THE GEM™ OPERATING SYSTEM HANDBOOK

DAVE PROCHNOW

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To my dearest Kathy

Preface

Not too long ago, a friend of mine was loading DOS into her new IBM PC XT when she was greeted by the staid A> prompt. "Is that it?" she asked. In many ways, this succinct response clearly illustrates the major problem with DOS. Dealing with an application as powerful as DOS's COMMAND.COM through such a nondescript interface isolates the user from a successful and harmonious interaction with the program. Even worse, extreme cases of this DOS isolationism can lead to computer apprehension and "DOS dread." With all of these negative aspects handcuffing DOS, there's got to be a better operating system "mousetrap."

Icons are one method for cutting through the fog created by an obfuscatory operating system. These pictorial representations of system attributes and command sequences make the actions and functions of an operating system completely invisible to the user. Fortunately, there is no exorbitant price to pay for this simplicity. In other words, all of the power and versatility of DOS is still present only the visual presentation of the operating system has been changed (obviously, to protect the innocent). Once you have been convinced of the merits of an icon-based operating system, your remaining task is to locate a suitable environment for controlling your computer. This book is dedicated to the exploitation of one such icon-based operating system—GEM.

GEM has its share of exciting characteristics, some of which were not originally intended by the system designers at Digital Research, Inc. These surprises range from subtle techniques for deriving the maximum productivity from GEM to the Apple Computer copyright infringement lawsuit. Even the current version 2.1 release of GEM confronts the GEM user with several interesting problems. All of these situations and more are covered within the pages of *The GEM Operating System Handbook.*

Throughout this book you will be guided by *tip*, *warning*, and *caution* "flags." Each of these informative passages will enhance your ability to use GEM. You can think of these "help sections" as the information that DRI forgot to tell you.

Basically, the structure of this book supplies in-depth instruction on four key GEM topics: the GEM Desktop, GEM system requirements, GEM-based applications, and programming the GEM environment. After a brief introduction to operating systems, Chapter 1 covers every aspect of the GEM Desktop. Since the remainder of this book draws heavily from the principles learned in this chapter, make sure that you comprehend this information before forging ahead. Of course, should you ever stumble across some unfamiliar GEM terrain, you can always return to Chapter 1 for a refresher course.

Chapter 2 looks at every aspect of the hardware that is necessary for running GEM. From computers to monitors, any question about what will and what won't work with GEM is answered. Apricot, Atari, and even IBM compatible users will find this chapter beneficial in identifying the peculiarities that will turn their computers into GEM cutters.

All five of the major GEM-based applications (the GEM Collection contains both GEM Paint and GEM Write) are thoroughly detailed in Chapters 3 through 6. In covering each of these applications, a standard chapter format is used. First, the complete installation procedure is annotated with informational messages when necessary. This section is followed by instructions on using the special features that are inherent to the application. Finally, concluding each chapter are two sections dealing with advanced user techniques and reference material for increasing your functional understanding of each application.

The last GEM area that receives special attention is programming your own applications and desk accessory through The GEM Programmer's Toolkit. Chapter 7 details the special features of this programming package, as well as some of the special GEM-specific tools that are available to the programmer.

Supporting these four, information-packed GEM topics is a thorough appendix, a detailed index, and over one hundred clear illustrations. And, for you GEM skeptics, there is even an unbiased accounting of several other alternative operating systems (Macintosh, DESQview, Windows, and TopView). In fact, if you feel that your computer is currently a diamond in the rough, then *The GEM Operating System* will help you polish this jewel into a GEM.

One glowing virtue of a book like *The GEM Operating System Handbook* is the wealth of "inside" information that fills its pages. Granted, much of the labor involved in the extraction of this material rests squarely on the shoulders of the author. There were several instances, however, where outside help was the only visible option for giving you, the reader, the type of in-depth coverage that you demand. In these instances, Digital Research, Inc., and Heath/Zenith, Inc., proved receptive to the task of data dissemination. At DRI, Judy Mervis, Director of Corporate Communications; Bill Higgs, Product Marketing Manager; and "transplanted" Tony Harris fielded my every request without hesitation. At Heath/Zenith, Bill Stewart was more than generous with his information on Zenith/GEM compatibility.

Introduction

Somewhere along the line of computer evolution, a systems programmer decided that communicating with the computer should be powerful, versatile, and flexible. It was from this altruistic thought that the computer operating system was born. Actually, this was a remarkable breakthrough from the complex binary and hexadecimal "switch-throwing" that marked the computer's infancy. When you wanted your IBM 7070 Data Processing System to execute a normal disk read on an IBM 7300 Disk Storage Unit (either Model 1 or Model 2), the mnemonic command DR, along with its associated accumulator referencing, would carry out this operation. In a strict sense, however, this was not an operating system. The term *system,* in these early four-digit IBMs, referred to the hardware level and not a software resident control environment. Therefore, the 7070 was not too far removed from its hardwired ancestors. If you doubt this claim, just ask any seasoned 7070 or 7090 programmer about wiring an IBM 7500 Card Reader Control Panel.

A truer representation of the beginning of a classical operating system could be found in the Burroughs B 2500 and B 3500 Systems. In this case, the Master Control Program (MCP) served as the vital link between computer and program. MCP-related functions controlled program loading and execution, program memory allocation, language library creation, input/output supervision, and error handling. The real savings in the presence of a crude operating system, like the Burroughs MCP, was the insulation of the programmer from primitive opcode and mnemonic coding—not to mention the elimination of wired control panels. This reduction in complexity underlined the strength of a powerful operating system.

Further advancements in large system operating systems were made under the

direction of IBM. In fact, their 360 system stands as both a hardware landmark and an operating system milestone. The Operating System/360 (OS/360) was an elaborate operating system supporting complex language processors, symbolic allocation of I/O (Input/Output) device drivers, and vast application programs.

At the heart of OS/360 was the Primary Control Program (PCP), which formed the basis for all other control programs and linked basic single-job operating system functions. Of course, handling multiple programming assignments concurrently was the real forte of OS/360. Multiprogramming with a Fixed number of Tasks (MFT) and Multiprogramming with a Variable number of Tasks (MVT) were the concurrent controllers for partitioning the 360's core storage environment.

A much more interesting development with the IBM 360 (at least with regards to our examination of emerging operating systems) was Disk Operating System/360 or DOS/360. This completely disk-resident operating system was relegated to systems with a minimum 16K bytes disk-based system configuration. Like OS/360, DOS/360 had a core control program that maintained program development, I/O support, and application execution. Additionally, DOS/360 was able to execute a maximum of three programs concurrently. This multiprogramming ability required a minimum of 24K bytes of main storage.

After the introduction of the IBM 360, programmers' appetites for a complete operating system were whetted, and manufacturers intensified their development of a more comprehensive environment. Even with this increased demand for an inclusive operating environment for large systems, it wasn't until the release of the personal home microcomputer that the operating system finally matured. An excellent example of this mainframe operating system maturation is evident in the Honeywell Series 60 (Level 66)/6000 System. The General Comprehensive Operating Supervisor, Time Sharing System, File and Record Control, General Loader, and Unified File Access System formed the basis for this typically complete, late 1970s operating system.

Gone were the days of switches, hardwiring, and obscure mnemonics and opcodes. In order for a microcomputer to be a commercial success, it had to have a simple computer/program interface. This simplicity translated into an independence from direct machine-level programming. In other words, it was no longer necessary for a computer operator to occupy the additional role of programmer. The microcomputer ushered in the age of the *user.*

THE BIG BREAK

The first real mover in this new, user-oriented operating system market was *CP/M.* CP/M, or Control Program for Microprocessors, is an 8-bit operating system designed by Digital Research, Incorporated, (DRI) for microcomputers based on the Intel 8080 and Zilog Z-80 Microprocessor Unit (MPU). The flexible structuring of CP/M makes for an extremely portable software environment. This programming portability means that software applications can run on numerous microcomputer designs and requires only a minor alteration in their disk format for successful operation. Vast non-brand specific software libraries, whose computational strength rivaled the power of some of the larger mainframe systems' programs, are now within reach of the microcomputer user. Advancing this cause for "universal software" even further are special disk formatting utilities that can configure a disk drive to read and write in any manufac-

turer's CP/M disk format.

Through all of this software revelry, CP/M exerted only a modest demand on the system hardware: a minimum RAM (Random Access Memory) of 20K bytes, at least one floppy disk drive, and a single-density Intel MDS 800 disk format. In spite of these loose requirements, a hardware standard slowly crystallized for the "typical" CP/M computer. The generic CP/M computer contained 64K bytes of RAM, two floppy disk drives, and used a single-sided, single-density disk format (Fig. I-1). These initial hardware standards were slowly eliminated by manufacturers designing their own machine-specific I/O drivers.

A fitting tribute to CP/M is that unlike its operating system forerunners, it remains a popular environment today. After undergoing several revisions and numerous complete facelifts (e.g., CP/M-86, Concurrent CP/M-86), CP/M Version 2.2 stands as the definitive standard for this particular operating system. CP/M 2.2 consists of four subsystem segments:

- ☐ Basic I/O System (BIOS)
- ☐ Basic Disk Operating System (BDOS)
- ☐ Console Command Processor (CCP)
- ☐ Transient Program Area (TPA)

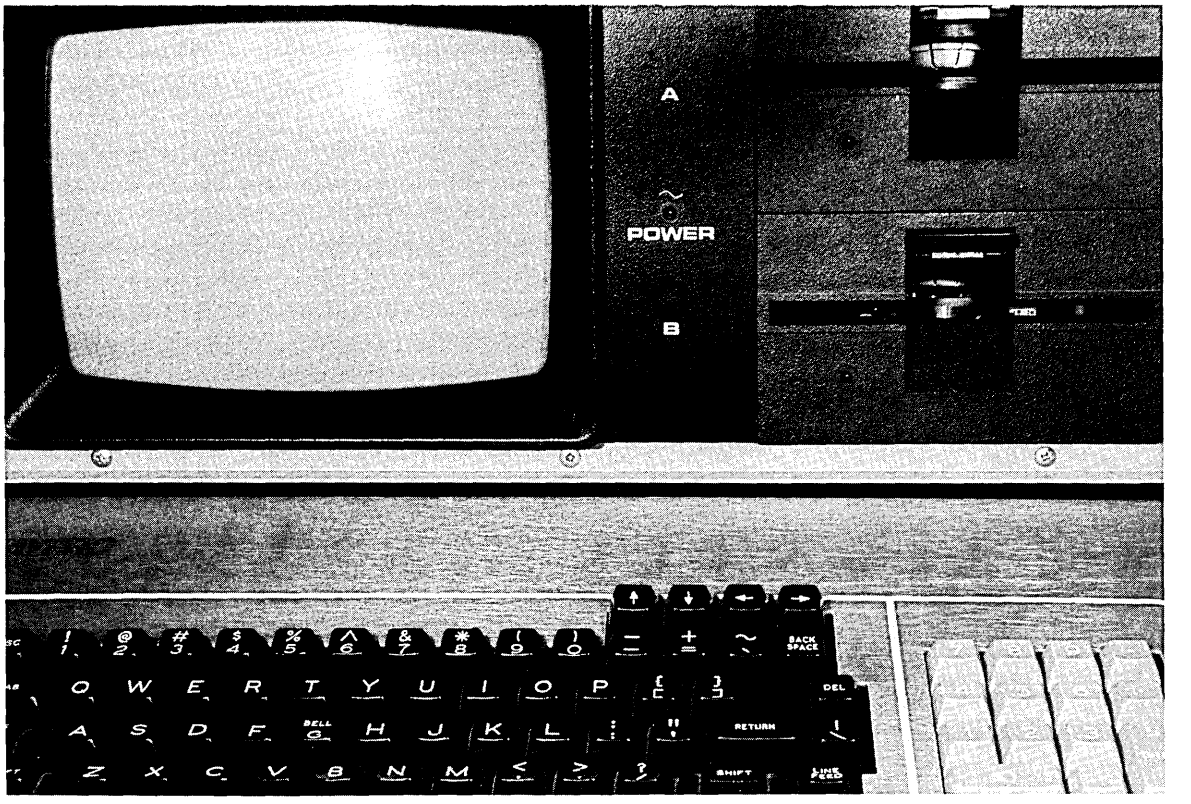


Fig. I-1. One of the more popular CP/M microcomputers, the KAYPRO II, still serves a large variety of users.

The BIOS is a hardware-level control interface for directing the read/write actions of both peripherals and mass storage devices (e.g., floppy disk drives). It is this segment that is reprogrammed or "patched" by computer manufacturers for accommodating the peculiarities of their unique hardware design.

All floppy disk control is monitored by the BDOS. The BDOS maintains each disk drive's (there can be up to 16 disk drives) file directory and controls the allocation of disk space for optimal access time. Realizing the ideal disk access time is a feature that is dependent on the movement of the disk drive's read/write head. Therefore, BDOS works to minimize this head traveling distance.

The most visible CP/M segment to the user is the CCP. This subsystem serves as a link between the keyboard and the remainder of the CP/M operating system. Under normal operating conditions, the CCP monitors the keyboard and executes every built-in CP/M command that it receives. There are six built-in recognizable CCP commands:

ERA a	Erases the specified file (a)
DIR a	Lists the specified files (a)
REN u1 = u2	Renames the file (u2) as the specified file (u1)
SAVE x u	Saves the specified memory location (x) as file (u)
TYPE u	Displays the specified file (u) on the console
USER x	Specifies user area (x)

Where:

a = an ambiguous file reference
u = an unambiguous file reference
x = an integer value

The TPA is the final segment in CP/M. This subsystem serves as a temporary memory holding zone for programs that are loaded through the CCP. An important characteristic of this feature is that once a program is loaded into the TPA, the other three subsystems can be removed from the computer's memory. There is also a group of basic transient commands that are accessed through the CCP for execution in the TPA. These ten transient commands are:

STAT c	Generates statistical data on the specified command line (c)
ASM u	Loads the CP/M assembler and executes the specified file (u)
LOAD u	Loads and stores in the TPA the specified "HEX" file (u)
DDT u	Loads and executes the Dynamic Debugging Tool
PIP c	Loads the Peripheral Interchange Program
ED u	Loads and executes the text editor program
SYSGEN	Generates a new CP/M system disk
SUBMIT u p(x)	Arranges commands for batch processing
DUMP u	Prints the specified file's (u) contents
MOVCPM c	Configures the CP/M system for the specified memory (c)

Where:

a = an ambiguous file reference
c = a command line
p = a parameter
u = an unambiguous file reference
x = an integer value

As described above, the CP/M user communicates with the operating system through the CCP. In turn, the CCP acknowledges its ability to receive these user-initiated commands with a *prompt* symbol. This prompt consists of two individual parts. The first part is a letter representing the currently logged disk drive. The letters A through P are the possible disk drive identification symbols. The second symbolic prompt part is the CCP *ready acknowledgment*, which is indicated by ">." Therefore, a complete CP/M prompt for an active A disk drive would be:

```
A>
```

By no means is the logged disk drive mandated to be the A drive. All of the different disk drives in the CP/M system can be individually logged. Changing the currently logged disk drive takes place through the CCP. In this case, the user first types the letter that represents the desired disk drive. This letter designation is then followed by a colon. Using this command,

```
B:
```

switches the currently logged drive to the B disk drive, while

```
A:
```

returns CP/M to the A disk drive.

Once the desired disk drive has been correctly logged, CP/M is able to address two types of file references: *ambiguous* and *unambiguous*. Both of these file references consist of three parts: the *filename*, a *delimiter*, and the *filetype*. Furthermore, the format of these file references, with regard to the three parts, is identical:

```
FILENAME.FILETYPE
```

In this example, FILENAME can be a maximum of eight characters, the delimiter is the period (.), and FILETYPE is commonly a fixed three-character (although a designation of less than three characters is permitted) name. This example is applicable to either an ambiguous or an unambiguous file reference.

An ambiguous file reference is used for nondescript file searching. There are two special *wildcard* characters that are especially reserved for ambiguous file references: ? and *. These wildcards are used as substitutions for known character positions in filenames and filetypes. The ? acts as a character-for-character wildcard. For example:

		WS.COM
?S.COM	matches	SS.COM
		PS.COM

In contrast, the * is a word-for-word wildcard. In this case:

		WS.COM
WS.*	matches	WS.OVR
		WS.EXE

A potential pitfall with the ambiguous file reference is when coupling these wildcards with a destructive command like the erase command ERA.

An unambiguous file reference is used in the specific search for an exact filename and filetype. Any alphanumeric character, except the following, can be used for unambiguous file references:

? * . , ; : < > [ ] _ ( ) % / \ |

Therefore,

WS, LETTER.DOC, PASCAL.COM, and 4MAT.EXE are all legal unambiguous file references.

In order to more fully appreciate the power of the CP/M operating system, let's perform five separate disk management functions. Starting with the file MEMCO.TST, we will (1) rename this file, (2) copy the renamed file to another disk, (3)determine the nature of our copied file, (4) output the file to our printer, and (5) execute the program file.

1. Rename the file.
   REN B:MEMTEST.BAS = B:MEMCO.TST
2. Copy the file.
   PIP A: = B:MEMTEST.BAS(v)
3. Status of the file.
   B:STAT A:MEMTEST.BAS $S
4. Print the file.
   B:PIP LPT: = A:MEMTEST.BAS(fp55t5)
5. Execute the file.
   A:MBASIC MEMTEST.BAS

Aside from remembering the proper syntax for each of these commands, CP/M disk management activities require that the user keep a constant vigil over the currently logged drive. Failure to correctly monitor this designation could result in a BDOS error message (e.g., attempting to copy a file to a read-only disk) and necessitate a warm or cold system restart.

DOS

One slap against CP/M that isn't an actual fault of the operating system at all is its

dependence on 8-bit MPUs. Unfortunately, it was this hardware restriction that was to sound the death knell of CP/M. After nearly a seven-year domination, the industrial 8-bit data/address "standard" was supplanted by the 16-bit MPU. The most noteworthy member of this new chip architecture is from the Intel 8086 MPU family—the Intel 8088. The increased data/address space of these new MPUs added computing power to the microcomputer that had been previously unavailable with the 8-bit MPU. Therefore, the 16-bit MPUs required an operating system that was able to address larger chunks of RAM, format higher density disk drives and, most importantly, address large megabyte-capacity hard drives.

Digital Research, Inc., expressed a keen interest in the maturation of their original 8-bit-dependent operating system into a revised version that would meet the demands of the newer 8088 chips. The result of this development was the ill-fated CP/M-86. For the record, CP/M-86 handles all of the hardware requirements imposed on the system by the 8088. Furthermore, CP/M-86 retains many of the successful elements of the original CP/M 2.2, such as the built-in and transient command structure (see Table I-1). DRI felt that this familiarity lent an air of painless transition for users upgrading their 8-bit microcomputers to the newer 16-bit models. IBM, however, had different plans.

Even though the 8088 was the premier 16-bit MPU (let's avoid the issue of the 8088 having a 16-bit internal structure and an 8-bit external data bus), it took IBM to make it the 16-bit MPU standard. This chip standardization was initiated through the introduction of the IBM PC line of microcomputers. Starting with the inept IBM PC, proceeding to the powerful IBM PC XT, and climaxing with the 32-bit 80286-based IBM PC AT, each of these systems sported a new operating system that was destined to become the next "industry standard." When the design of this system was undertaken, instead of giving the nod to DRI, IBM enlisted the work of Microsoft Corporation. Microsoft's operating system was known simply as IBM Personal Computer Disk Operating System or PC-DOS (DOS rhymes with toss).

In its lifetime, PC-DOS (and its compatible cousin MS-DOS or Microsoft DOS) has undergone numerous version changes with more advanced supersets looming on the horizon. Where does this constant upgrading leave the IBM PC user? There are two

Table I-1. A Listing of the Commands Found in the Current Implementation of CP/M-86 for the IBM PC.

CP/M-86 Command Summary

ASM86 (Assembler)	HELP
ASSIGN	PIP
CONFIG	PRINT
DDT86	REN
DIR	SETUP
DSKMAINT	STAT
ED	SUBMIT
ERA	TOD
FUNCTION	TYPE
GENCMD	USER
HDMAINT	

Table I-2. Both the Internal and the External DOS Commands for IBM PC-DOS 3.21.

IBM PC-DOS 3.21 Command Summary

ASSIGN	EXE2BIN	RENAME
ATTRIB	FDISK	REPLACE
BACKUP	FIND	RMDIR
BREAK	FORMAT	SELECT
CHDIR	GRAFTABL	SET
CHKDSK	GRAPHICS	SHARE
CLS	JOIN	SORT
COMMAND	KEYBxx	SUBST
COMP	LABEL	SYS
COPY	MKDIR	TIME
CTTY	MODE	TREE
DATE	MORE	TYPE
DEL	PATH	VER
DIR	PRINT	VERIFY
DISKCOMP	PRINT	VOL
DISKCOPY	PROMPT	XCOPY
ERASE	RECOVER	

prevalent attitudes which address this question. First, that PC-DOS is an inadequate product that is incapable of handling hardware enhancements without revision. In other words, PC-DOS is a nearsighted operating system which lacks sophistication. The second point of view insists that PC-DOS is a brilliant example of programming for the future. In this case, PC-DOS represents the ideal operating system due to its flexibility for adapting to every new hardware advancement. Of course, Versions 3.0, 3.1, and 3.2 of PC-DOS were all released in close proximity to each other without a major intervening hardware system release.

PC-DOS consists of two types of commands: *internal* and *external.* When DOS is booted or loaded into an IBM PC, all of the internal commands are placed into RAM. This command core remains in RAM until either the system is rebooted or the IBM PC is switched off. One benefit of basing the internal commands within RAM is that the DOS floppy disk can be removed from its disk drive. Then, in the future, when the user enlists an internal command, the action is performed directly from RAM without having to read a DOS disk for instructions.

Conversely, external commands reside permanently on the DOS floppy disk. Therefore, due to the nature of their residence, external commands require that the DOS floppy disk remain in a currently logged disk drive for proper execution. In many respects, external commands can be thought of as separate, unique programs that must be loaded and run just like their conventional software brethren. Table I-2 lists all of the commands, both internal and external, for PC-DOS 3.2.

At the disk level, DOS mimics the disk drive designation convention that was initiated by CP/M 2.2. Therefore, Drive A is known as the *Source* drive and Drive B is called the *Destination* drive. Additionally, extra disk drives, like a hard disk drive, and a virtual device, such as a RAM-based disk drive, are labeled with sequential letters of the alphabet. For example, if you have an IBM PC XT with two floppy disk drives, one hard disk drive, and a properly partitioned RAM disk drive, the letter designa-

tions would be A and B for the two floppy disk drives, C for the hard disk drive, and D for the RAM disk drive.

In dealing with files, however, DOS uses a slightly different approach from the one espoused by CP/M 2.2. DOS no longer relies on ambiguous and unambiguous file references. Instead, a new four-part file specification replaces this former file dichotomy. A DOS file specification consists of a drive specifier, a filename, a separator, and an extension. For example:

```
A:WS.COM

  A:  - drive specifier
  WS  - filename
   .  - separator
 COM  - extension
```

Looking at each one of these file specification elements individually, the drive specifier has two distinct parts. First is the disk drive letter used for identifying the disk drive location of the desired file. If the desired file is located on the currently logged disk drive, the drive specifier can be eliminated from the file specification. The second part of the drive specifier is a colon (:) used as a delimiter for the drive letter.

The next element of a file specification is the filename. Like a filename in CP/M 2.2, DOS filenames can be a maximum of eight characters in length and use any alphanumeric character. Unlike CP/M 2.2 filenames, however, DOS filenames can include the following special characters:

```
! @ # $ % ^ ( ) - _ { } ' ` ~
```

These characters:

```
. " / \ [ ] : | < > + = ;
```

are excluded from filename usage by DOS.

The period separator in a DOS file specification serves the same purpose as its CP/M 2.2 counterpart. Likewise, if an extension is omitted from a file specification, then this separator is unnecessary.

An extension is the final element of a DOS file specification. This optional, three-character (maximum) name is placed to the right of the period separator. Once this extension is fixed to a file specification, it must always be used with all future referencing of that particular file.

