information about the IBM Displaywriter System functions, this manual also describes the equipment components and available IBM support for the IBM Displaywriter System.

AUDIENCE

This publication is intended for company executives, office administrators, and office personnel who may direct or supervise the use of the IBM Displaywriter System but who may not directly operate the system. Familiarity with word processing is helpful, but not mandatory, in understanding the contents of this publication.

CONTENTS

This publication has five chapters, four appendixes, and a glossary:

- Chapter 1, "Introduction," an overview of the IBM Displaywriter System
- Chapter 2, "Component Devices," detailed descriptions of each of the component devices of the IBM Displaywriter System
- Chapter 3, "Functions," a general description of the functions available with various licensed programs
- Chapter 4, "Examples," descriptions of how to do common types of documents on an IBM Displaywriter System
- Chapter 5, "Support," information about IBM support for the IBM Displaywriter System in the areas of installation, training, and product services

- Appendix A, "IBM 5215 SELECTRIC® Element Printer Specifications," information about type styles and paper specifications

- Appendix B, "IBM 5218 and IBM 5228 Tractor Feed Specifications," information about paper specifications for the IBM 5218 and the IBM 5228 Tractor Feed

- Appendix C, "IBM 5218 and IBM 5228 Sheet-Feed Paper Handler Specifications," information about paper specifications for the Sheet-Feed Paper Handler for the IBM 5218 and IBM 5228 Printwheel Printers

- Appendix D, "Asynchronous and Binary Synchronous Communications Summary," detailed information about Asynchronous and Binary Synchronous Communications

- Appendix E, "IBM Displaywriter System Ergonomic Features," a general description of the design features of the IBM Displaywriter System

- "Glossary," definitions of word processing, data processing, and communications terms used in this manual.

RELATED PUBLICATIONS

The other available publications in the IBM Displaywriter System Library include:

- Customer Planning Guide for the IBM Displaywriter System, G544-0852. This manual provides the information the customer needs to prepare for the arrival and set up of the system. The manual discusses such topics as the size and weight of system components, the required system operating environment, and space requirements.

- IBM Displaywriter System Customer Setup Guide, G544-0858. This guide gives detailed step-by-step instructions for system setup. With this guide, customer personnel can (without training or tools) unpack system components, arrange them in a work area, connect power cords and intermachine cables, prepare units for operation, and run the system verifier test. This guide is shipped with the system.

- IBM Displaywriter System Customer Planning Guide for Communication, G544-0865. This manual provides planning information for the physical installation of the communication feature on the IBM Displaywriter System. It is intended for the customer personnel who

will plan for the physical setup of an IBM Displaywriter System with communications. No previous knowledge of communications is required to use this manual.

- IBM Displaywriter System Host Attach Programming Guide: Binary Synchronous Communications, G544-2039. This manual provides a detailed description of the IBM Displaywriter System's binary synchronous communication facility. It also describes programming requirements for host system and application programmers who use binary synchronous protocols to communicate with a Displaywriter.

- IBM Displaywriter System Host Attach Programming Guide: Asynchronous Communications, G544-2038. This manual provides a detailed description of the IBM Displaywriter System's asynchronous communication facility. It also describes programming requirements for host system and application programmers who use asynchronous protocols to communicate with a Displaywriter.

- IBM Displaywriter System 3270 Data Stream Compatibility Application Manual, G544-2049. This manual provides a detailed description of the functions provided by the IBM 3270 Data Stream Compatibility licensed program for the IBM Displaywriter System. This licensed program allows an IBM Displaywriter System to access IBM host computer systems using IBM 3270 application programs via SNA/SDLC communications.

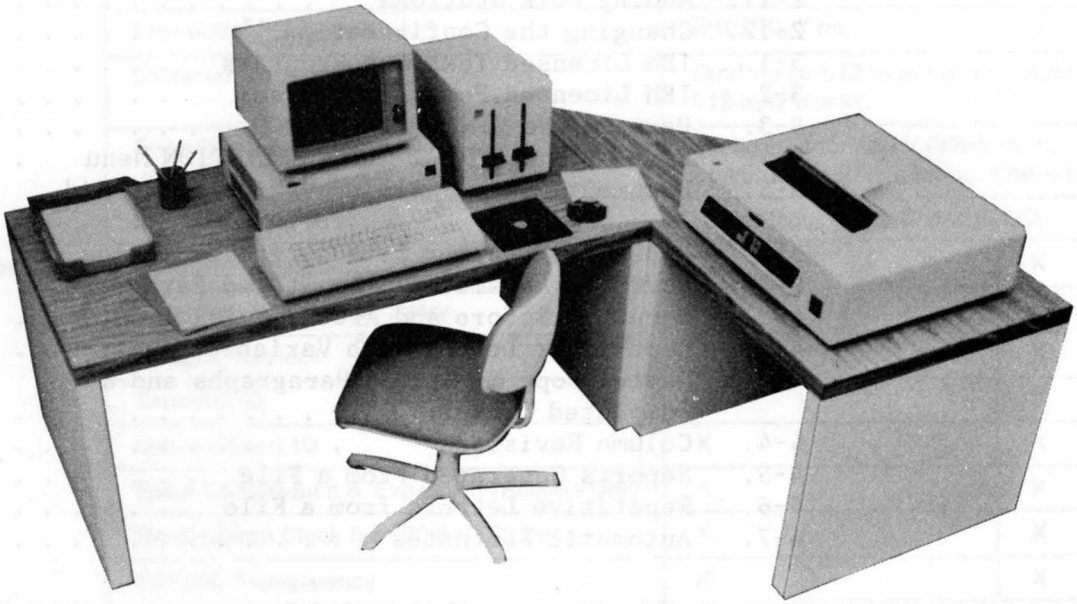
- IBM Displaywriter System Problem Determinatin Guide, S544-0860. This manual is a part of the IBM Displaywriter System Reference Package Materials. It lists the problems that may occur during the operation of the system. It also gives the procedures that an operator can follow to determine both the cause of the problem and the solution.

- IBM Displaywriter Asychronous Communications Link Problem Determination Guide, S544-2143. This manual contains problem determination procedures for the Displaywriter System when in an Asychronous Communications environment.

- IBM Displaywriter System Binary Synchronous Communications Data Link Problem Determination Guide, S544-2144. This manual contains problem determination procedures for the Displaywriter System when in an Binary Synchronous Communication environment.

CONTENTS

FIGURES



CHAPTER 1. INTRODUCTION

At a time when financial data is available almost instantly from a company's data processing center, it may take a week or more to type and edit a financial statement. Even after the document is typed, it must be proofread for typographical errors and any arithmetic in it must be recalculated to check for calculation errors. Inventories can be verified almost immediately by checking a computer's data base, but the office is still forced to store copies of files and to search through file cabinets to retrieve information--then the information must be sorted and typed to produce a report. Documents can be distributed across the country at electronic speeds, yet most documents are mailed and can take days to arrive at their destination.

For many organizations, no system exists to handle information as the valuable resource that it is. Yet the volume of paper work continues to grow at a staggering rate.

To help organizations handle information, IBM offers the IBM Displaywriter System--a diskette-based text processor, capable of creating and editing text, and of sending and receiving information over communications lines from compatible office equipment and computers.

Using the text processing functions, an operator can create, revise, and electronically store documents on a diskette. The operator can also use a spelling verification aid to compare the words in a document to two stored dictionaries. Words not found in either dictionary are highlighted automatically so the operator can easily find and check them.

By accessing a host computer, the operator can review large data bases and select data to be transferred to IBM Displaywriter diskette. Once stored on IBM Displaywriter diskettes, this host data becomes available for subsequent IBM Displaywriter text processing tasks.

Using the files management functions, the operator can create, store, and revise lists of information, called records. These files can be rearranged into reports or merged with text to produce personalized repetitive documents.

Documents can be printed on attached printers, or, by use of the communications function, distributed to compatible

communicating office equipment in the same building or at remote offices in other cities.

DISPLAYWRITER COMPONENTS AND CONFIGURATION

An IBM Displaywriter System consists of at least one work station. Each work station has a display station (a display module, a keyboard module, and an electronics module) and a diskette unit for reading and recording information on data diskettes.

A printer is recommended for a full text processing system, but is not required. (A work station used only to communicate with a computer, for example, might not use a printer.) The IBM Displaywriter System printer can be one of four impact printers. With an additional hardware feature, up to three work stations can share one printwheel printer, or each work station can have its own printer. A Mag Card Unit is also available for organizations that already have mag card card typewriters. (Figure 1-1 shows the major IBM Displaywriter System components.)

The modular design of the components of the IBM Displaywriter System offers configuration flexibility for a range of office environments. The IBM Displaywriter System can be designed:

- As a standalone unit with one work station and one printer
- As a cluster of two or three work stations sharing a printwheel printer
- As part of an operator-controlled document distribution network. The addition of communications allows the electronic transfer of documents to compatible communications equipment.

More detailed descriptions of each component and examples of various configurations are contained in Chapter 2.

IBM DISPLAYWRITER LICENSED PROGRAMS

Licensed programs provide the IBM Displaywriter System's operational functions. IBM Licensed Programs include:

- Three text processing programs (including a spelling verification aid or spellaid not available with Textpack E)
- An Asynchronous Communications Program

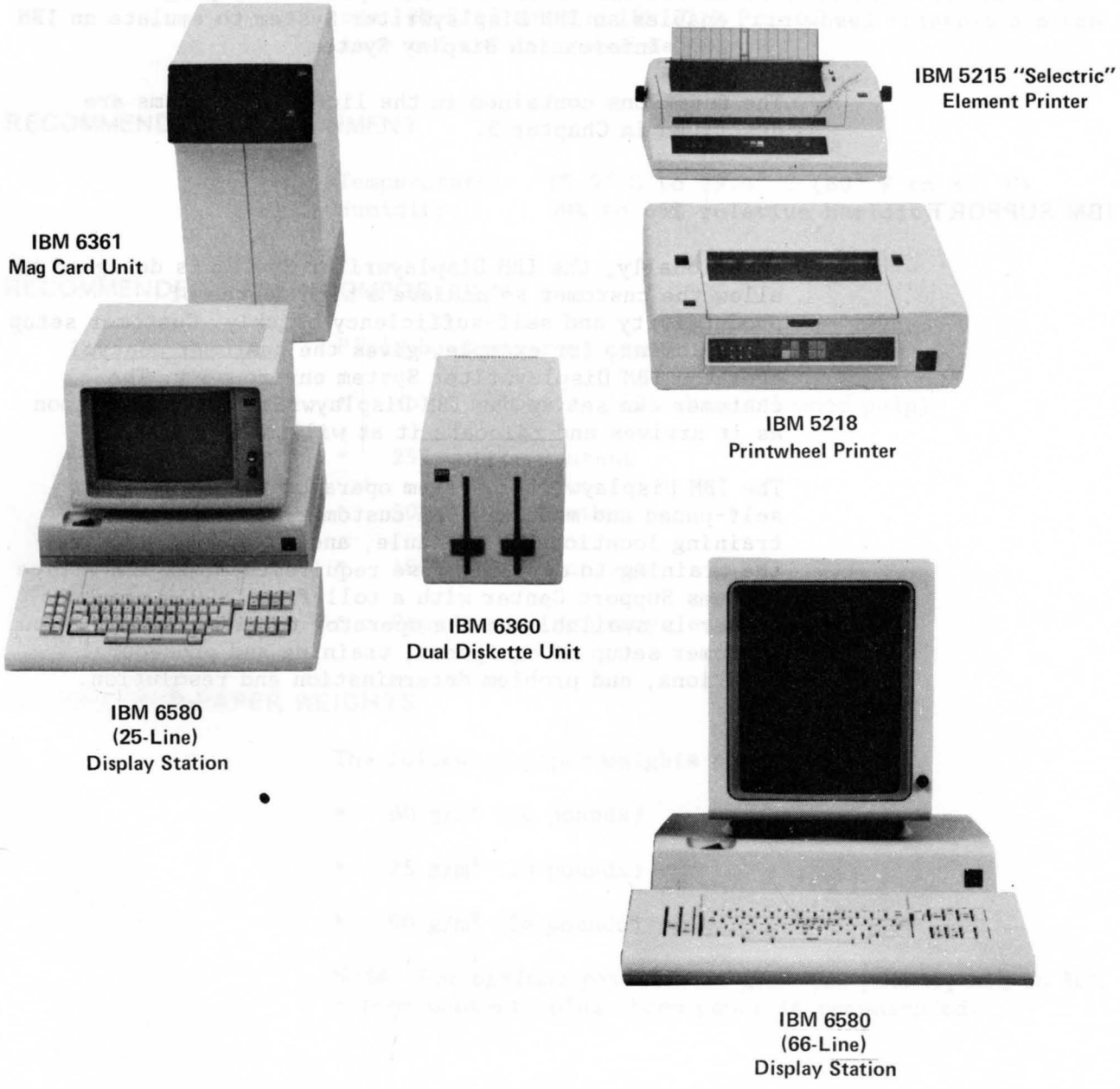


Figure 1-1. IBM Displaywriter System Components

- A Binary Synchronous Communications Program
- A Magnetic Card Conversion Program

- Two spelling verification aid programs containing dictionaries in other languages
- A files management program for file creation and maintenance
- An IBM 3270 Data Stream Compatibility program that enables an IBM Displaywriter System to emulate an IBM 3270 Information Display System

The functions contained in the licensed programs are described in Chapter 3.

IBM SUPPORT

Additionally, the IBM Displaywriter System is designed to allow the customer to achieve a high degree of productivity and self-sufficiency quickly. Customer setup of equipment, for example, gives the customer control over the IBM Displaywriter System environment. The customer can set up the IBM Displaywriter System as soon as it arrives and relocate it at will.

The IBM Displaywriter System operator training is self-paced and modular. The customer controls the training location and schedule, and can even customize the training to meet in-house requirements. An IBM Office Systems Support Center with a toll-free (800) telephone number is available to the operator to give assistance on customer setup of equipment, training and procedural questions, and problem determination and resolution.

CHAPTER 2. COMPONENT DEVICES

This chapter contains a description of each of the major components of the IBM Displaywriter System. The IBM Displaywriter System components include:

- IBM 6580 Display Station (25-line display or 66-line display)
- IBM 6360 Diskette Unit
- IBM 5215 Selectric Element Printer
- IBM 5218 and IBM 5228 Printwheel Printers
- IBM 6361 Mag Card Unit.

Each IBM Displaywriter System includes at least one work station. Each IBM Displaywriter System work station (Figure 2-1) consists of a display station (a display module, a keyboard module, and an electronics module) and a diskette unit. Documents are typed at the keyboard, viewed and revised on the display, and stored on a diskette for future use. The operator also uses the keyboard to initiate other functions, such as printing.

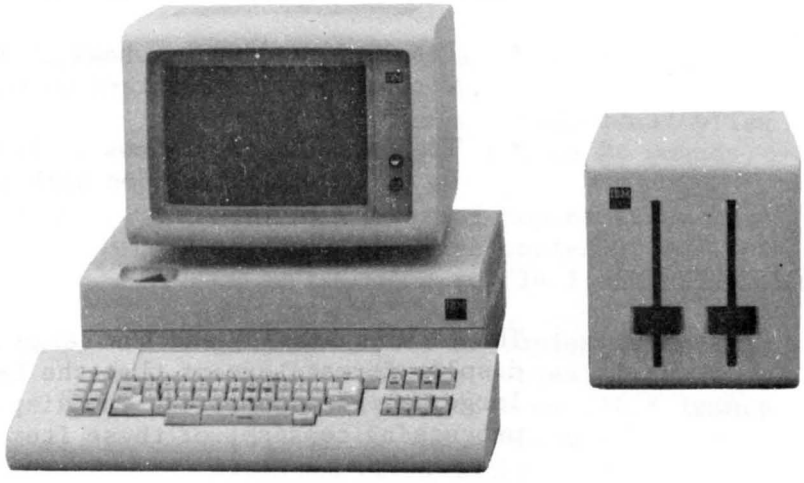


Figure 2-1. IBM Displaywriter System Work Station (25-Line Display Station Shown)

A printer is recommended for a full text processing system, but it is not required. (A work station used only to communicate with a computer, for example, might not use a printer.) An IBM Displaywriter System also may have a Mag Card Unit.

These components can be combined in different ways to meet the requirements of a wide range of users. This allows the IBM Displaywriter System to meet individual needs.

Two of the most important goals for the IBM Displaywriter System are operator comfort and system ease of use. Many of the features of the IBM Displaywriter System are based on the results of ergonomic studies. Ergonomics is the science of adapting working conditions to meet people's needs and is concerned with making the equipment people use as easy and comfortable to use as possible. In addition to the features mentioned in this chapter, Appendix E lists additional features that help to contribute to operator comfort.

DISPLAY STATION

The base of the display is the electronics module. The operator also can tilt and swivel the display on the base and also adjust the brightness of the displayed characters.

The display is available in two sizes:

- The 25-line display shows 25 lines of information, with up to 80 characters on each line.
- The Large Display shows 66 lines of information, with up to 100 characters on each line.

Display Format-Text

The 25 Line Display and the Large Display have the same display format, except that the Large Display has a larger application area. The display format for text processing consists of these items:

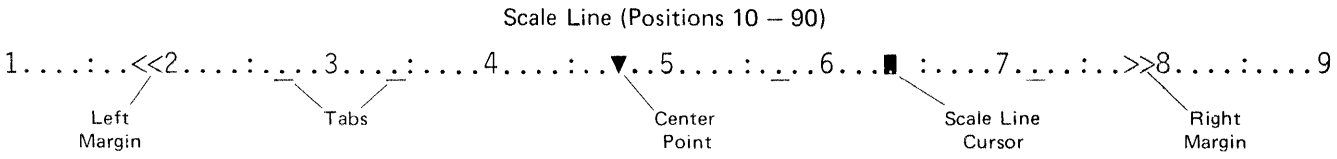
- **Lines 1 and 2** are status lines showing information such as the names of the diskettes loaded and the name and page number of the document in use. The status line shown for Textpacks 4 and 6 has an additional field of information (not shown) that indicates whether the system is in a replace mode or an insert mode. (Information not relevant to a task is not shown while that task is executed. Communication

```
 1 Context Field         |Document Name              |Audit Window    |
 2 L Disk|R Disk|Communication Status|Pg xxxx.y.z|Ln zxxxy|Kyb xxx-y|Pitch xx
 3 ....:....1....:....2....:....3....:....4....:....5....:....6....:....7....8
 4
 5
 6
 7
 8
 9
10
11
12
13
14
15
16
17
18
19
20
21
23
24 prompt
25 message
```

Figure 2-2. IBM Displaywriter System 25 Line Display Format

status, for example, shows only during communications.)

- **Line 3** is the scale line displayed during text operations and some format menus. The scale line gives format information such as margins, tab settings, and the center of the typing line.



- **Lines 4 -- 23 (Lines 4 -- 64 on the Large Display)** comprise an application area, called a viewport. The viewport can display up to 20 lines (61 lines on the Large Display) of:
  - Text, the document being created, reviewed, or revised
  - A menu, a list of options that aid an operator in selecting and defining the tasks to be performed.
- **Line 24 (Line 65 on the Large Display)** is the prompt line that tells the operator to perform some action.

- **Line 25 (Line 66 on the Large Display)** is the message line that displays messages to inform the operator of device status or function status.

Display Cursor

A cursor, which looks like a brightened underline, indicates the location on the display where the next typed character or character to be edited appears. The operator can either type or change information on the display at this location or move the cursor to another location on the display by using the cursor movement keys. (For a description of the cursor movement keys, see "Keyboard Module.")

The cursor and the character above it are brightened on the display to help the operator locate them. A second cursor on the scale line indicates to the operator the position of the cursor along the scale line.

Display Page Positioning

The IBM Displaywriter System can process document pages that have more lines or longer lines than can be displayed at one time on the display. For pages with more lines than can be shown on the display, the operator can move the viewport up or down through the text. For example, if the operator moves the cursor down when it is positioned on the bottom line of the display, the text moves up and displays the next line of text. At the same time, the top line leaves the display.

For lines with more than 80 characters (or 100 characters on a large display), the operator can move the viewport across the line to show 80-character (or 100-character) segments of the line. For example, if the operator moves the cursor to the right when it is positioned at the right margin of the screen and there are more characters on that line, the screen segments to show another 60 characters (or 75 characters) or shows just the rest of the line if there are fewer than 60 more characters on that line. An overlap of 20 characters from the previous screen provides some context information for the operator. In this way, the operator can view a line of up to 999 characters, although only part of the line is displayed at one time.