DOS is also able to use the two wildcard characters, ? and *, found in CP/M 2.2 for file management. The only difference between the DOS-based ? and * and the CP/M versions is that DOS refers to them as global filename characters. Their implementation and resultant action remains the same, however. Once again, ? is used as a character-for-character substitute, while * is able to represent from one to eight characters on a word-for-word basis. For example, the global filename characters in DOS can be used to represent:

characters,

1??.EX?	matches	123.EXE 1AB.EXP 19Z.EX5

words,

*.EXE	matches	123.EXE WS.EXE XTALK.EXE

and combinations,

W???????.*	matches	WS.COM WSMSGS.OVR WSCOLOR.BAS

As a comparison to the file management ability of CP/M 2.2, let's conduct the same five disk operations from the previous section under the direction of DOS. As with the CP/M examples, we will start with the file MEMCO.TST. After (1) renaming this file, we will (2) copy the renamed file to another disk, (3) determine the nature of our copied file, (4) output the file to our printer, and (5) execute the program file.

1. Rename the file.
   REN B:MEMCO.TST MEMTEST.BAS
2. Copy the file.
   COPY B:MEMTEST.BAS A: /V
3. Determine status of the file.
   B:CHKDSK A:MEMTEST.BAS /V
4. Print the file.
   B:PRINT A:MEMTEST.BAS
   Followed by: Name of list device (PRN):
   Press the ENTER key.
5. Execute the file.
   A:BASICA MEMTEST.BAS

There is a small price to pay for the power of DOS. The increase in the performance of DOS has also increased the potential for error. The limited number of error messages that were possible with CP/M 2.2 have been replaced by 86 pages of possible DOS warnings and statements. Granted, many of these messages are acknowledgments and not system faults, but there is still room for overlooking the proper file specification and receiving a copy error. Only flawless typing and a watchful eye on the drive specifier will reduce the likelihood of a disastrous file erasure.

ICONS

One disagreeable aspect that is common to all of the former operating systems is their

absolute reliance on a rigid, typed command set. This unpleasantness is not caused by the presence of a fixed command structure; to the contrary, it is the onerous encumbrance placed on the user for memorizing both the syntax and the orthography of each command. A user failing to exercise the prescribed caution over entering any of these operating system commands can face at the least an error message and at the most the destruction of irreplaceable data. A typical scenario that illustrates the latter happening deals with the DOS COPY command. Imagine that you have just finished your perfect Lotus 1-2-3 template and saved a copy onto your working disk. After exiting to DOS, you decide to ensure your templates safety by copying it to a backup disk which currently holds an older version of the same template. Lacking complete concentration, you erroneously misrepresent the two drive specifiers and mistakenly copy the backup onto the perfected working version, erasing all of your successful work. Gads, couldn't DOS incorporate some form of warning system which would at least minimize the possibility for large-scale data loss? Even elaborate warnings of potential data loss wouldn't alleviate the additional need for proper command spelling. For example, entering DIP won't give you a disk drive file listing, no matter how many times you enter it. Likewise, what warning flag would be appropriate in this situation, "Read the manual, dummy"? There has to be a better method for handling these file management duties.

One innocuous method for dealing with data, and one that is recognizable by virtually any user, is with pictures. Of course, the adage, "one picture is worth one thousand words," lends some credence to this assertion. A computer-based application of this technique would be in using a universal graphics representation for each operating system command. Under this pictorial tutelage, the potential for user error and confusion would be reduced. Likewise, by coupling these graphics images with a surrogate finger-pointing device, keyboard-bound typing errors would be completely eliminated. The overall benefits derived from graphics-based, or *icon,* operating systems are that they remove the need for typed command entry and they lessen user bewilderment from complex, convoluted command structures. Currently, in our tracing of the computer operating system lineage, we are standing at this exact evolutionary spot.

The idea of graphics image application to bewildering concepts is not a new endeavor. Several ancient civilizations throve on various forms of pictographic writing. From Aztecs to Zuñis, picture writing created a solid foundation for communicating the complex ideas of daily life. Without a doubt, the leading proponents of this pictorial diagraming were the Egyptians. In fact, the special attributes found in the Egyptian pictographs coined the term *hieroglyphic* (for you etymologists, this is from the Greek word *hieros* or sacred and the Greek word *glyphein* or to carve) writing. Egyptian hieroglyphs were rich in their ability to represent images (ideographic), words and syllables (syllabic), quality hand writing (hieratic), and simplified, everyday hand writing (demotic). If nothing else, this elaborate graphics writing style contributed to the education of the masses and the advancement of the civilization. But how does all of this relate to computer operating systems?

If we apply the Egyptian hieroglyphic ideal to the complexity of the computer operating system, we are left, once again, at the doorstep of Digital Research, Inc. DRI has studied the need for a better operating system "mousetrap" and created the *Graphics Environment Manager* or GEM. GEM is a graphics-oriented, mouse-controlled operat-

ing system that provides an intuitive, icon-based command structure, which virtually eliminates all dependence on syntax memorization, as well as keyboard entry. Furthermore, GEM successfully addresses the issue of software portability. In other words, GEM applications can be easily adapted to numerous operating systems (e.g., PC-DOS, MS-DOS, TOS) and MPUs (e.g., 8088 and 68000) through only a modest amount of recoding. This versatility opens the door for GEM to become the first universal operating system.

Many of the features that are found in GEM have been adapted from previous research. Back in May of 1981 the first commercial computer with an icon-based operating system was released to the public. Developed at Xerox Corporation's Palo Alto Research Center (PARC), the Xerox Star (it was subsequently named the Xerox 8010) bore a $50,000 price tag and many of today's GEM attributes. Prevalent among these GEM precursors were the use of icons to represent disk file management and the employment of a mouse for control of the operating system.

Building on this graphics environment start, Apple Computer, Incorporated, made the next big advancement in icon-based operating systems with the January 1984 release of the Macintosh computer. This unorthodoxly styled microcomputer (Fig. I-2) gained valuable design lessons from the mistakes Apple Computer made through the failure of the Lisa (this was a previous, albeit weak, attempt by Apple to introduce an icon operating system). Oddly enough, Apple Computer elected to market the merits of their new computer squarely on the shoulders of their operating system. Dubbing the Macintosh to be the computer "for the rest of us," this marked the first time that the benefits imparted by an operating system outweighed the computation prowess of the MPU. This odd marketing strategy must have worked because it was with the Macintosh that the first commercially successful footnote in the development of a graphics operating system was written.

The next step was up to DRI. In September of 1984, Digital Research made the first announcement of the GEM operating system. Like the armies of Pre-Bolshevik Russia leading their troops into battle with icons, DRI launched its own icon-laden campaign against a firmly entrenched DOS foe. Digital Research's intent was to provide all 8088 computer users with a simple and highly efficient operating system alterna-

Table I-3. All of the Menu-Resident Commands Found on the GEM Desktop.

GEM Desktop 1.0 Command Summary

Calculator	Quit
Clock	Save Desktop
Close	Set Preferences
Close Window	Show as Icons
Desktop Info	Show as Text
Enter DOS Commands	Show Info
Format	Sort by Date
Install Disk Drive	Sort by Name
Install Application	Sort by Size
New Folder	Sort by Type
Open	To Output
Print Spooler	

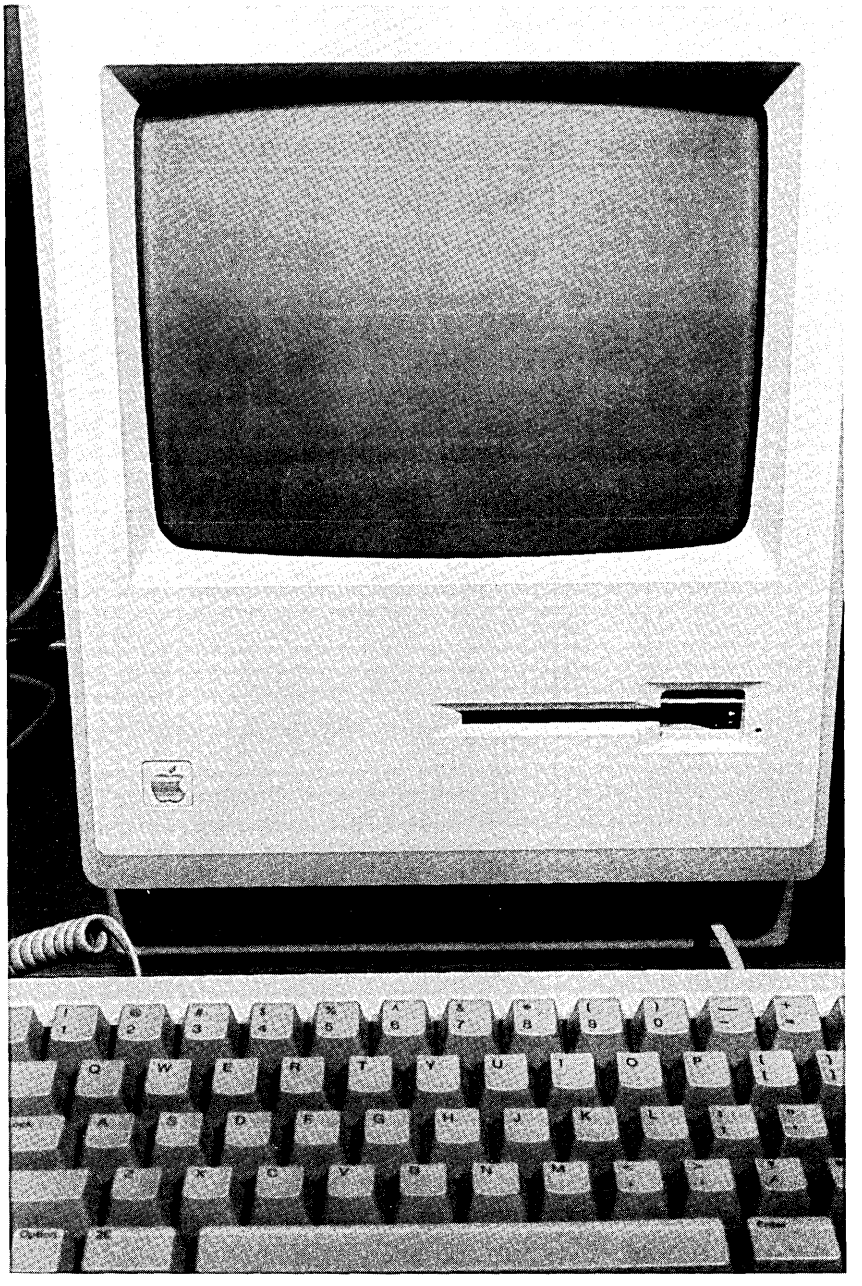


Fig. I-2. The unusual lines of the Macintosh computer broke all of the established computer "rules" when it was released in 1984. Remarkably, the computational strength of the Macintosh played second to the unique icon-based operating system.

tive to DOS. In an attempt to accomplish this goal, GEM featured high resolution graphics, enhanced color support, consistent icon representations, drop-down menus, accurate screen-to-output depiction (sometimes called what-you-see-is-what-you-get), application level information interchange, and mouse control. All in all, GEM achieved many of DRI's goals, predominantly with new IBM PC users and other 8088 computer

beginners. Unfortunately, GEM still lacks a widespread penetration in the established base of DOS users. This trend is changing, however, and further GEM-related software developments are bound to enhance the general adoption of GEM.

GEM breaks all of the traditions set by the operating systems discussed in the former sections. This is best illustrated by viewing GEM's treatment of the five file management tasks previously assigned to CP/M 2.2 and DOS. Before undertaking this comparison, however, a brief mention of GEM file naming is in order. Basically, all references to file types and file specifications have been removed from GEM. Only the generic term *item* is used for referring to any GEM file, whether it is an application or a document. A simple, menu-driven application installation procedure handles all of the file management duties that were laboriously manipulated with typed alphanumeric characters, batch file creation, and pathname selection in CP/M and DOS. Once this installation is complete, a descriptive icon is assigned to the application and a unique icon is automatically assigned to all of the document files that are produced by that application. The *subdirectories* of DOS, on the other hand, are treated as *folders* in GEM.

Following the conventions used in the CP/M and DOS examples, we will start with the item MEMCO.TST. Once this item has been (1) renamed, we will (2) copy the renamed item to another disk, where we will (3) determine the nature of our transferred item. After we have completed the item's informational assessment, we will (4) output the item to our printer. Finally, we will (5) execute the program item.

1. Rename the item (Fig. I-3).

   ☐ Select the item's icon with the mouse.

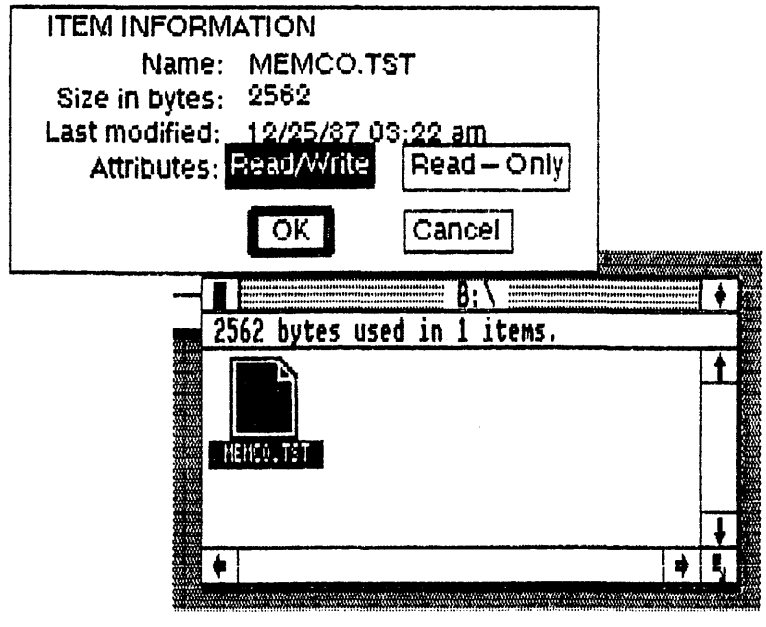


Fig. I-3. The ITEM INFORMATION dialog.

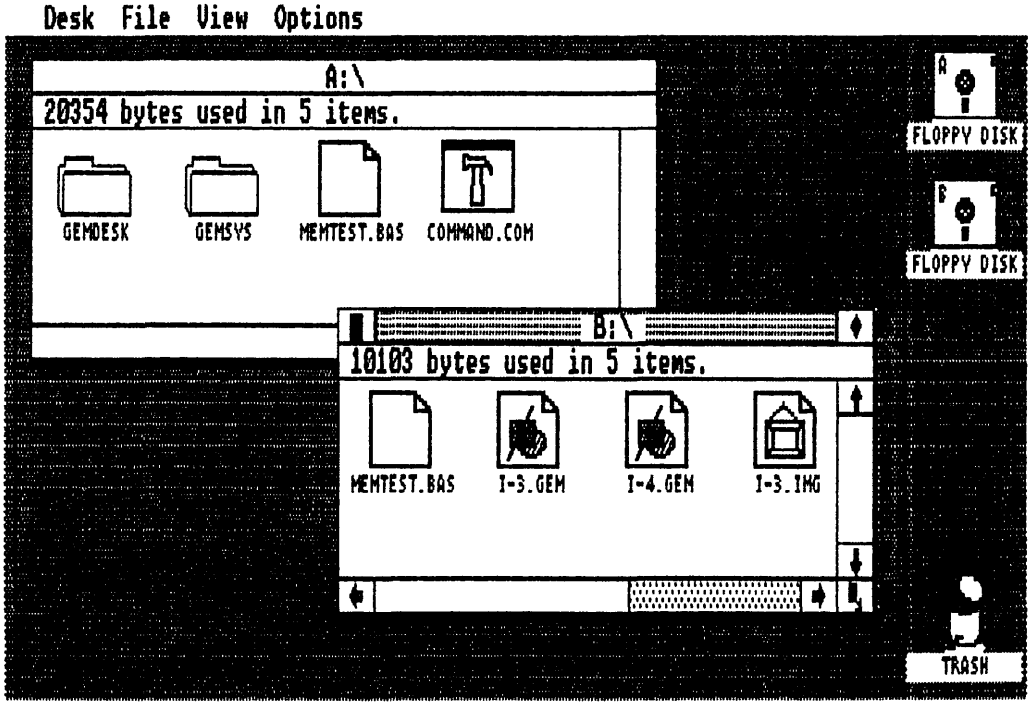


Fig. I-4. A selected icon is dragged to its new destination.

- ☐ Choose **Show Info . . .** from the File Menu.
- ☐ Type **MEMTEST.BAS** in the Name field.

2. Copy the item (Fig. I-4).

   - ☐ Select the item's icon.
   - ☐ Drag the selected icon to the A: disk icon.

3. Determine status of the item (Fig. I-5).

   - ☐ Select the item's icon.
   - ☐ Choose **Show Info . . .** from the File Menu.

4. Print the item (Fig. I-6).

   - ☐ Select the item's icon.
   - ☐ Choose **Print Spooler** from the Desk Menu.
   - ☐ Click on the **Add Name . . .** button.
   - ☐ Add name with **ITEM SELECTOR** dialog.
   - ☐ Press the ENTER key.

5. Execute the item (Fig. I-7).

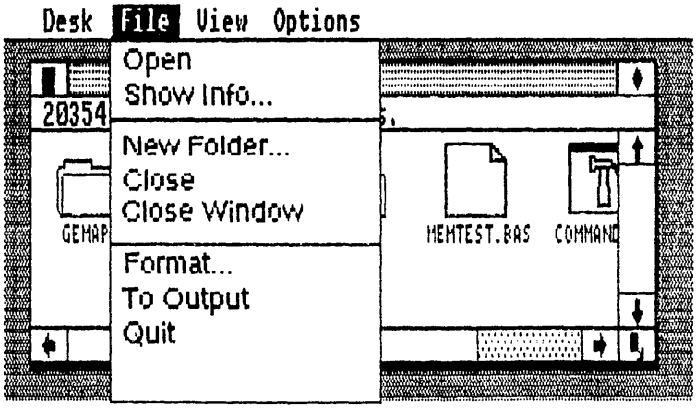


Fig. I-5. **Show Info . . .** determines the status of a file.

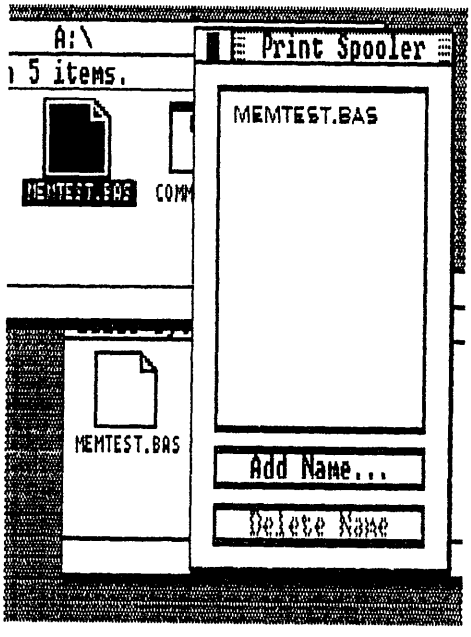


Fig. I-6. **Print Spooler** desk accessory.

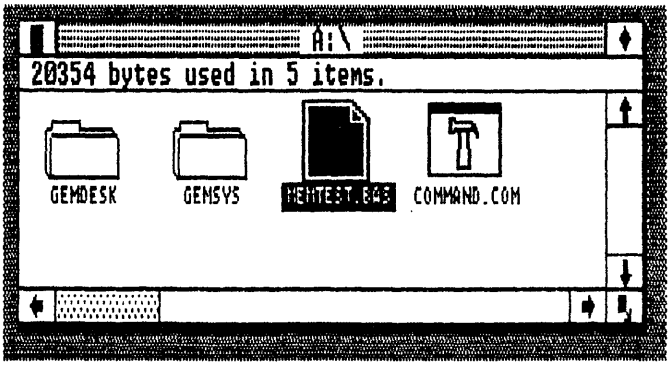


Fig. I-7. A double-click on the BASIC program will load and execute BASICA.

☐ Double-click on the MEMTEST.BAS icon.

The real marvel with GEM is that all of these actions take more time and effort to describe than they do to execute. A flick of the wrist and a click of the mouse button are all that is necessary for performing many of these file management chores. Only when entering item names does the keyboard come into play. Thankfully, this keyboard independence lessens the chance for typing errors, which could lead to data destruction. But DRI realizes that there is always room for error. Therefore, GEM contains a complete and thorough warning message network (these are known as *dialogs*), which safeguards against the execution of potentially data-damaging commands. Based on the combination of these two error-limiting features within the icon environment, GEM is able to compete effectively with DOS in the 8088 system.

CLICKS VS. COMMANDS

In order to get an effective feel for the differences between GEM and PC-DOS, the following file management exercises were performed under the direction of both of these operating systems: file directory management, file copying, and hard (or fixed) disk drive file manipulation. Representative screen illustrations showing the results that are obtained from each of these exercises are given for both GEM and PC-DOS.

File Directory Management

GEM (Fig. I-8):

☐ Double-click on the disk drive icon.
☐ Double-click on the Document folder.

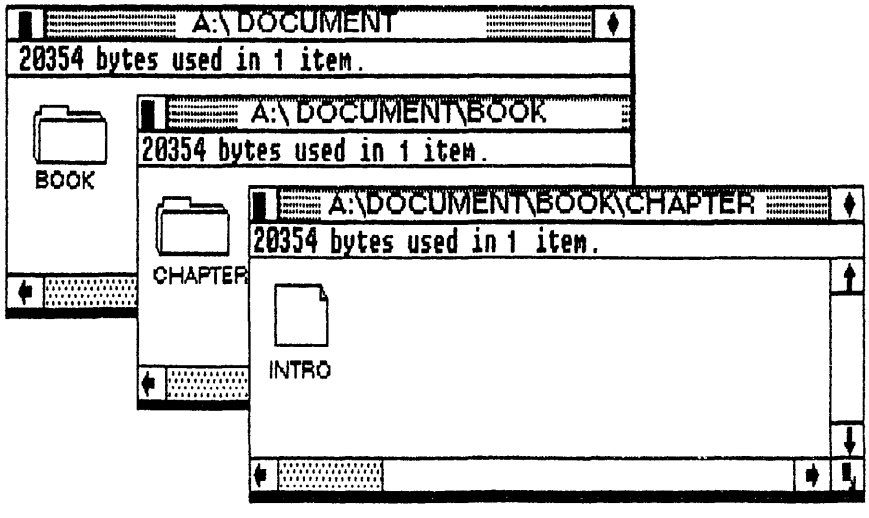


Fig. I-8. GEM deals with subdirectories through the folder icon.

```
A>TREE B:\F

DIRECTORY PATH LISTING FOR VOLUME ??????????

Path: \DOCUMENT

Sub-directories:  BOOK


Path: \DOCUMENT\BOOK

Sub-directories:  CHAPTER


Path: \DOCUMENT\BOOK\CHAPTER

Sub-directories:  None



A>
```

Fig. I-9. The DOS method for dealing with subdirectories.

- ☐ Double-click on the Book folder.
- ☐ Double-click on the Chapter folder.
- ☐ Double-click on the Intro document.

PC-DOS (Fig. I-9):

- ☐ Log disk drive.
- ☐ Display directory.
- ☐ Set Tree command.
- ☐ Load word processor.
- ☐ Start Intro document.

GEM (Fig. I-10):

- ☐ Click on the Book folder.
- ☐ Drag the Book folder to disk drive B: icon.

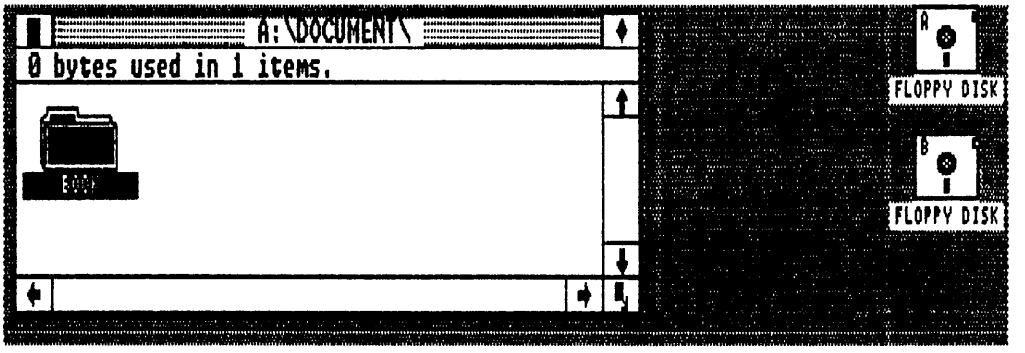


Fig. I-10. To copy the selected folder, just drag the folder to its destination.

```
The IBM Personal Computer DOS
Version 2.10 (C)Copyright IBM Corp 1981, 1982, 1983

A>COPY A:\DOCUMENT\BOOK B:\DOCUMENT\BOOK
```

Fig. I-11. DOS-based subdirectory copies.

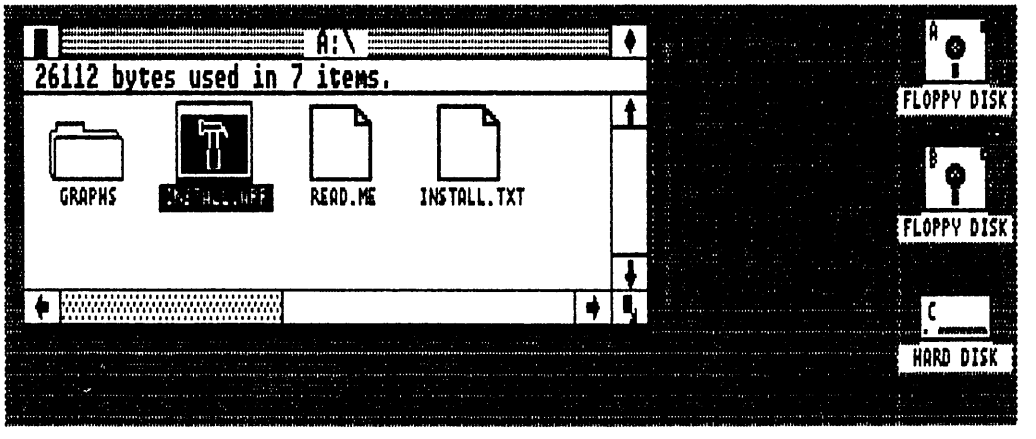


Fig. I-12. Double-click on the INSTALL.APP icon to install the program on a hard disk.

PC-DOS (Fig. I-11):

- ☐ Log the disk drive.
- ☐ Display directory.
- ☐ Change directory.
- ☐ Copy subdirectory Book.

GEM (Fig. I-12):

- ☐ Close the hard disk drive's window.

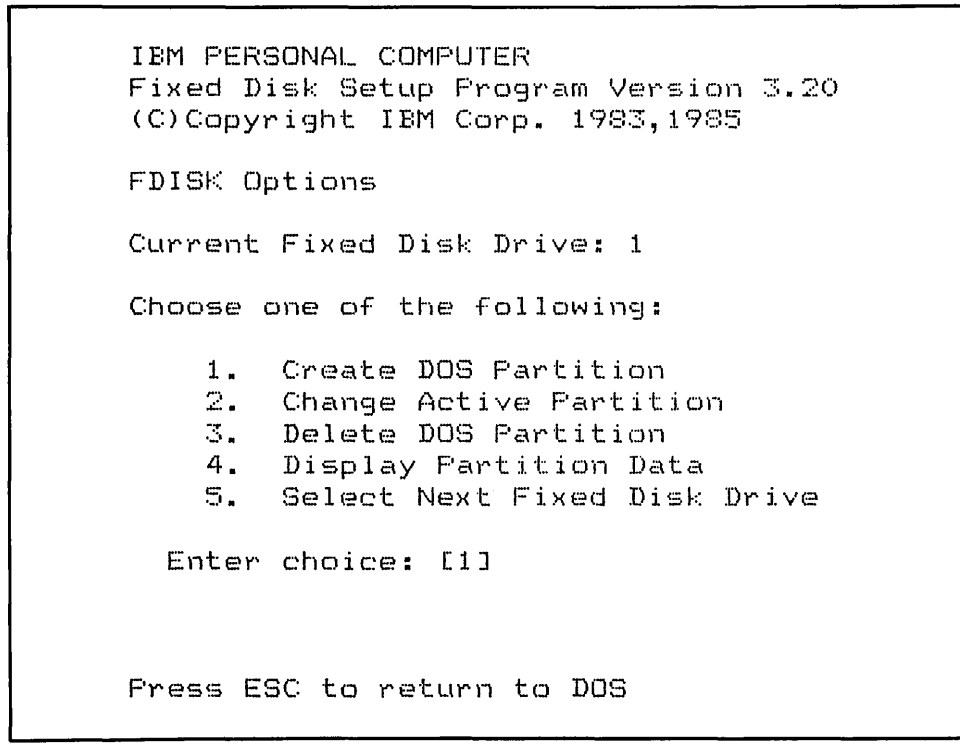


Fig. I-13. The DOS command FDISK is used as a preparatory step for installing an application on a hard disk.

- ☐ Double-click on disk drive A:.
- ☐ Double-click on INSTALL.APP.

PC-DOS (Fig. I-13):

- ☐ Load FDISK.
- ☐ Create a DOS partition.
- ☐ Format DOS partition.
- ☐ Load application onto hard disk drive.
- ☐ Set partition.

Chapter 1

The GEM Environment

GEM is an alternate operating environment that lacks concurrent operation. In other words, you can't run several programs simultaneously under GEM (see Chapter 9 for operating systems that are multitasking). You can, however, use any of your existing software with GEM for a marked increase in both your performance and productivity. Alternatively, there are special GEM applications that further exploit the advantages of the GEM environment (see Chapters 3 through 6). But what exactly is the GEM environment?

The foundation upon which GEM is built is the Desktop. Of course, this is not a real desktop. The GEM Desktop is more properly referred to as a desktop metaphor. In the GEM operating system environment, however, this figurative likeness is an apt descriptor. For all intents, the GEM Desktop turns your computer into an electronic desktop, complete with a clock, a calendar, and unlimited file cabinets. Furthermore, the GEM Desktop forms an elucidative "shell" around your computer's DOS. This insulating barrier serves as an effective means for using DOS commands by breaking through the confusion generated by a mute A> prompt.

Before you will be able to "sit down" at the GEM Desktop, you will need to make an assessment of your computer hardware; GEM is very picky about its hardware. Basically, a successful GEM system needs to satisfy the following hardware requirements:

Computers. IBM PC, IBM PC XT, IBM PC AT, or true, 100% IBM PC compatibles (other computer implementations are discussed in Chapter 2).

Storage. Two double-sided, double-density disk drives or one double-sided, double-density disk drive and a hard disk drive.

DOS Versions. PC-DOS version 2.0 or higher (e.g., version 3.2) or MS-DOS ver-

sion 2.0 or higher (e.g., version 3.0).

Memory. Minimum of 256K bytes RAM for any PC-DOS version 2 (e.g., version 2.10), minimum of 320K bytes RAM for any PC-DOS version 3 (e.g., version 3.1), with similar minimal restrictions under MS-DOS.

Display. Color: IBM Color/Graphics Monitor Adapter or IBM Enhanced Color Graphics Adapter with compatible color monitor. Monochrome: IBM Enhanced Color Graphics Adapter, Hercules Graphics Card, or compatible with similarly compatible monochrome monitor.

Input Devices (Optional). Keyboard, Microsoft Mouse, Mouse Systems Mouse, SummaMouse Model No. 445, SummaSketch Tablet, or compatible.

Output Device (Optional). Photographic media, Apple LaserWriter printer, Epson LQ, MX, FX, RX printers, Hewlett-Packard LaserJet+ printer, IBM Graphics Printer, IBM Color Printer, Juki 5510 printer, or Hewlett-Packard plotter.

There are numerous qualifications that accompany these hardware requirements. Chapter 2 provides a thorough accounting of each hardware element and suggests ways to circumvent some of their more stringent mandates.

GEMPREP

One of either the benefits or the banes of offering such a wide choice of input and output devices is in giving the user a diverse selection. Because, along with this outlandish I/O smorgasbord comes the impossible task of updating the selection to reflect today's most popular devices. Remember that in the microcomputer market, "here today and gone tomorrow" adequately describes the endurance of many manufacturers. At any rate, DRI has made numerous adjustments to its selection of GEM Desktop device drivers. Therefore, it would be ridiculous to try and represent all of the possible combinations of GEM input and output device drivers. As a point of reference, only the most current DRI device driver release, which contains several special enhanced output devices, will be discussed. This release encompasses the following range of serial numbers:

5054-0000-065001 through # 5054-0000-070000
5054-0000-080001 and higher

One important fallout from selecting this broad range of serial numbers is that *every* possible device driver release for current and future GEM Desktops (version 1.2) is covered. For you GEM users who lack a Desktop that lies within this serial number range, contact DRI for upgrading information.

STOP! Before you go any further, make backup copies of your GEM System Master Disk and its three accompanying device driver disks (Device Driver Disk #1, Device Driver Disk #2, and Device Driver Disk #3).

Use the following procedure:

1. Load PC-DOS into your computer. (CTRL + ALT + DEL)
2. Format four new floppy disks. Leave DOS in drive A: and place your blank disk in drive B:.

☐ Type: **FORMAT B:**

Answer **Y** to the Format another (Y/N)? prompt three more times.

3. Copy each DRI GEM disk. Remove DOS from drive A: and insert the GEM System Master Disk. Insert one of the blank formatted disks into drive B:.

☐ Type: **COPY A:*.* B:**

Repeat this process for each of the three device driver disks as well.

4. Place your DRI GEM disks in a safe, isolated location. Label and use your backup disks for all of your future GEM Desktop installation work.

Creating your GEM Desktop is a simple, menu-driven operation. You will need several items before you begin installation, however. First, you need to fully understand the nature of your input, output, and display devices. Unlike other installation packages, GEM only requires that you know the *name* of each device. There are no complicated address locations or command code sequences for you to excavate from the device's documentation. Second, if—and only if—you will be using the GEM Desktop on a two floppy disk drive-based system, you will need two blank floppy disks (hard disk drive users are excluded from this necessity). Third, you will need your PC-DOS disk. This disk will be used for copying system tracks to the GEM Desktop. Finally, the four copies that you made from the DRI GEM disks will be needed during this installation. After you have acquired all of the necessary materials, it is time to install the GEM Desktop.

The actual installation is performed through a single file located on the GEM System Master Disk. This GEM Desktop preparation file is called *GEMPREP*. Use the following procedure for initiating GEMPREP:

1. Insert your PC-DOS disk in disk drive A: and load PC-DOS. (CTRL + ALT + DEL)
2. Remove the PC-DOS disk and insert your working copy of GEM System Master Disk in drive A:.

☐ Type: **GEMPREP**

3. Soon your display screen will contain the greeting:

Welcome to GEMPREP!
Do you want to put the GEM Desktop on a hard disk? Y/N?

One precaution that you must observe throughout the GEM Desktop installation procedure is that you are consistent in your PC-DOS usage. If you boot your system with PC-DOS version 2.10, then make sure that you use version 2.10 for the remainder of the installation. Carelessness on this point will prevent a successful GEM Desktop preparation. Additionally, the version of PC-DOS that you use will determine the mini-

mum amount of system RAM that is needed for running the GEM Desktop. The minimal guidelines for the numerous versions of PC-DOS break down into two broad categories:

1. **PC-DOS version 2.X family members**—require a minimum system RAM of 256K bytes.
2. **PC-DOS version 3.X family members**—require a minimum system RAM of 320K bytes.

Both of these limits are faithfully watched by the GEM Desktop and failure to meet either of the minimal RAM values will result in an error dialog and a return to DOS. Unfortunately, these RAM values are not observed during the GEM Desktop preparation. It is only during the starting of the GEM Desktop that an evaluation of the system RAM is made. Therefore, this insufficient memory error action translates into a "soft crash" of the GEM environment. Of course, these same RAM limits apply to their similarly numbered MS-DOS version counterparts.

Once you have been greeted by GEMPREP, the following prompts guide you through the installation procedure.

- ☐ Prepare the GEM STARTUP disk
- ☐ Prepare the GEM DESKTOP disk (These first two steps are used by floppy systems only.)
- ☐ Type of Graphics Card?
- ☐ Type of Mouse?
- ☐ Mouse Port?
- ☐ Type of Output Device?
- ☐ Output Device Port?

No matter whether the GEM Desktop has been installed on a hard disk drive or a twin floppy disk drive, the correct execution of GEMPREP will result in several subdirectories, each of which contains numerous files. Table 1-1 lists all of the subdirectories, along with their corresponding files, that constitute the GEM Desktop.

GEM Subdirectory and File Structure

STARTUP	**DESKTOP**
COMMAND.COM	GEMAPPS <DIR>
MODE.COM	GEMDESK <DIR>
GEM.BAT	DESKTOP.APP
GEMBOOT <DIR>	DESKTOP.RSC
GEM.EXE	DESKTOP.INF
GEM.RSC	DESKHI.ICN
CALCLOCK.ACC	DESKLO.ICN
SNAPSHOT.APP	GEMSYS <DIR>
SNAPSHOT.RSC	FORMAT.COM
GEMSYS <DIR>	*.FNT
GEMVDI.EXE	OUTPUT.APP
ASSIGN.SYS	OUTPUT.RSC
IBMCHMPS.SYS	METAFIL5.SYS
	DEFAULT.OPT

Table 1-1. Running GEMPREP Copies These Directories, Subdirectories, and Files onto Either a Hard Disk or Two Separate Floppy Disks.

WORKING ON THE DESKTOP

Now that you have prepared the GEM Desktop on either your hard disk drive or as two floppy disks, labeled GEM STARTUP and GEM DESKTOP, you may move the working copy of GEM System Master Disk and the three device driver backup disks (Device Driver Disk #1, Device Driver Disk #2, and Device Driver Disk #3) to the rear of your floppy disk storage box. In fact, you probably won't ever need to use these disks again. All of your future work with the GEM Desktop will be conducted from the files that you created with GEMPREP.

Whether you will be starting the GEM Desktop from a hard disk drive or a floppy disk drive, the description remains the same with only a slightly different series of actions.

Starting the GEM Desktop From a Hard Disk Drive

1. Boot your system from the active DOS partition on the hard disk drive. From a floppy disk drive:

   ☐ Type: **C:**

2. If you aren't already there, go to the root directory (this step will be unnecessary for most GEM users).

   ☐ Type: **CHDIR **

3. Start the GEM Desktop.

   ☐ Type: **GEM**

4. After running through all of the subdirectories, the GEM Desktop will appear (see Fig. 1-1).

Starting the GEM Desktop From a Floppy Disk Drive

1. Boot your system from the GEM STARTUP disk. (CTRL + ALT + DEL)
2. If you aren't already there, go to the root directory (this step will be unnecessary for most GEM users).

   ☐ Type: **CHDIR **

3. Start the GEM Desktop.

   ☐ Type: **GEM**

4. After running through all of the subdirectories, the GEM DESKTOP disk prompt will appear.
5. Remove the GEM STARTUP disk and insert the GEM DESKTOP disk into drive

A:. Press the ENTER key.

6. The GEM Desktop is now ready for use (see Fig. 1-2).

Typing all of these commands for each entry into the GEM Desktop is nothing short of ridiculous. A much better method is to use a *batch file* that will automatically execute a specified set of instructions each time the computer is either started or reset. This type of batch file is commonly called an *AUTOEXEC.BAT* file in DOS. Basically, when DOS is started by the computer (like during power up or following a system reset), the command processor looks for a file named AUTOEXEC.BAT in the root directory of the currently logged drive (either a hard drive or a floppy drive). If this file is present, it is executed immediately following the installation of other system configuration files (e.g., CONFIG.SYS).

An auto-execution batch file, when properly written, can carry out all of the "dirty" work that is needed for starting the GEM Desktop. Furthermore, this AUTOEXEC.BAT file can perform all of your other computer "housekeeping" duties (e.g., set the time and date) without affecting the initiation of the GEM Desktop. The only drawback to the usage of an AUTOEXEC.BAT file is the need for available disk space. This room is necessary for holding the AUTOEXEC.BAT file (usually around 20-150 bytes worth) and the files that are used by the batch file. Actually, this point is relatively minor to a 10M, 20M, or 30M byte hard drive user. On the other hand, this issue is one of major concern for the user with a two floppy disk drive system. Happily, even the two floppy disk drive version of the GEM Desktop can make full use of an AUTOEXEC.BAT file. DRI has left plenty of disk space on the GEM STARTUP disk for accommodating virtually any size of an AUTOEXEC.BAT file.

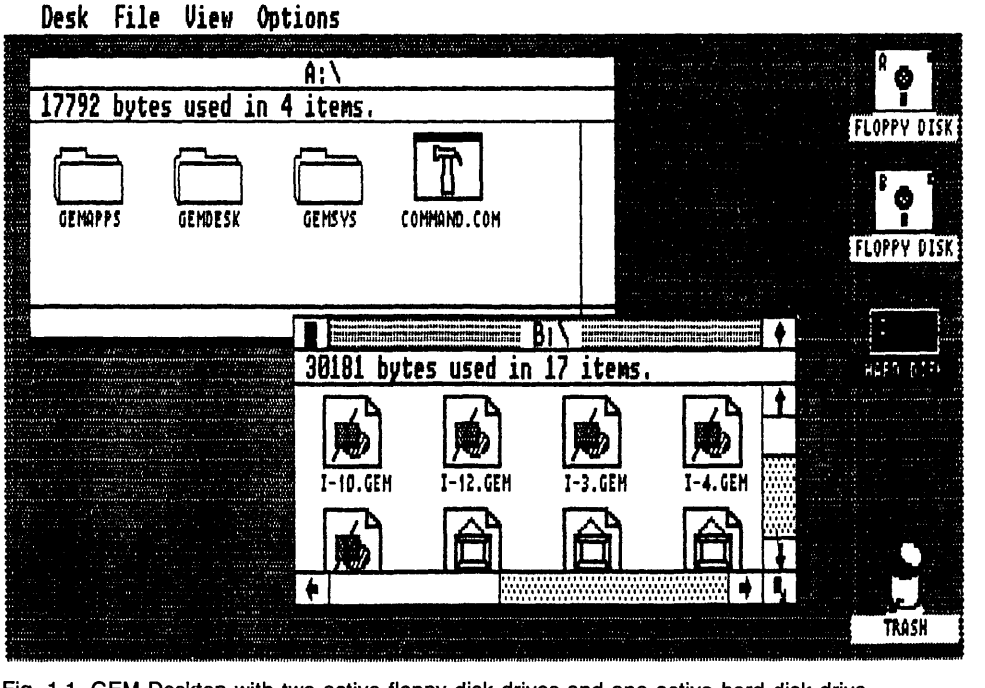


Fig. 1-1. GEM Desktop with two active floppy disk drives and one active hard disk drive.

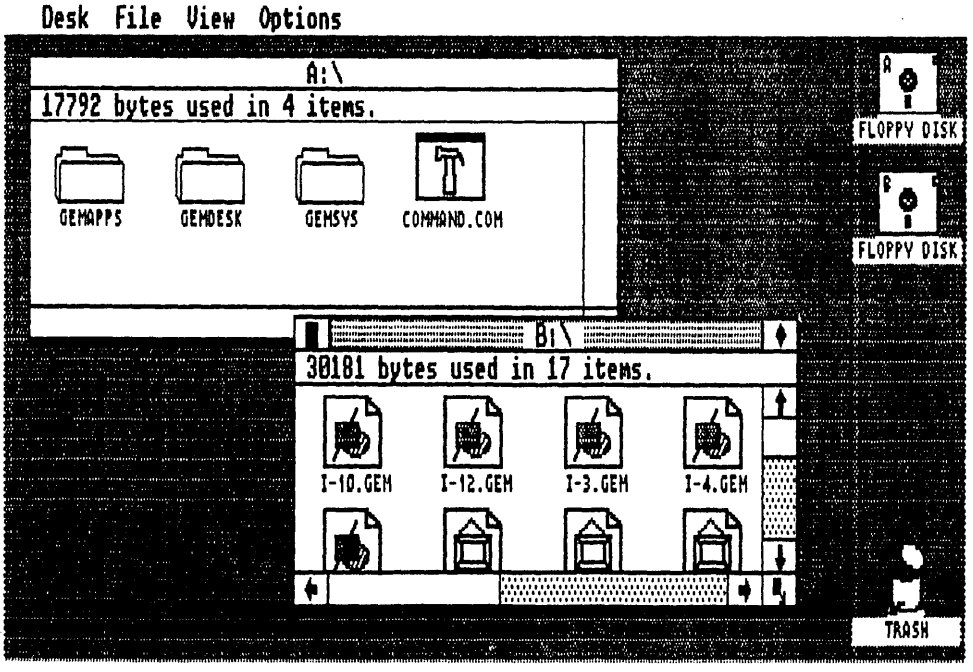


Fig. 1-2. GEM Desktop with two active floppy disk drives.

Creating an AUTOEXEC.BAT File for Starting the GEM Desktop

The following examples illustrate numerous forms of AUTOEXEC.BAT files that will work with the GEM Desktop. In each instance, there is no regard as to the type of drive that will use the batch file. There is essentially no difference between a hard drive or a floppy drive resident AUTOEXEC.BAT file.

An AUTOEXEC.BAT file can be created with either a text editor or through the DOS COPY command. If you elect to use a text editor, make sure that invisible text formatting commands are not inserted into the file. For example, use WordStar in the non-document file editing mode.

With the DOS COPY command:

1. Load DOS into your computer.
2. Remove the DOS disk and insert the GEM STARTUP disk (hard drive users make sure that you are in an active DOS partition that contains the GEM Desktop).

3. Type:

   ☐ COPY CON AUTOEXEC.BAT
   ☐ Press the ENTER key.

4. Type each command line of the batch file and press ENTER. Typing errors can be corrected by using the backspace key. Pressing CTRL + BREAK will abort the copy and cancel the creation of the AUTOEXEC.BAT file.

5. When all of the command lines have been entered, type F6 and press the ENTER key. The following will be displayed:

```
1 File(s) copied
A>
```

Caution! Hard drive users who already have an AUTOEXEC.BAT file in the root directory of the active partition on their drive will lose all of the command lines contained in this file by following the above file creation procedure. A suggested option to this problem is to use a text editor for adding the GEM Desktop activating command lines. The DOS EDLIN Line Editor program is ideal for adding the required GEM-specific lines. Only the insert command (e.g., 1I) and the end edit command (E) will be used with EDLIN. Refer to your DOS manual for instructions on using these commands.

Examples of AUTOEXEC.BAT files that automatically start the GEM Desktop:

```
COPY CON AUTOEXEC.BAT
GEM
(F6)
```

In this example, steps for logging the current disk drive and changing to the root directory have both been eliminated. This is a fringe benefit of using an AUTOEXEC.BAT file. Since this batch file must be in the root directory of the logged drive for proper use, both of these actions are unnecessary.

```
COPY CON AUTOEXEC.BAT
DATE
TIME
GEM
(F6)
```

This example allows you to update the date and time before starting the GEM Desktop.

```
COPY CON AUTOEXEC.BAT
CLOCK
GEM
(F6)
```

Other, non-DOS, programs can be executed from an AUTOEXEC.BAT file. In this case, the generic CLOCK command represents any of a number of different time and date stamping programs that are currently available. These programs read an on-board clock/calendar chip (these are usually found on peripheral expansion cards) and transfer the results to the GEM Desktop. Remember to include this special program on the GEM STARTUP disk (or the active hard drive partition) that holds the AUTOEXEC.BAT file. Otherwise, you will experience a system crash when the batch file tries to execute the nonexistent program.

```
COPY CON AUTOEXEC.BAT
DATE
TIME
ANSI
VDISK
GEM
(F6)
```

Wrong! This example is incorrect. Both ANSI and VDISK (these device drivers are found in PC-DOS version 3.X) are special programs for use only with the DEVICE command. Likewise, the DEVICE command is used exclusively for configuring the system hardware. Additionally, all system configuration is accomplished through a CONFIG.SYS file. Finally, this is a unique file that cannot be used in conjunction with an AUTOEXEC.BAT file. Refer to Chapter 2 for information on how to use CONFIG.SYS with the GEM Desktop.

Fioppy Drive Note

One point to remember is that this AUTOEXEC.BAT file and its associated reference programs must all be on the GEM STARTUP disk. Once this batch file has run its course, you will still have to remove the GEM STARTUP disk and insert the GEM DESKTOP disk into drive A:. Of course, starting the GEM Desktop will, for the most part, be a "hands free" operation with only one disk swap necessary.