Keyboard Module

The IBM Displaywriter System keyboard module (Figure 2-3) is available with either 92 or 96 standard characters. A cable attaches the keyboard module to the electronics module. This allows the operator to move the keyboard module to the most comfortable position. The keys are pearl white with black characters to help decrease glare and reduce operator eye fatigue. Except for the addition of a system entry key (ENTER), key shape, size, and placement of the main key group are similar to the IBM Office System 6 keyboards.

Coded functions--initiated by using the CODE key and another key--have been minimized. Only the functions which may be characterized as touch-typing functions (word underlining and centering, for example) are in the main key group.

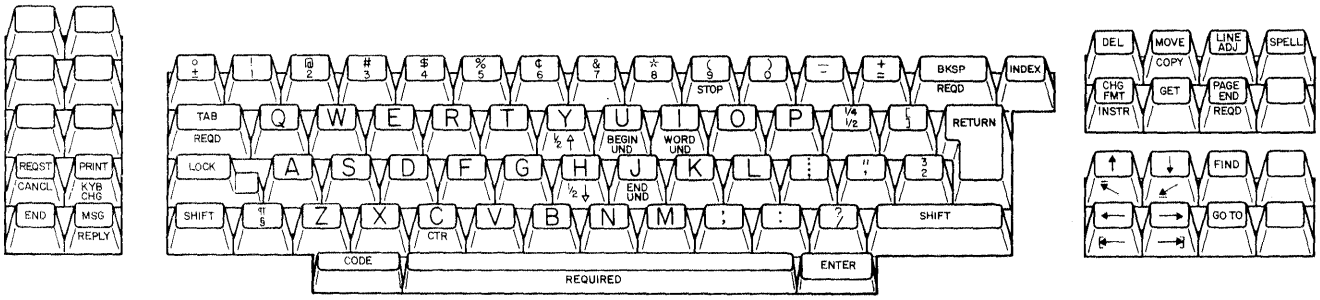


Figure 2-3. IBM Displaywriter System Keyboard

Function Keys

The keyboard has three types of function keys located in clusters to the right and left of the main key group.

- The **cursor movement keys** position the cursor on the screen at the point of the next entry. The cursor can be moved up, down, left, or right. The cursor also can be moved automatically to the boundaries of a page such as the first or last line and the first or last character of a line. Other functions are available to move the cursor directly to the beginning of a specified page of text or to the first character of a specified character string.

- The **function control keys** initiate functions such as moving text within a document, deleting text, and changing formats.

- The **work station control keys** initiate work station functions such as printing a page of a document.

These keys have additional functions when the different licensed program products are loaded.

IBM 6360 DISKETTE UNIT

The IBM 6360 Diskette Unit can read information stored on the magnetic diskettes and record information created at the keyboard onto the diskette. The operator can move the cable-connected diskette unit to either the left or right of the display station, whichever is more convenient.

Diskettes

A diskette is a magnetic disk approximately 203 mm (8 inches) in diameter, enclosed in a protective sleeve. The storage capacity of the diskette depends upon the type of diskette used. An IBM Diskette 1 (one-sided diskette) has a storage capacity of approximately 284,000 bytes of customer usable characters and controls. An IBM Diskette 2D, a double-density, two-sided diskette, can have information stored on both sides of the diskette with more information stored in the same amount of space. An IBM Diskette 2D has a storage capacity of approximately 985,000 bytes of customer usable characters and controls.

The licensed programs, which control text and communications functions, are stored on program diskettes. The operator uses work diskettes to store operator-created information.

Single Diskette Unit

The IBM 6360 Single Diskette Unit (Figure 2-4) has one usable slot (the right-hand slot is blocked) and operates with one diskette inserted at a time. Any tasks which require the use of more than one diskette, such as copying a diskette, are done by the operator inserting each diskette as it is needed.

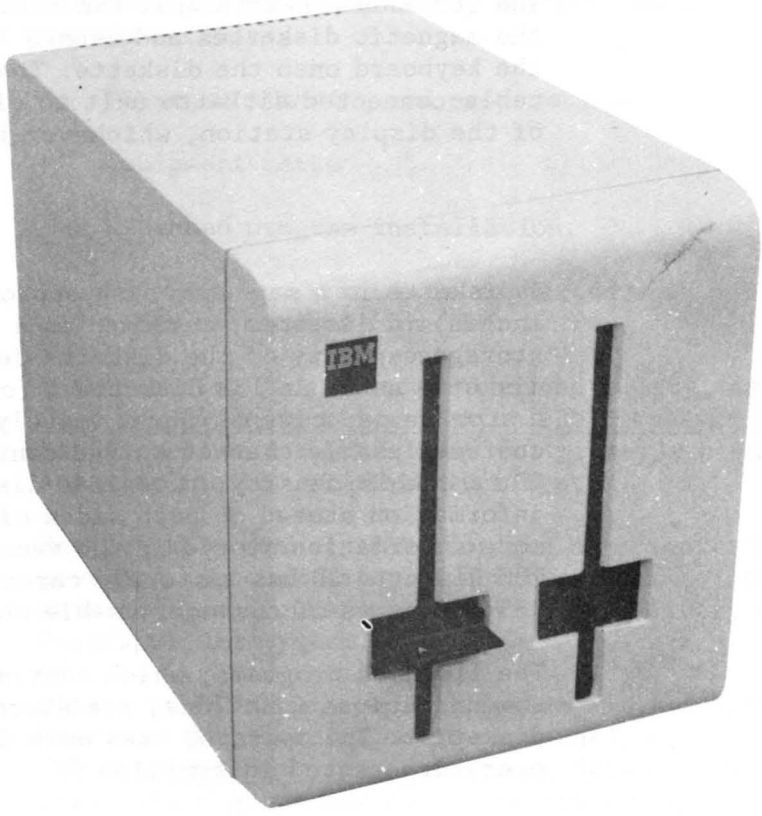


Figure 2-4. IBM 6360 Single Diskette Unit

Dual Diskette Unit

The IBM 6360 Dual Diskette Unit is identical to the single diskette unit in appearance and function, except that the dual diskette unit has two usable diskette slots. Printing can be done from one diskette while the operator works with the other diskette. Tasks such as copying documents from one diskette to another can be done without operator intervention.

Diskette Drives

Two types of diskette drives can be used in the IBM 6360 Diskette Unit. One type can read/record information on an IBM Diskette 1 (one-sided) only. The other type of diskette drive can read/record information on both the IBM Diskette 1 and Diskette 2D (two-sided).

Both types of diskette drives can be ordered as part of either single (one slot) or dual (two slots) diskette units. Figure 2-5 shows the various options for combinations of diskette drives in single and dual diskette units.

	Type of Diskette Used	
6360 Diskette Unit	Left Diskette Slot	Right Diskette Slot
-010	IBM Diskette 1 Only	–
-011	IBM Diskette 1 Only	IBM Diskette 1 Only
-020	IBM Diskette 1 or 2D	–
-022	IBM Diskette 1 or 2D	IBM Diskette 1 or 2D

Figure 2-5. 6360 Diskette Unit Options

IBM 5215 SELECTRIC® ELEMENT PRINTER

The IBM 5215 Selectric Element Printer (Figure 2-6) is an impact printer that uses the familiar IBM Selectric typewriter print mechanism. Many ribbons and elements used on current IBM Selectric typewriters and IBM mag card typewriters can be used on the IBM 5215 Selectric Element Printer. (Contact your IBM Marketing Representative to determine which ribbons and elements are compatible.)

The IBM 5215 Selectric Element Printer prints at a rated burst speed of up to 15.5 characters per second (cps). (Actual printing time per page will vary based on information being printed.) The IBM 5215 prints in either 10 or 12 pitch. The IBM 5215 printer can be ordered so that it will print one of the following: 5.1, 5.3, or 6 lines of type per vertical inch.

The IBM 5215 printer can print on manually-fed paper that is up to 381.0 mm (15 inches) wide, with a maximum writing line of 317.5 mm (12.5 inches).

The IBM 5215 Selectric Element Printer prints on cut paper or on continuous paper fed through an optional Pin-Feed Platen.

Messages on the work station display and lights on the printer notify the operator of the status of the printer.

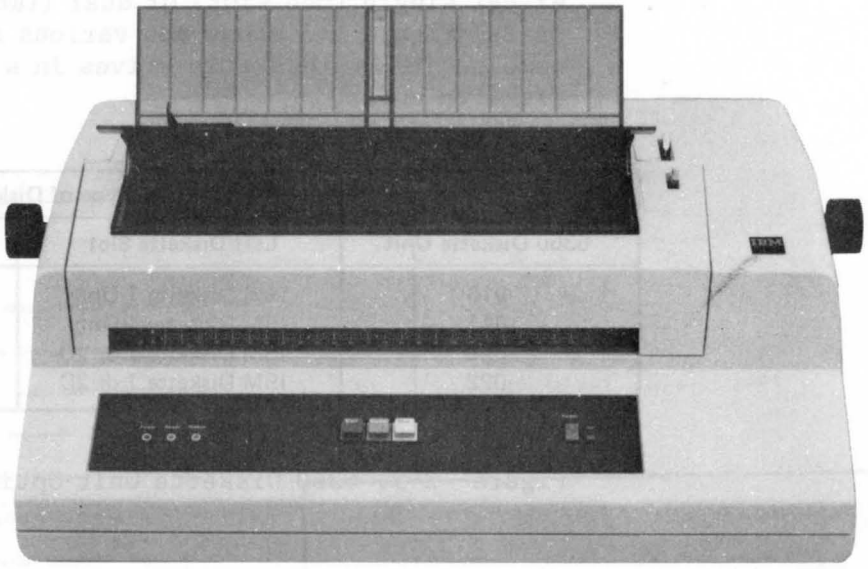


Figure 2-6. IBM 5215 Selectric Element Printer

Each IBM 5215 printer supports a single work station. Work done at the keyboard is independent of work done at the printer. The operator can trail print each page after it is typed. When trail printing, the operator can type or revise text in the same document while a previous page is printed. The operator also can batch print an entire document as another document is created or revised.

Only one document is printed at a time to prevent the intermixing of pages from different documents. Thus, the operator avoids the task of sorting pages, by document, after they are printed.

Special Request Features for the IBM 5215 Selectric Element Printer

A Pin-Feed Platen feeds continuous pin-feed paper. (See Appendix A for acceptable paper sizes.)

Used with the Pin-Feed Platen are:

- An out-of-paper switch which stops the printer when only 51 mm (2 inches) of paper remain
- A roll paper holder that supports and feeds roll paper or, for perforated forms, guides the paper onto the platen pins and separates incoming from outgoing paper

- A paper stand that separates incoming from outgoing continuous paper. The paper supply stack is placed under the paper stand, and the shelf is used to stack the printed continuous paper.

IBM 5218 AND 5228 PRINTWHEEL PRINTERS

The IBM Printwheel Printers (Figure 2-7) are bidirectional impact printers that have a printwheel which is rotated electronically to select the desired characters.

The IBM 5218-A01 Printwheel Printer has a 10-pitch rated burst print speed of up to 40 characters per second (cps). The IBM 5218-A02 and the IBM 5228-A12 Printwheel Printers have a 10-pitch rated burst print speed of up to 60 cps. (Actual printing time per page will vary, based on the information being printed.)

The IBM Printwheel Printers print in 10-pitch, 12-pitch, 15-pitch, and proportional spacing.

The IBM Printwheel Printers can print 5.1 (by special order), 5.3, 6, or 8 lines per vertical inch, as selected by the work station operator. To assist in more precise forms alignment, a line spacing option of 24 lines per inch can be chosen so that each carrier return causes the paper to index only 1.06 mm (.04 inches).

The IBM 5218 printer can print on manually-fed paper ranging from 80 mm (3.15 inches) to 392 mm (15.43 inches) with a maximum writing line of 335 mm (13.25 inches). The IBM 5228 Printwheel Printer has a wider carriage than the IBM 5218 Printer allowing for a line of 432 mm (17 inches).

Messages on the work station display and lights on the printer notify the operator of the status of the printer. The printwheel can be changed without removing the printer ribbon.

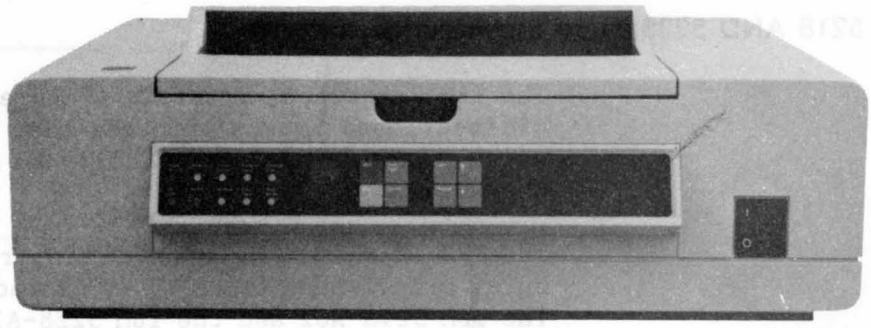


Figure 2-7. IBM 5218 Printwheel Printer

The IBM Printwheel Printers print on cut paper or on continuous-form pin-feed paper. Single-sheet paper can be fed automatically through an optional Sheet-Feed Paper Handler or loaded manually by the operator. An optional continuous paper Tractor-Feed is available for feeding continuous pin-feed paper.

With a Printer Sharing Card (a logic card placed in a display station to which the printer and the other display stations are attached to determine printer control in a shared configuration) an IBM Printwheel Printer can be shared by up to three work stations in either a trail or batch printing mode, as directed by the work stations. Batch printing normally is used when the printer is shared.

Only one document is printed at a time to prevent the intermixing of pages from different documents. Thus, the operator can avoid the task of sorting pages, by document, after they are finished printing.

Optional Sheet-Feed Paper Handlers

The Sheet-Feed Paper Handler (Figure 2-8), which is removable, automatically feeds cut sheet paper for either printwheel printer. It has two paper trays. Each tray can hold approximately 200 sheets of 20-lb paper. The output tray on the sheet feeder can hold approximately 400 sheets of 20-lb paper.

Although all the paper in a tray at one time must be the same size and weight, the Sheet-Feed Paper Handler can feed a variety of paper weights and sizes. (See Appendix C for acceptable paper sizes and weights and environmental requirements.)

Note: Separate Sheet-Feed Paper Handlers are available for the IBM 5218 and IBM 5228 Printwheel Printers, but the size of the paper used is the same for both. Paper requirements are listed in Appendix C.

Figure 2-8. IBM 5218 Printwheel Printer with a Sheet-Feed Paper Handler

Each document is printed in collated order. If multiple copies of the same document are printed, each copy is printed and ejected in collated order. This eliminates the need for the operator to collate documents manually.

Paper sensors alert the operator when a tray is empty or when there is a paper misfeed.

Individual cut sheets or envelopes can be fed manually without removing the Sheet-Feed Paper Handler.

Optional Tractor Feeds

Separate Tractor Feeds for feeding continuous pin-feed paper are available for the IBM 5218 and the IBM 5228 Printwheel Printers. The Tractor Feeds can be adjusted to accommodate various paper widths. (See Appendix B for acceptable paper sizes and weights.)

Used with the Tractor Feed are:

- A paper stand that separates incoming from outgoing continuous paper. The paper supply stack is placed under the paper stand, and the shelf is used to stack the printed continuous paper.
- An out-of-paper sensor that stops the printer when the end of the continuous paper is reached.

IBM 6361 MAG CARD UNIT

The IBM Displaywriter System will use the IBM 6361 Mag Card Unit (Figure 2-9) to record magnetic cards and to read magnetic cards created on compatible mag card office equipment. An IBM 6361 Mag Card Unit is attached to a work station, which is the only work station that can use that Mag Card Unit.

Information on magnetic cards can be read and recorded on the IBM Displaywriter System diskette for revision, printing, or storage. In some cases, information from magnetic cards may need to be edited before the information is revised or printed. (For more information about magnetic card compatibility, contact your IBM Marketing Representative.)

The input hopper holds up to 50 cards. The output stacker holds up to 200 cards.

The magnetic card is a reusable recording medium. Up to 50 lines of 100 characters each can be recorded on each card, for a total capacity of 5000 characters.

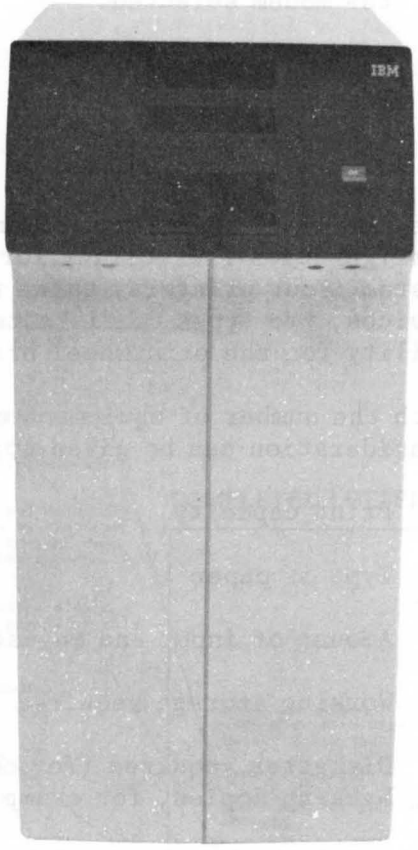


Figure 2-9. IBM 6361 Mag Card Unit

COMMUNICATIONS FEATURE FOR ASYNCHRONOUS AND BINARY SYNCHRONOUS COMMUNICATIONS

Communications function is provided by the IBM Displaywriter System Asynchronous Communications Program 5608-SR1 or the Binary Synchronous Communications Program 5608-SR2. The following equipment is required for electronic communications:

- A communication adapter. The adapter can provide an EIA RS-232C compatible interface. The EIA interface is required for operation with external modems that meet the EIA RS-232C interface specifications.
- A modem. External modems are available from IBM and from other manufacturers.

- A data coupler. This may be required, depending on the modem selected.
- Communication line

FLEXIBILITY

The number of equipment options available allows configuration flexibility for each IBM Displaywriter System. Four printers, three types of paper handling devices, two types of diskette units, and printer-sharing ability (on the printwheel printers) are available.

With the number of equipment options available, consideration can be given to:

- Print capacity
- Type of paper
- Amount of input and revisions
- Working storage required
- Diskettes required (for copying diskettes to create back-up copies, for example)

For example, the amount of input may be small enough to justify only a single work station, but the print volume or the requirement for automatically feeding cut sheet paper may justify a higher speed printer and perhaps a dual-diskette unit.

The following examples and figures illustrate how customers can use the IBM Displaywriter System's equipment options and flexibility to change their IBM Displaywriter Systems to meet changing needs.

Example 1. Changing the Printer

XYZ Inc. acquires an IBM Displaywriter System work station and Selectric Element Printer. Later, after a library of stored documents is developed, the company needs more print capability. It simply replaces the Selectric Element Printer with a higher-speed printwheel printer and also adds a Sheet-Feed Paper Handler to provide automatic paper handling as shown in Figure 2-10.