No matter which path you take, the final result is the GEM Desktop seen in Figures 1-1 and 1-2. There are five distinct elements that make up the GEM Desktop: the desktop work area, the Menu Bar, the disk icons, the trash icon, and the pointer. Each of these elements functions in a manner that is similar to the function of their analog office cohorts.

The large solid field in the center of the GEM Desktop is the *desktop work area.* This surface is where all of the "physical" GEM actions are carried out. In other words, an opened disk icon displays its contents on the desktop work area for examination and manipulation. Similarly, the desktop work area holds the calculator (discussed later in this chapter) during the performance of mathematical functions.

The *Menu Bar* lists four different command menus: Desk, File, View, and Options. Each of these menus is discussed in detail later in this chapter. For the most part, these menus contain commands that control the GEM environment. Activation of these commands is as simple as pointing and clicking (more about these terms later). By using this method, GEM has reduced the need for command memorization and lessened the chance for typing errors.

Components, files, and, to some extent, command actions in the system are represented on the GEM Desktop disk with *icons.* These icons are descriptive pictures that increase the user's awareness of the meaning for this symbolic representation. For example, the *disk icons* are used for indicating the number and designation of the system's storage devices. A twin floppy disk drive system will have two floppy disk icons labeled A and B. A standard IBM PC XT system will have one floppy disk icon labeled A and one hard disk icon labeled C.

Another icon used on the GEM Desktop is the *trash icon.* This miniature waste-

basket serves as a visual reminder to the GEM user that files can be erased from disks by placing them in the trash icon. In fact, anything that you wish to permanently remove from the GEM Desktop can be placed in the trash icon—this includes whole disks.

Movement on the GEM Desktop could be hard to follow since our viewpoint is a detached one. In order to facilitate a proper desktop work area perspective, a small arrow called the *pointer* serves as our digital "finger." The movement of the pointer is governed by the movement of an input device. A mouse is the preferred input device for working on the GEM Desktop. Throughout the remainder of this book all movements on the GEM Desktop will be discussed with reference to a mouse. You diehard keyboard users, however, will find a mouse-to-keyboard conversion chart later in this chapter.

There are four mouse actions that are used on the GEM Desktop: moving, clicking, dragging, and double-clicking. Each of these actions represents a method for data manipulation that would be equivalent to numerous command entries in a conventional DOS environment.

Moving

Mouse movement is used for controlling the position of the GEM Desktop pointer. Every action of the mouse is duplicated by a corresponding pointer movement. Try this:

- ☐ Move the mouse right > > > >.
- ☐ Move the mouse left < < < <.
- ☐ Move the pointer up ^^^^.
- ☐ Move the pointer to the floppy disk icon A.
- ☐ Move the pointer to the trash can icon.

Lifting the mouse and repositioning it results in no pointer movement. This technique is effective when operating the mouse within a confined space.

Clicking

Clicking is used for selecting icons and choosing commands on the GEM Desktop. A "click" is performed by placing the pointer over the desired icon or command and pressing and quickly releasing the mouse button (on multi-button mouses, like the PC Mouse by Mouse Systems, use the left-hand button). Try this:

- ☐ Click on the trash can icon.
- ☐ Click on the floppy disk icon A.

Clicking the pointer on the desktop work area is used for "de-selecting" an icon or command.

Dragging

Icon movement on the desktop work area is accomplished through *dragging.* Follow these steps for dragging:

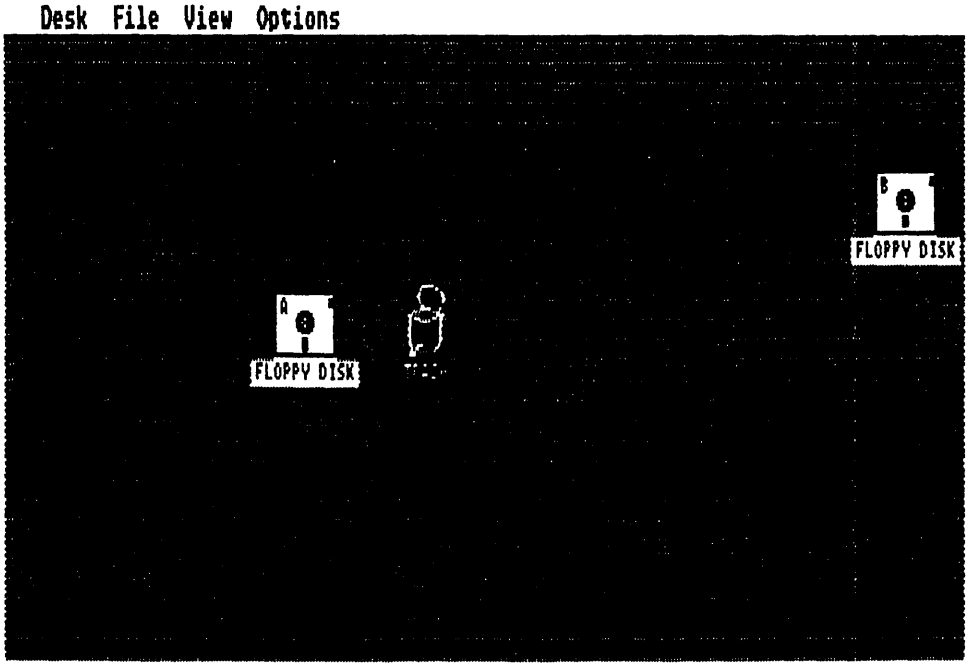


Fig. 1-3. Both the floppy disk drive A: icon and the Trash icon have been dragged into the center of the desktop.

1. Place the pointer on the icon.
2. Press and hold the mouse button.
3. Move the mouse to the new location.
4. Release the mouse button.

In addition to icon movement, dragging is useful for disk management such as erasing, formatting, and copying files. Try this:

- ☐ Drag the floppy disk icon A to the center of the desktop work area.
- ☐ Drag the trash can icon next to the new position for the floppy disk icon (Fig. 1-3).
- ☐ Return both icons to their original positions.

Double-clicking

Double-clicking is used for opening an icon. Opening an icon can be thought of as starting, loading, or running an application program. Additionally, double-clicking can list the contents of a disk drive and subdirectory. In this manner, double-clicking functions like the DIR command in PC-DOS. Try this:

- ☐ Double-click on the floppy disk A icon.
- ☐ Double-click on the trash can icon (incidentally, you have now received your first warning dialog) (Fig. 1-4).
- ☐ Click the "ok" button on the warning dialog.

Special Mouse Actions

All four of the previously described mouse actions deal with icons and commands on the solitary level. There are two special mouse actions, however, that act on multiples of icons and commands.

Group Select

A refinement in dragging allows the mouse to capture and move several icons at once:

- ☐ Place the pointer in the upper left-hand corner of the floppy disk A icon.
- ☐ Click and hold the mouse button while dragging the pointer to the lower right-hand corner of the other disk icon (either B or C).
- ☐ Release the mouse button.

If this action is done correctly, a dotted rectangle will form around both of these icons and cause both of them to be selected when the mouse button is released. Both of these icons are now joined and may be dragged together. When you are finished, clicking in the desktop work area will de-select the group select.

Shift-Click

Another, more selective, method for choosing several icons or commands is through *shift-clicking.* Shift-clicking uses the keyboard's SHIFT key along with the mouse button for linking isolated icons or commands together into a group.

- ☐ Place the pointer on the floppy disk A icon and click.
- ☐ Press and hold the keyboard's SHIFT key.
- ☐ Move the pointer to the second disk icon (once again, either B or C) and click.
- ☐ After selecting all of the icons (we will only use two icons in this demonstration), release the SHIFT key.

Once they have been highlighted, these shift-clicked icons will behave just like the group-selected variety.

Windows

If you followed the above examples, the GEM Desktop now contains a *window.*

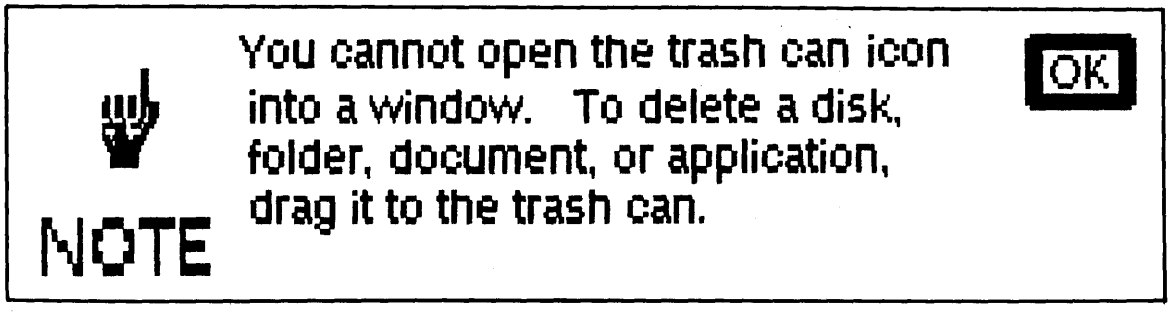


Fig. 1-4. A dialog appears when you double-click on the Trash icon.

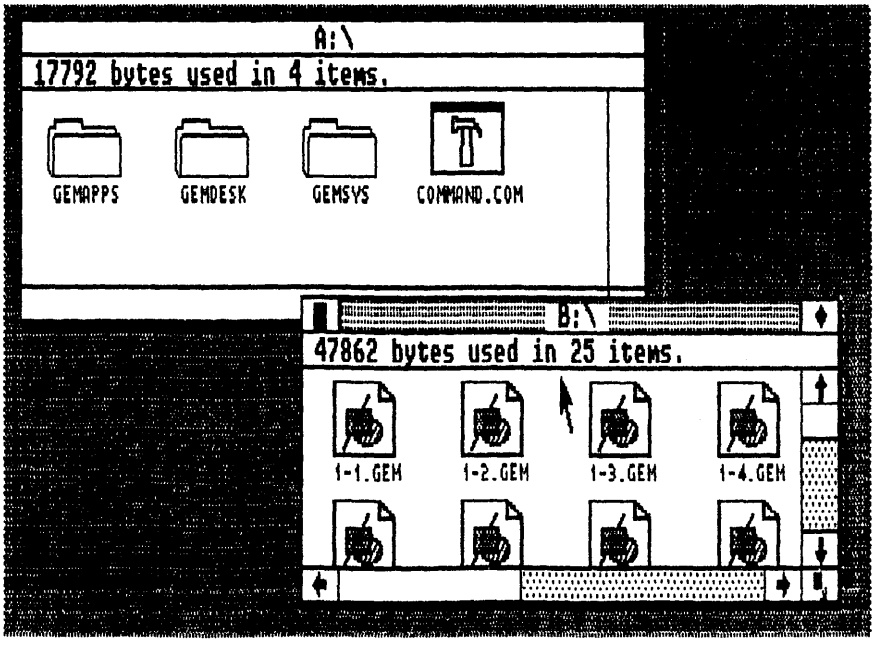


Fig. 1-5. Two open windows are on the desktop. The pointer is inside the active window.

The GEM Desktop can hold a maximum of four open windows at a single time. A window consists of a Title Bar and numerous other assorted control features contained within a defined border. A textured Title Bar, like the one in the window from the double-clicking example, indicates an active window. Mouse actions (clicking, dragging, and double-clicking) can only be performed in active windows. Furthermore, only one active window may be present on the GEM Desktop at one time.

Activating Windows. Open another disk icon (either floppy disk B or hard disk C). Now, this second window is the *active* window. In order to switch between windows, the desired window must be first activated.

☐ Activate a window by clicking *anywhere* within its border (Fig. 1-5).

Once you activated a window, however, it comes to the surface of the GEM Desktop, while all other windows recede underneath (Fig. 1-6).

Closing a Window. In order to remove a window from the GEM Desktop, the window must be closed. Closing a window is performed only on an active window.

☐ Click on the Close Box on the Title Bar to close a window (Fig. 1-7).

Upon closing, the next available window becomes the active window. Go ahead and close the active window for floppy disk B (or hard disk C). The window for floppy disk A has now come to the surface and is active.

Sizing a Window. Another method for controlling the active window is by alter-

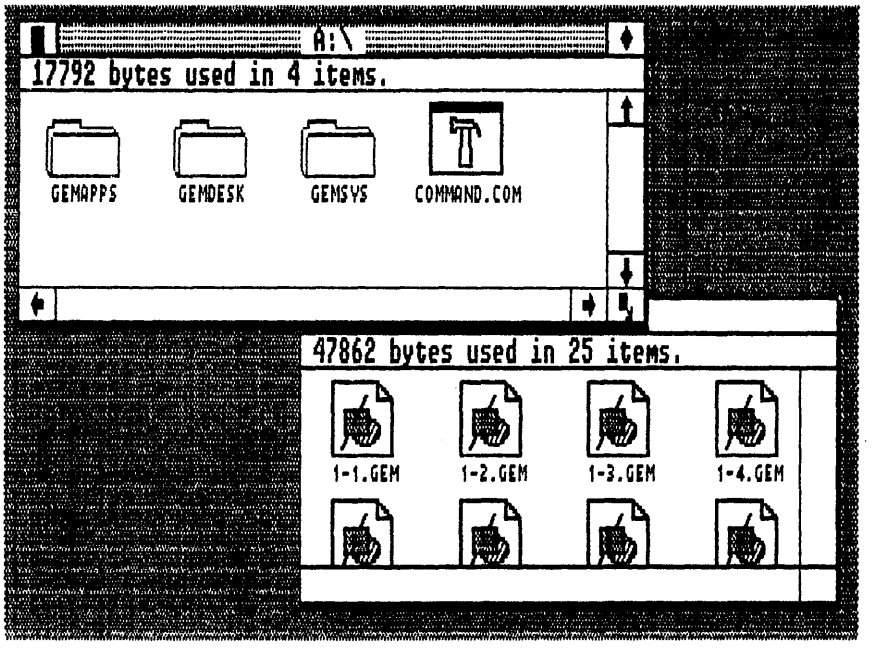


Fig. 1-6. The active window has been switched from B:\ to A:\.

ing its size. Dragging the Size Box of the active window alters the dimensions of the window (Fig. 1-8).

Sizing a window is one of the best ways for "cleaning" the GEM Desktop. Vari-

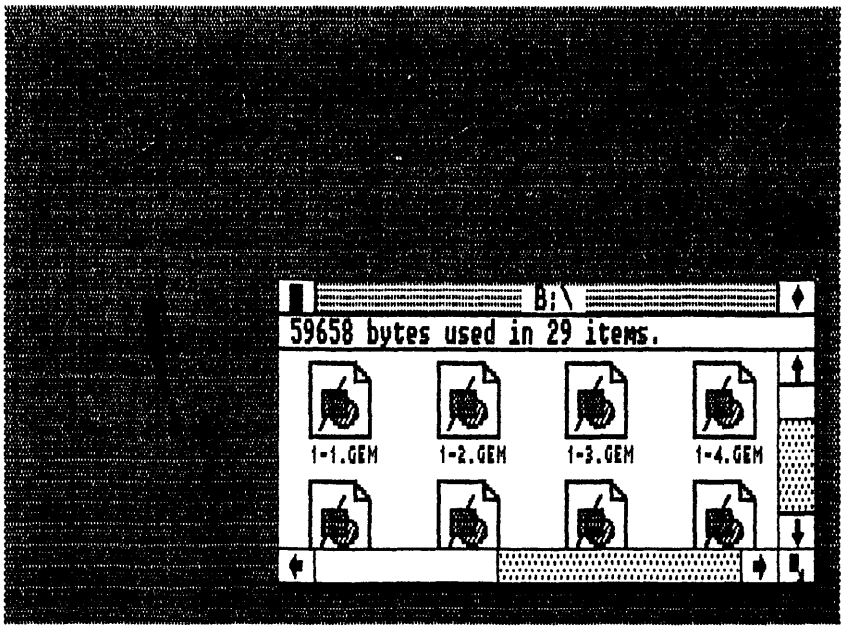


Fig. 1-7. Clicking in the Close Box on the active A:\ window removes that window from the desktop.

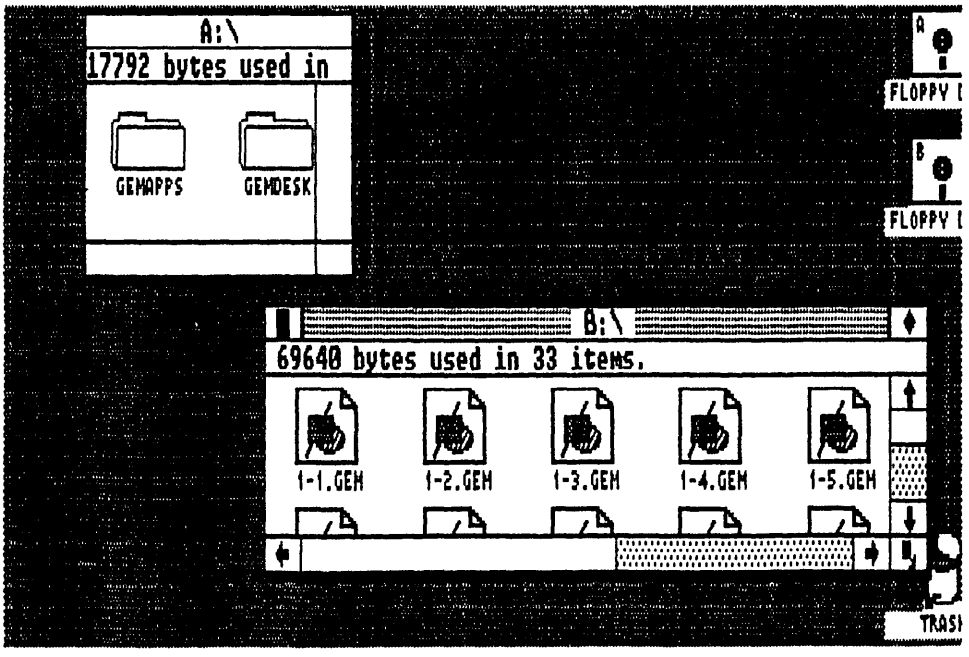


Fig. 1-8. Dragging the Size Box changes the dimensions of a window.

ously sized windows are also easier for changing to and from the active state. Once again, open the floppy disk B icon (or hard disk C). Now, size this window until the window for floppy disk A is also visible.

Full Box. *Full Box* is used for quickly changing the size of the active window. Clicking on the Full Box makes the active window fill the entire desktop work area. Clicking on the Full Box a second time returns the active window to its previous size and position (Fig. 1-9).

Dragging a Window. An active window can be moved by dragging it by its Title Bar:

- ☐ Place the pointer on the textured Title Bar (remember this indicates an active window) and drag the window to its new location.

Work Area

The large plain field inside the borders of the active window is the *work area.* Contained within the work area is the directory for the selected disk icon. In its default condition, the work area displays this directory as a series of three different icons: folders, applications, and documents. Collectively, these icons are called *directory* icons. The GEM DESKTOP disk is an ideal candidate for discovering work area features. If you haven't been using this disk in the previous examples, place its directory in an active window at this time.

Note: A quick way to update the active window's work area each time you insert a new floppy disk is to press the keyboard's ESC (ESCAPE) key. This action will only

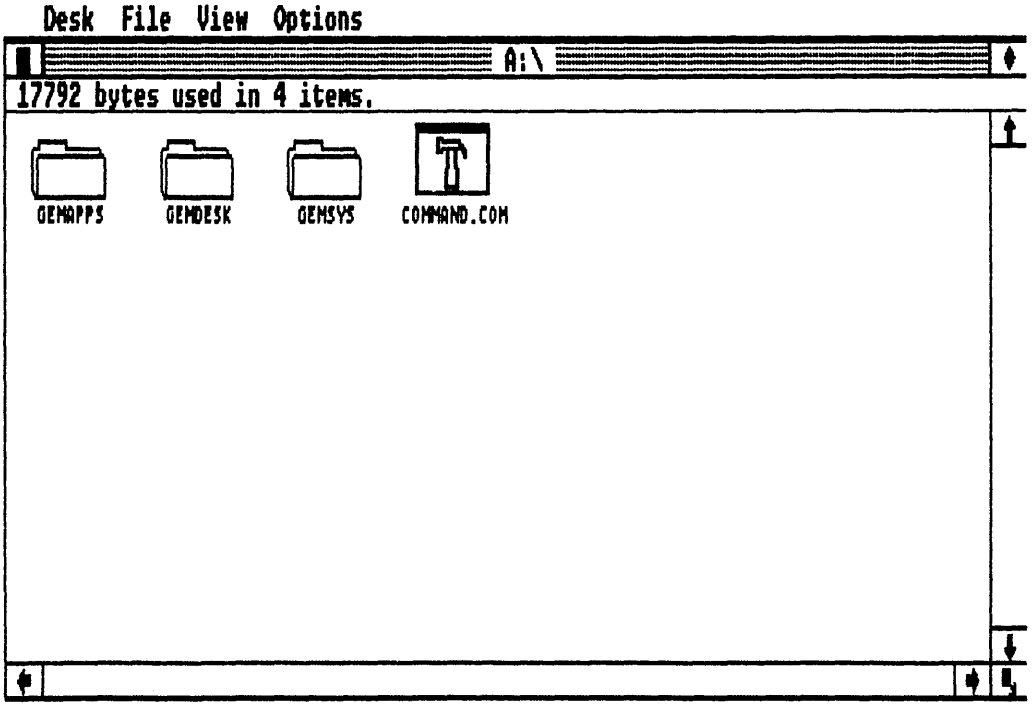


Fig. 1-9. Clicking in the Full Box makes the active window fill the entire screen. Clicking the Full Box a second time reduces the window to its original size.

work on the disk drive that corresponds to the active window. Therefore, make sure that the Title Bar's drive designation matches the drive with the changed floppy disk.

Opening a Folder. *Folders* are icons that represent the subdirectory file management system used in PC-DOS.

- ☐ Open a folder by double-clicking on the folder icon.

The work area now contains the documents and applications that are contained "inside" the folder. Additionally, the Title Bar changes its name to reflect the name of this new folder (or subdirectory).

Moving the Work Area. Many times the dimensions of the window are insufficient for displaying all of the work area's contents. Sliders, Scroll Bars, and direction arrows enable you to move the work area left-right and up-down for viewing the entire contents of the directory. These controls are found on the right-hand and bottom borders of the active window (Fig. 1-10).

- ☐ Click on arrows.
- ☐ Click on Scroll Bars.
- ☐ Drag Sliders.

Holding down a Scroll Bar will provide a smooth and continuous scroll.

Information Line

A short string of text immediately under the Title Bar is called the *information line.* The information line indicates the amount of disk space occupied by the directory that fills the active window. Additionally, the information line states the number of items found in the directory.

Menus

Four words are found along the top of the GEM Desktop in the menu bar. Each of these words is an identification for a *menu.* Menus contain lists of commands that are chosen by clicking on the desired command.

Displaying Menus. A menu will continue to be displayed until another menu is displayed, a command is chosen, or the pointer is clicked on the desktop work area.

- ☐ Move the pointer onto the Menu Bar.
- ☐ When the pointer makes contact with any of the menu words, a menu is displayed (Fig. 1-11).

Choosing Commands. The list of commands that are displayed in a menu are represented as either *available* or *unavailable.* All commands that are in bold, dark letters are available. Conversely, the faint, light commands are unavailable. The availability of a command is determined by the nature of the currently selected icon. Therefore, if no icons have been selected, then most of the icon-related commands will be unavailable.

- ☐ A command is chosen by clicking on it.

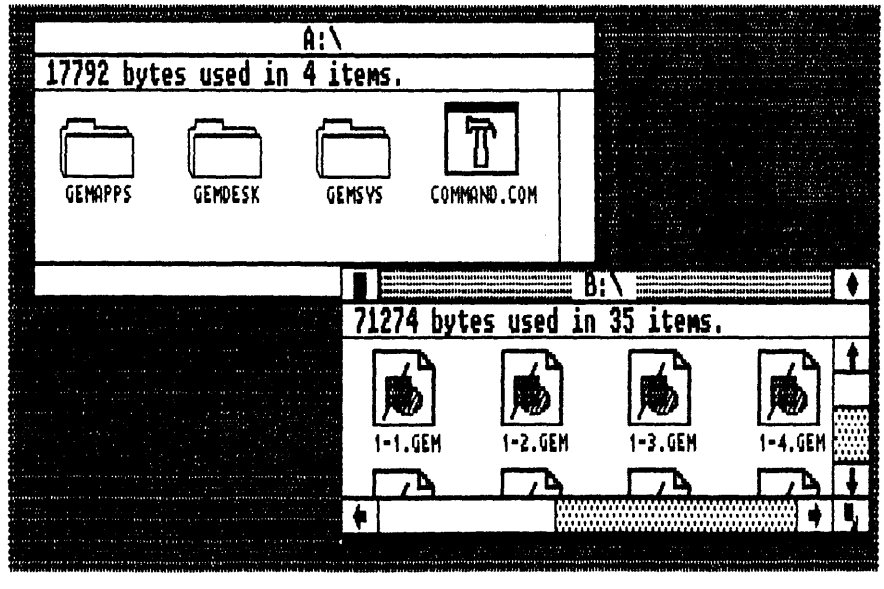


Fig. 1-10. Sliders, Scroll Bars, and arrows, move the items that are inside the window.