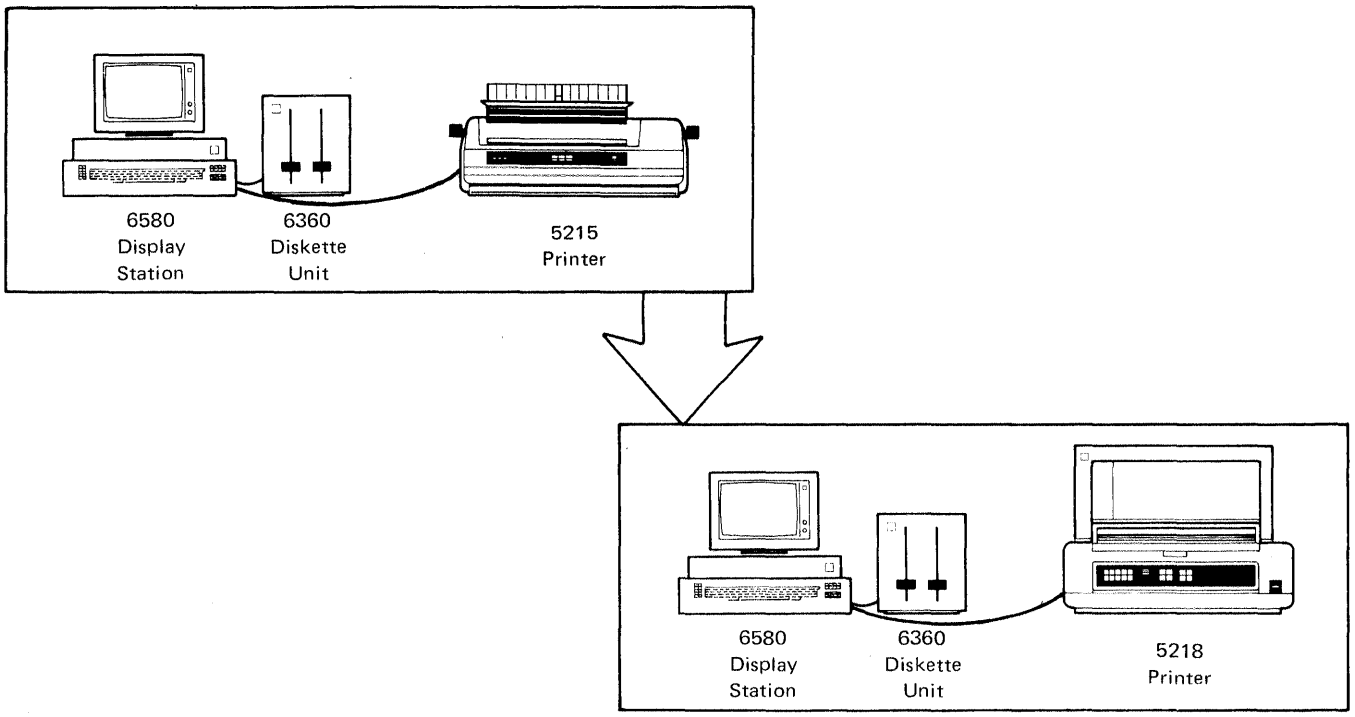


Figure 2-10. Changing the Printer

Example 2. Adding Work Stations

A branch office of XYZ Inc. acquires an IBM Displaywriter System work station and a printwheel printer. Later it finds that the number of original documents being generated has increased and that it needs more input capability. To gain the input capability, it adds two more work stations to the configuration. All three work stations share the printwheel printer as shown in Figure 2-11.

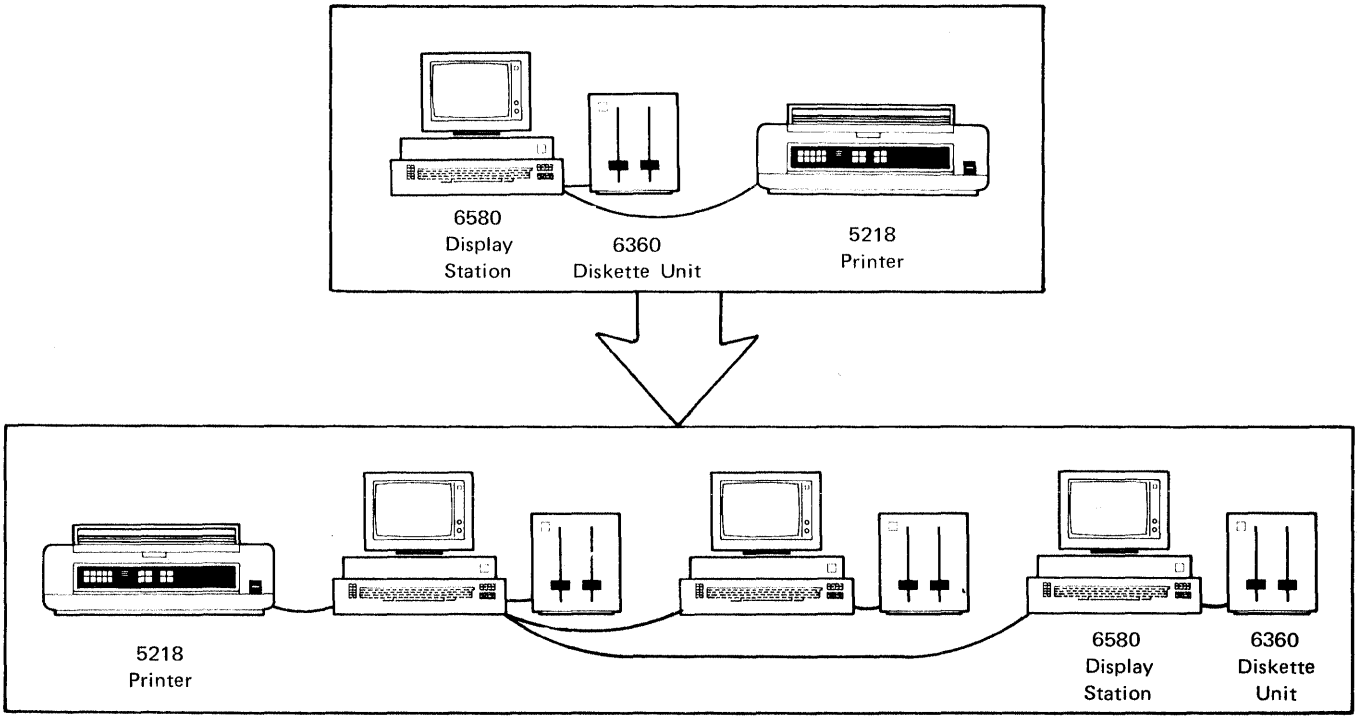


Figure 2-11. Adding Work Stations

Example 3. Changing the Configuration

The XYZ Inc. headquarters office has three IBM Displaywriter System work stations attached to a printwheel printer. When the Accounting Department moves to another building, it needs some word processing support in its new location.

A Selectric Element Printer is acquired, and one IBM Displaywriter System work station is removed from the cluster in the headquarters office and attached to the Selectric Element Printer to provide the support for the Accounting Department. The other two IBM Displaywriter System work stations and the printwheel printer remain in their original location.

The IBM Displaywriter System equipment is designed to be flexible enough to allow easy reconfiguration, and XYZ personnel can move the IBM Displaywriter System equipment and set it up in a new location as shown in Figure 2-12.

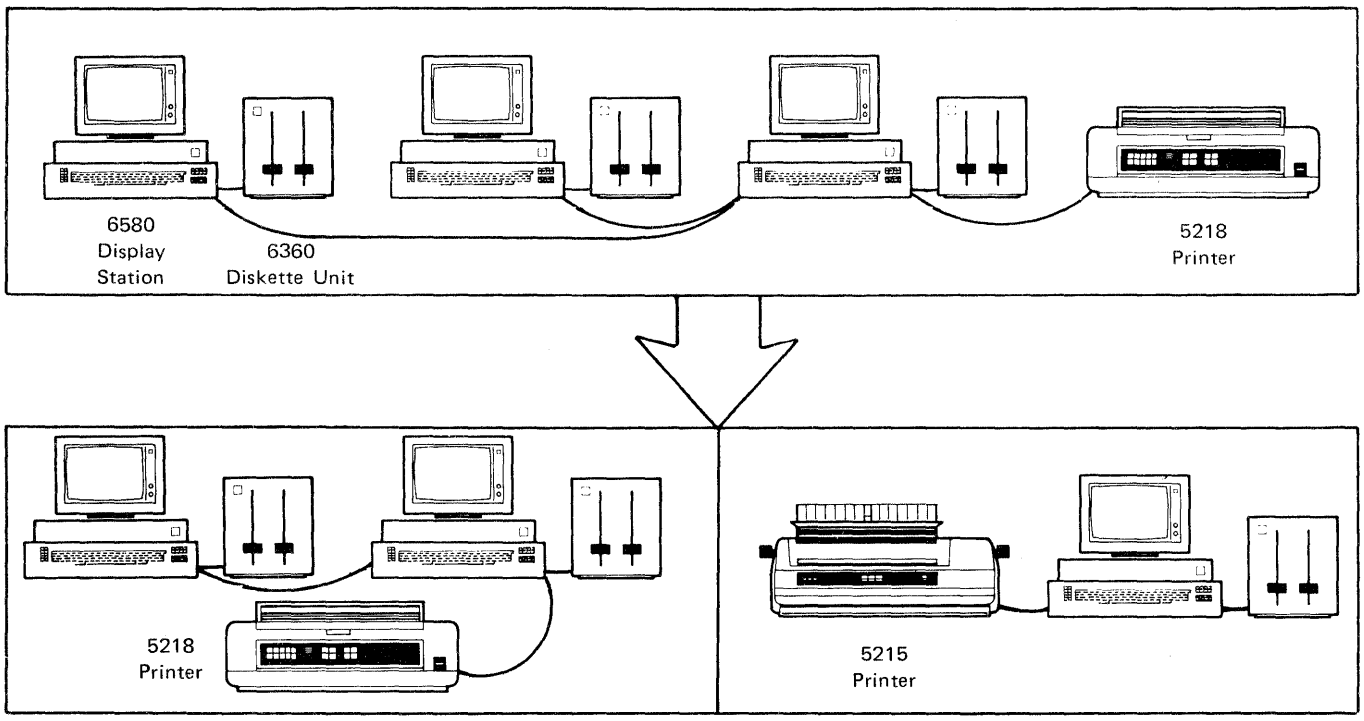


Figure 2-12. Changing the Configuration

CHAPTER 3. FUNCTIONS

The components described in the previous chapter perform IBM Displaywriter System functions under the control of IBM Licensed Programs. This chapter describes the licensed programs and the functions they provide. These programs provide for:

- Operator assistance functions
- System functions
- Text processing functions
- Files management functions
- Electronic communications functions
- IBM 3270 data stream compatibility functions

The text processing, files management, and communication functions are all supported by the IBM Displaywriter's system and operator assistance functions. These functions provide helpful reference information at the work station and help reduce operator errors. All licensed programs provide some operator assistance and system functions.

Text processing functions are those directly used by the operator to create, revise, or print a document. The IBM Displaywriter System Textpack programs provide the text processing functions. Figure 3-1 on the next page identifies the contents of the programs. These are explained later in this chapter.

Files management functions help the operator to create, store, and revise files of information, then retrieve the information to produce reports and repetitive documents based on that information.

Licensed Program Name	Text Processing Functions	Feature Program Support Capability*
Textpack E 5608-TRE	basic text	No
Textpack 2 5608-TR2	basic text spelling verification aid	Yes
Textpack 4 5608-TR4	basic text advanced text spelling verification aid column processing math background/trail printing enhanced spelling verification aid enhanced arithmetic records instructions for files management keystroke save	Yes
Textpack 6 5608-TR6	basic text advanced text spelling verification aid enhanced spelling verification aid column processing math enhanced arithmetic records instructions for files management automatic footnotes automatic outlining automatic column reference and column heading display keystroke store, recall, and editing background/trail printing electronic spelling dictionary keystroke save	Yes

*Any IBM Displaywriter System that has shared printwheel printers, a diskette unit that uses IBM 2D diskettes, and/or one or more of the licensed feature programs listed in Figure 15 must use a text program with support capability as a prerequisite for use of the licensed feature program.

Figure 3-1. IBM Licensed Textpack Programs

Figure 3-2 lists the IBM Licensed Feature Programs that are available for the Displaywriter System. To use these Feature Programs, a customer must also have a Textpack Program that has support capability for using the Feature Program and the appropriate storage.

Communications functions are those involved in the electronic communications of information, either between the IBM Displaywriter System and a text processor or

between the IBM Displaywriter System and a suitably programmed computer.

Licensed Feature Program	Contents
Asynchronous Communications 5608-SR1	See "Communications Functions" in this chapter.
Binary Synchronous Communications 5608-SR2	See "Communications Functions" in this chapter.
Magnetic Card Conversion 5608-SR3	Must be used for data conversion with any IBM Displaywriter System having an IBM 6361 Mag Card Unit.
Languagepack 5608-SR4	See "Spelling Verification Aid" in this chapter.
Reportpack 5608-SR5	See "Files Management" in this chapter. Note: Can only be used with Textpacks 4 and 6.
IBM 3270 Data Stream Compatibility 5608-SR6	See "IBM 3270 Data Stream Compatibility" in this chapter, Note: Can be used with Textpacks 4 and 6.
Languagepack 2 5608-SR7	See "Spelling Verification Aid" in this chapter.

Figure 3-2. IBM Licensed Feature Programs

OPERATOR ASSISTANCE FUNCTIONS

Operator assistance functions help the operator by providing reference information at the work station and by reducing the number of steps and choices the operator must memorize. These functions lead the operator through a task and present the choices available when a choice needs to be made. These functions include:

- Menus that help the operator select and define the tasks to be performed
- Messages that inform the operator of function and device status
- Prompts that tell the operator the next operational step

Menus

A menu is a list of choices that is presented to an operator to define and complete a task. In a format menu, for example an operator sees a format item, the possible choices, and the choice in effect unless changed.

Part of the LINE FORMAT Menu is shown in Figure 3-3 below. In this example, the format item is line spacing.

The line spacing options are shown under Possible Choices. The entry under Your Choice is the current value that is in effect until changed. If an item is changed, the entry under Your Choice reflects the new choice.

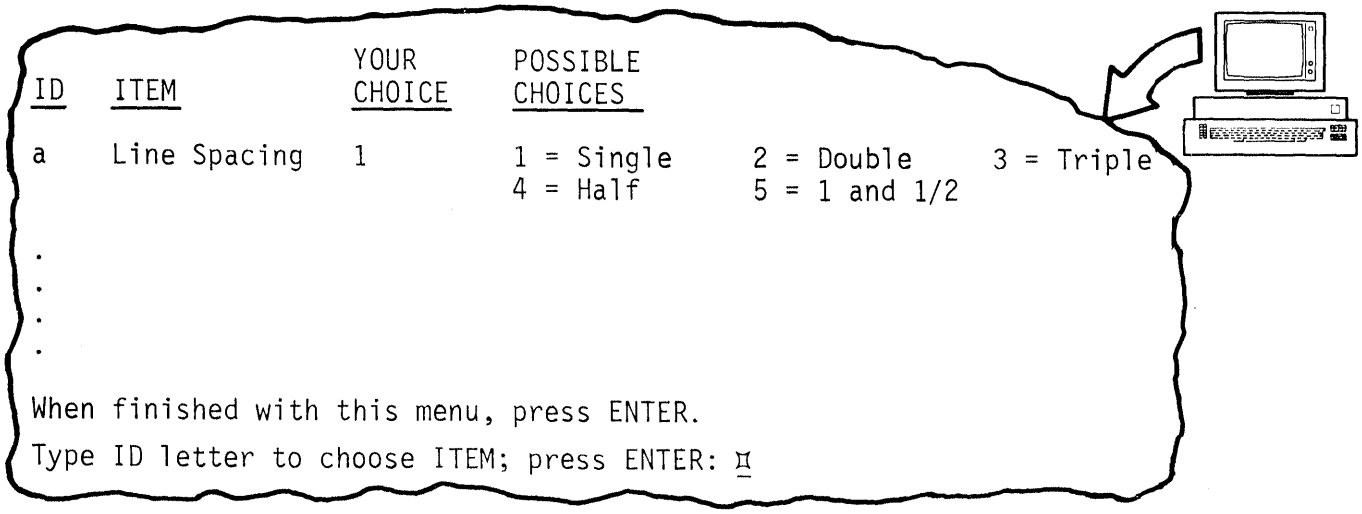


Figure 3-3. Part of the LINE FORMAT MENU

Other menus help an operator select certain tasks and functions. Choices made in the menu may cause the IBM Displaywriter System to ask the operator for additional information. In the TYPING TASKS SELECTION Menu (Figure 3-4), if the operator chooses Revise Document, the prompt **Type document name; press ENTER:** appears.

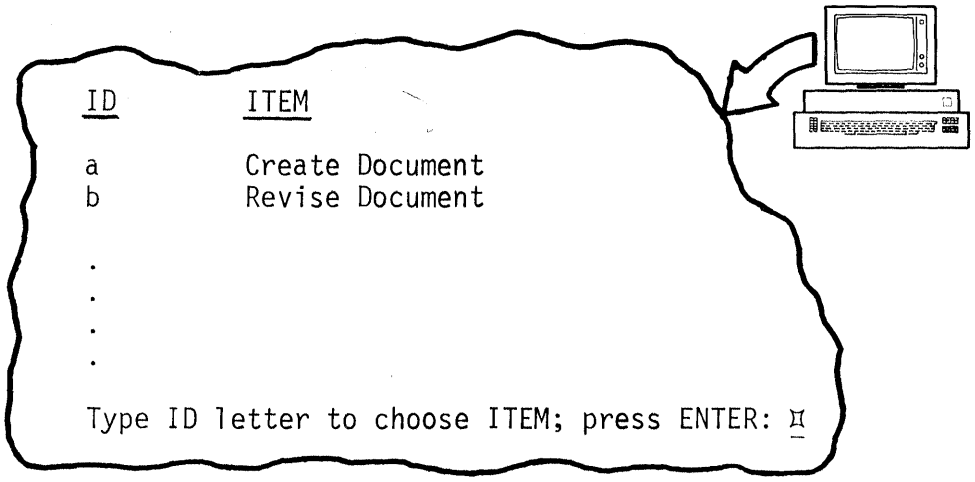


Figure 3-4. Part of the TYPING TASKS SELECTION Menu

Messages

To allow an operator to work more efficiently, the system communicates with the operator through three types of messages that appear on the display:

- Immediate messages appear on the message line automatically in response to an operation action. For example, **Invalid Choice** is an immediate message displayed when an invalid choice is made in a menu.
- Delayed messages inform the operator of the status of tasks previously requested. For example, a delayed message might inform an operator that a print operation (previously requested by that operator) for a specific document is completed.
- Device service messages indicate that a device needs attention. For example, a device service message might indicate that the printer ribbon has run out.

Prompts

Prompts, which are highlighted on the display, guide the operator and reduce the need to memorize the steps of a function. Prompts can indicate the next action an operator must take (for example, **Type page number; press ENTER**). Other prompts interact with an operator

during a multi-step function. For example, if the operator presses the MOVE key, the prompt **Move what?** displays. After the operator specifies what is to be moved (by moving the cursor to the end of the block of text), the prompt **To where?** appears. The operator moves the cursor to the point where the block of text is to be inserted and then the system inserts the text.

SYSTEM FUNCTIONS

Many repetitive operator actions and decisions are necessary in an office environment. Through system functions available in all licensed programs, an IBM Displaywriter System helps to reduce these repetitive actions so office personnel can perform other tasks. The system functions also help the operator reduce the need to handle and track documents and files stored on the Displaywriter System. The major system functions include:

- Information management tasks which help the operator maintain the library of documents and files stored on the Displaywriter diskettes, and
- System personalization that allows standard information, such as a default document format, to be entered in the system one time for repetitive use by the operator.
- Textpacks 4 and 6 system functions allow the operator to combine more than one Licensed Program and one feature program diskette, which are shipped on IBM 1 diskettes (single-sided, single-density), on an IBM 2D (dual-sided, dual-density) diskette. Any remaining unused space on the combined program diskette can be used for customer data.

Information Management

Information management tasks include the different types of information manipulation that are necessary when the operator has documents and files stored on Displaywriter diskettes. Among these tasks are:

- Automatic indexing. The operator can display or print a list of all the documents and files that are stored on a Displaywriter diskette. This index contains each document name and document comment.
- Duplication of diskettes and documents. The operator can duplicate the contents of one Displaywriter diskette to another or duplicate a document or file.

- Deletion of a diskette or a document. The operator can erase a diskette for reuse or a document or file that is no longer needed.

System Personalization

After an IBM Displaywriter System has been set up, the program diskette can be personalized for the customer's equipment configuration and document formats. For example, the operator can specify such items as the most common method of paper handling.

For personalization of document formats, the default values for menus can be reviewed and changed, if necessary. The operator changes only those values which need to be different from the original defaults. These changes create new (personalized) defaults that are appropriate for the customer. For example, the original default for line spacing is single-space. If an operator's primary format uses double-space, the operator can change the program diskette default to double-space. Double-space is then the machine standard.

The operator can create a document format and an alternate format, which are stored on the licensed program diskette. The operator than has to access and change the format menus only if the format for a specific document is different from the document or alternate formats.

TEXT PROCESSING FUNCTIONS

The IBM Displaywriter System Textpacks E, 2, 4, and 6, Licensed Programs all contain the basic text functions necessary to create and revise a document. These functions are described in "Basic Text." (Textpacks 2, 4, and 6 can be used to support more than one work station sharing a printwheel printer and/or the use of the feature programs listed in Figure 3-2. Textpack E cannot be used in these situations.)

Textpacks 4 and 6 also contain some advanced text functions, and column and four-function math for statistical typing. These functions are described in "Advanced Text," "Column Processing," and "Math."

The basic text functions necessary to create, paginate, print, and revise a document are included in all IBM Textpack programs. This section describes these functions.

Textpack 6 contains some advanced text functions, and some enhancements to the math functions, auto footnotes, and auto outlining/section numbering, automatic column reference and column heading display, and keystroke store and recall. These functions are described in this chapter.

Creating a Document

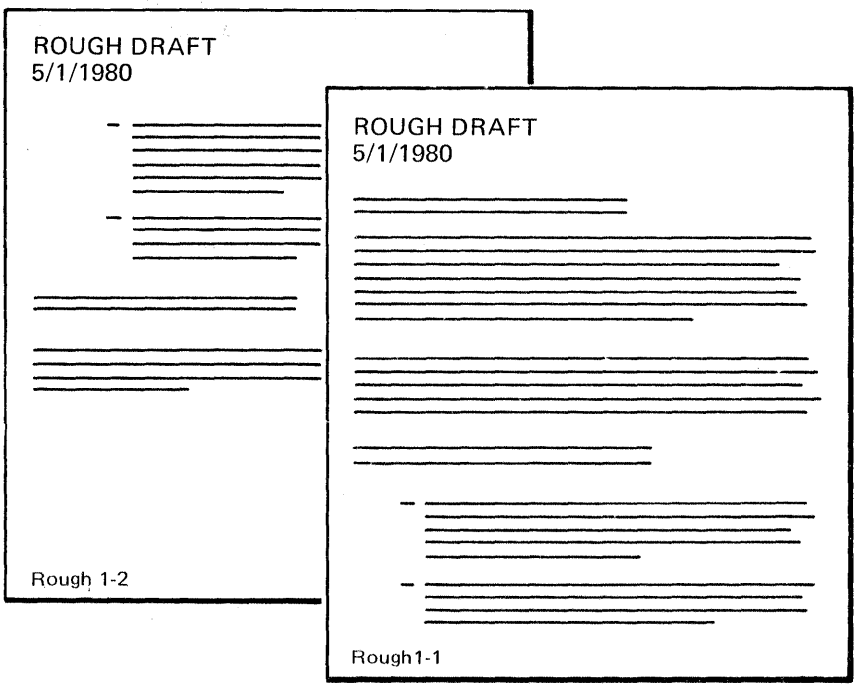
To create a document, the operator may perform some or all of the following steps:

- Establish the format
- Type the document
- Use the Spelling Verification Aid to check the spelling

ESTABLISHING A FORMAT: The operator names the document and can add a document comment (a description of up to 44 characters). After naming the document, the operator can go to the typing area if the default document format is used, or the operator can access the format menus to establish the format for that specific document.

In addition to the format choices the operator would make if typing the document on a typewriter (such as margin settings), the IBM Displaywriter System format choices include:

- Headers and footers, constant text that can be typed once and automatically printed at the top and/or bottom of each page (like the example on the following page).



- Automatic page numbering that consecutively numbers document pages as a part of header or footer text
- Line spacing for printing text that allows the operator to print:
  - Single-space, space-and-a-half, or double- space on an IBM 5215 Selectric Element Printer
  - Half-space, single-space, space-and-a-half, double-or triple-space on an IBM 5218 or 5228 Printwheel Printer
- Line alignment that optionally prints text with a justified right margin or a partially justified right margin

Rec_ID	Last_Name	Initials	Dept.	Numbers	Rank
1	Alfa	A. A.	210	1586	4
2	Grant	B. B.	709	4687	4
3	Archee	R. A.	942	7681	3
4	Dukworth	B. Z.	790	1876	5
5	Balder	T. C.	041	2615	3
6	Galleon	D. L.	631	3264	2
7	Boman	A. J.	081	7272	6

- Tab stops that establish both the position of each tab and how text is to be aligned at that tab setting:
  - Right or left aligned
  - Centered
  - Aligned at a decimal point or comma

Additional format changes also can be made in the document in the CHANGE FORMAT Menu. The operator can change the format for a page, a paragraph, a line, or make a type style change in midline. For example, line spacing of a paragraph can be changed to make the paragraph stand out from surrounding text.

TYPING A DOCUMENT: The operator creates the document by typing the text at the keyboard. The operator also can copy pages of a document stored on the diskette to the new document without any retyping. Text from more than one stored document can be included in the new document.

The operator can type at rough draft speed because errors can be erased by backspacing and retyping.

Several IBM Displaywriter System functions are designed to help save keystrokes and time.

- Word underlining and centering are each done with a single code.
- A phrase or line of text can be solidly underlined by using a beginning code to start the underline and an ending code to stop it.

- A carrier return can be inserted automatically on every line as the keyed text crosses the right margin.

- A temporary left margin for indented paragraphs can be created by one code and cancelled by one code.

The typed characters that appear on the screen are stored on diskette. The operator can type without regard to page boundaries. As the memory capacity of the IBM Displaywriter System is reached, text is stored on the diskette automatically. System pagination, which segments the text into pages, can be done after the document is completed. The document then is ready to print.

If the operator has some incidental typing such as envelopes, forms fill in, notes, or messages which do not need to be displayed. They can be typed using the Displaywriter's Key to Print feature. This feature enables an operator to type without storing on diskette or displaying on the screen, much like using a typewriter. The jobs can be typed using the IBM 5215 Selectric Element Printer, the IBM 5218 Printwheel Printer or the IBM 5228 Printwheel Printer.

PAGINATING A DOCUMENT: After creating or revising a document, the operator can use the paginate function to adjust line endings, adjust page endings, and eliminate widow lines.

In both the Create Document and the Revise Document tasks, the operator can adjust line endings and make page ending decisions as each page is created or revised.

System pagination also is possible. When system pagination is invoked, the IBM Displaywriter System makes the line ending and page ending decisions and divides the text into pages without operator intervention.

Printing a Document

The IBM Displaywriter System has background print capability (not available with Textpack E). This means that as soon as the operator has assigned the document to a print queue (a list of documents to be printed), the operator is free to start working on another document. This makes concurrent operations possible.

Each work station maintains its own print queue. If the system has a single work station and printer, the queue indicates the order in which documents are printed on a first-in, first-out basis. The operator can display the contents of the work station's print queue on the screen,

rearrange the printing order of the documents, or cancel the printing of a document.

If two or three work stations share a printer, then the work station queue serves an additional purpose of printer control. When an operator requests and receives control of the printer, no other work station's documents are printed until all the documents in the controlling queue are printed or until the operator releases the printer.

Revising a Document

To change an existing document on an IBM Displaywriter System, an operator retrieves the document from storage on the diskette by identifying the document to be revised.

To revise the document, the operator moves the cursor to the position in the document where the text is to be changed and enters the new material at the keyboard. Additional text can be inserted at any point in the document--either by keying it, moving it within the document, or getting it from another document. The operator can define the beginning and end of a block of text (from a single character to an entire document) by using the cursor and other function keys. The operator can move the block of text to another location, copy the block to an additional location in the document, or delete the block of text.

The operator also can change the format of an existing document. For example, a draft copy originally formatted to print in triple-space can be reformatted so that the final copy prints in double-space.

Key-to-Print

Key-to-print is an operator selectable task which allows the Displaywriter System to function like a typewriter, for incidental typing and interactive forms fill-in support. This task can be invoked from the Task Selection menu and will interrupt the printer at a page boundary if a job is being printed when key-to-print is requested. While using key-to-print information is not stored on a diskette or displayed on the Display Station. The suspended print job will be resumed when key-to-print is ended.

Spelling Verification Aid

After the operator finishes typing or revising a document, the IBM Displaywriter System spelling verification aid can be used to help check for possible spelling errors (not available with Textpack E). The spelling verification aid compares the words in a document to:

- An IBM-provided spelling dictionary capable of checking approximately 50,000 words in U.S. English only.
- A supplemental dictionary created by the customer. This dictionary can have words containg 4500 characters unique to that environment (such as technical, medical, or legal terms).

The spelling verification aid checks the document while the operator waits. Any word not found in either the main or supplemental dictionary is highlighted for easy operator identification. A highlighted word could be a misspelled word, a proper noun (such as a person's name) or a word is correctly spelled but not listed in either dictionary.

After the spelling check is completed, the operator returns to the Revise Document mode. An example of a display after the spelling verification aid has been used is shown in Figure 3-5. The operator finds the highlighted words and corrects the misspelled words. If a highlighted word is correct, the operator can cancel the highlighting without changing the word.

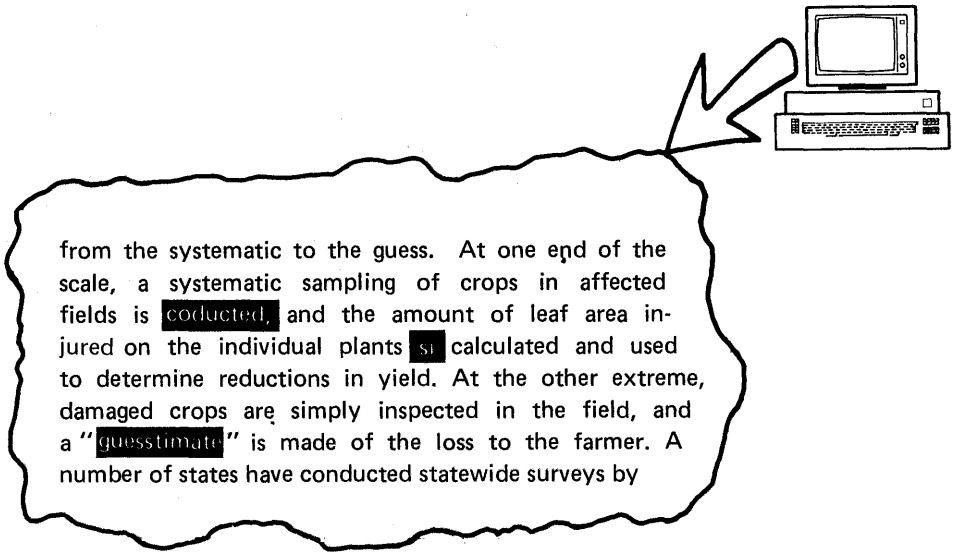


Figure 3-5. Document After Spelling Verification Aid Is Used

The operator using the spelling verification aid should be aware that a word may be spelled correctly but be wrong in the context of a sentence (for example, "too" instead of "two"). While doing a spelling check, the system checks for the root words in the dictionary and then allows prefixes or suffixes to be added to them. Because of this, the spelling verification aid may occasionally verify a misspelled word formed from inappropriate combinations of prefixes, root words, and/or suffixes. For example, "destate," a combination of the prefix "de" and the root word "state," will not be highlighted.

Enhanced Spelling Verification Aid

The enhanced spelling verification aid contained in Textpacks 4 and 6 has additional capabilities. After creating or revising a document, the operator can choose to do a spelling check, make hyphenation decisions, and have the document paginated in one operation. As a part of this task, the operator can choose to do:

- A prompted spelling check
- Either prompted or automatic hyphenation

If the operator chooses to use the spelling verification aid in this task, the spell check will be prompted. Just as in regular spelling verification, the Displaywriter compares the words in the document to the spelling and

supplemental dictionaries. Any word not found in either dictionary is highlighted on the screen. Some of the text surrounding the highlighted word is also shown to provide some context. The operator can 1) indicate that the word is acceptable, 2) leave it highlighted for later action, or 3) correct the misspelled word by typing it correctly on the prompt line. The newly typed word is checked immediately. If it is spelled correctly, it replaces the misspelled word in the text. If it also is incorrect, the operator is alerted to try another possible spelling. The operator can then choose to add the word to the supplement if it is not contained in the IBM Spelling Dictionary.

As a part of the pagination of a document in this task, the lines of text are adjusted to fit within the margins. When is a word that crosses the right margin, a hyphenation decision is necessary. There are two methods of making the hyphenation decision:

1. The operator can choose to have the system prompt when a hyphenation decision is necessary. Then, the operator is shown the word to be hyphenated with the cursor located at a dictionary-suggested hyphenation point, along with some of the text surrounding that word. The operator can then hyphenate the word, move the entire word to the next line, or leave the entire word on the line it is on.

2. The operator can also choose automatic hyphenation. In this mode, the Displaywriter System automatically hyphenates any word that crosses the right margin. It uses information from the spelling dictionary to determine the hyphenation points within a word. It also will use hyphenation points stored with the supplemental words if these points have been indicated when storing words to the supplemental dicationary.

After the spell check, hyphenate, and paginate operation is complete, the document is ready to print immediately, if the operator has not already trail printed the document during the task.

Languagepack and Languagepack 2

An IBM Licensed Feature Program, Languagepack Program 5608-SR4, includes spelling dictionaries in all of the following languages:

- U. S. English
- United Kingdom English
- National French
- French Canadian

- Dutch
- Spanish
- Italian
- German
- Swedish
- Danish
- Norwegian

Each U. S. English and United Kingdom English spelling dictionary is capable of checking approximately 50,000 words. Each dictionary for the other languages listed above is capable of checking over 150,000 words. Only one dictionary can be used as a spelling verification aid at one time.

Languagepack also has space for one supplemental dictionary for each of the eleven language dictionaries. The Languagepack licensed program is shipped on three program diskettes with three to four spelling dictionaries and space for supplemental dictionaries on each diskette.

Languagepack 2, used with Textpacks 4 and 6, contains the eleven spelling dictionaries listed above. It also supports the enhanced spelling capabilities of combined spell check, hyphenation, and pagination as described in "Enhanced Spelling Verification Aid."

Electronic Spelling Dictionary

The electronic spelling dictionary is an enhanced spelling aid which operates with Textpack 6. This enhancement helps the Displaywriter operator check the spelling of a word and correct a misspelled word. A special dictionary and search technique is used to present a list of likely candidate words. The operator may select a word from this list to replace the misspelled word. Electronic spelling dictionary is available is U.S. and U.K. English languages only.

Advanced Text

The advanced text in Textpacks 4 and 6 contains additional functions besides those used to create and revise text. These include the merge function used in repetitive documents and document assembly, and some additional functions for creating or revising documents. Advanced text is useful for applications that require additional revision support for long documents or additional support in preparing repetitive or assembled documents.

Merge Function for Repetitive Documents

Repetitive documents are documents that have the same text, but also have variables that are different in each document. The operator can create repetitive documents by combining stored text with variable information.

To generate repetitive letters, the operator types a fill-in document that will be merged with the constant text to produce the final letters.

The fill-in document lists each variable name (or switch code) that appears in the repetitive letter and the variable information to be inserted at that place in the repetitive letter. If variable names are used, the variable information does not have to be typed in the same order as the variable names appear in the repetitive letter. This helps the operator save time because:

- Variable information can be typed in the fill-in document without being rearranged to match the repetitive letter.
- A fill-in document may be used with a variety of repetitive letters. The operator does not have to retype the same variable information merely to rearrange it to match a new repetitive letter. (If there are variables listed which do not not appear in a given repetitive letter, the system ignores them in processing the merge.)
- Although a variable may be used more than once in a repetitive letter, it only has to be typed once in the fill-in document.

For an example, see Figure 3-6.

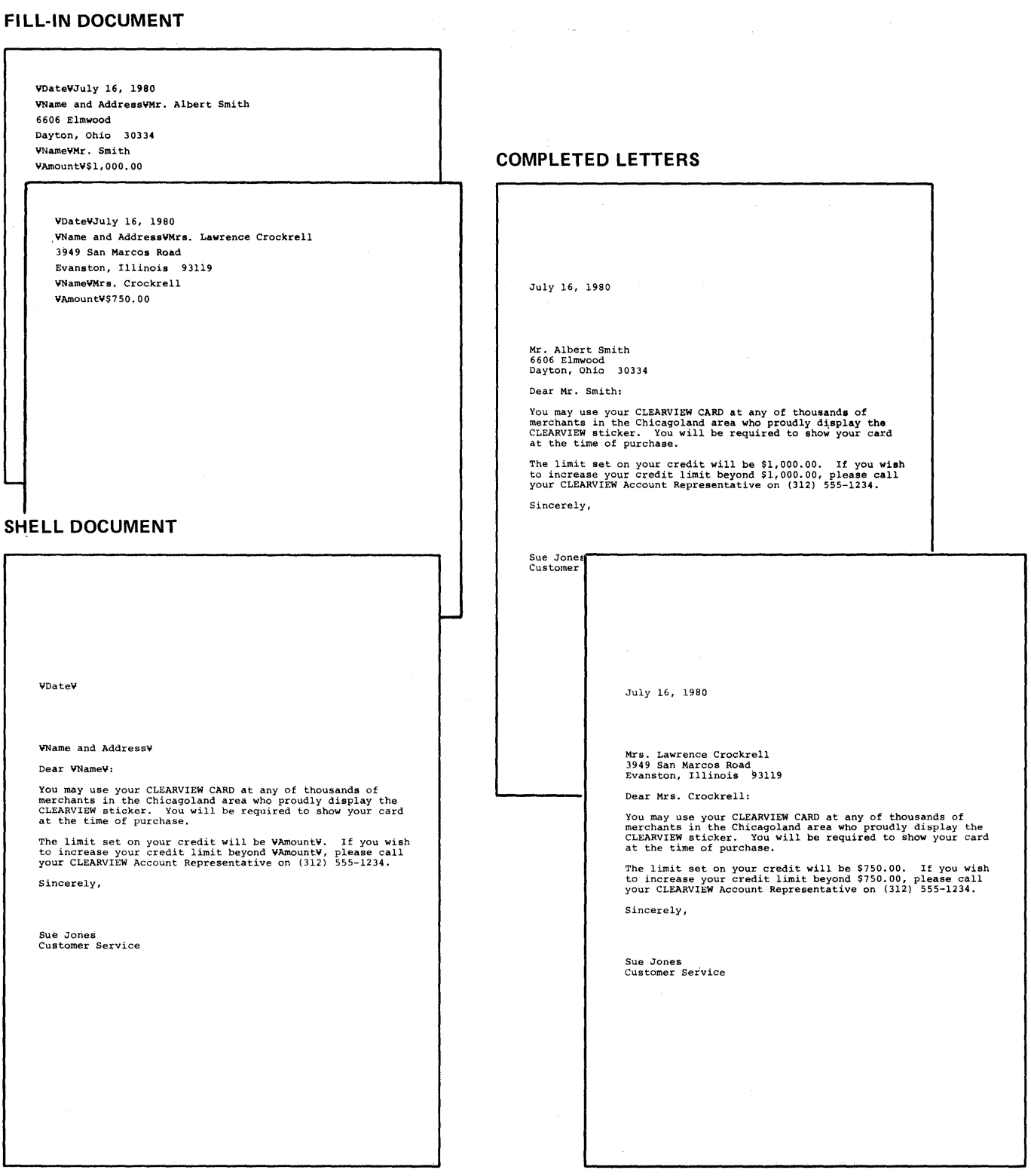


Figure 3-6. Repetitive Letter with Merged Variables

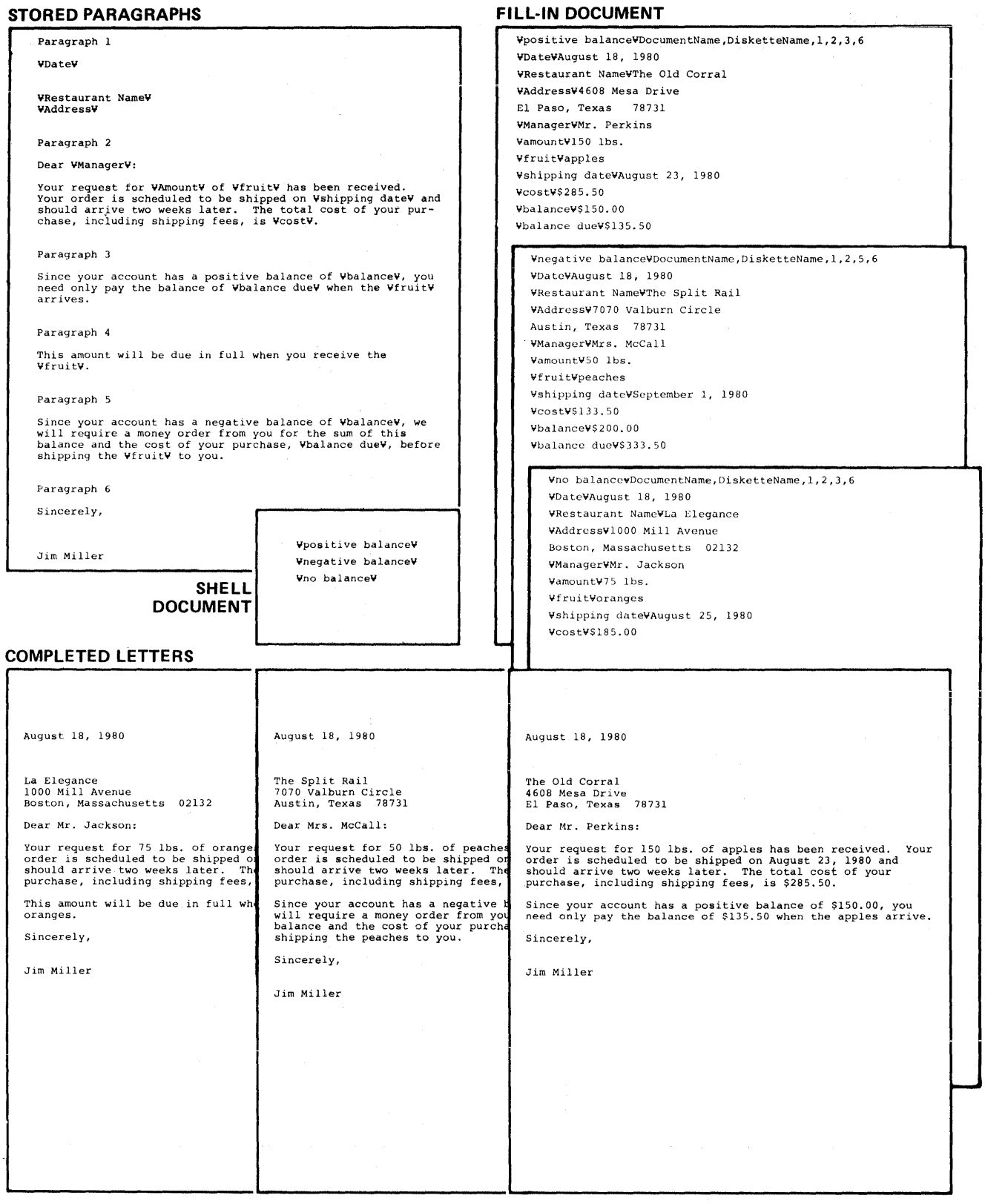


Figure 3-7. Document Assembled from Stored Paragraphs

Merge Function for Document Assembly

The procedure for document assembly incorporates the use of the merge function and is similar to that used for repetitive documents. In document assembly, however, there is no single piece of constant text. Instead, there is a library of stored paragraphs or blocks of text which are compiled to create unique shell documents.