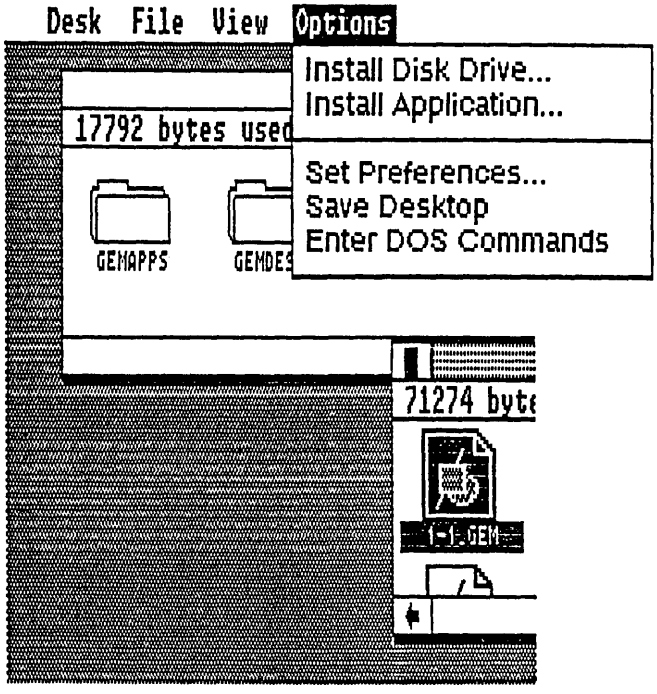


Fig. 1-11. When the pointer makes contact with the Menu Bar, a drop-down menu is displayed.

Select an icon (if you have a disk in drive A:, use the floppy disk A icon). Now, display the File Menu and move the pointer up and down through the list of commands. As the pointer makes contact with each command, the command is highlighted. Position the pointer on the **Open** command and click. The window for drive A: will now fill the desktop work area. This command serves the same function as double-clicking on the floppy disk A icon.

Another command worth trying is the **Show Info . . .** command. First, select a folder's icon. Now, choose the **Show Info . . .** command. A dialog stating the folder's name, size, date of creation, and characteristics is placed on the work area. Click on the **ok** button when you are finished. A quick way to identify all commands that will produce a dialog is to look for an ellipsis (. . .) following the command.

Tip: Responding to a dialog is accomplished by clicking on the appropriate response button (e.g., "ok"). For the most part, the preferred response button in a dialog is outlined with a heavy black border. This emphasized button border is a visual indication that the ENTER key can be depressed for acknowledging this response. In other words, if the button that you will be clicking has an enlarged border, then the ENTER key can be pressed instead of clicking with the mouse.

Displaying the Directory

The *View Menu* allows you to alter the directory's display. Six different representations of the directory are possible through the View Menu. A dotted line on the View Menu separates the two types of directory commands. The top View Menu section specifies the visual type of the directory, while the bottom determines how the direc-

tory's entries will be sorted. A command choice from both sections of this menu are needed for displaying the directory. Any changes to either the directory type or sorting will effect the directories of all windows. Therefore, these commands are not limited to the active window (Fig. 1-12).

- ☐ Display the View Menu.
- ☐ Click on the directory type.
- ☐ Display the View Menu.
- ☐ Click on the directory sorting method.

THE GEM DESKTOP MENUS

The GEM Desktop has a standard set of four different menus. These menus serve as the means for executing commands on the GEM Desktop. Clicking and dragging icons plus the GEM Desktop menus form the basis for all disk and file management activities.

Desk Menu (Fig. 1-13)

Choosing **Desktop Info . . .** from the Desk Menu displays a dialog containing the authors' names and copyright information for the installed version of the GEM Desktop.

Choosing **Calculator** activates the GEM Desktop calculator. This multifunction calculator responds to both keyboard and mouse entry.

Using the Calculator. There are two powerful keys on the GEM Desktop calculator (Fig. 1-14) that aren't found on many conventional calculators:

EC Entry Clear—Clicking this key erases the current number entry without chang-

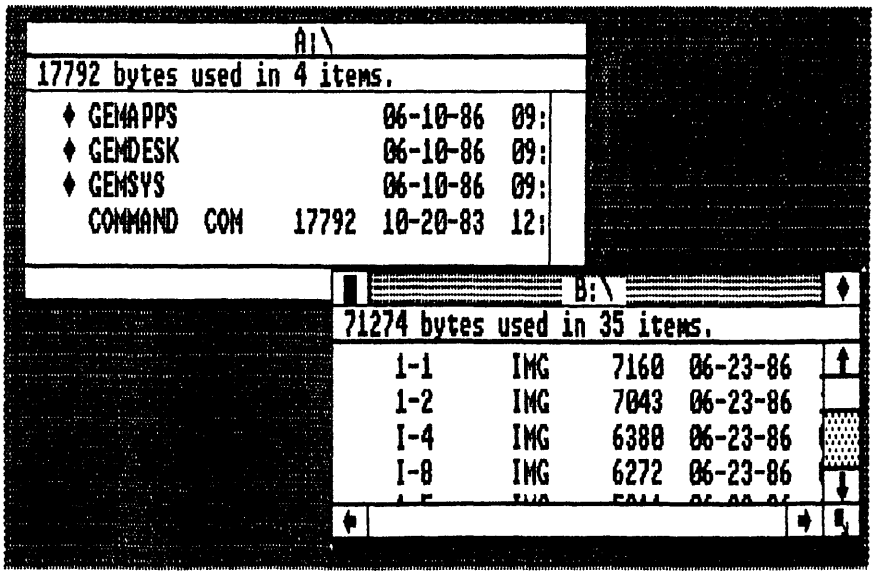


Fig. 1-12. By selecting the Show as Text and Sort by Size commands from the View Menu, the presentation of the disk's directory can be altered.

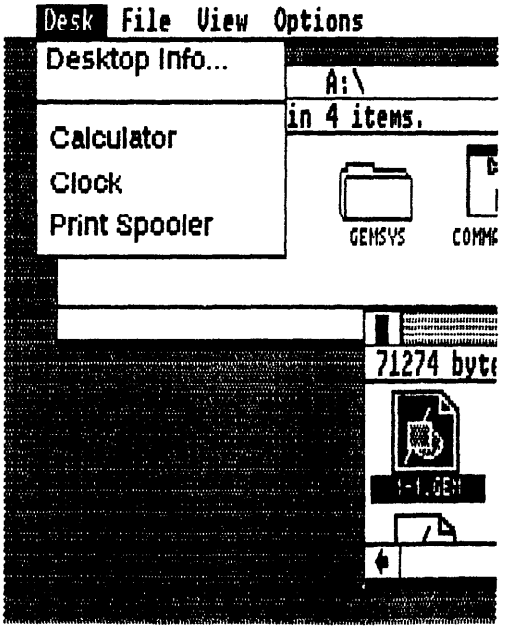


Fig. 1-13. The GEM Desktop Desk Menu.

ing any of the previous functions. Clear (or C), on the other hand, erases all functions and resets the calculator.

+ \ – Sign change—Reverses the sign of the currently displayed value. For example, clicking this key would change "5" to "–5." This key is also useful for entering negative data. Keyboard entry of this key is through the backslash key (\).

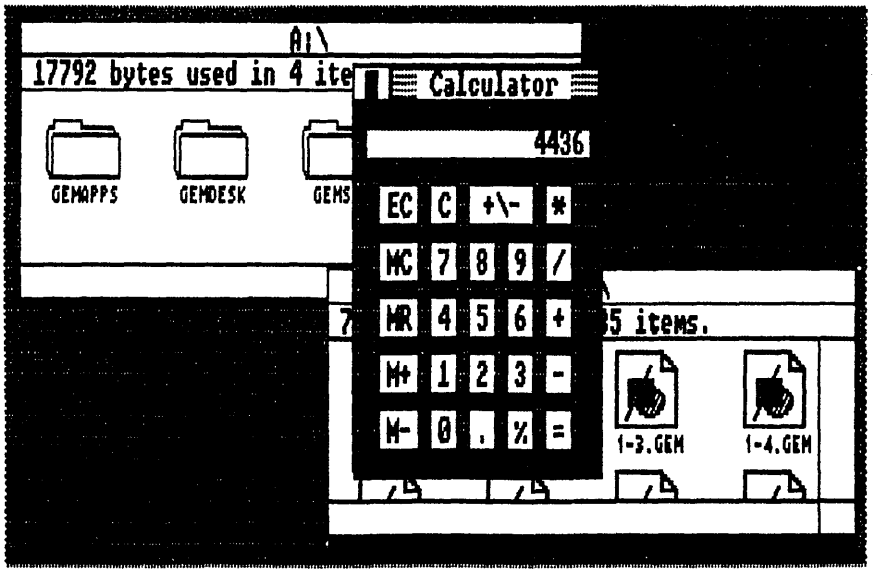


Fig. 1-14. A multifunction calculator appears when the Calculator desk accessory is selected.

Calculating percentages on the calculator is accomplished by using the % key, as in these calculation examples:

```
17744 * 25 %
17744 * 25 % =
```

Calculating with memory is accomplished by using the memory keys (M+, M–, MR, and MC); as in these calculation examples:

```
6 + 4 M+
30 / 6 M–
MR
MC
66 * 13 M+
2559 / 3 M– MR
```

Choosing **Clock** from the Disk Menu activates the GEM Desktop (Fig. 1-15) clock. This is a real-time clock calendar that displays the correct time and date as set through DOS (a battery-powered time and date stamp is valuable with this desk accessory).

Using the Clock. There are two modes of operation with the GEM Desktop clock. The first mode is the *time* mode. A clock's dial icon is visible when the GEM clock is in this mode. This is also the mode used for viewing and setting the current time. The other clock mode is the *alarm* mode. A bell icon is used for representing this mode. Setting and reading the alarm time is performed in this mode. In both cases, the date remains the same in the lower half of the clock window.

To set the time/date and alarm:

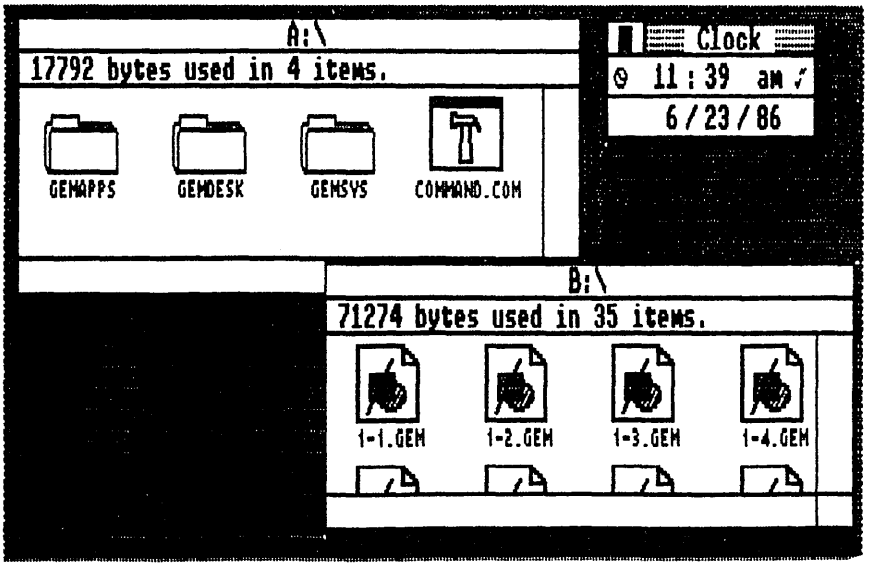


Fig. 1-15. A real-time clock and calendar appears when the Clock desk accessory is selected.

☐ Click on the mode icon to change modes.
☐ Click on the hours, minutes, month, date, or year.
☐ Use the keyboard's number keys for entering the correct value.

- Use 12-hour settings for the time (i.e., 01-12).
- Use only two-digit entries (e.g., 03 = 3).

☐ Click on "am" to change to "pm" and click on "pm" to change to "am."

To activate the alarm:

☐ Click on the alarm icon (a musical note to the right of the time).
- A bold, dark alarm icon indicates that the alarm is "on."
- A light, faint alarm icon indicates that the alarm is "off."

☐ Click on the alarm icon to turn the alarm "off."

Print Spooler (Fig. 1-16) is the last of the Desk Menu options. This desk accessory forms a list of ASCII (American Standard Code for Information Interchange) text files for processing through OUTPUT (see a full explanation of this application later in this chapter). This list is sent to the printer, starting with the top file. Complete control over the formation of this queue is possible by adding and deleting file names. Each list that is created with the Print Spooler is a temporary list that can not be saved.

Using the Print Spooler. To add a name to the Print Spooler:

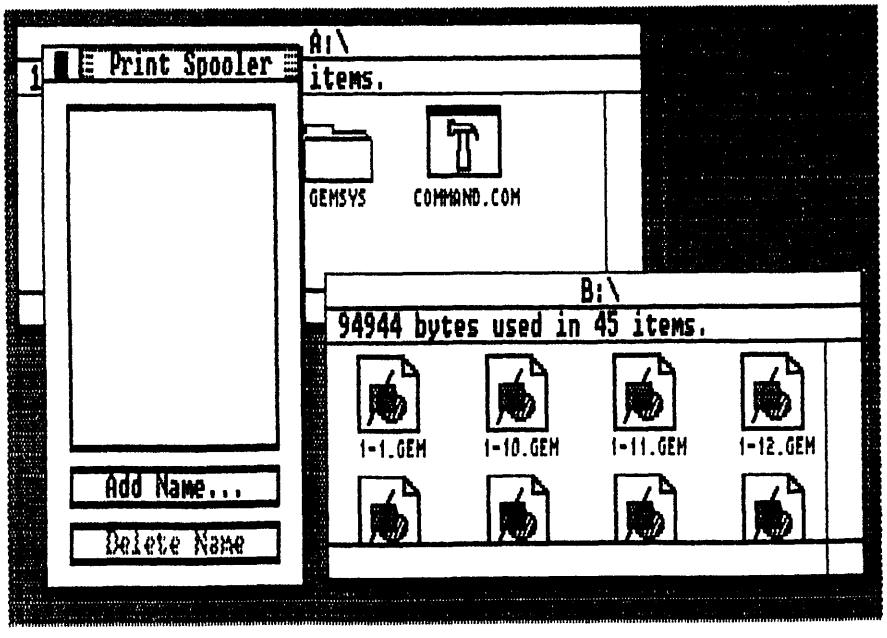


Fig. 1-16. This desk accessory forms a list of ASCII text files for output to the connected peripheral.

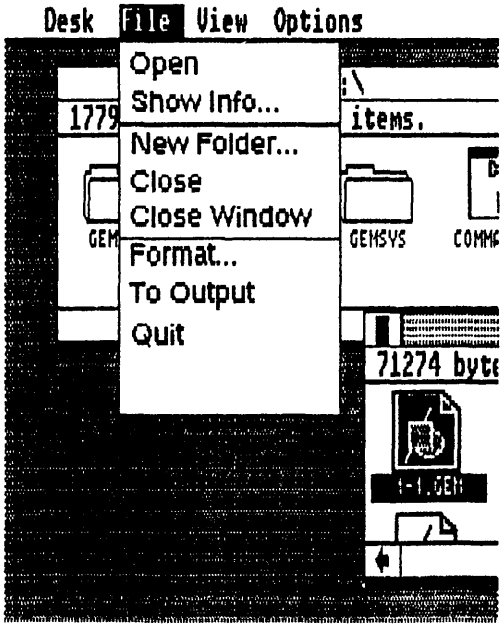


Fig. 1-17. The GEM Desktop File Menu.

- ☐ Click on the **Add Name . . .** button. An ITEM SELECTOR dialog will appear. Printing is suspended while the ITEM SELECTOR is active.
- ☐ Add the file name.
- ☐ Return to the Print Spooler window. This action is performed automatically after the file name has been added to the Print Spooler.

To Delete a name:

- ☐ Click on the file name.
- ☐ Click on the **Delete Name** button. If you choose the file that is currently being printed, the printing of that file will be terminated and the next file in the print spooler will be printed.

Warning! The Print Spooler desk accessory should not be used on a floppy-based system. Only hard drive systems are able to use this command.

File Menu (Fig. 1-17)

Open opens a selected icon. This command is equivalent to double-clicking on the icon.

Show Info . . . displays a dialog that describes the selected icon. There are four possible information dialogs.

The *Disk Information Dialog* contains a listing of the number of folders and items that are on the selected disk, the number of bytes used by each of these folders and items, and the number of unused bytes remaining on the disk.

The *Folder Information Dialog* contains a listing of the number of folders and items that are in the selected folder, the number of bytes used by these folders and items, and the date and time that the selected folder was created or last modified.

The *Item Information Dialog* contains a listing of the name of the selected item, the number of bytes used by the item, the date and time of the last modification to the item, and the read/write status of the selected item.

The *Trash Information Dialog* contains text that describes the function of the trash can on the GEM Desktop.

New Folder . . . creates a new folder for the directory in the active window. A dialog appears for naming this new folder. A maximum of eight characters can be used for naming this folder with a three-character type name as an option. This new folder will be empty when it is placed in the directory.

Close closes the directory of the active window.

Close Window closes the active window. This command is equivalent to clicking on the Close Box of an active window.

Format . . . formats the selected disk. A warning dialog appears prior to the actual formatting. In order to initiate the formatting process, you must click the "ok" button in this dialog.

To use **Format . . .:**

- ☐ Place the GEM DESKTOP disk in drive A: (hard drive people will use drive C:).
- ☐ Insert the floppy disk to be formatted into drive B: (this is drive A: on hard-drive-equipped systems).
- ☐ Choose **Format . . .** from the File Menu.
- ☐ Be sure that the drive identified in the dialog matches the one with the blank disk.
- ☐ Click the "ok" button.

To Output loads and starts the GEM OUTPUT application. Refer to the **OUTPUT** section later in this chapter for information on this application.

Quit exits the GEM Desktop and returns to the computer's DOS. The DOS prompt is visible when the action from this command is complete.

View Menu (Fig. 1-18)

Show as Icons displays directory contents as icons.

Show as Text displays the directory contents as text.

Sort by Name sorts the directory alphabetically according to each item's name.

Sort by Date sorts the directory according to the date of each item's entry or modification.

Sort by Size sorts the directory according to the size of each item as measured in bytes.

Sort by Type sorts the directory alphabetically according to each item's type.

To use the View Menu:

- ☐ Display the View Menu.
- ☐ Choose a **Show . . .** command.

☐ Choose a **Sort . . .** command.

Remember that when dealing with the View Menu commands, each change affects every directory window.

Options Menu (Fig. 1-19)

Install Disk Drive . . . contains a dialog for either installing or removing a disk drive. This command is useful for altering drive designations, as well as identifying RAM drives (see Chapter 2 for a discussion of RAM drives).

Below is an example using the **Install Disk Drive . . .** Command. In this example, we will work with a Hardcard hard disk expansion card drive on the GEM Desktop.

☐ Click on a disk drive icon (floppy disk A is the preferred icon).
☐ Choose the **Install Disk Drive . . .** command. The INSTALL DISK DRIVE dialog appears.
☐ Type a drive designation in the Drive Identifier field of the dialog. The drive designation C is used for representing the Hardcard drive.
☐ Type a drive name in the Icon Label field of the dialog. HARDCARD DRIVE serves as a descriptive name for this new drive.
☐ Click on the Icon Type button that represents the installed drive. In this case, the Hard drive icon is appropriate.
☐ Click on the "Install" button.

Fewer steps are necessary for removing a disk drive from the GEM Desktop. In this example, we will remove the Hardcard drive that we just installed.

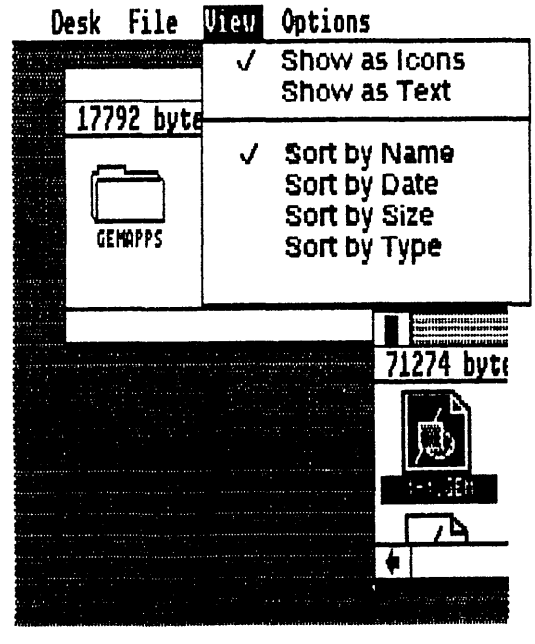


Fig. 1-18. The GEM Desktop View Menu.

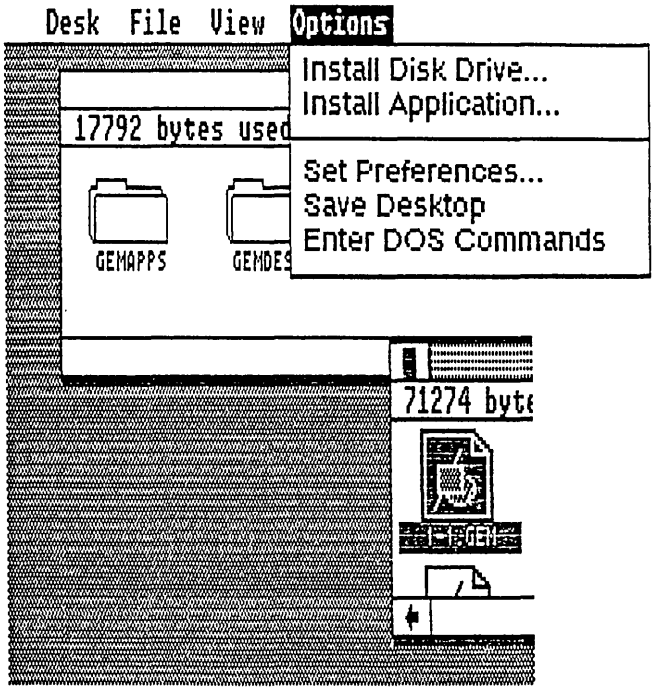


Fig. 1-19. The GEM Desktop Options Menu.

- ☐ Click on the disk icon to remove.
- ☐ Choose the **Install Disk Drive . . .** command. The INSTALL DISK DRIVE dialog appears.
- ☐ Click on the "Remove" button.

It is impossible to remove all of the disk drive icons from the GEM Desktop. At least one disk drive icon must be present at all times.

Install Application . . . contains a dialog for installing non-GEM applications, programs, and documents. This installation procedure is mandatory for enabling the application to make full use of the GEM Desktop. Once an application has been properly installed, mouse actions, like double-clicking, can be used for loading and starting the application. GEM applications use a slightly different method for installation. See the chapter dealing with each specific GEM application for information concerning this installation (Chapters 3 through 6).

Below is an example using the **Install Application . . .** Command. As a means of illustration, WordStar will be used in these examples (refer to Appendix E for the installation of other applications).

- ☐ Click on the applications icon. An application icon will have one of the following file types: APP, BAT, COM, or EXE. Also, an application icon can be identified by a thick, dark band along its top border.

- ☐ Choose the **Install Application . . .** command. The INSTALL APPLICATION dialog appears.
- ☐ The correct name of the application should appear in the Application Name field.
- ☐ Type all file types that you will ever create with this application in the Document Types field. There is room for a total of eight types. In the case of WordStar, don't forget to include .BAK backup file types.
- ☐ Click the correct Application Type button. The "DOS-takes parameters" selection generates an OPEN APPLICATION dialog each time this application is opened. This dialog is used for setting parameters that are understood by the installed application.
- ☐ Click the correct Needs Full Memory button. Only memory intensive applications (e.g., Lotus 1-2-3) should respond with a "Yes" click. One drawback to any application that makes use of full memory is that returning to the GEM Desktop will take longer. This tardiness stems from all but a small kernel of the GEM Desktop being removed from the computer's memory (approximately 20K bytes RAM).
- ☐ Move the Icon Type window until the correct application icon is visible. Use the arrows, Scroll Bars, and Slider for moving the Icon Type window. Furthermore, the Title Bar of the Icon Type window can be used for identifying the proper application icon.
- ☐ Click on the Install button (see Fig. 1-20).

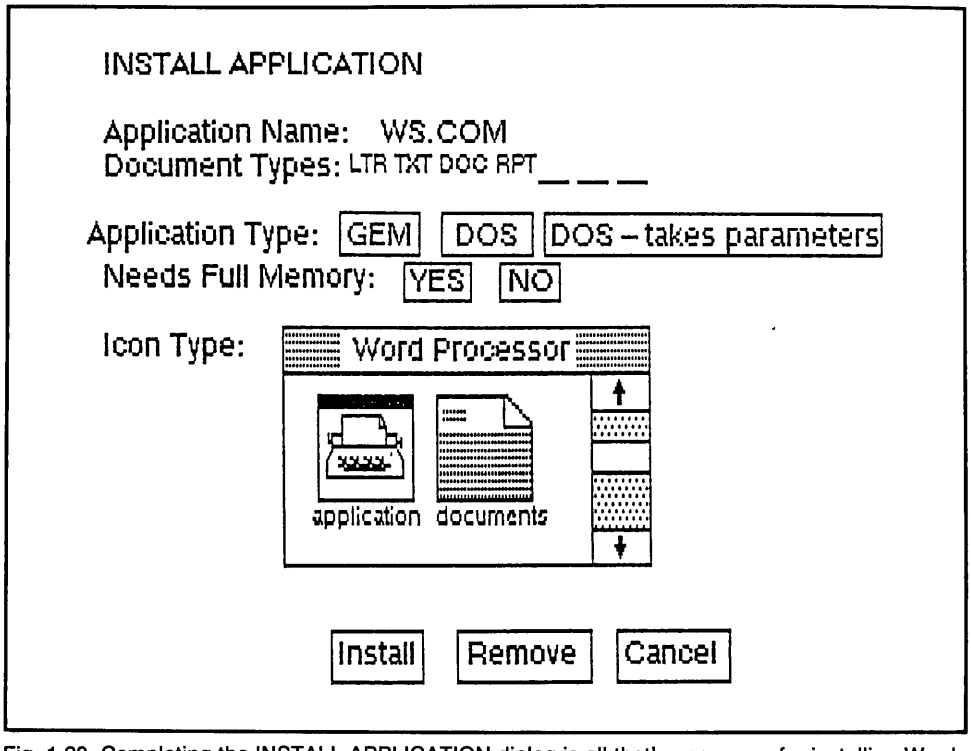


Fig. 1-20. Completing the INSTALL APPLICATION dialog is all that's necessary for installing WordStar in the GEM environment.

To remove an installed application:

- ☐ Click on the application's icon.
- ☐ Choose the **Install Application . . .** command. The INSTALL APPLICATION dialog appears.
- ☐ Click on the Remove button.

Caution! All installed applications remain installed *only* during the current GEM Desktop session. In other words, once your computer is turned off, all application installations are lost. This action can be prevented by saving the application installations through the **Save Desktop** command (see below).

Setting a PATH. When you double-click on an installed application, the GEM Desktop begins its search for the application in the current directory. This technique might be fine for most floppy drive systems, but it is totally inadequate for hard drive systems. If you make elaborate use of subdirectories, then you will have to guide GEM to the actual resting place of the application. The DOS command **PATH** can be added to a root directory batch file for navigating GEM to the actual location of the application.

This GEM search path is added to either GEM.BAT (a batch file that is created by GEMPREP) or a current AUTOEXEC.BAT file that resides in the root directory. Use a text editor for adding the **PATH** command to one of these batch files. For example,

```
PATH C:\BOOK;C:\ARTICLE
```

would lead the GEM Desktop from the root directory to two subdirectories named BOOK and ARTICLE. By using this DOS search path, applications can be installed in unique folders for increased productivity.

Set Preferences . . . contains a dialog for controlling the display of delete and copy dialogs, setting the speed for a double-click, and turning the GEM Desktop speaker on and off (Fig. 1-21).

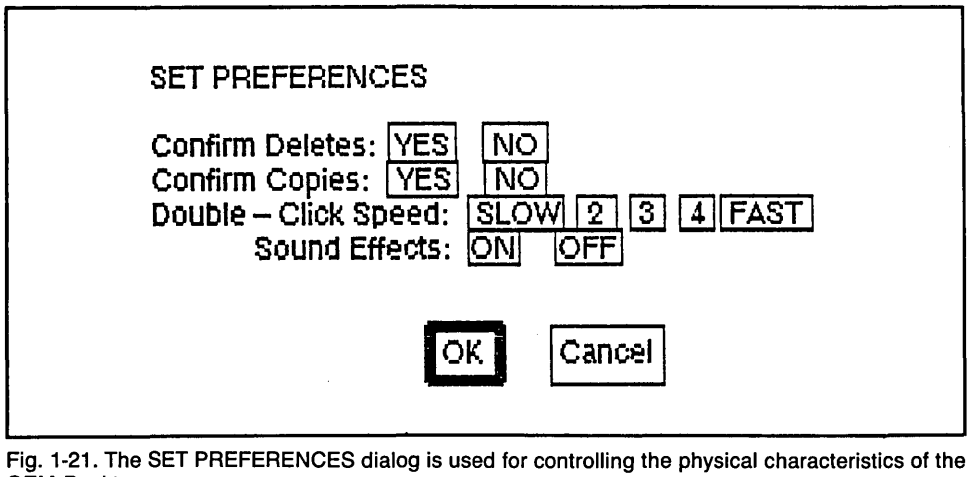


Fig. 1-21. The SET PREFERENCES dialog is used for controlling the physical characteristics of the GEM Desktop.

To set preference options:

- ☐ Display the Options Menu and choose the **Set Preferences . . .** command. The SET PREFERENCES dialog appears.
- ☐ Click the "Yes" or "No" button for selecting Delete confirmation. A "no" selection for Delete confirmation eliminates the DELETE FOLDERS / ITEMS dialog. Therefore, all items dragged to the trash can will be erased without an opportunity to cancel this command. The default value is "yes."
- ☐ Click the "Yes" or "No" button for selecting Copy confirmation. A "no" selection for Copy confirmation eliminates the COPY FOLDERS / ITEMS dialog. Therefore, once a Copy action has been started, you will not be given a chance for canceling this command. The default value is "yes."
- ☐ Click the value button for the speed between mouse button double clicks. Selecting one of the five speed settings determines the amount of time that is required for representing a double-click. This option serves as a definition for a double-click. The default value is "3."
- ☐ Click the "On" or "Off" button for speaker sound. This selection turns the computer's speaker on or off. The default value is "on."

Save Desktop saves to disk all of the GEM Desktop characteristics that were created during the current session. These may include:

1. Options from the SET PREFERENCES dialog.
2. Directory type and directory sort from the View Menu.
3. The GEM Desktop icon positions.
4. Location and size of all open windows.
5. *All* installed applications. This includes the special icons that were assigned to each application during the installation procedure.

Note: You floppy disk drive users need to have the GEM DESKTOP disk in drive A: *prior* to using the **Save Desktop** command.

Before you use the **Save Desktop** command, up to four windows may be opened with their location and size saved for the next GEM Desktop session. With this capability, each window will snap into view with its previously determined location and size when the GEM Desktop is started.

- ☐ Open the first window.
- ☐ Use the size box for setting the size of the window.
- ☐ Drag the window to its preferred location.
- ☐ Repeat these steps for each additional window. A total of four windows may be saved with this procedure.
- ☐ Display the Options Menu and select the **Save Desktop** command.

Enter DOS Commands converts the GEM Desktop into a standard PC-DOS environment. The presence of the DOS A> prompt indicates that the GEM Desktop is now receptive to DOS commands.

Note: Floppy-disk-based systems will be unable to use DOS external commands unless a DOS disk is inserted into drive A: following the selection of **Enter DOS Commands**. Additionally:

1. Any DOS internal or external command may be used.
2. Alternate pathnames, directories, and subdirectories may be called.
3. Other applications may be run.
4. Default disk drive assignments may be changed.

A special non-DOS command is used for returning to the GEM Desktop. Only this command should be used for readmittance to the GEM environment. At the DOS A> prompt:

- ☐ Type: **EXIT**
- ☐ Press the ENTER key.

Note: On floppy-disk-based systems, the GEM DESKTOP disk should be inserted into drive A: before entering the **EXIT** command.

Caution! Do NOT type "GEM" for returning to the GEM Desktop from the GEM-initiated DOS environment. A GEM kernel remains in your computer's memory and this false command entry will crash the system. The **EXIT** command is the only safe "exit" from DOS back into the friendlier confines of the GEM Desktop.

ADDITIONAL GEM DESKTOP MANAGEMENT COMMANDS

There are three additional commands that help with the management of the GEM Desktop.

Copying

Copying on the GEM Desktop is performed by dragging a source icon or group of icons to a destination.

Source icon—disk, directory, folder, application, and document
Destination—disk, directory, and folder

To copy a source icon:

- ☐ Select the icon that is to be copied.
- ☐ Drag this icon to its destination (the destination may be either another icon or an empty space in the destination's work area).
- ☐ Place the dragged icon directly over the destination icon until the destination is highlighted by the pointer (this step only applies to copies that are made to destination icons), and release the mouse button. The COPY FOLDERS / ITEMS dialog appears.
- ☐ Click on the "ok" button.

These same steps are used for copying groups of icons. Once the group of icons

has been selected, however, only one member of the group must be dragged for the copy.

Note: If a name conflict occurs during the copying process, the NAME CONFLICT DURING COPY dialog appears. This dialog provides you with an opportunity for naming or renaming the copied item.

If the Copy's Name field is empty, then you are able to type in a name that will be used for the copied item.

- ☐ Type an item name in the Copy's Name field.
- ☐ Click on the "ok" button.

On the other hand, if the same name appears in the Current Name field as appears in the Copy's Name field, then an item with the same name as the source icon's name is already on the destination. There are two procedures for dealing with this dialog.

1. Replace the destination's item with the copied item.

   - ☐ Click on the "ok" button.

This action will erase the item with the same name on the destination and replace it with the source item. Another name for this action would be "updating" an item. This is a useful disk management utility.

2. Change the name of the source icon.

   - ☐ Use the backspace key to erase the name from the Copy's Name field. (Use the Escape key to quickly erase the entire field.)
   - ☐ Type in a different name for the source icon.
   - ☐ Click on the "ok" button.

The result of this second item renaming procedure is that the destination will now contain two items. One item will be the renamed source item, while the other item will be the destination's original item. Another name for this action is "backing up" an item.

Note: Renaming a name conflict is not the same as renaming an icon. See a complete explanation of renaming later in this section.

Erasing

The contents of an icon can be erased from the GEM Desktop by dragging the icon into the trash can.

Erasable icons—disks, folders, applications, and documents.

- ☐ Select the icon.
- ☐ Drag the icon onto the trash can icon until the pointer highlights the trash can.
- ☐ Release the mouse button. The DELETE FOLDERS / ITEMS dialog appears.
- ☐ Click on the "ok" button.

Renaming

The name of an icon can be changed with the **Show Info . . .** command.

Icons which can be renamed—Folders, applications, and documents.

- ☐ Select the icon.
- ☐ Display the File Menu and choose the **Show Info . . .** command. The ITEM INFORMATION dialog appears.
- ☐ Use the backspace key to erase the current icon name from the Name field. (Use the Escape key to quickly erase the entire field.)
- ☐ Type the new name in the Name field.
- ☐ Click on the "ok" button.

Renaming an icon is not the same as resolving a name conflict. Refer to "Copying" for an explanation of renaming item's with name conflicts.

OUTPUT

To Output is a command found on the File Menu of the GEM Desktop. OUTPUT is used for sending output icons that represent GEM-created pictures, graphs, charts, designs, and text to selected output devices. These types of output icons include documents created by GEM Draw, GEM Graph, GEM Paint, GEM WordChart, and GEM Write. These documents have the types: .GEM, .IMG, or .OUT. The selected output devices include camera, plotter, printer, and screen.

An Overview for Using OUTPUT

- ☐ Create an output list.
- ☐ Determine the final output from the various menus on the OUTPUT menu bar.
- ☐ Choose the **Start Output . . .** command. The START OUTPUT dialog appears.
- ☐ Click on the "ok" button.

Creating an Output List

The *output list* (Fig. 1-22) is a catalog of the documents that will be sent to the selected output device. If no output icons are selected prior to choosing the **To Output** command, then the output list will be empty when it appears. The preferred method for using OUTPUT, however, is to select the output icons first.

- ☐ Select output icon(s).
- ☐ Display the File Menu and choose the **To Output** command. The output list appears.

Notes:

1. The order of document names in the output list does NOT reflect the order in which

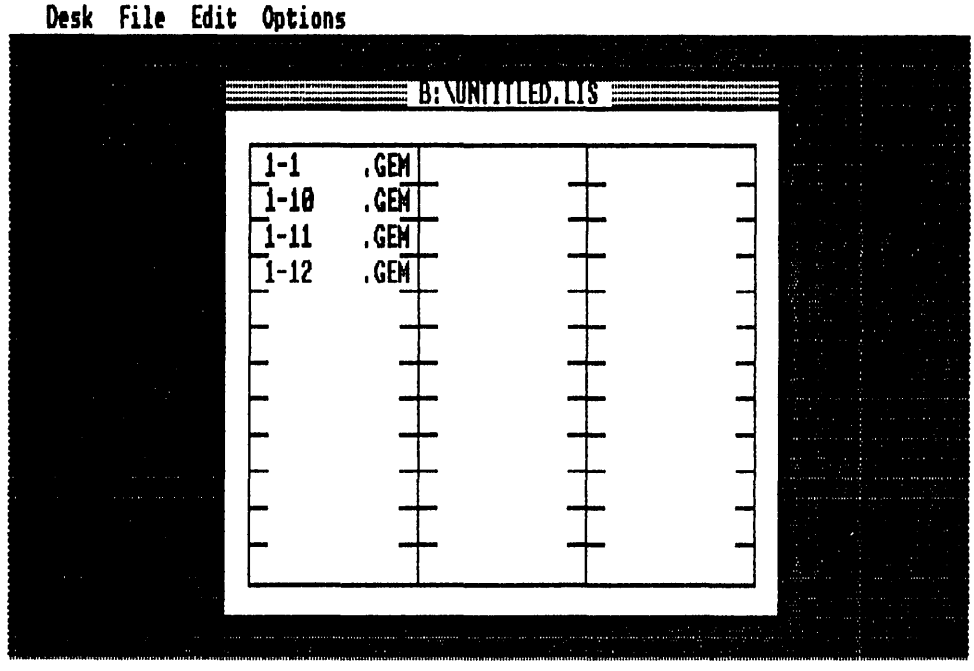


Fig. 1-22. Choosing the **To Output** command places a set of selected icons on the OUTPUT list.

they will be sent to the output device. All document names are placed in the output list in the same order as they are found in the directory.

2. A total of 128 characters are allowed in an output list. This total includes directory path names, drive designations, backslashes, periods, and document names. Any selected documents that exceed the 128 character limit will not appear in the output list.

3. The position of a name on the output list can be changed by dragging the name to a new location. Only single names can be dragged in this manner.

OUTPUT Menu Bar

Four different menus are available for controlling the final output: Desk, File, Edit, and Options.

Desk Menu (Fig. 1-23)

The Desk Menu displays an OUTPUT information dialog and activates the various desk accessories.

Choosing **Output Info . . .** from the Desk Menu displays a dialog which contains copyright and author information about OUTPUT.

Choosing **Calculator** displays a multifunction desktop calculator desk accessory. Refer to a previous section in this chapter for operation information.

Choosing **Clock** displays the current time, date, and an alarm clock feature. Refer to a previous section in this chapter for operation information.

Choose **Print Spooler** for adding or removing names from an output list during printing. Refer to a previous section in this chapter for operation information.

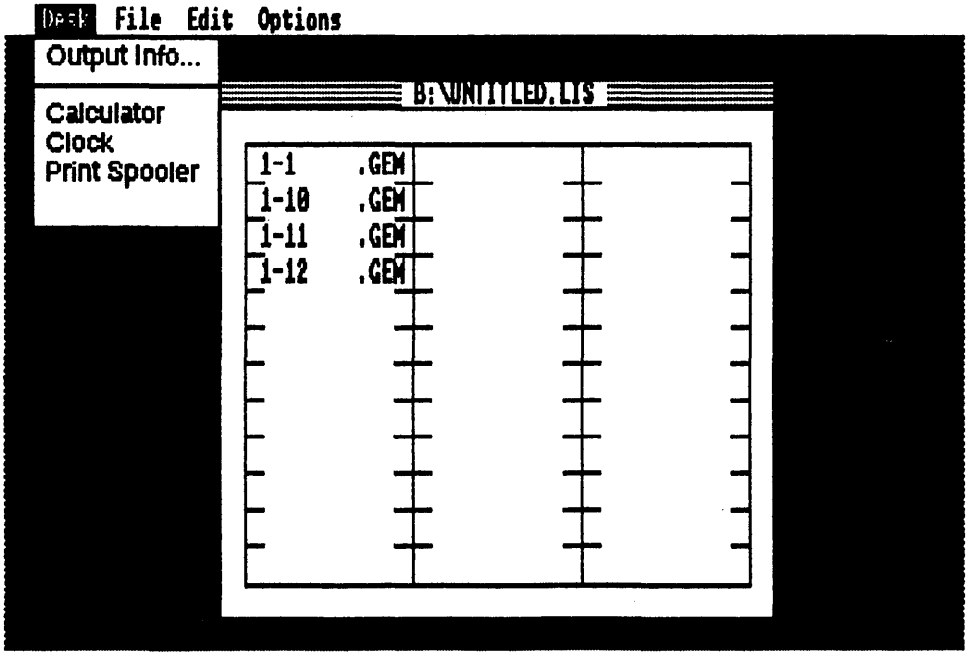


Fig. 1-23. The OUTPUT Desk Menu.

File Menu (Fig. 1-24)

The File Menu performs all disk activities for output lists and output devices. Additionally, this menu is used for starting and stopping the final output and returning to the GEM Desktop.

New erases the current output list and displays an empty and untitled output list. Possible outcomes from using the **New** command:

1. Erases the current output list and displays an empty one. This outcome is only possible if the current output list has been previously saved and you have not made any additional changes to the names on this current list.
2. Displays a warning dialog. This dialog appears when the current output list has not been saved to a disk.

- ☐ Click on the "cancel" button to save the current output list (you will need to choose either the **Save** or the **Save As . . .** command to actually begin the save of this output list).
- ☐ Click on the "ok" button to erase the current output list and display a new one.

Open . . . displays the specified output list.

- ☐ Display the File Menu.
- ☐ Choose the **Open . . .** command. The ITEM SELECTOR dialog appears.

The ITEM SELECTOR contains an index of the previously saved output lists that are in the current directory.

☐ Double-click on the output list's name.

Alternatively, the output list's name can be typed into the Selection field (followed by a click on the "ok" button). Also, the Directory field can be used for specifying another path for searching for a needed output list.

Close closes the current output list.

☐ Display the File Menu.
☐ Choose the **Close** command.

If this current output list has not been previously saved, the ITEM SELECTOR dialog appears. Enter a name for the output list and click on the "ok" button.

One fringe benefit of using the **Close** command is that it will automatically "re-save" any output list that has been previously saved. This action is similar to the **Save** command (discussed next).

Save saves the current output list to disk using its same name. The output list remains on the screen following this save. Another name for the action performed by the **Save** command is "updating."

Save As . . . saves the current output list with a specified name. Using the **Save As . . .** command automatically adds the type .LIS to the specified name. The **Save**

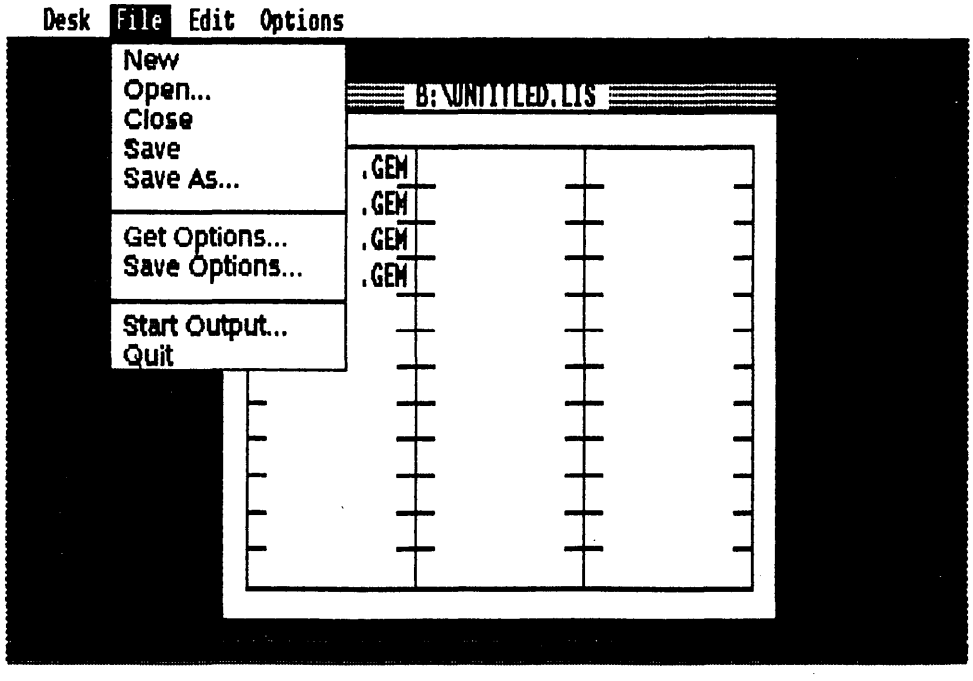


Fig. 1-24. The OUTPUT File Menu.

As . . . command is always used to save a new output list. The output list remains on the screen following this save. The action of this command is also known as "backing up."

- ☐ Display the File Menu.
- ☐ Choose the **Save As . . .** command. The ITEM SELECTOR dialog appears.
- ☐ Type the name for the output list into the Selection field.
- ☐ Click on the "ok" button.

Get Options . . . retrieves the option settings for all of the output devices that were previously saved with the **Save Options . . .** command.

- ☐ Display the File Menu.
- ☐ Choose the **Get Options . . .** command. The ITEM SELECTOR dialog appears.
- ☐ Double-click on the desired option document. (Type the desired option document name in the Selection field and click on the "ok" button.)

To abort the option document retrieval command, click on the "cancel" button.

Note: You can quickly restore all of the default option settings for all of the output devices by selecting DEFAULT.OPT.

- ☐ Display the File Menu.
- ☐ Choose the **Get Options . . .** command. The ITEM SELECTOR dialog appears.
- ☐ Double-click on the DEFAULT.OPT option document.

Save Options . . . saves the established options for all of the output devices in an option document. The **Save Options . . .** command automatically appends the type .OPT to each newly created option document's name.

- ☐ Make all of the necessary changes to the output devices' options.
- ☐ Display the File Menu.
- ☐ Choose the **Save Options . . .** command. The ITEM SELECTOR dialog appears.
- ☐ Type a new name for the option document in the Selection field.
- ☐ Click on the "ok" button.

To abort the option document creation command, click on the "cancel" button.

Start Output . . . sends the documents contained in the current output list to the specified output device. All output device option settings should be made prior to using this command. Additionally, an output list must be both open and current before any documents can be sent to an output device.

- ☐ Select an output list.

- ☐ Display the File Menu.
- ☐ Choose the **Start Output . . .** command. The START OUTPUT dialog appears.
- ☐ Click on the name of the desired output device in the Device field.
- ☐ Type the number of copies that you want in the Number of copies field.
- ☐ Click on the "ok" button.
- ☐ Output begins.