To create documents using document assembly, the operator types a shell document. The shell document contains lists of paragraph or document descriptions. These descriptions are repeated in the fill-in document and specify which paragraphs are to be compiled and in what order. The fill-in document also contains all the variables that are to be merged into the paragraphs after the paragraphs are compiled.

The merge function then collects the paragraphs and merges in the variables to produce the final documents.

For an example, see Figure 3-7.

Additional Advanced Text Functions

Advanced text contains other functions that enhance the operator's ability to create and revise text. Among the more important of these functions are then:

- **Alternating headers and footers** allows the operator to type the headers and/or footers on pages that will be duplexed so that the header and/or footer appear on the left-hand side of even numbered pages and the right-hand side of odd numbered pages. This is available with Textpacks 4 and 6.

- **Automatic Outlining** gives the operator a method of creating and maintaining consistent document outlines using section numbers, numbered paragraphs or bulleted lists. These may be numbered alphabetic, with roman numerals, arabic numbers or with no lettering or numbers, as shown. Outlining is available with Textpack 6.

For example:

I.
II.
III.
A.
B.
C.
i.
ii.
iii.
a.
b.
c.
1.
2.
3.
4.

- **Automatic Footnotes** with Textpack 6 provides the operator with the capability to renumber, automatic tie-in, placement/repagination, and spill across pages for footnotes of indefinite length. The final formatted and paginated document can be printed by any other Textpack program.

- **Global replace/delete** allows the operator to specify a character, a word, or a group of words (up to 60 characters) that appears several times within a document. The system will find every occurrence of the specified information between the point where global replace/delete begins and the end of the document and either replace it with another character string or delete it.

  The global replace/delete is a case-sensitive, character search. Up to three "Search For/Replace With" pairs may be specified. These may be used for three independent character strings or may specify how various occurrences of a character string might appear.

For example:

Search For:	ship	Replace With:	boat
Search For:	Ship	Replace With:	Boat
Search For:	SHIP	Replace With:	BOAT

OR

Search For:	ship	Replace With:	ocean liner
Search For:	boat	Replace With:	sailboat
Search For:	craft	Replace With:	vessel

- **Enhanced FIND** capability is designed to facilitate accessing character strings and will find a character string even if it is interrupted by line or page boundaries, or if it contains a syllable hyphen or underscore code within the string.

- **Block overstrike** allows the operator to overstrike a block of text with a single character, such as a slash or an X.

Column Processing

Textpacks 4 and 6 also contain column processing functions for statistical typing. Column processing functions include automatic column layout and column revision capability.

To save calculation time, the operator can use the IBM Displaywriter System for automatic column layout. The operator simply types a sample line containing the longest entry from each column. The IBM Displaywriter System calculates the spacing and sets tabs so that there will be an even amount of white space between the columns. The operator can then type the table.

The automatic column layout capability can also be used when previously typed tables are revised. If, for example, the operator wants to insert a column into a table, the automatic column layout capability can reformat the table and set new tab settings to make room for the new column.

The operator can also manually set the tabs for a table if the desired table format has different amounts of white space between the columns.

The column functions also allow the operator to designate columns of alpha or numeric characters as blocks of text so that a column can be deleted, moved, or copied just like any other block of text. Columns can be moved or copied within a table or to another table. This gives an

operator more flexibility in doing revisions within tables.

Math

Textpacks 4 and 6 have four-function math capability which allows an operator to add, subtract, multiply, or divide rows or columns of numbers that have been typed on the IBM Displaywriter System. Numbers on the display can be:

- Added to or subtracted from another number shown on the display or from a constant number entered on the prompt line by the operator
- Multiplied or divided by another number shown on the display or by a constant number entered on the prompt line by the operator

The operator uses the cursor to indicate which numbers are to be used in the calculations and the math keys to indicate the type of mathematic operations to be done. The results of the calculations are displayed for the operator in an accumulator (called Total) at the bottom of the display.

The operator can use four-function math to verify the accuracy of previous calculations. The operator can also choose to have the results of the calculations appear as part of the text.

Using these math functions, the operator can perform other calculations such as figuring percentages and calculating both subtotals and totals in a table.

Enhanced Math

The enhanced math functions allow the operator to automatically calculate averages and percentages. In addition to keeping a running total of the math calculations in the accumulator, the system will keep track of the number of items added to or subtracted from the total. If an average is needed, the system automatically computes the average by dividing the number in the Total by the number of items.

The system can calculate a percentage of a Total, and it can also add the percentage to or subtract it from the Total. In addition, the Total can be multiplied or divided by a percentage.

The enhanced math functions also allow the operator to add a row or column of numbers by simply pressing a typamatic row add key or column add key. The system will continue to add the numbers in a row or column until the key is released.

Automatic Column Reference and Column Heading Display

Automatic Column Reference and Column Heading Display (available with Textpack 6) provides the Displaywriter operator with an enhancement to the creation and revision capability for statistical applications. When the operator wishes to revise or type a table containing multiple columns, the Displaywriter System can automatically display a single column with the column's heading and the first column of the table for reference purposes. This is helpful when working with tables which exceed the display capability.

Keystroke Store, Recall, and Editing

This enhancement provides the ability to store on diskette a series of keystrokes (characters, controls, commands, etc.) known to be used repetitvely, to recall them, and to have the keystrokes executed by pressing a single key. The program is captured as keystrokes are executed and may be altered in a single step mode.

FILES MANAGEMENT

The Reportpack Licensed Program and Textpacks 4 and 6 Licensed Programs provide the capability for files management. Textpack 4 or 6 are prerequisites for using the Reportpack Licensed Program.

A file is a structured collection of records considered as a unit. Each record of a file contains all the information about one person, project, inventory item, etc. A telephone directory is an example of a file, with each line of the directory being one record in the file.

Each record is made up of fields. A field is one piece of information in a record such as a person's first name or phone number. In the following example, the telephone directory file consists of records having a last name field, an initials field, a department number field, a telephone number field, and a rank field.

Rec_ID	Last_Name	Initials	Dept.	Numbers	Rank
1	Alfa	A. A.	210	1586	4
2	Grant	B. B.	709	4687	4
3	Archee	R. A.	942	7681	3
4	Dukworth	B. Z.	790	1876	5
5	Balder	T. C.	041	2615	3
6	Galleon	D. L.	631	3264	2
7	Boman	A. J.	081	7272	6

Within each IBM Displaywriter System file, each record can contain up to 1000 bytes of customer information. The maximum field lengths within a file are 17 characters (math fields), 80 characters (character fields), and 512 characters (text fields), depending on the field type.

File Creation and Maintenance

To create a file, the operator describes each field by selecting options in a field description menu. The operator specifies whether the field type is character (contains letter and numbers), math (contains numbers only), or text (contains letters, numbers, and word processing controls, such as tabs and carrier returns, and may be more than one line of text). When entries are made in the file, they are checked against the field descriptions. The operator is alerted if an entry does not match the field description.

After a file is named and described, records can be added to the file in a variety of ways:

- Records can be typed at the display station.
- Records can be acquired from an appropriately programmed IBM System/370 host.
- Appropriately formatted text can be converted to records.
- Records can be duplicated from another file.

The operator can revise the file by adding or deleting entire records, by adding fields to the file, or by revising the information already in the file.

Other files capabilities help the operator revise the files. To display a record or a specific set of records, the operator specifies the conditions that the

information in one or more fields of the records must match in order for that record to be selected. An operator might, for example, ask for the records in which the last name is Smith or in which the department number is 210 and the person's rank is 5 or higher. Only these records would then be displayed. The operator can view these records and revise them.

The operator can also temporarily rearrange the fields in a file so that the fields to be revised appear at the beginning of each record. If, for example, after a department moves to a new location and all the telephone numbers need to be revised, the operator can rearrange the fields so that the telephone number field appears first. This reduces the need to search for a field in records with many fields. This rearrangement does not permanently change the file.

The IBM Displaywriter System offers several options for duplicating or copying files. The operator may copy the entire file to create a backup file or copy only selected records to create a subfile. The operator can also choose which fields to copy and in what order these fields should appear in the new file. This allows the operator to use the copy selected records facility to create a file or a subfile which contains only the necessary fields.

Merging File Information with Text

An operator can merge file information with text information to create output documents, such as reports or letters. All records from an input file can be merged, or specific records can selected. A stored merge control document, created using Textpacks 4 or 6 contains the instruction for the merge. This control document determines the format of the output document and can contain instructions to specify the file information that is to be merged with the text, under what conditions it is to be inserted, and any calculations that are to be performed on file information before it is inserted. Calculations can include addition, subtraction, multiplication, and division.

Merge control documents can contain instructions to create a single report that is produced with the information from all selected records. These lists or reports are described in "Lists and Reports." Merge control documents can also specify that a separate output document be produced for each input record processed. This type of repetitive document is described in "Repetitive Documents."

Lists and Reports

The operator can create lists or reports by merging the file information with the merge control document and specifying that a single report be produced from the selected records in the file. Some of the following options can be used:

- The records can be sorted so that they are listed in a specific order based on the contents of a field (or fields) that the operator selects. The sorting is done either alphabetically or numerically, depending on the information in the chosen field(s), and may be done in either ascending or descending order.

- The list can be formatted so that the information prints in several columns, similar to the name and telephone number columns in a telephone book.

- The records can be grouped so that all records of a certain type are printed together with headings, blank lines, lines of text, or new pages separating the groups of records so that the list can be read more easily. (See Figure 4-5 in chapter 4 for an example.)

- Summaries can be automatically generated for the reports. The records within a group can be counted or the total, average, maximum, or minimum of values of a field can be computed. These summaries may be printed together with the grouped records or separately. (See Figure 4-5 for an example.)

- Calculations can also be performed on file information before that information is inserted into the report. The operator sets up an math expression.

  For example, the operator might set up the expression so that the amount in the balance field is multiplied by a constant number (interest rate) to produce an interest due that is inserted in the report.

Repetitive Documents

The file can also be merged with a text job so that one document is prepared for each record in the file. Information in the file is merged into the text job so that the document is personalized.

The following options can be used when using the merge function to produce repetitive documents.

- The records can be sorted so that the repetitive documents are printed in a specific order based on the contents of a field (or fields) that the operator selects. The sorting is done either alphabetically or numerically, depending on the information in the chosen field(s), and may be done in either ascending or descending order.

- Calculations can also be performed on file information before that information is inserted into the repetitive document. The operator sets up an math expression that causes the calculation to be done.

  For example, the operator might set up the expression so that the amount in the balance field is multiplied by a constant number (interest rate) to produce an interest due to be inserted in the repetitive document.

COMMUNICATION FUNCTIONS

The IBM Displaywriter System (equipped with the communication feature and using the IBM Displaywriter System Asynchronous, Binary Synchronous Communications Programs described in this section) can send information to and receive information from another IBM Displaywriter System work station or other compatible communication equipment, including a suitably programmed host computer. The equipment involved in the IBM Displaywriter System communication process can be located the office next door or on another continent.

Communications on the IBM Displaywriter System is an important capability because:

- Documents that are typed and stored can be translated into electronic signals sent over telephone lines at transmission speeds up to 4800 bits per second (bps).

- Documents that are received at an IBM Displaywriter System work station can be stored and printed or can be revised by the operator. (Documents received by other compatible communication equipment may need additional editing or reformatting if revisions are necessary.)

- Text and all necessary control codes can be created off-line on the IBM Displaywriter System for transmission to another communication device. The ability to create and edit information off-line helps insure faster, more accurate transmission which can reduce line and computer connect charges.

- When the communication function is not needed, the IBM Displaywriter System can be used to perform other word processing applications.

Equipment Required

The communication function requires a:

- Communications adapter on the IBM Displaywriter System
- Modem (depending on the modem selected, a data coupler may be required)
- Licensed communication program and a text program
- Communication line

The modem will be external, therefore physically located outside the IBM Displaywriter System. An external modem is attached to the IBM Displaywriter System by a 3.8-meter (12.5-foot) cable. The IBM Displaywriter System supports the external modem. The modem is selected by menus provided by the licensed program.

Communication Protocols

Two communication modes, Asynchronous, Binary Synchronous, Communications, are available. Asynchronous, Binary Synchronous, and SNA/SDLC Communications control the flow of data over the telephone line differently. From an operator's point of view, Asynchronous Communications usually appears to be interactive. Binary Synchronous Communications has batch transmission of information, with all information prepared before initiating communication and sent with minimal operator intervention.

Optional Features and Devices

A security keylock may be installed to prevent unauthorized access to the communication function. If the keylock is installed, the key must be inserted and in the ON position in order for an operator to select the communication task or revise the communication profiles.

The IBM 3845 and 3846 Data Encryption Devices can be used to encrypt/decrypt data transmitted over the communication line. The IBM 3845 or 3846 Device is conncected between the IBM Displaywriter System and the external modem at each end of a communication line.

Personalization

All personalization and configuration of the communication function is done through menus provided by the licensed program. The modem and line description is stored as a part of the program diskette and is not changed unless the modem or line is changed.

The various operating options available to match another communication device, such as code set (EBCDIC for example) also are defined by menus and retained as profiles on the program diskette. Because the need to reset all options for each communication session is eliminated, the profiles are a key to the simplicity of operation of the IBM Displaywriter System communication.

A SESSION OPTIONS Menu allows the operator to change some options (which diskette on a dual-diskette unit should be used for receiving communication, for example) without terminating the on-line communication.

Up to four operational profiles for Asynchronous Communications and eight profiles for Binary Synchronous Communications can be defined. This provides the flexibility to address a variety of communication applications without the need for the operator to respecify (or be aware of) the options for each particular application.

Asynchronous Communications

Asynchronous Communications usually appears to be interactive and may be considered as a two-way conversation between the sender and the receiver. For example, during communication with a computer, the computer might ask for a password. The operator types the password. The computer then asks what computer program the operator wants to use, and the operator types the program name. This is an example of interactive, conversational communication.

The operator could type as the pages of a document all the information the computer will request, and then use the document send function to communicate selected pages. Characters are presented on the display as they are sent and received. Received information is highlighted to distinguish it from transmitted data. This is an example of batch communications using Asynchronous Communications.

To facilitate error recovery and retransmission, the operator can halt transmission at any line boundary and

resume transmission from any page or line within the document.

IBM Displaywriter System emulates the interactive characteristics of an IBM Communicating Mag Card Selectric Typewriter, an IBM 2741 Communications Terminal, or a teletypewriter similar to the Teletype[1] 33, 35, or 43 KSR (Keyboard Send-Receive) models, using the keyboard for conversational exchanges of information. Characters are translated into electronic signals and sent immediately as they are keyed, with no editing of data prior to transmission.

Asynchronous Communications has three operating modes based on these emulations: CMC (emulates an IBM Communicating Mag Card Selectric Typewriter), 2741 (emulates the IBM 2741 Communications Terminal), and TTY (emulates a teletypewriter).

The mode to be used for a communication session is chosen in a communication menu on the program diskette. Since four communication profiles can be stored, an operator may have a profile for each mode.

Features and Capabilities

The following security capabilities apply to all three Asynchronous communicating modes, unless otherwise noted.

- If the optional security keylock is installed, the key must be inserted and in the ON position for an operator to select the communication task or revise a communication profile.

- A four-character Terminal ID may be used in the 2741 mode, and a 31-character Terminal ID may be used in the TTY mode. In both modes, the other communication device must provide a matching ID before communication can be initiated.

The operator can specify that a copy of the communicated information be recorded as a document on the diskette for subsequent printing and editing off-line. This document recording process may be activated or deactivated at any time. This document provides a record of all or a portion of the communication activity without the need to use the printer for on-line printing as communication takes place.

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[1] Registered Trademark of the Teletype Corporation.

During the communication session, the IBM Displaywriter System can print other documents stored on the same diskette or stored on the second diskette in a dual diskette unit. Information received during communication can be recorded on the diskette and printed after communication is terminated.

Additionally, the IBM Displaywriter System may be set up to disconnect automatically after 30 seconds of line inactivity to prevent prolonged periods of nonproductive idle time on the line.

In the TTY mode, the IBM Displaywriter System also may be set up to disconnect automatically on reception of an EOT (end of transmission) control code.

See Appendix D for more specific information about Asynchronous Communications.

Binary Synchronous Communications

In Binary Synchronous Communications (BSC) protocol, the communication function enables the IBM Displaywriter System to batch transmission for communication with the following:

- IBM Mag Card II Typewriter--Communicating
- IBM 6240 Mag Card Typewriter--Communicating
- IBM 6640 Document Printer--Communicating
- IBM Office System 6--Communicating
- IBM 6670 Information Distributor
- IBM 5520 Administrative System
- IBM Displaywriter System--Communicating
- A suitably programmed computer.

Batch transmission means that all information, including any necessary control language, is prepared before beginning the communication session. After the session begins, all information is sent and received with minimal operator intervention.

Features and Capabilities

Three security features help to protect against unauthorized access to the communication function.

- If the optional security keylock is installed, the key must be inserted and in the ON position for an operator to select the communication task or revise a communication profile.

- A one- to five-character Terminal ID can be assigned to the IBM Displaywriter System when communicating with a computer. The computer can use the Terminal ID to identify authorized terminals and distinguish between terminal types.

- Session IDs of up to 20 characters can be assigned to each IBM Displaywriter System to authorize communication. At the beginning of a communication session, the IBM Displaywriter System checks the session ID of the other office machine. If it matches an ID on the list of acceptable IDs, communication continues; if not, communication is terminated.

The IBM Displaywriter System emulates the characteristics of either an IBM 2270/3780 or 2780 terminal.

To prepare for a communication session, the operator lists the documents to be sent to the various receivers and uses the Session IDs as addresses for sending the documents. Some documents may be sent to more than one receiver, while some receivers may not be sent all the documents on the list. When communication is initiated, the IBM Displaywriter System checks the receiver's ID and sends the receiver only the documents addressed to that ID.

When a document is received by an IBM Displaywriter System, it is recorded directly on a diskette. The stored document can be printed later, or it can be automatically placed in the print queue so that the document is printed after it is received. The stored document can be accessed after the communication session and revised.

During the communication session, the IBM Displaywriter System can print other documents not involved in communication that are stored on the same diskette or on the second diskette in a dual diskette unit. This printing does not affect communication.