Clicking on the "cancel" button returns you to the output list without sending any documents for output.

Tip: You can easily stop the current output by pressing the Escape key during execution. The action will "take effect" after the current document has been sent to the specified output device.

Quit terminates OUTPUT and returns you to the GEM Desktop.

Edit Menu (Fig. 1-25)

This menu controls the selection, arrangement, and removal of names within an output list.

Add Name . . . adds the specified name to the output list.

- ☐ Display the Edit Menu.
- ☐ Choose the **Add Name . . .** command. The ITEM SELECTOR dialog appears.

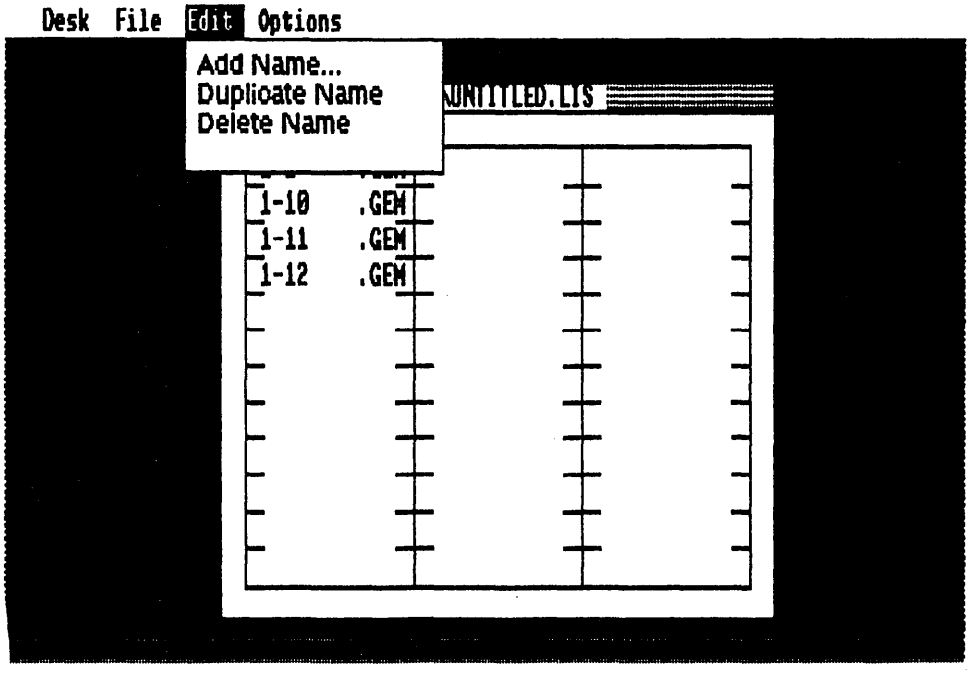


Fig. 1-25. The OUTPUT Edit Menu.

- ☐ Double-click on the name in the directory window. (Either select the name or type the name in the Selection field and click on the "ok" button.)

Click on the "cancel" button to prevent a name from being added to the output list.

Tip: All of the documents in the current directory can be added to the output list by clicking on the "ok" button without selecting or typing any names in the Selection field. This technique is limited to a maximum of 36 documents.

To change directories on the current disk:

- ☐ To advance—click on a folder name in the directory window.
- ☐ To review—click on the directory window's Close Box.

To change directories on a different disk:

- ☐ Click in the Directory field.
- ☐ Use the Backspace key to erase the field. (Use the Escape key to quickly erase the entire field.)
- ☐ Type the drive designation and folder name and type in the Directory field.
- ☐ Click in the directory window.

The final list is now ready for saving and/or output to a specified output device.

Duplicate Name copies the selected document names in the output list.

- ☐ Click on the desired document names. Use group select or shift-click for highlighting more than one document name.
- ☐ Display the Edit Menu.
- ☐ Choose the **Duplicate Name** command.

The **Duplicate Name** command will automatically dim (or become unavailable) when the output list contains the maximum number of document names.

Delete Name removes the selected document names from the output list.

- ☐ Click on the desired document names. Use group select or shift-click for highlighting more than one document name.
- ☐ Display the Edit Menu.
- ☐ Choose the **Delete Name** command.

Options Menu (Fig. 1-26)

This menu determines the option settings for the output devices.

Screen . . . controls the option settings for the computer's screen.

- ☐ Display the Options Menu.

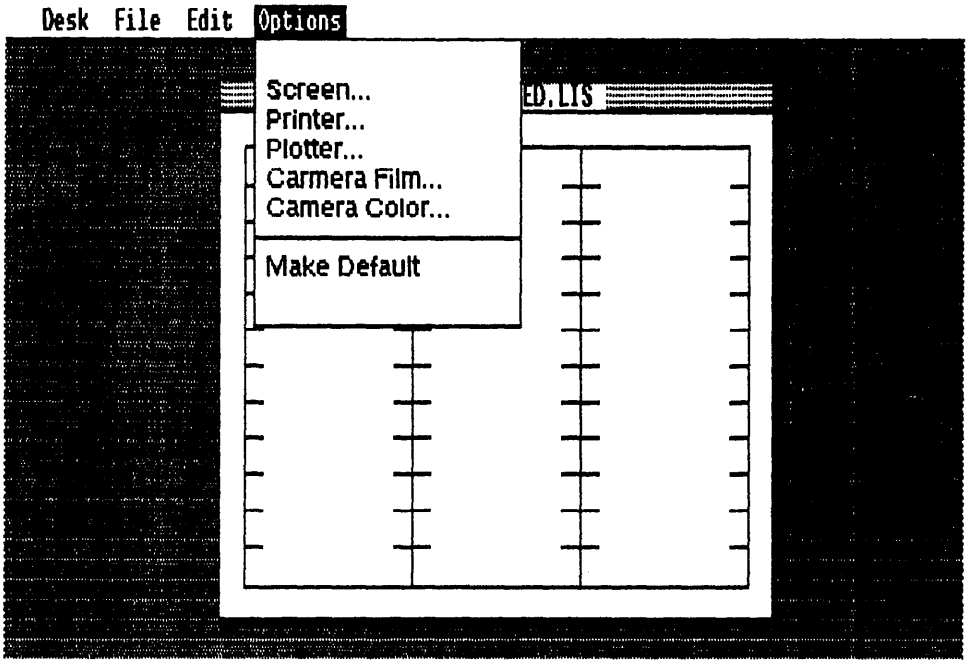


Fig. 1-26. The OUTPUT Options Menu.

☐ Choose the **Screen . . .** command. The SCREEN OPTIONS dialog appears.
☐ Click on the desired amount of pause in the Wait for field.

There are two options in this field.

1. Clicking on "key" causes the output to pause until any key is pressed. Furthermore, pressing the up-arrow key when this option has been selected will cause the previous document to be sent to the screen. This action is similar to "leafing" backwards through the output list.
2. Clicking on one of the number settings (2, 5, 10, and 20) sets a pause time interval. This time value (in seconds) is used before the next document is sent to the screen.

☐ Click on the method of repetition in the Cycle field.

There are two options in this field.

1. Click on "yes" to keep sending the same output list to the screen, until the Escape key is pressed.
2. Click on "no" to send the output list only once to the screen.

☐ Click on the "ok" button.

Click on the "cancel" button to abort the screen option settings.

Printer . . . controls the option settings for the printer.

☐ Display the Options Menu.
☐ Choose the **Printer . . .** command. The PRINTER OPTIONS dialog appears.
☐ Click on the output's final size in the Scale field.

There are two options in this field.

1. Click on "best fit" to proportionately fill the dimensions of an 8 1/2" × 11" sheet with the document.
2. "Full scale" causes the document to be printed in its exact dimensions.

☐ Click on the treatment of the first sheet of paper in the Initial Form Feed field.

There are two options in this field.

1. Clicking on "yes" makes the printer perform a form feed prior to printing.
2. "No" causes the printer to begin printing at its initialized placement.

☐ Click on the type of horizontal justification in the Horizontal field.

There are three options in this field.

1. "Left" causes the document to be printed on the left of the page.
2. Clicking on "center" makes the document print in the center of the page.
3. Click on "right" to print the document on the right of the page.

☐ Click on the format of the vertical justification in the Vertical field.

1. Clicking on "top" prints the document on the top of the page.
2. "Center" prints the document in the center of the page.
3. "Bottom" causes the document to be printed on the bottom of the page.

☐ Click on the treatment of the last sheet of paper in the Final Form Feed field.

There are two options in this field.

1. "Yes" causes the printer to execute a form feed at the conclusion of printing the document.
2. Click on "no" to stop the printer at the end of the document's page.

☐ Click on the method of printing in the Print in Background field.

There are two options in this field.

1. "Yes" enables you to return to the GEM Desktop while the output list sends your

documents to the printer. You will need a minimum of 320K bytes RAM for using this option (even on PC-DOS 2.X computers.)

2. Clicking on "no" keeps the user in OUTPUT until the printing has been concluded.

☐ Click on the "ok" button.

To abort the printer option settings, click on the "cancel" button.

Warning! The "Print in Background" option should not be used on a floppy-based system. Only hard drive systems are able to use this option.

Plotter . . . controls the option settings for the plotter.

☐ Display the Options Menu.
☐ Choose the **Plotter . . .** command. The PLOTTER OPTIONS dialog appears.
☐ Click on the output's final size in the Scale field.

There are two options in this field.

1. Click on "best fit" to proportionately fill the dimensions of an 8 1/2″ × 11″ sheet with the document.
2. "Full scale" causes the document to be plotted in its exact dimensions.

☐ Click on the type of horizontal justification in the Horizontal field.

There are three options in this field.

1. "Left" causes the document to be plotted on the left of the page.
2. Clicking on "center" makes the document plot in the center of the page.
3. Click on "right" to plot the document on the right of the page.

☐ Click on the format of the vertical justification in the Vertical field.

There are three options in this field.

1. Clicking on "top" plots the document on the top of the page.
2. "Center" plots the document in the center of the page.
3. "Bottom" causes the document to be plotted on the bottom of the page.

☐ Click on the "ok" button.

To abort the plotter option settings, click on the "cancel" button.

Camera Film . . . controls the option settings for the camera's film.

☐ Display the Options Menu.
☐ Choose the **Camera Film . . .** command. The CAMERA FILM OPTIONS dialog appears.

☐ Click on the film specification in the Film Type field.

There are five options in this field.

1. "Polaroid Type 669" film is in your camera.
2. "Polaroid Polachrome" film is going to be used.
3. Click on "Ektachrome - ASA 100" for using this type of film.
4. Clicking on "Agfachrome - ASA 100" sets OUTPUT for this film type.
5. "Fujichrome - ASA 100" is the selected film type.

☐ Click on the brightness scale in the Lightness field.

There are three general options in this field.

1. Clicking on one of the three negative values (−3, −2, and −1) causes *print* film to become darker and *slide* film to become lighter.
2. "0" is a neutral middle value.
3. Click on one of the three positive values (+3, +2, and +1) to make *print* film lighter and *slide* film darker.

☐ Click on the "ok" button.

Click on the "cancel" button to abort camera film option settings.

Tip: You will have to experiment with these values to obtain the best results. Two better films worth trying are Kodak Professional Ektachrome EPY Tungsten film for color slides and Kodak Panatomic X for black and white prints. Color print films lack the appropriate lattitude for producing effective results and should be avoided.

Camera Color . . . controls the option settings for the camera's color.

☐ Display the Options Menu.
☐ Choose the **Camera Color . . .** command. The CAMERA COLOR OPTIONS dialog appears.
☐ Click on the color code number in the Color Index field.

There are sixteen options in this field. Each option is a reference value (0-15) that indexes a specific GEM application color code.

☐ Click on the color assignment in the Basic Color field.

There are twelve options in this field. The options in this field are specific colors (e.g., White, Brown, Blue, and Purple) that can be assigned to a color index.

☐ Click on the desired shade in the Lightness field.

There are ten options in this field. Various shades of the basic color can be assigned

to the specified color index by selecting a lightness value (from "light" to "dark").

☐ Edit the color percentages in the Red, Green, and Blue fields.

There are 101 options in each of these fields. An option in each of these fields represents a percentage of color (0-100%). The initial values shown for these fields are determined by the settings in the Basic Color field and the Lightness field. Excessive editing of the Red, Green, and Blue fields can lead to some bizarre color combinations. Exercise caution and restraint when editing these fields.

☐ Repeat the four above field selections for each necessary color index.
☐ Click on the "ok" button.

Click on the "cancel" button to exit the CAMERA COLOR OPTIONS dialog.

Note: The **Camera Color . . .** command stores all of your various color index combinations in a temporary memory buffer, until you click on either the "ok" or the "cancel" button.

Make Default saves all of the current option settings in a document labeled DEFAULT.OPT.

Caution! Using the **Make Default** command will replace any document labeled DEFAULT.OPT that is in the current directory.

To Restore the manufacturer's default settings:

☐ Display the File Menu.
☐ Choose the **Quit** command. Return to the GEM Desktop (this may require that you leave any GEM application that you are using).
☐ Double-click on the GEMSYS folder.
☐ Drag the DEFAULT.OPT document to the trash can.
☐ The original OUTPUT default settings have now been restored.

When OUTPUT is first started, all of the options are set according to the values specified in a DEFAULT.OPT document. This feature can be an enormous benefit, if you always use the same output device settings.

GEMSETUP

All of the hardware used in the GEM environment is accessed through device drivers. These special applications reside in the computer's memory and tell the printer how to print pictures from GEM Paint, the screen how to display WordChart text, and the mouse how to move the pointer on the GEM Desktop. In short, without these device drivers, GEM would be just another pretty box.

Loading the proper device drivers into GEM is accomplished in one of two ways. The first way is when you run GEMPREP. At this time, all of the required device drivers are placed on the GEM STARTUP disk. The second way is through a special application called GEMSETUP. GEMSETUP is a menu-driven setup system that allows you to change the device drivers for all of your connected hardware devices. Additionally,

the communication ports and the system fonts can be changed through GEMSETUP. While GEMPREP is used exclusively when you initially create the GEM environment, GEMSETUP is used whenever a hardware, port, or font change is made to the GEM Desktop.

If you add a new hardware device to your computer, you absolutely need to use GEMSETUP before the GEM Desktop will be able to take advantage of this output device. The same thing applies to a change in any communication port designation (e.g., LPT1 to LPT2 or COM1 to COM2); you must run GEMSETUP before you can use this new port. Likewise, if you want to use a different set of type fonts on an output device (this includes your computer monitor), then you will have to run GEMSETUP. One final use for GEMSETUP is in editing or removing unneeded device drivers from the GEM Desktop. This is a valuable practice that helps conserve computer RAM for GEM application use.

Using GEMSETUP

Before you can start GEMSETUP, the GEM Device Driver Disk #1 must be inserted in drive A:.

- ☐ Double-click on the floppy disk A icon. (Press the Escape key, if this directory is already open.)
- ☐ Double-click on the application icon labeled GEMSETUP.APP.
- ☐ Display the Categories Menu.
- ☐ Choose the desired hardware, port, or font command.
- ☐ Make a selection in the chosen window.
- ☐ Display the File Menu.
- ☐ Choose the **Save Summary . . .** command. The warning dialog appears.
- ☐ Click on the "ok" button.

When a category is selected, there are two different windows that fill the work area.

Chosen . . . window. This window contains all of the currently used device drivers, ports, or fonts that are installed on the GEM Desktop.

Available . . . window. This window lists all of the device drivers, ports, or fonts that are available to the GEM Desktop.

To Make a selection for the Chosen window:

1. Display the Categories Menu.
2. Choose the device, port, or font command.
3. Drag the desired driver or port from the Available window into the Chosen window. More than one font may be taken at a time by using shift-click and dragging one member of the selected group.
4. Repeat steps 1 through 3 for all of the altered device drivers, ports, and/or fonts.
5. Display the File Menu.
6. Choose the **Save Summary . . .** command.

Note: Only one device driver or port may occupy the Chosen window at one time. Several fonts may occupy the Chosen window, however, at one time.

There are three menus available on the GEMSETUP Menu Bar: Desk, File, and Categories.

Desk Menu (Fig. 1-27)

The Desk Menu contains a GEMSETUP dialog and activates the GEM desk accessories.

Choosing **GEMSETUP Info . . .** from the Desk Menu displays a dialog that contains copyright and author information for GEMSETUP.

Choosing **Calculator** starts a multifunction desktop calculator. Refer to the section earlier in this chapter dealing with the GEM Desktop Menu Bar for operation instructions.

Choosing **Clock** displays a window with real-time clock, alarm clock, and calendar features. Refer to the section earlier in this chapter dealing with the GEM Desktop Menu Bar for operation instructions.

Choosing **Print Spooler** from the Desk Menu forms a list of ASCII files for output. Refer to the section earlier in this chapter dealing with the GEM Desktop Menu Bar for operation instructions.

File Menu (Fig. 1-28)

The File Menu contains commands for dealing with your setup summary.

Open Summary displays a window that contains all of the current device driver,

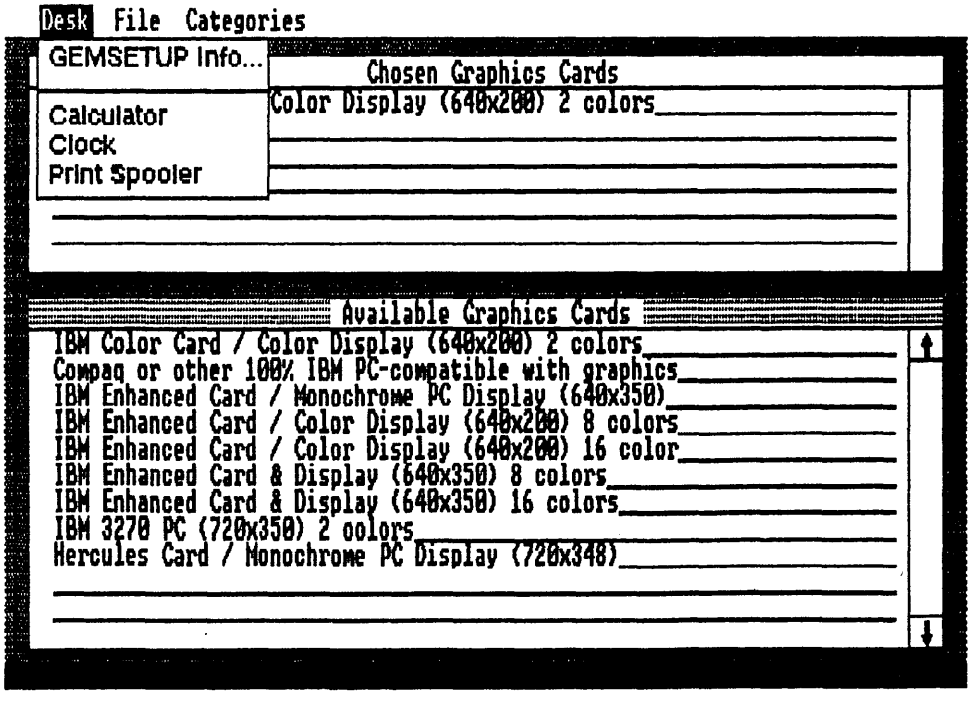


Fig. 1-27. The GEMSETUP Desk Menu.

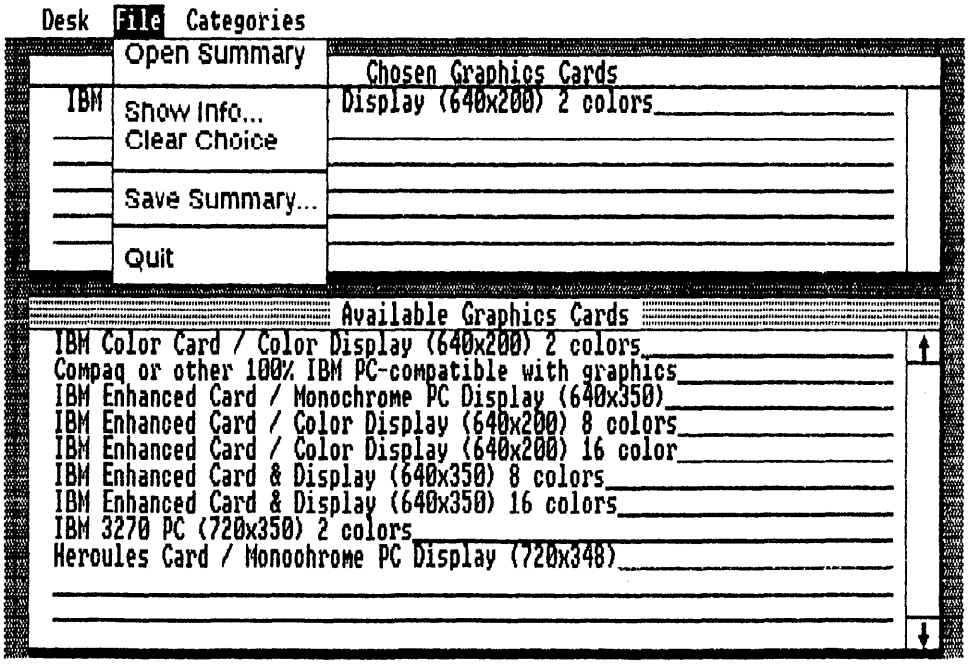


Fig. 1-28. The GEMSETUP File Menu.

port, and font setups. This information will be saved only through the **Save Summary . . .** command.

- ☐ Display the File Menu.
- ☐ Choose the **Open Summary** command. The Summary window appears.
- ☐ Click on the Summary window close box.

Show Info . . . provides information about any selected item from the Available window.

- ☐ Click on an item in the Available window. (This might require two separate clicks, if the Available window is NOT the active window.)
- ☐ Display the File Menu.
- ☐ Choose the **Show Info . . .** command. The INFORMATION dialog appears.
- ☐ Click on the "ok" button.

There are four fields in the INFORMATION dialog:

1. Filename—the name of the selected item.
2. Disk Label—the name of the floppy disk that contains the selected item.
3. Description—a description of the selected item.
4. Details—a technical summary of the selected item.

Clear Choice deletes a selected item from the Chosen window. This same item is also deleted from the Summary window.

- ☐ Click on the desired item in the Chosen window. (This might require two separate clicks, if the Chosen window is NOT the active window.)
- ☐ Display the File Menu.
- ☐ Choose the **Clear Choice** command.

You can check the setup summary to verify that the unwanted item has been removed.

Note: Several type fonts can be removed by a single **Clear Choice** command by using shift-click.

Save Summary . . . saves the new setup on the GEM STARTUP disk and erases the former setup.

- ☐ Display the File Menu.
- ☐ Choose the **Save Summary . . .** command. A warning dialog appears.
- ☐ Click on the "ok" button.
- ☐ Several disk dialogs appear prompting you to insert the disks that are necessary for saving the new setup.

Click on the "cancel" button to stop the summary save.

Notes:

1. Using the **Quit** command, without first saving a new summary, will display a dialog informing you of the need to save the summary. In this quit dialog, the "ok" button is used for NOT saving the summary. The "cancel" button, however, is used for returning to GEMSETUP with the intent of using the **Save Summary . . .** command.
2. Your setup MUST contain a selected graphics card. Saving a summary that is missing this important item will produce a warning dialog telling you to include a graphics card in your setup.

Quit ends GEMSETUP and returns you to the GEM Desktop. A special safety dialog prevents you from exiting GEMSETUP without first saving your setup summary.

Categories Menu (Fig. 1-29)

This Menu displays the device driver, port, and font categories for selection in a setup summary.

Graphics Cards lists the monochrome and color graphics cards that are supported by the GEM Desktop.

Screen Fonts lists the type fonts that are available for screen display.

Mouse lists the mouses that are supported by the GEM Desktop.

Mouse Ports lists the available ports for mouse connection.

Plotters lists the various plotters that are supported by the GEM Desktop.

Plotter Fonts lists the type fonts that can be used with the selected plotter.