The IBM Displaywriter System supports automatic answer capability if the function is provided in the modem. Once an appropriate profile is selected, the automatic-answer and record-to-diskette capabilities allow the reception of communication without operator involvement. Only the station initiating the call needs to be attended by an operator. The IBM Displaywriter System can be left unattended in a ready state at night to take advantage of lower telephone line rates, to accommodate stations that

are in different time zones, or simply to keep the IBM Displaywriter System free for text processing during business hours. When called from another location, the unattended IBM Displaywriter System automatically answers. After ID exchanges, communication takes place. When the communication session is finished, communication is terminated. The unattended IBM Displaywriter System returns to the ready state, able to communicate with the next caller.

The IBM Displaywriter System also disconnects automatically if there is no line activity (electronic signal) for 20 seconds or if no text is sent for 10 minutes. Both disconnect activities prevent the IBM Displaywriter System from being held on line when there is no productive activity.

See Appendix D for more specific information about Binary Synchronous Communications.

IBM 3270 DATA STREAM COMPATIBILITY

The IBM 3270 Data Stream Compatibility licensed program allows an IBM Displaywriter System to access suitably programmed IBM host computer systems using IBM 3270 application programs. Communications to the suitably programmed IBM host is through SNA/SDLC communication protocol.

A communicating IBM Displaywriter using the IBM 3270 Data Stream Compatibility Licensed Program appears as a IBM 3270 Information Display System to the following suitably programmed IBM host systems:

- IBM System/370
- IBM 3031/3032/3033/3081 PROCESSOR COMPLEXES
- IBM 4300 PROCESSORS.

The IBM 3270 Information Display System emulated consists of a single IBM 3278 Model 2 or 4 Display, an IBM 3274 Model 51C Controller, and, optionally, a single IBM 3287 Printer. For a list of suitable programming environments, see the IBM Displaywriter System 3270 Data Stream Compatibility General Information Manual.

When using the IBM 3270 Data Stream Compatibility Licensed Program, the IBM Displaywriter System can perform a subset of the functions of an IBM 3270 Information System. This function subset enables the IBM Displaywriter System to interact with the following generalized applications.

- Inquiry and update
- Data entry
- Personal Computing
- Program development
- Combined data and word processing.

The applications addressed by the IBM Displaywriter System using the IBM 3270 Data Stream Compatibility Licensed Program are limited only by the application programs being used in the IBM host computer. A more complete description of the general applications, functions, and any limitations is contained in the IBM Displaywriter System 3270 Data Stream Compatibility General Information Manual.

An IBM Displaywriter in the 3270 mode (using the IBM 3270 Data Stream Compatibility Licensed Program) allows the operator to have rapid access to a data file stored on the host system. The operator can then inquire, retrieve, and/or update this file information.

For example, many users have questions concerning the status of an account or need to check the disposition of an order. Using the IBM Displaywriter in 3270 mode and accessing an interactive inquiry application, the operator can obtain the information directly from the host system. If changes to the accessed information are necessary, the operator can update the file to reflect these changes.

An IBM Displaywriter in the 3270 mode also can be used as a data entry device. Revisions, updates, and additions to an existing host data file can be made either directly online or into an intermediate file for later batch processing.

In 3270 mode the IBM Displaywriter System operator can store the IBM 3270 data stream on diskette after it appears on the display. With this important capability, information available in host computer data files now can be accessed and converted to the internal IBM Displaywriter data format. After ending 3270 operations, the operator can use the full Textpack formatting functions of the IBM Displaywriter to create a finished document.

The IBM Displaywriter System using the 3270 and Textpack programs establishes a bridge for the integration of data from the traditionally separate, data and word processing sources.

Equipment Required

Use of the IBM 3270 Data Stream Compatibility Licensed Program requires a:

- Communications adapter on the IBM Displaywriter System
- Modem
- Communication line
- 256 K memory.

An IBM 5218 or IBM 5228 Printwheel Printer can be used if a printer is desired. (An IBM 5215 Selectric Element Printer can not be used with the IBM 3270 Data Stream Compatibility Licensed Program.)

Use of IBM Displaywriter Functions In The 3270 Mode

Certain IBM Displaywriter System functions can still be used while the IBM 3270 Data Stream Compatibility is used.

- Text documents can be batch printed while the IBM Displaywriter System is in the 3270 mode. Messages associated with printing are also displayed.
- The message line on a 25-line display is shared between the IBM Displaywriter text mode and 3270 mode so that messages for either mode can be displayed.
- On the large display, IBM Displaywriter System text mode and 3270 mode messages are displayed on different lines. Messages for both modes can be displayed simultaneously.

Operator Control Capabilities

The IBM 3270 Data Stream Compatibility Licensed Program provides the following operator control capabilities:

- Operator information area on the bottom line of the display screen
- Upper and lower case
- Cursor positioning controls
- Editing controls
- Program function and program access keys
- Shift keys
- Erasing controls.

CHAPTER 4. EXAMPLES

This chapter contains a number of work examples for the IBM Displaywriter System. All examples use basic text functions available in all IBM Textpack Licensed Programs, unless noted otherwise.

An operator can use an IBM Displaywriter System to perform routine typing tasks, such as the creation of memos and documents. After the documents are created, the IBM Displaywriter System can perform a spelling check to alert the operator to possible misspelled words.

The IBM Displaywriter System also can be used to revise documents such as powers of attorney, contracts, procedure manuals, loan documents, and leases. Long documents such as these may need to be revised extensively before completion.

An operator may want to make an outline of a document or place footnotes with certain documents.

An operator can create letters or documents that have similar contents. The IBM Displaywriter System can be used to generate these repetitive letters into which the operator simply adds the necessary variables. Standard paragraphs or blocks of text also can be stored on a work diskette. The operator can then choose the appropriate pieces of stored material and combine them to create a new document.

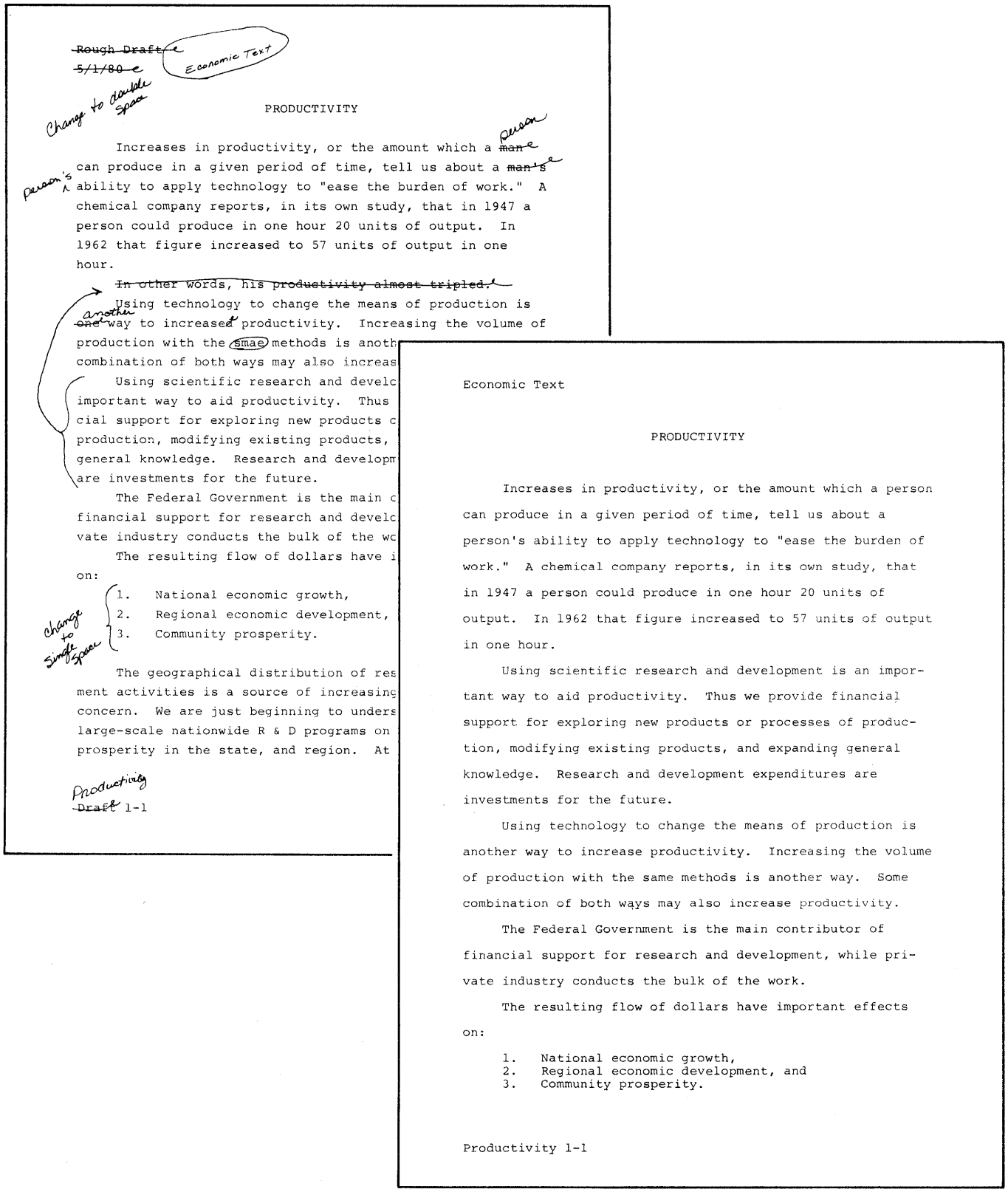
The operator can create, store, and revise files of information. This information can be used to produce one repetitive letter for each record or the records can be grouped and organized into a report or list. The operator can sort the file to put the information from the records in alphabetical or numeric order and select only specified records for use.

EXAMPLE 1. REVISING A DOCUMENT

Revisions to a document may include deleting text, adding text, moving blocks of text from one location to another, and changing the document format, such as changing from double-space to single-space.

Before some documents are completed, they may go through a number of revision cycles. To avoid the time-consuming and costly process of typing a document each time it is revised, the IBM Displaywriter System allows the operator to make these revisions without retyping existing text.

Figure 4-1 shows a revised copy marked by the author and the final printed document.



Rough Draft
5/1/80
Economic Text
Change to double space
PRODUCTIVITY
Increases in productivity, or the amount which a man can produce in a given period of time, tell us about a man's ability to apply technology to "ease the burden of work." A chemical company reports, in its own study, that in 1947 a person could produce in one hour 20 units of output. In 1962 that figure increased to 57 units of output in one hour.
person
person's
In other words, his productivity almost tripled.
Using technology to change the means of production is one way to increased productivity. Increasing the volume of production with the same methods is anoth
another
combination of both ways may also increas
Using scientific research and develc
important way to aid productivity. Thus
cial support for exploring new products c
production, modifying existing products,
general knowledge. Research and developm
are investments for the future.
The Federal Government is the main c
financial support for research and develc
vate industry conducts the bulk of the wc
The resulting flow of dollars have i
on:
1. National economic growth,
2. Regional economic development,
3. Community prosperity.
change to single space
The geographical distribution of res
ment activities is a source of increasing
concern. We are just beginning to unders
large-scale nationwide R & D programs on
prosperity in the state, and region. At
Productivity
Draft 1-1
Economic Text
PRODUCTIVITY
Increases in productivity, or the amount which a person can produce in a given period of time, tell us about a person's ability to apply technology to "ease the burden of work." A chemical company reports, in its own study, that in 1947 a person could produce in one hour 20 units of output. In 1962 that figure increased to 57 units of output in one hour.
Using scientific research and development is an important way to aid productivity. Thus we provide financial support for exploring new products or processes of production, modifying existing products, and expanding general knowledge. Research and development expenditures are investments for the future.
Using technology to change the means of production is another way to increase productivity. Increasing the volume of production with the same methods is another way. Some combination of both ways may also increase productivity.
The Federal Government is the main contributor of financial support for research and development, while private industry conducts the bulk of the work.
The resulting flow of dollars have important effects on:
1. National economic growth,
2. Regional economic development, and
3. Community prosperity.
Productivity 1-1

Figure 4-1. Document Before and After Revision

EXAMPLE 2. REPETITIVE LETTER WITH VARIABLES

Repetitive letters, sometimes called form letters, are letters that have similar text, but some variable information, such as the name and address, is different in each letter. Examples of repetitive letters are employment, personnel, policy renewal, and stockholder relations letters.

To create a repetitive letter, the operator types a shell document containing the constant text. The variables can be inserted into the shell in one of two ways.

1. If the operator is using Textpack E or Textpack 2, then the constant text with codes that indicate where each piece of variable information is to be inserted retyped. Then the operator manually inserts the variable information into a copy of the shell document.

   Figure 4-2 shows a shell document and the final document with the variables inserted.

2. If the operator is using Textpacks 4 or 6, the operator can type the constant text with variable names (or switch codes) that mark the position where the variable information will be inserted. Then the operator can type all the variable information for several documents, and use the system to automatically merge these variables into the letters.

   Figure 3-6 in Chapter 3 shows a shell document with named variables, the fill-in document, and the repetitive letters.

VARIABLES

Mr Abel Label
202 East 50th Street
New York, N.Y. 10020
974579
Mr. Label
48.00
November 18
Phil Phillips

SHELL DOCUMENT

RE: LOAN NO.

Dear

Your Personal Loan with us is long overdue, and you have not answered our many letters and notices. Lack of concern on your part indicates a situation that demands more severe action be taken.

We suggest you take a moment and mail your payment of $. If it is absolutely impossible for you to pay the full amount due by, please contact the undersigned.

Your immediate cooperation is appreciated.

Sincerely,

Loan Department
111 555-1212

wpc

FINAL DOCUMENT

Mr. Abel Label
202 East 50th Street
New York, N.Y. 10020

RE: LOAN NO. 974579

Dear Mr. Label:

Your Personal Loan with us is long overdue, and you have not answered our many letters and notices. Lack of concern on your part indicates a situation that demands more severe action be taken.

We suggest you take a moment and mail your payment of $48.00. If it is absolutely impossible for you to pay the full amount due by November 18, please contact the undersigned.

Your immediate cooperation is appreciated.

Sincerely,

Phil Phillips
Loan Department
111 555-1212

wpc

Figure 4-2. Repetitive Letter With Variables

EXAMPLE 3. DOCUMENTS FROM STORED PARAGRAPHS

Routine documents that contain similar information can be created by combining stored paragraphs of standard information. With the IBM Displaywriter System, each document can be created from the stored paragraphs, which reduces the time and cost associated with generating original documents. The document also can be customized by adding original information or variables, such as an inside address and salutation.

The operator must type and store a library of paragraphs (or blocks of text). A document can be created from those stored paragraphs in one of two ways.

1. If the operator is using Textpack E or Textpack 2, the operator manually chooses the appropriate paragraphs from the paragraphs previously typed and stored on the diskette. Then the operator adds the original text or variables.

   Figure 4-3 shows a master copy of the stored paragraphs and the final document created from the selected paragraphs.

2. If the operator is using Textpacks 4 or 6, the operator types:

   - A shell document containing lists of paragraph or document descriptions, and
   - A fill-in document which contains both the lists of paragraphs to be compiled and the variable information to be merged into the final document.

   The merge function compiles the paragraphs with the variables for each document. Figure 3-7 in Chapter 3 shows a shell document, a fill-in document, and the final letters created after merge.

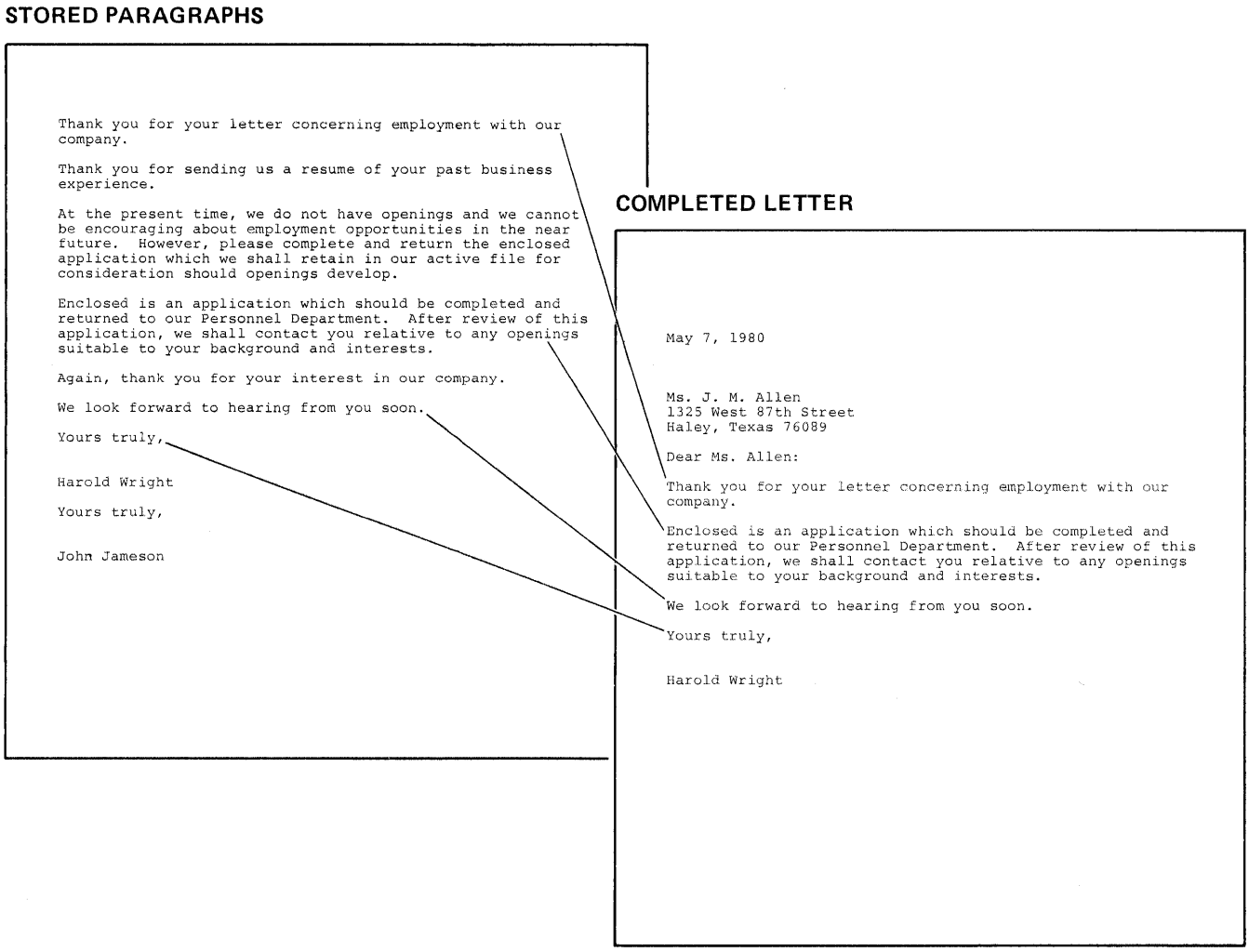


Figure 4-3. Master Copy of Stored Paragraphs and a Completed Letter

EXAMPLE 4. COLUMN REVISIONS

Column revisions may include deleting a column, adding a column, and moving columns from one location to another. Column revisions may also require reformatting the table.

In column revisions like those in Figure 4-4, each column is treated as a block of text, so a column can be deleted, copied, or moved to another place in the same table or to another table in the same document. Columns can also be inserted into a table.

After the changes are made, the operator can use the automatic column layout capability to reformat the table so that the columns are equally spaced on the page.

ORIGINAL DOCUMENT

	Six Months Ended 2/28/81	Year Ended August 31 1980	1979	1978
Commission on sales	$784,836	$834,556	$653,948	$685,644
Less: 75 percent	588,627	625,917	490,461	514,233
Net Commissions on sales	196,209	208,639	163,487	171,411
Expenses (including taxes)	140,632	200,018	131,162	109,691
Net distribution income before Federal income tax	55,577	8,621	32,325	61,720
Provision for Federal income tax	40,281	865	7,774	11,139
Net distribution income after provision for Federal income tax	$ 15,296	$ 7,756	$ 24,551	$ 50,581

REVISED DOCUMENT

	Year Ended August 31 1978	1979	1980
Commission on sales	$685,644	$653,948	$834,556
Less: 75 percent	514,233	490,461	625,917
Net Commissions on sales	171,411	163,487	208,639
Expenses (including taxes)	109,691	131,162	200,018
Net distribution income before Federal income tax	61,720	32,325	8,621
Provision for Federal income tax	11,139	7,774	865
Net distribution income after provision for Federal income tax	$ 50,581	$ 24,551	$ 7,756

Figure 4-4. Column Revisions

EXAMPLE 5. REPORT GENERATION

Files management can be used to produce lists or reports. The file information is merged with a control document which controls the content and format of the report. This capability allows the operator to print lists without retyping the information that is already in the file.

The operator creates a merge control document using Textpacks 4 and 6. In this document the operator specifies:

- The format of the final report
- Any additional text, such as report headings, to be included
- How the records are to be grouped
- What report summary information should be included
- What math calculations should be done.

After the merge control document is created, it is ready to merge with the file. However, prior to merging the control document with the file, the operator can decide:

- Whether all records or only selected records should be merged with the text
- What order the records should be listed in.

The IBM Displaywriter System then merges the control document with the file to produce the final report.

Many different lists and reports can be generated from the same file by simply merging the file with different merge control documents. Figure 4-5 shows some of the possible reports that can be generated from the sample file. Arithmetic is used in some of the reports.

Rec ID	Customer Name	Address	City	St	Zip	Contact	Date	Amount	Rep	Ind
1	Dareco Supply Co.	1407 8th St.	Phoenix	AZ	85730	Mr. Donald Smith	01/05/81	10500	Jones	Med
2	Global Industries	913 Dowd St.	Tucson	AZ	85719	Ms. Patricia Ross	01/05/81	28000	Ortiz	Mfg
3	Farrington Co.	642 Peach Dr.	Pomona	CA	77890	Mr. Timothy Sainz	01/08/81	42500	Jones	Mfg
4	Universal Industry	90 Elm St.	Pomona	CA	77689	Mr. Thomas Boyd	01/09/81	19975	Hull	Mfg
5	Mayan Construction	66 Ash St.	El Centro	CA	77459	Ms. Betty Smith	01/12/81	110700	Ortiz	Bld
6	Farmers Association	356 Rural Rd.	El Centro	CA	77635	Mr. John Gaus	02/13/81	200550	Hull	Frm
7	Tool Setting Co.	1240 9th St.	Phoenix	AZ	85702	Ms. Leslie Garland	02/21/81	32780	Curtis	Mfg
8	City College	23 N. Central	Tucson	AZ	85723	Mr. Robert Ries	02/25/81	67300	Jones	Ed

CUSTOMER LIST

CUSTOMER	CONTACT	AMOUNT	REPRESENTATIVE
Cactus Hardware	Mr. Manuel Shull	$18,900	Jones
City College	Mr. Robert Ries	$67,300	Jones
City Services	Ms. Suzanne Strayer	$89,900	Curtis
Clinical Supply	Mr. Donald Higgins	$17,450	Hull
Community College	Ms. Sharon Smith	$235,980	
Dareco Supply Co.	Mr. Donald Smith		
Farmers Association	Mr. John Gaus	$	
Farrington Co.	Mr. Timothy Sainz		
Global Industries	Ms. Patricia Ross		
Hospital Supply	Ms. Donna Ikeda		
Johnson Mfg. Co.	Mr. Samuel Salor	$	
Mayan Construction	Ms. Betty Smith	$	
Ranchers Inc.	Ms. Brenda Hebert	$	
Rural Implements	Ms. Judy Exline		
State Pipe Co.	Mr. Keith Cronin		
State University	Ms. Pamela Ramage		
Thompson Const. Co.	Ms. Betsy McKane		
Tool Setting Co.	Ms. Leslie Carland		
Universal Industry	Mr. Thomas Boyd		
Wrench Inc.	Ms. Lupita Arino		
	TOTAL	$1,	

REVENUE ANALYSIS BY STATE

STATE	INDUSTRY	REP	REP TOTAL	INDUSTRY TOTAL
AZ				
	Ed	Jones	$ 67,300	
		Ortiz	$ 54,900	$122,200
	Frm	Hull	$156,890	$156,890
	Med	Hull	$ 17,450	
		Jones	$ 10,500	
	Mfg	Curtis	$124,780	
		Ortiz	$ 28,000	
		Hull	$125,890	
			STATE TOTAL	
CA				
	Bld	Jones	$ 64,350	
		Ortiz	$110,700	
	Ed	Ortiz	$235,980	
	Frm	Hull	$200,550	
	Med	Ortiz	$ 51,790	
	Mfg	Curtis	$132,400	
		Jones	$ 18,900	
		Hull	$ 19,975	
			STATE TOTAL	

REPORT SUMMARY

NUMBER OF CUSTOMERS	20
YEAR-TO-DATE TOTAL	$1,420,355

REVENUE ANALYSIS BY INDUSTRY

YEAR-TO-DATE 1981

INDUSTRY	CUSTOMER	AMOUNT	TOTAL
Bld	Mayan Construction	$110,700	
	Thompson Const. Co.	$64,350	
			$175,050
Ed	City College	$67,300	
	Community College	$235,980	
	State University	$54,900	
			$358,180
Frm	Farmers Association	$200,550	
	Ranchers Inc.	$130,890	
	Rural Implements	$26,000	
			$357,440
Med			
	Clinical Supply	$17,450	
	Dareco Supply Co.	$10,500	
	Hospital Suppy	$51,790	
			$79,740
Mfg	Cactus Hardware	$18,900	
	City Services	$89,900	
	Farrington Co.	$42,500	
	Global Industries	$28,000	
	Johnson Mfg. Co.	$125,890	
	State Pipe Co.	$60,000	
	Tool Setting Co.	$32,780	
	Universal Industry	$19,975	
	Wrench Inc.	$32,000	
			$449,945
	YEAR-TO-DATE TOTAL		$1,420,355
	LARGEST AMOUNT	$235,980	
	AVERAGE AMOUNT	$71,018	
	NUMBER OF CUSTOMERS	20	

Figure 4-5. Reports Generated From a File

EXAMPLE 6. FILES MANAGEMENT FOR REPETITIVE LETTERS

Files management can also be used to produce repetitive documents, such as contracts or letters. The text for the document is created using Textpacks 4 or 6. The document controls the merge process and specifies:

- The format of the final document
- What fields from the record should be inserted into the text
- What math calculations should be done.

This capability allows the operator to generate personalized documents that may be used for several purposes. One file might be used for tracking donations, generating letters to donors, creating name and address lists for future solicitations, etc.

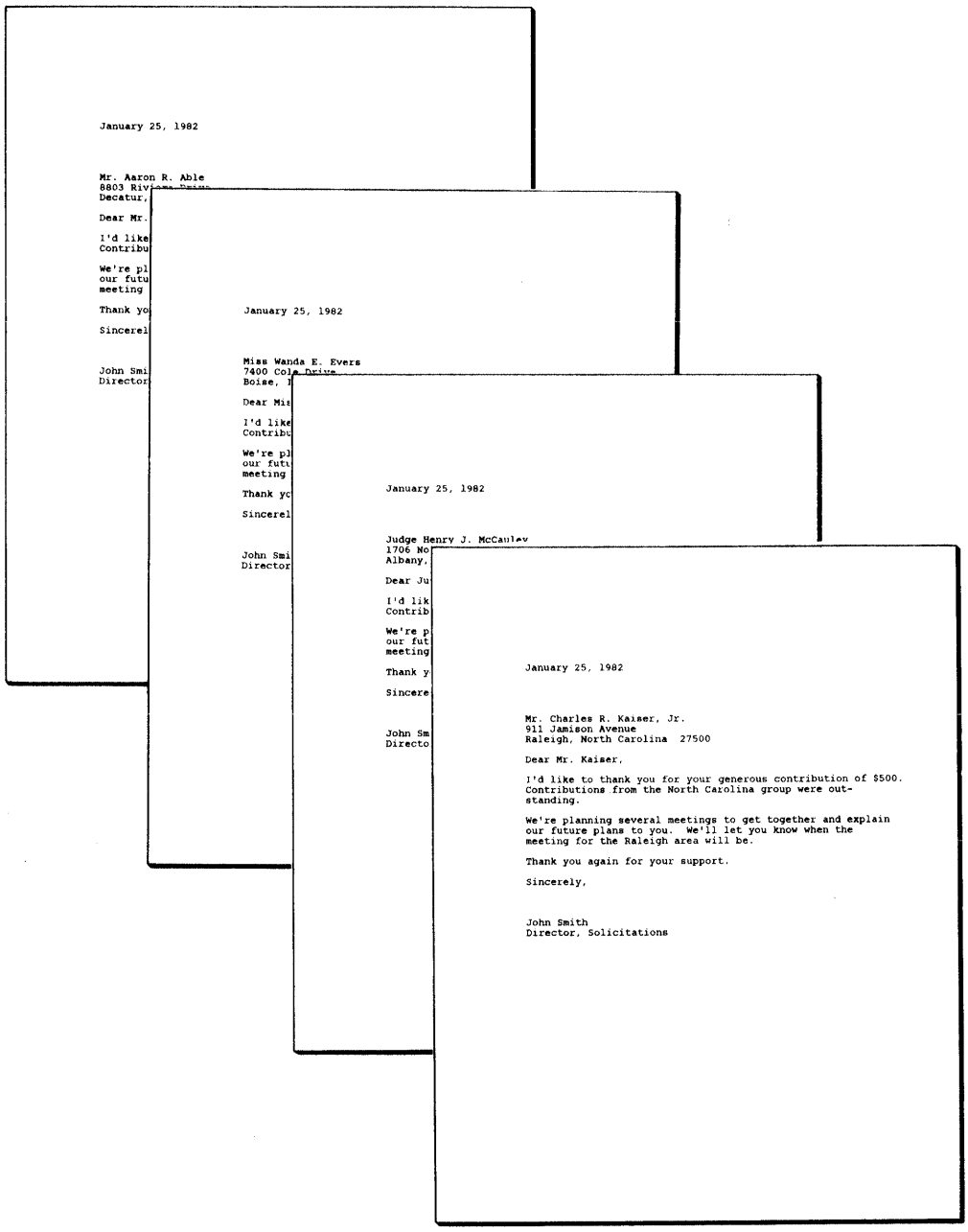
Prior to merging the control document with the file, the operator can also decide:

- Whether all records or only selected records should be merged with the text
- What order the final documents should be printed in.

The IBM Displaywriter System then merges the control document with the file to produce the final repetitive documents.

Figure 4-6 shows the personalized repetitive letters that might be generated from a file.

Title	First Name	MI	Last Name	Sub-title	Street	City	State	Zip	Amount
Mr.	Aaron	R.	Able		8803 Riviera Drive	Decatur	Alabama	35600	150
Miss	Wanda	E.	Evers		7400 Cole Drive	Boise	Idaho	83600	100
Judge	Henry	J.	McCauley		1706 North 38th Street	Albany	New York	12500	750
Mr.	Charles	R.	Kaiser	Jr.	911 Jamison Avenue	Raleigh	North Carolina	27500	500
Dr.	Larry	J.	Prescott		2845 Bridle Path	Jacksonville	Florida	32001	1000
Ms.	Celeste	M.	Carroll		2706 Burton Road	Tampa	Florida	33500	800
Mr.	William	W.	Aiken	III	1416 Versailles	Boca Raton	Florida	38290	200
Mrs.	Olivia	K.	Hyde		3362 Ramsey Street	Tallahassee	Florida	39220	1200
Mr.	Russell	I.	Isaacs		2904 Cameron Street	Mobile	Alabama	76458	780
Mr.	Dean	A.	Norton		2076 Burton Road	Selma	Alabama	87563	475
Miss	Alcie	D.	Manning		8334 Burlington Road	Birmingham	Alabama	76576	1350
Mr.	Dan	J.	York		9016 Alpine Court	Tuscaloosa	Alabama	76583	100



January 25, 1982

Mr. Charles R. Kaiser, Jr.
911 Jamison Avenue
Raleigh, North Carolina 27500

Dear Mr. Kaiser,

I'd like to thank you for your generous contribution of $500. Contributions from the North Carolina group were outstanding.

We're planning several meetings to get together and explain our future plans to you. We'll let you know when the meeting for the Raleigh area will be.

Thank you again for your support.

Sincerely,

John Smith
Director, Solicitations

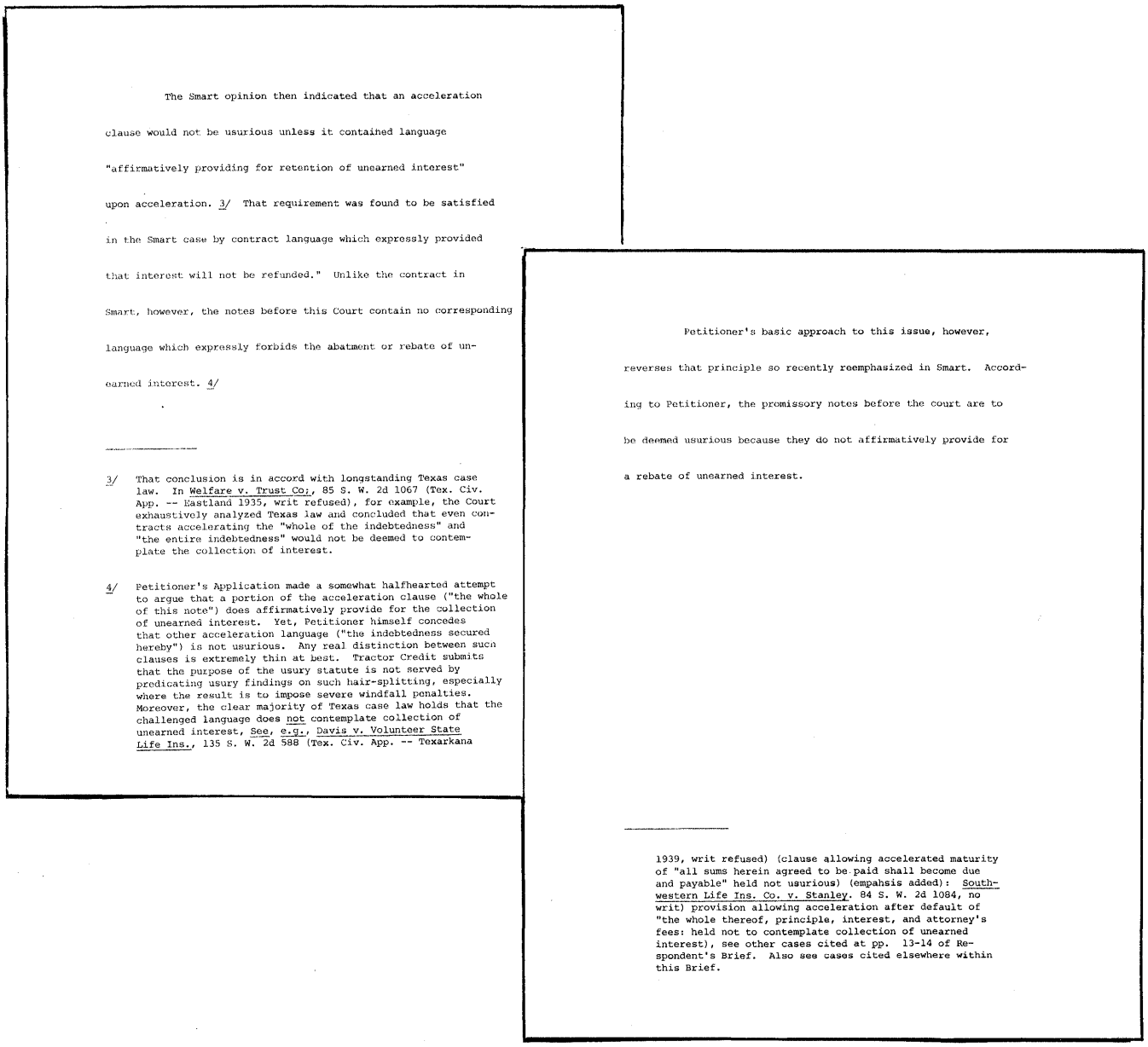
Figure 4-6. Repetitive Letters from a File

EXAMPLE 7. AUTOMATIC FOOTNOTES

The footnote capabilities provide the operator with the ability to:

- Renumber
- Placement/repagination
- Automatically tie-in
- Spill across pages

With this capability the operator can place a footnote at the bottom of the appropriate page by typing a footnote instruction in the document text where the footnote reference should appear. During pagination, the system automatically numbers the footnotes in the correct sequence as shown in Figure 4-7. Automatic footnotes is available with Textpack 6 only.



The Smart opinion then indicated that an acceleration clause would not be usurious unless it contained language "affirmatively providing for retention of unearned interest" upon acceleration. 3/ That requirement was found to be satisfied in the Smart case by contract language which expressly provided that interest will not be refunded." Unlike the contract in Smart, however, the notes before this Court contain no corresponding language which expressly forbids the abatment or rebate of unearned interest. 4/

3/ That conclusion is in accord with longstanding Texas case law. In Welfare v. Trust Co:, 85 S. W. 2d 1067 (Tex. Civ. App. -- Eastland 1935, writ refused), for example, the Court exhaustively analyzed Texas law and concluded that even contracts accelerating the "whole of the indebtedness" and "the entire indebtedness" would not be deemed to contemplate the collection of interest.

4/ Petitioner's Application made a somewhat halfhearted attempt to argue that a portion of the acceleration clause ("the whole of this note") does affirmatively provide for the collection of unearned interest. Yet, Petitioner himself concedes that other acceleration language ("the indebtedness secured hereby") is not usurious. Any real distinction between such clauses is extremely thin at best. Tractor Credit submits that the purpose of the usury statute is not served by predicating usury findings on such hair-splitting, especially where the result is to impose severe windfall penalties. Moreover, the clear majority of Texas case law holds that the challenged language does not contemplate collection of unearned interest, See, e.g., Davis v. Volunteer State Life Ins., 135 S. W. 2d 588 (Tex. Civ. App. -- Texarkana

Petitioner's basic approach to this issue, however, reverses that principle so recently reemphasized in Smart. According to Petitioner, the promissory notes before the court are to be deemed usurious because they do not affirmatively provide for a rebate of unearned interest.

1939, writ refused) (clause allowing accelerated maturity of "all sums herein agreed to be paid shall become due and payable" held not usurious) (empahsis added): Southwestern Life Ins. Co. v. Stanley. 84 S. W. 2d 1084, no writ) provision allowing acceleration after default of "the whole thereof, principle, interest, and attorney's fees: held not to contemplate collection of unearned interest), see other cases cited at pp. 13-14 of Respondent's Brief. Also see cases cited elsewhere within this Brief.

Figure 4-7. Automatic Footnotes

CHAPTER 5. CUSTOMER SUPPORT

This chapter describes the customer support provided by IBM for the IBM Displaywriter System in the following major areas:

- Office Systems Support Center
- Planning and equipment setup
- Training
- Problem determination and resolution
- Licensed program support

OFFICE SYSTEMS SUPPORT CENTER

An Office Systems Support Center, available to all IBM Displaywriter System users, provides:

- Assistance during equipment setup
- Assistance with training questions
- Answers to questions about operational procedures
- Assistance with problem determination procedures and problem resolution for licensed programs.

A toll-free (800) telephone number is provided to all IBM Displaywriter System users. Through the 800 number, the user can directly contact the Office Systems Support Center. Personnel at the Office Systems Support Center work with the operator to handle questions or problems. After the operator explains the situation, the Center personnel will ask questions, suggest actions to be taken, and contact other IBM personnel, if necessary. The Office Systems Support Center is a contact point for immediate assistance and offers direct access to application and technical expertise. This helps increase system availability through more rapid problem identification and resolution.

PLANNING AND EQUIPMENT SETUP

Planning and equipment setup for the IBM Displaywriter System includes:

- Physical planning and preparation
- Equipment setup
- Licensed program installation.

Each of these activities is supported with publications and other assistance from IBM.

Site planning is a customer responsibility, and the Customer Planning Guide for the IBM Displaywriter System contains planning guidelines for properly preparing a site for the IBM Displaywriter System.

Besides this manual, IBM provides an orientation seminar covering customer setup of equipment, use of training materials, and other topics prior to delivery of the IBM Displaywriter System.

After the IBM Displaywriter System is delivered, the operator (or other customer personnel) can refer to the IBM Displaywriter System Customer Setup Guide for information about how to unpack and set up the IBM Displaywriter System work stations and printer. The setup process consists of unboxing each piece of equipment and plugging in connecting cables. This process is designed to provide customers with greater flexibility and control in locating and relocating these devices. (If difficulties are encountered during the equipment setup, the operator can call toll-free to the Office Systems Support Center to receive immediate help.)

After setup, the operator may load an IBM Licensed Program. Once the program diskette has been loaded, the operator can personalize it so that the defaults reflect common customer applications.

TRAINING

As indicated, education begins prior to installation of the IBM Displaywriter System. After installation, IBM offers further educational assistance with management and supervisor seminars.

The amount of training required by each operator depends on the tasks assigned to that operator. The IBM Displaywriter System operator training manuals describe logical groups of operations and tasks. The modular

training material allows a supervisor or an operator to tailor the training to fit that office's type of work. The Office Systems Support Center is available to answer questions related to training.

Information about educational assistance and costs (if any) may be obtained from the local IBM branch office.

PROBLEM DETERMINATION AND RESOLUTION

During normal system operation, the IBM Displaywriter System provides the operator with messages and prompts so that operator procedural errors can be distinguished from machine malfunctions. Problems not caused by operator procedural error may be caused by machine malfunction or by licensed program defects. If a problem occurs, the operator follows a problem determination procedure to determine whether the problem is caused by machine malfunction, by a licensed program defect, or by an operator error.

The Problem Determination Guide in the IBM Displaywriter System Reference Package directs the operator through the problem determination procedure. The operator also may use a Problem Determination Diskette that has a diagnostic program. If the operator has questions or needs assistance during the problem determination procedure, a call should be made to the Office Systems Support Center.

If the problem is determined to be a hardware malfunction after completing the problem determination procedure, the operator is directed to call IBM service. With the information the operator gathers from the problem determination procedure, the problem can be corrected with one service call in many cases. This can reduce machine downtime.

If an operator has completed the problem determination procedure and has not received an error code or message that identifies an equipment problem, the Office Systems Support Center should be notified. The problem may be a licensed program problem or, occasionally, an equipment problem not identified by the problem determination procedure.

For problems on the IBM 5218 Printwheel Printer, the IBM 5218 Printwheel Printer Problem Determination Guide can be used to assist the operator in pinpointing the problem and gaining assistance from IBM, if necessary.

The Office Systems Support Center helps the operator determine the cause of the problem and directs the appropriate IBM personnel to resolve it.

LICENSED PROGRAM SUPPORT

When the Office Systems Support Center identifies a licensed program problem, the problem is dealt with as quickly as possible. The customer receives either a revised program diskette with a program correction or alternative procedures. The new program or procedures then will be sent to all other IBM Displaywriter System customers with that licensed program as a licensed program update release. Each customer is responsible for installing the latest licensed program update release as it is received.

SUMMARY

IBM customer support is designed to enable an IBM Displaywriter System user to plan, install, and productively operate an IBM Displaywriter System. This support is provided through direct contact with an IBM marketing and service team and the IBM Office Systems Support Center, through IBM seminars, and through comprehensive IBM Displaywriter System documentation. For additional information on IBM support, contact your IBM Marketing Representative.

APPENDIX A. IBM 5215 SELECTRIC ELEMENT PRINTER SPECIFICATIONS

TYPE STYLES

Contact your IBM Marketing Representative for information about available type styles.

PAPER SPECIFICATIONS

Paper Types

Manually-fed paper can be up to 381.0 mm (15 inches) wide with a 317.5 mm (12.5 inches) writing line.

Continuous-form paper may be either single-part (without carbon copies) or multi-part (with carbon copies). The maximum number of copies is one original and five copies.

Note: When using multi-part, continuous-form paper, all plies (copies and carbon paper of multi-part forms) must be "positively" fastened at one edge so that they do not separate before leaving the Pin-Feed Platen. "Positive" fastening refers to the optional, secure fastening methods available from major forms-manufacturing companies.

Pin-Feed Platen Paper Sizes

Continuous paper measuring 133.35 mm (5.25 inches) to 333.38 mm (13.13 inches) pin-to-pin can be used, depending on the width of the Pin-Feed Platen. Pin-Feed Platens are available in the following widths (pin-to-pin):

- 133.4 mm (5.25 inches)
- 152.4 mm (6.0 inches)
- 190.5 mm (7.5 inches)
- 203.2 mm (8.0 inches)
- 228.6 mm (9.0 inches)
- 238.1 mm (9.4 inches)
- 250.8 mm (9.9 inches)
- 254.0 mm (10.0 inches)
- 257.2 mm (10.1 inches)
- 258.8 mm (11.3 inches)
- 292.1 mm (11.5 inches)
- 317.5 mm (12.5 inches)
- 333.4 mm (13.1 inches)

Note: The acceptable form width is 12.7 mm (0.5 inches) wider than the pin-to-pin width. The writing line will be 6.35 mm (0.25 inches) less than the pin-to-pin width.

Pin-Feed Platen Recommended Environment

Temperature:	15.5° C to 29.4° C (60° F to 85° F)
Humidity:	30% to 65% relative humidity

APPENDIX B. IBM 5218 AND IBM 5228 TRACTOR FEED SPECIFICATIONS

PAPER TYPES

Continuous-form paper may be either single-part (without carbon copies) or multi-part (with carbon copies).

Note: When using multi-part, continuous-form, pin-feed paper, all "plies" (copies and carbon paper of multi-part forms) must be "positively" fastened at one edge so that they do not separate before reaching the exit tractor drive pins. "Positive" fastening refers to the optional, secure fastening methods available from major forms-manufacturing companies.

PAPER SIZES

Width:	50.8 mm (2 inches) to 368.3 mm (14.5 inches) pin to pin
	50.8 mm (2 inches) to 44.45 mm (17.5 inches) pin to pin on the IBM 5228 Wide Carriage Printwheel Printer
Weight:	Single-part forms: 60 to 90 g/m^2 (16 to 24 pounds) Multi-part forms: individual plies of 45 to 90 g/m^2 (12 to 24 pounds)
Copies:	Maximum number of copies is one original and five copies if the form is up to 368.3 mm (14.5 inches) wide
	Maximum number of copies is one original and two copies if the form is wider than 368.3 mm (14.5 inches wide) up to the maximum width of 44.45 mm (17.5 inches) on the IBM 5228 Wide Carriage Printwheel Printer

Thickness: Maximum thickness for one original and five copies, including carbons, is 0.6 mm (.024 inches).

Note: Multi-part forms should be tested before quantity ordering since some manufactured five- and six-part forms may exceed the maximum allowable thickness and may cause paper feeding problems.

APPENDIX C. IBM 5218 AND IBM 5228 SHEET-FEED PAPER HANDLER SPECIFICATIONS

The specifications for the Sheet-Feed Paper Handlers for the IBM 5218 and the IBM 5228 Printwheel Printers are the same and are described below.

RECOMMENDED ENVIRONMENT

Temperature:	15.5° C to 29.4° C (60° F to 85° F)
Humidity:	30% to 65% relative humidity

RECOMMENDED PAPER COMPOSITION

Plain bond paper of either:

- No. 1 sulphite (100% chemical wood pulp)
- 25% cotton content
- 50% cotton content
- 100% cotton content
- Paper made from recycled office paper.

ACCEPTABLE PAPER WEIGHTS

The following paper weights can be used:

- 60 g/m^2 (16 pounds)
- 75 g/m^2 (20 pounds)
- 90 g/m^2 (24 pounds).

Note: For optimum results, 75 g/m^2 (20 pound), 25% to 50% cotton content, plain bond paper is recommended.

ACCEPTABLE PAPER SIZES

Various paper sizes can be fed in the Sheet-Feed Paper Handler. Only one size of paper should be loaded at one time in either the top or bottom paper trays.

The following paper sizes can be fed reliably either lengthwise or sideways:

- 203 x 267 mm (8.0 x 10.5 inches)
- 216 x 279 mm (8.5 x 11.0 inches).

The following paper sizes can be fed reliably lengthwise only:

- 178 x 267 mm (7.0 x 10.5 inches)
- 184 x 267 mm (7.25 x 10.5 inches)
- 191 x 267 mm (7.5 x 10.5 inches)
- 203 x 330 mm (8.0 x 13.0 inches)
- 216 x 330 mm (8.5 x 13.0 inches)
- 216 x 356 mm (8.5 x 14.0 inches).

PAPER LIMITATIONS

The following paper supplies cannot be used reliably in the Sheet-Feed Paper Handler and may cause paper jams:

- Coated paper
- Vellum paper
- Coated erasable bond
- Synthetic paper (such as rice paper or parchment)
- Translucent paper
- Multi-sheet forms and documents (bound or unbound)
- Peel-off pressure-sensitive labels
- Some chemically treated paper (for example, paper used to make copies without carbon paper)
- Preprinted forms that require a high degree of registration accuracy for character location

- Dark-colored paper
- Envelopes
- Card stock
- Some preprinted paper where the printing process results in either introducing chemicals which contaminate feed-mechanism components or changing the paper frictional characteristics.

UNSATISFACTORY PAPER CONDITIONS

Paper in unsatisfactory condition will not feed reliably and may cause paper jams. The following can affect the use of the Sheet-Feed Paper Handler:

- Paper with exposed gummed surfaces, holes, perforations, cutouts, or windows
- Highly-embossed paper with an embossment height exceeding 0.5 mm (0.020 inches)
- Folded documents
- Different sizes or weights of paper in the same paper tray
- Paper with excessive curl or waviness exceeding 3.0 mm (0.118 inches)
- Reams of paper with edges or corners folded or bonded together (Some conditions, such as bonded edges, may be corrected by fluffing the ream.)
- Paper with poorly cut (rough) edges.

Note: Paper should not be exposed to adverse temperature and humidity conditions. (Consult the paper manufacturer for recommended storage environment.)

APPENDIX D. ASYNCHRONOUS AND BINARY SYNCHRONOUS COMMUNICATION SUMMARY

Asynchronous Communications

		Operating Mode		
		CMC	2741	TTY
Applications	Displaywriter System—CPU	N/A	X	X
	Displaywriter System—Office Machine	X	N/A	X
Facilities	EIA RS 232C Interface	X	X	X
	Switched Lines*	X	X	X
	Auto Answer Modems	X	X	X
Line Control	Line Speed**	134.5/300/1200bps	134.5/300/1200 bps	110/150/200/300/1200 bps
	Line Code	Correspondence	Correspondence	7-bit
	Parity**	Odd	Odd	Even/Odd/None
	Terminal ID**	N/A	4 Characters	31 Characters
	Inactivity Disconnect**	X	X	X
	Reverse Interrupt	X	X	X
	Echoplex**	N/A	N/A	X
	EOT Disconnect**	N/A	N/A	X
Capabilities	Interactive Keyboard/Display	X	X	X
	Document Transmission	X	X	X
	Session History Document	X	X	X
	Background Printing	X	X	X
	Unattended Receive	X		X

X = Supported N/A = Not Applicable

*point-to-point, full-duplex only
**setup option

For more detailed information about communications, see the *IBM Displaywriter System Host Attach Programming Guide: Asynchronous Communications.*

Binary Synchronous Communications

		Operating Mode	
		2770, 3780 Emulation	2780 Emulation
Applications	Displaywriter System—CPU	X	X
	Displaywriter System—Office Machines	X	X
Facilities	EIA RS 232C Interface for External Modem	X	X
	Single or Dual Modem Capability	X	X
	Switched Lines*	X	X
	Nonswitched Lines*	X	X
Line Control	Line Speeds	1200***/2000/2400/4800 bps	
	Line Code**	EBCDIC, 7 bit	
	Character Buffers**	Send up to 512-byte blocks. Receive up to 512-byte blocks.	
	Error Checking—7 bit	Vertical Redundancy Check (VRC). Longitudinal Redundancy. Check (LRC)	
	Error Checking—EBCDIC	Cycle Redundancy Check (CRC)	
Capabilities	Auto Answer Modem	X	X
	Extended Transmission Retry	X	X
	Optional Keylock	X	X
	Terminal ID	X	X
	Session (User) ID	X	X
	Space Compression & Expansion (Receive Only)	X	X
	Synchronous Clock for 600 & 1200 bps	X	X
	EBCDIC Transparency	X	X

X = Supported

*point-to-point, half duplex
**setup option
***600 bps if the modem supports a half-speed option

For more detailed information about communications, see the *IBM Displaywriter System Host Attach Programming Guide: Binary Synchronous Communications.*

APPENDIX E. IBM DISPLAYWRITER SYSTEM ERGONOMIC FEATURES

Device	Feature	Purpose and Benefit
System Covers	Paint Finish	Matte finish to minimize glare. Easily cleaned.
	Pearl White Color	Has a reflectivity ratio of less than 3:1 between the work station, keyboard, and source documents. Helps reduce eye strain and fatigue by reducing frequent pupillary changes of the eye when moving between contrasting light and dark surfaces.
Keyboard	Cable-attached	Permits positioning of the keyboard, independent of the display, for operator comfort.
	Surface Angle	Keys arranged at 12° slope to provide the proper angle for typing.
	Keytops	Matte finish to reduce reflections. Contoured to provide secure feel.
	Nomenclature on Keytops	Dark characters on light background for easy recognition and to minimize glare.
	Touch	Key forces ranging from 40 to 75 grams with key displacements of 1.5 to 3 mm (1/16 to 1/8 inch) for accurate typing with minimal effort. Audible and tactile feedback gives a positive signal when keys are pressed.
Display	Screen	Non-reflective to minimize glare.
	Display Graphics	Large, easy-to-read alphanumeric displays. Character matrix helps eliminate confusion between symbols, such as the letter O and the number 0 (zero).
	Image Stability	Combined high-refresh rate and phosphor characteristics of the display contribute to the stability of the displayed images, which helps reduce eye fatigue and strain.
	Brightness/Contrast	Individual controls for operator convenience. Permits operator to adjust for a variety of lighting conditions.
	Phosphor Color	Green, which is recommended by ergonomics specialists.
	Tilt Display (0° to 20°)	Allows for improved line of sight.
	Rotate 0° to 12° Right and Left	Permits flexibility in placement of the work station. Permits adjusting the display to minimize reflections.
Diskette Unit	Cable-attached	Permits flexibility in the positioning of the diskette unit.
	Design	Low noise and heat output levels for operator comfort.
Printers	Operator Panel	Located on the front surface of the printer. Angled for easy viewing by a standing or seated operator. All lights and controls are easily accessed from the front of the printer.
	Design	Low noise and heat output levels for operator comfort.
	Covers	Matte finish to minimize glare.
	Ribbon Cartridge	Easy to change and clean to handle.
	Printwheel Cartridge	Printwheels are contained in cartridges for simple, easy printwheel changes.

GLOSSARY

The following terms are defined as they are used in this book. If you do not find the term you are looking for, refer to the IBM Data Processing Glossary, GC20-1699. All terms marked with an asterisk (*) are from the American National Dictionary for Information Processing.

IBM is grateful to the American National Standards Institute (ANSI) for permission to reprint its definitions from the American National Dictionary for Information Processing (Copyright (c) 1975 by the American National Standards Institute, Inc.), which was prepared by Subcommittee X3K5 on Terminology and Glossary of American National Standards Committee X3.

alternate format. A stored second format that can be changed.

ASCII*. American National Standard Code for Information Interchange. The standard code, using a coded-character set consisting of 7-bit coded characters (8 bits including parity check), used for information interchange among data processing systems, data communication systems, and associated equipment. The ASCII set consists of control and graphic characters.

Asynchronous Communications. Data transmission in which each information character is individually synchronized (usually by the use of start bits and stop bits).

batch printing. Queueing one or more documents to print as a separate job. The operator can type or revise additional documents at the same time.

batched communication. The sending of a large body of data from one station to another station in a communications network without intervening responses from the receiving unit.

Binary Synchronous Communications. Data transmission in which the character synchronization is controlled by timing signals generated at the sending and receiving stations.

block. A section of text whose beginning and end points are defined by the operator using the block keys at the work station. Blocks are displayed at the work station with the blocked characters highlighted. Blocks may be deleted from the text, or copied, or moved within the text.

bps. Bits per second. In serial transmission, the instantaneous bit speed with which a device or channel transmits a character.

BSC. Binary Synchronous Communications.

carrier return. The function of moving the printer element to the left margin of the next line.

character. A letter, digit, or other symbol that is used as part of the organization, control, or representation of data.

coded function key. A key that normally produces a character but performs a special function when the CODE key is held down while the coded function key is pressed.

communications facility. Anything used or available for use in furnishing data communications service.

continuous paper. Connected paper forms that feed continuously through a printer.

cps. Characters per second. A printing or transmission speed.

default. A value, attribute, or option that is preassigned and assumed by a system when no other has been specified by the operator.

diskette. A thin, flexible, magnetic disk and its semirigid, protective jacket, in which the diskette is permanently enclosed. It provides reusable storage of documents that can be used and updated.

diskette slot. The opening in the diskette unit into which a diskette is inserted.

document. (1) A collection of one or more lines of text that can be named and stored as a separate entity.

duplex*. In data communications, it pertains to simultaneous, two-way, independent transmission.

duplicate. To copy information from a location, leaving the information at that location unchanged, and to move the copy to another location.

EBCDIC*. Extended binary coded decimal interchange code. A coded-character set consisting of 8-bit coded characters.

ergonomics. The science of adapting working conditions to meet people's needs and is concerned with making the equipment people use as easy and comfortable to use as possible.

field. One piece of information in a record; for example, the first name of a person. Fields make up a record.

file*. A set of related records treated as a unit, e.g., in stock control, a file could consist of a set of invoices.

footer. Constant text that is formatted to be in the bottom margin of one or more pages.

format. (1) A set of specific conditions that determine the final position of text on a page.

full duplex. In data communications, it pertains to simultaneous, two-way, independent transmission. Synonym for duplex.

function keys. Special keys that do not produce characters for printing when they are used, but allow the operator to give instructions to the system for additional functions. Included are the keys that normally produce a printed character, but when used with the code key produce a function instead.

half duplex*. In data communications, it pertains to alternate, one-way- at-a-time, independent transmission.

header. Constant text that is formatted to be in the top margin of one or more pages.

highlight. The process of emphasizing an area on the display by brightening the area and reversing the color of any characters within the area.

hyphenation. The process of separating a word by inserting a hyphen to end a line and moving the remainder of the word to the start of the next line.

index. On a diskette, a list of document names and comments. A diskette index can be viewed or printed.

insert mode. Characters typed when the system is in an insert mode are added to the existing text.

integrated modem. A modem that is an integral part of the device with which it operates.

justify. To print a document with even right and left margins.

licensed program. Software program which remain the property of the manufacturer, for which customers pay a license fee.

menu. Choices listed on the display that can be selected by an operator.

merge file/report. The ability to combine fields from all selected output records with a shell document to produce one output document.

merge file/text. The ability to perform either merge file/report or merge record/text.

merge record/text. The ability to combine fields from a single record with a shell document to produce one output document per record.

message. A message issued by the system because of a condition that requires an operator response.

modem*. Modulator- demodulator. A device that modulates and demodulates signals transmitted over data communications facilities.

modulation. The process by which some characteristic of one wave or signal is varied in accordance with another wave or signal.

module. A hardware unit designed for use with other components.

nonswitched communications line. In data communications, a mode of operating in which a data circuit is established for the exclusive use of the data stations without using switching facilities. Synonym for leased line.

pagination. The process of adjusting text to fit within margins and/or page boundaries.

pitch. A unit of width of typewriter type, based on the number of times a letter can be set in a linear inch. For example, 10-pitch type has 10 characters per inch.

problem determination procedure. A prescribed sequence of steps aimed at recovery from, or circumvention of, problem conditions.

prompt. Information that appears on the display to alert the operator to a specific condition or action needed.

queue. A waiting line or list formed by items in a system waiting for service; for example, tasks such as printing to be performed or messages to be transmitted.

record. A collection of related data or words, treated as a unit; all the information about one person, project, etc. Records make up a file.

replace. Characters typed when the system is in a replace mode are typed over existing text.

revision. The process of changing the text and/or format of a document.

scale line. A line on the display showing margins, tabs, and character positions.

segment. To move the display image horizontally to bring into view information that is to the left or right of the display's boundaries.

select. The ability to choose only certain records from a file based on field values.

shell document. A standardized document that uses variable information to complete it.

sort. The ability to arrange records sequentially according to field values.

status lines. The first two lines of the display which indicate special functions currently being performed, the document name, the identity of the cursored codes or symbols, the diskette name(s), page number, line number, keyboard number, and pitch.

switched communications line. A mode of operating data communications in which the physical connection between the terminals is established through communications equipment. The connection must be established for each message or series of messages involved in the transmission. Synonym for switched line.

transmission. In communications, one or more blocks or messages.

transparency. In teleprocessing, the ability to send EBCDIC control and graphic characters that are not acted upon as transmission control characters by the receiving device.

variable. Information (such as name, date, time) that can be inserted within a standardized document.

widow line. A single first or last line of a paragraph separated from its related text and appearing on a different page.

work station. In the IBM Displaywriter System, the combination of Electronics Module, Display Module, Keyboard Module, and Diskette Unit.

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