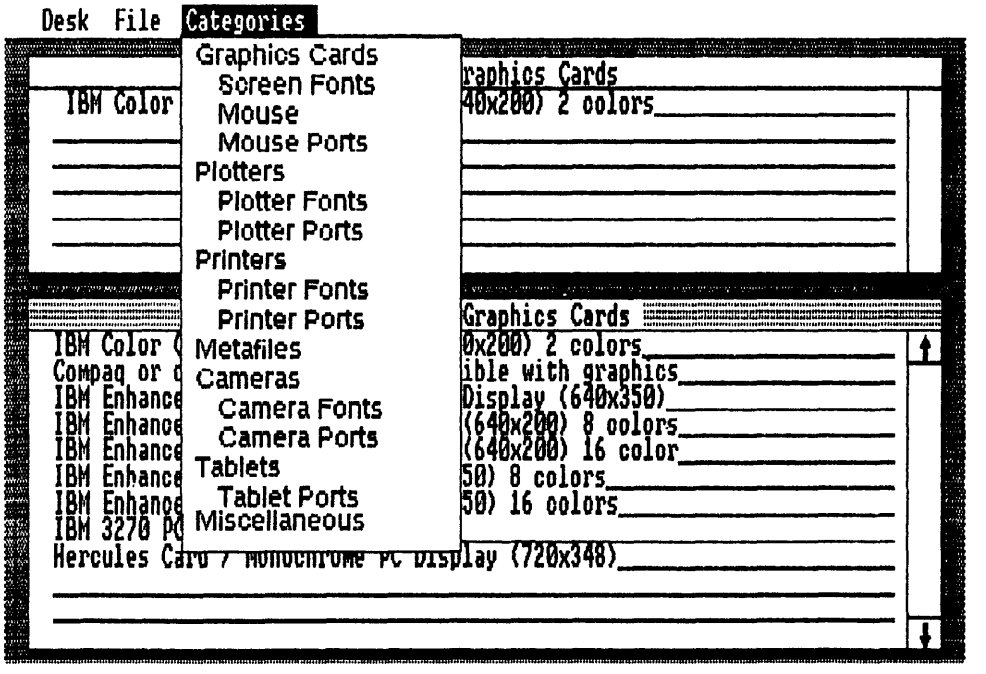


Fig. 1-29. The GEMSETUP Categories Menu.

Plotter Ports lists the available ports for plotter connection.
Printers lists the various printers that are supported by the GEM Desktop.
Printer Fonts lists the type fonts that can be used with the selected printer.
Printer Ports lists the available ports for printer connection.
Metafiles lists the batch files that are available to the GEM Desktop.
Cameras lists the photographic cameras that are supported by the GEM Desktop.
Camera Fonts lists the type fonts that can be used with the selected camera.
Camera Ports lists the available ports for camera connection.
Tablets lists the various tablets that are supported by the GEM Desktop.
Tablet Ports lists the available ports for tablet connection.
Miscellaneous lists miscellaneous device drivers, ports, or type fonts.

Note: Commands that are unavailable during the setup procedure are light colored or dimmed. For example, if you don't choose a plotter, then **Plotter Fonts** and **Plotter Ports** are both dimmed.

KEYBOARD EQUIVALENTS

Even if you lack a mouse or tablet, you can still use the GEM Desktop. All of the mouse functions (e.g., click and drag) can be duplicated through specific keyboard keystrokes. Table 1-2 lists the mouse functions along with their keyboard equivalents.

You don't need to install the keyboard with either GEMPREP or GEMSETUP. The keyboard is a fixed default setting. An important point to remember is that *all* of the keyboard equivalents remain active even when a mouse or tablet is setup on

Table 1-2. Every GEM Mouse Action can be Duplicated Through Keyboard Interaction.

GEM Keyboard Equivalents

Mouse Action	Keystroke (s)
Click	Home
Double-click	Home + Home
Drag	End + Arrow keys + Home
Move	Arrow keys
Shift-click	Home + Arrow keys + Shift, Home

the GEM Desktop. By pressing the Control key (Ctrl), you can activate the keyboard mouse control keys. A beep from the IBM's speaker lets you know that keyboard control is now active (NOTE: This control can be removed by pressing the Ctrl key again). Therefore, you can make use of the delicate pointer control of the shift-arrow key combination, for example, when your hand is too heavy for mouse control.

Chapter 2

GEM Cutters

Just as a jeweler can turn minerals into precious gems through an assortment of grinding wheels and carborundum, computer users can transform inscrutable DOS commands into menu-driven GEMs through an application of system hardware and compatible peripherals. While the former metamorphosis is dependent on a skilled hand and a scientific knowledge of abrasives, the latter change is subject to numerous exceptions, alterations, and substitutions. In this other GEMology, the type of computer system hardware will dictate the available peripherals, which, in turn, will shape the final GEM.

Beginning with the computer system hardware, there are various microcomputers that can be conveniently grouped according to their MPU. The two most prominent MPUs that currently support the GEM environment are the Intel iAPX 88/10 8088 8-/16-bit and the Motorola MC68000 16-/32-bit. The two bit numbers following each MPU designation describe the external data bus bit width (8-bit on the 8088 and 16-bit on the 68000) and the internal register bit width (16-bit on the 8088 and 32-bit on the 68000). Make no mistake—the Intel 8088 is a 16-bit MPU and the Motorola 68000 is a 32-bit MPU. These secondary data bus bit width values just serve as clarification of each chips true computational strength.

These MPUs, whether it's the 8088 or the 68000, control two major functions: memory manipulation and I/O intercourse. Three general lines of communication, each in the form of a multi-bit bus, are open for these two functions: address, control, and data buses. In its dealings with these various functions and buses, the MPU uses a built-in command language known as an *instruction set.* Table 2-1 lists all of the commands that make up the 8088 instruction set. Likewise, the instruction set for the 68000 is given in Table 2-2. Interacting with this MPU instruction set is the level at which GEM

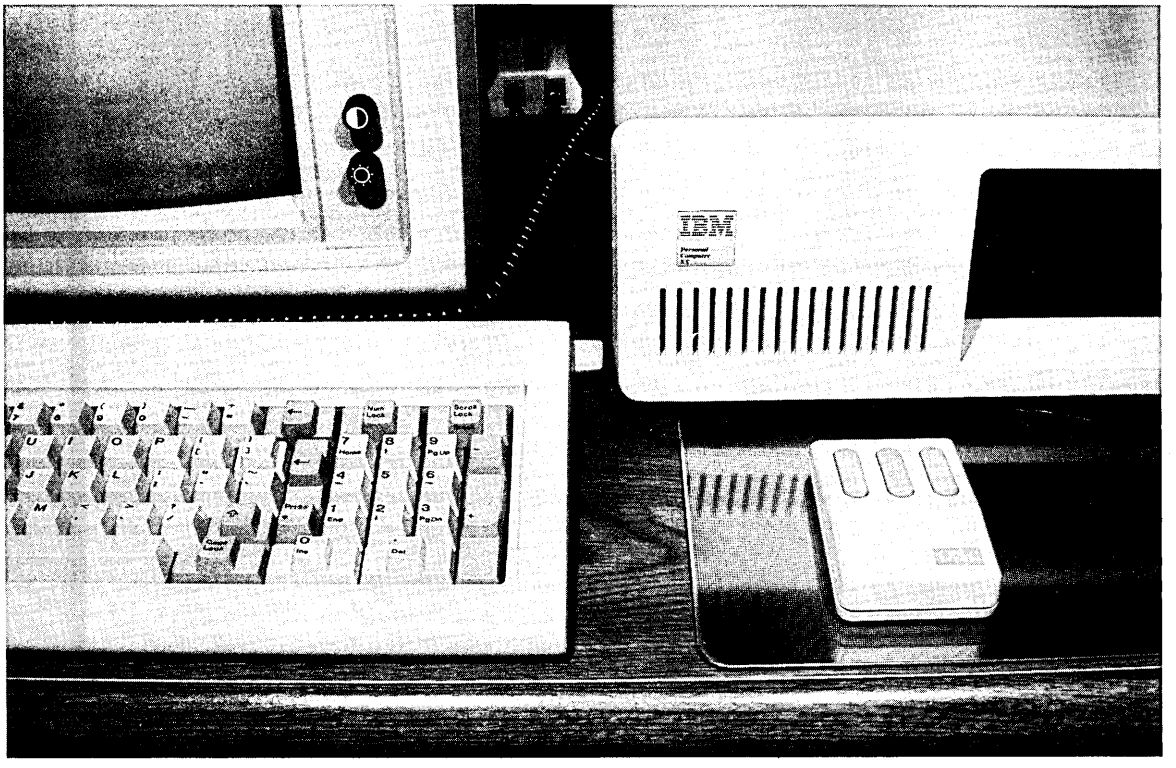


Fig. 2-1. A complete GEM system: the IBM PC XT, Hercules Graphics Card, IBM Monochrome Display, and Mouse Systems mouse.

controls both the computer system hardware and the associated peripherals.

One attractive feature of GEM is that it is a portable environment. In other words, the GEM Desktop and its related GEM applications can be converted for successful operation on different MPUs with no loss of function in any of the GEM elements. All

Table 2-1. This Partial Accounting of the 8088 Instruction Set Lists Only the Mnemonics for Each Instruction.

AAA	IN	PUSHF
AAD	INC	RCL
AAM	JMP	RCR
AAS	LAHF	RET
ADC	LEA	ROL
ADD	LDS	ROR
AND	LES	SAR
CALL	MOV	SAHF
CBW	MUL	SBB
CMP	NEG	SHL/SAL
CWD	NOT	SHR
DAA	OR	SUB
DAS	OUT	TEST
DEC	POP	XCHG
DIV	POPF	XLAT
IDIV	PUSH	XOR
IMUL		

ABCD	CMP	RESET
ADD	DIVS	ROL
AND	DIVU	ROR
ASL	EOR	RTE
ASR	EXG	RTR
Bcc	EXT	RTS
BCHG	JMP	STOP
BCLR	LEA	SUB
BRA	LINK	SWAP
BSET	MOVE	TAS
BSR	MULS	TRAP
BTST	MULU	TST
CHK	NEG	UNLK
CLR	PEA	

Table 2-2. A Mnemonic Alphabetical Listing of the Major Members from the 68000 Instruction Set.

of the translation from one MPU to another is executed through reprogramming with the new instruction set. Therefore, dramatically distinct computer systems can receive a unique GEM translation with no sacrifice in the GEM-user interface. Currently, three major microcomputer manufacturers offer machines that run GEM: Apricot, with the Apricot PC; Atari, with the Atari 520ST; and IBM, with the IBM Personal Computer (PC) and IBM Personal Computer XT (PC XT).

APRICOT PC

Apricot is one computer manufacturer that learns from other's mistakes. Their extensive line of microcomputers takes the basis of the IBM PC (the Intel 8088 MPU) and adds several features that make the Apricot F series and Apricot PC viable choices in the business microcomputer field.

In Apricot's microcomputer stable there are three candidates that prove quite able-bodied at catering to GEM whims: the F2, F10, and PC. There are several points that are similar among each of these computers. First, they each use an Intel 8086 MPU with a clock speed that is near that of the IBM PC's 8088. Another similarity among these three Apricots is the incorporation of 3.5″ floppy disk drives into each system. Finally, the two most common interface ports, RS-232C and Centronics parallel, are standard features on the base computer.

F2

This small 8086 computer bears a strong resemblance to the Macintosh in its squat, compact physical design. Using a true clock speed of 4.67 MHz, the F2 is able to mimic the IBM PC in its GEM performance. Two double-sided, double-density 3.5″ floppy disk drives add 1.44M bytes of total storage capacity to the F2. These high-density disks permit the GEM Desktop to be placed on a single disk during installation.

F10

The major difference between the F10 and the F2 is the presence of a 10M byte

Fig. 2-2. A typical mechanical mouse. A rolling ball is used for control in this mouse. The Macintosh mouse is a good example of a mechanical mouse.

hard disk in the F10. Along with the system standard double-sided, double-density 3.5″ disk drive and 512K bytes RAM, the F10 is functionally similar to the IBM PC XT.

PC

The PC is Apricot's attempt at satisfying several of the deficiencies found in the F series that reduced their IBM PC compatibility (e.g. an 8087 Math Co-processor socket). This includes an open expansion slot for the installation of a user-supplied graphics card (the F series comes with their own RGB cards). One point of caution with the Apricot PC, however, is the amount of RAM supplied in the base model. The modest 256K bytes RAM will have to be increased for realizing the full potential of GEM on this computer.

ATARI 520ST

One of the more popular wars that was waged during the 1985 Christmas season concerned the supremacy of a single 68000-based computer. The chief antagonists in this fray included: the Atari 520ST, the Apple Macintosh, and the Commodore Amiga. Apple's production headstart over the competition gave the Macintosh a minor victory. The Atari 520ST, however, came on strong at the end and currently rivals the sales of both the Amiga and the Macintosh.

The Atari 520ST and its more powerful brother, the 1040ST, share a unique characteristic that is not found elsewhere in the contemporary microcomputer world—they have GEM in ROM. What this amounts to is the GEM Desktop is permanently installed

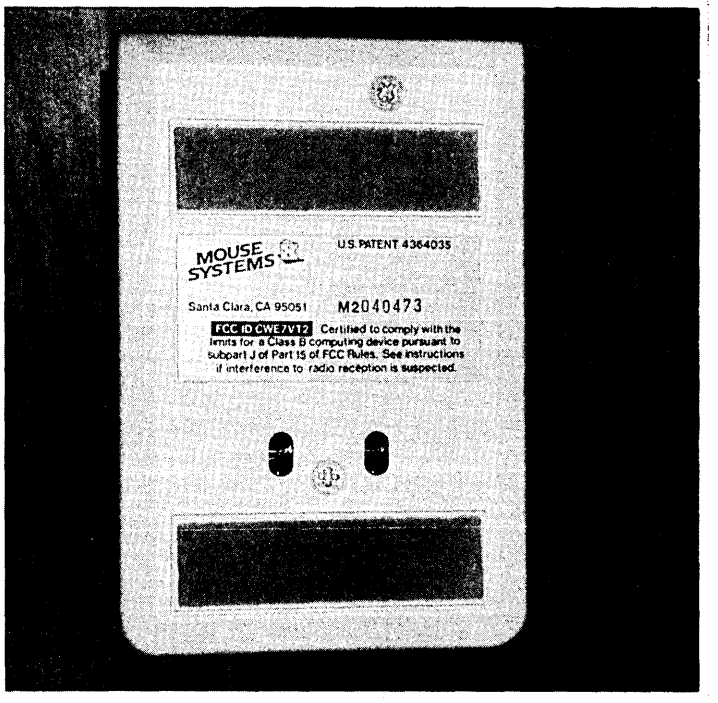


Fig. 2-3. The Mouse Systems PC Mouse uses an IR (infrared) sensor for detecting mouse movement.

inside the computer. Therefore, when either the 520ST or the 1040ST is powered up the GEM Desktop is available. In this configuration, GEM is a direct part of each computer's operating system. Atari has elected to banally name this new operating system TOS (The Operating System).

Both the 520ST and the 1040ST use the Motorola 68000 MPU running at an 8 MHz clock speed. Ample memory, high-resolution, and large mass storage space make these Ataris ideal for reaching GEM's true potential. Early versions of the 520ST, however, lacked the ROM-resident GEM and the computer's total performance suffered as a result of this poor production technique. 520ST owners that still must load the operating system into RAM prior to using their computers, should consult Atari for the required ROM chip upgrade.

IBM PC AND IBM PC XT

Invariably, whenever an IBM PC (or PC XT) computer is mentioned, the first question asked is, "What about PC compatibles?" By definition, a PC-compatible computer is based on an Intel 8088 MPU running at a 4.77 MHz clock speed with a functional copy of the IBM BIOS (Basic I/O System) stored in the system ROM. There are several points that need to be emphasized in this definition, however. First, the type of MPU can vary with little loss in the IBM PC compatibility. Popular substitutions for the 8088 include the Intel 8088-2 and the NEC V20 μPD70108.

A bonus feature of the 8088-2 is that it can operate at a higher clock speed. Unfortunately, some programs display adverse results when used at higher speeds. As a solution, in most systems that use the 8088-2, both the IBM PC standard 4.77 MHz clock

speed, as well as a faster 8 MHz are used. Subsequently, a special keystroke sequence is used for switching between these two clock speeds.

PC compatibles that use the NEC V20 MPU generate an entirely different set of pros and cons. Basically, the NEC V20 is a pin-for-pin copy of the 8088. The V20 is even able to understand the same instruction set used by the 8088. The major difference between these two MPUs is that the V20 handles data much more efficiently than the 8088. This is due to increased instruction set performance (multiply/divide and string instructions share the greatest boost) inside the V20. Furthermore, the V20 is able to operate at 4.77 MHz (also, there is an 8 MHz version of the V20).

Warning!The following enhancement MIGHT violate the warranty of your computer. Only use this suggestion if you are willing to accept the potential consequences.

Based on the above thumbnail description of the V20's characteristics, a suitable substitution for the IBM PC's and IBM PC XT's 8088 would be the NEC V20. Before you begin this MPU replacement, remember these two statements of caution:

1. Avoid the generation of static electricity around either of these MPUs. This danger is especially prevalent with the CMOS (Complementary Metal Oxide Semiconductor) V20.
2. This is an experimental system alteration that is *not* sanctioned by IBM.

NEC V20 substitution procedure:

- ☐ Remove the five hex screws from the rear panel of the IBM PC or PC XT.
- ☐ Gently slide the metal housing forward until the rear edge of this housing makes contact with the front edge of the floppy disk drive mounting bracket.
- ☐ Rotate the metal housing upward and completely remove it from the IBM chassis.
- ☐ Locate the 8088 socket. (This is along the right rear edge of the main system board, near the power supply.)
- ☐ Using a *high-quality* pair of IC extractors, grasp the 8088 and firmly remove it from the socket. This might require a gentle end-for-end rocking motion. Do NOT use a side-for-side rocking motion.
- ☐ Place the 8088 in a static-free area—preferably encased in static-free foam.
- ☐ Insert the V20 into the former 8088 socket. Be sure to observe the proper orientation of pin #1.
- ☐ Replace the metal housing and secure the five screws.

The only true test in this type of replacement is to boot some software and observe the results. Theoretically, the V20 should work with the GEM environment, but different computers will behave differently. For example, one IBM PC might accept the new MPU, while another might suffer from floppy disk drive access problems. Both of these occurrences have been documented. Therefore, the only solution is to test the V20 for yourself. If you don't suffer from any compatibility problems, then you can expect a 1-25% performance increase over an IBM PC or PC XT that is equipped with the standard 8088. PC compatible computers are also able to take advantage of this V20 substi-

tution. The same operation qualifiers and cautions, however, apply to these computers as well.

One last feature that is buried deep inside the V20 is its ability to execute 8080 code. On the surface this doesn't sound very impressive, that is, until you stop and realize that the CP/M operating system is written in 8080 code (see Introduction). Now, by using a V20 inside your IBM PC, you will be able to execute both PC-DOS and CP/M 2.2 programming. Right? Well, almost. The only flaw in this logic is that a special V20 version of this 8080 operating system needs to be used for accessing standard CP/M 2.2 software. Once you have this V20 driver, however, then you will actually have two computers inside one housing.

Note: Several independent manufacturers offer a NEC V20 CP/M driver for the IBM PC. Try these addresses for availability:

Micro Interface Corporation, 6824 N. W. 169th Street, Miami, FL 33015

Micro Solutions, 125 South Fourth Street, DeKalb, IL 60115

Software Toolworks, 15233 Ventura Blvd., Suite 1118, Sherman Oaks, CA 91403

The last issue that determines the true compatibility of an 8088-based system with an IBM PC or PC XT centers on the clone's BIOS. This piece of code handles all of the read/write activities that are monitored through the MPU. Altering this code increases the likelihood that the GEM environment will not work on this computer. Several excellent "copies" of the IBM BIOS have been produced, however. One of the best of these BIOS recodings is written by Phoenix Software Associates of Norwood, MA. But it should be emphasized here that no BIOS rewrite is an exact copy of the IBM BIOS. Therefore, GEM could fail to function correctly with an IBM BIOS clone.

The commercially marketed version of GEM is designed to function on IBM PC family computers and 100% true IBM PC compatibles.

IBM PC

An IBM Personal Computer comes equipped with two double-sided, double-density 360K byte floppy disk drives (although other drive choices do exist). The 8088 serves as the MPU. An optional 8087 Math Co-processor socket is available. The current incarnation of this classic has 256K bytes of internal RAM. Early 1981 and 1982 models of the IBM PC had only 64K bytes RAM on their main system boards. Without extensive memory upgrading, these models will not support GEM. The remainder of the onboard memory consists of a 40K bytes ROM, which holds the BIOS and a BASICA subset.

System expansion is accomplished through five expansion slots. Two of these slots are automatically occupied by a floppy disk controller and a display adapter.

IBM PC XT

The IBM PC XT has a standard configuration of one double-sided, double-density 360K byte floppy disk drive. There is also a 10M byte internal hard disk drive. A plentiful 200 watt power supply is able to meet the power demands of this hard drive. An 8088 is the MPU, with an open socket for holding an 8087 Math Co-processor. Standard system board memory with the PC XT is 256K bytes RAM (although newer enhanced versions hold 640K bytes RAM). An additional 40K bytes ROM is used for

holding the BIOS and BASIC.

There are eight expansion slots on the PC XT. Two of these slots are half-length slots, which require shorter "half card" expansion cards. In a standard XT system, three slots are taken for the floppy disk controller, hard disk controller, and display adapter.

An exciting option for the IBM PC XT is a dual floppy disk drive model. This configuration replaces the 10M byte hard disk drive with another 360K byte floppy disk drive. The advantages of a dual floppy drive PC XT over a similarly configured PC are the increased number of expansion slots and the larger power supply. Of course, a dual floppy drive XT can be readily equipped with a hard drive at a future date through a simple user-installable upgrade. All you have to do is purchase a hard disk drive kit. These kits come in two common sizes, 10M bytes and 20M bytes, and contain a hard disk controller card and all of the necessary installation hardware. An attractive sidelight to this hard drive upgrade is that a larger 20M byte drive or 30M byte drive can be used instead of IBM's standard 10M byte version (once again, the enhanced IBM PC XT's have a standard 20M byte hard drive).

IBM PC AT

There are two PC AT models: the basic model and the enhanced model. The basic model uses one 1.2M byte floppy disk drive. A total of 256K bytes RAM is housed on the main system board. Alternatively, the enhanced model has both the 1.2M byte floppy disk drive and a 20M byte hard disk drive. Furthermore, the enhanced model has 512K bytes RAM on the main system board.

Both models use an Intel 80286 as the MPU with an open socket available for an 80287 Math Co-processor. The remainder of the system memory is 64K bytes ROM containing the BIOS and BASIC. There are also eight expansion slots on both models. Only six slots are open for additional expansion in either model. One of these slots is occupied by a combination floppy/hard disk drive controller, while the other is used by a display adapter.

As a rule, GEM will run on an IBM PC AT. Extremely rare and isolated problems have been reported in booting GEM from the 1.2M byte floppy disk drive, however. Installing and running GEM from the internal hard drive will overcome this problem. Another solution is to purchase the optional 360K byte floppy drive (IBM Personal Computer AT Double-Sided Diskette Drive). Complete GEM compatibility is possible with this disk drive.

IBM 3270

This IBM model is a marked departure from the previous microcomputers. The main function of the 3270 is that of a workstation terminal. In this case, the host unit is primarily a member of either the IBM 4300 family or the IBM 3080 family. The superior screen resolutions of the 3270 make the windows of GEM crisp and clear. In fact, a major advantage of the 3270 is its multitasking, window-handling capabilities.

On the hardware level, the 3270 remains virtually identical to the previously mentioned IBM products. The same 8088 MPU running at 4.77 MHz is supported by a minimum of 256K bytes RAM and 40K bytes ROM. Options include extra memory through expansion cards, one or two double-sided, double-density 360K byte floppy

disk drives, and a 10M byte hard disk drive. There are even two sophisticated graphics versions of the 3270, the IBM 3270 PC/G and the IBM 3270 GX, that can accommodate displays with an unbelievable resolution of 960 × 1000 pixels (or picture elements). Unfortunately, GEM lacks a suitable driver for these high-resolution displays at this time.

IBM PCjr

GEM will NOT run on a standard IBM PCjr. Two of the PCjr's features prevent this acceptance: 128K bytes RAM and a single 360K byte floppy disk drive. Only through costly peripheral purchases can both of these limitations be overcome. First, you will need to add a minimum of 256K bytes RAM (for a system total of 384K bytes). This excessive amount is dictated by the PCjr's video RAM usage. Also, this value is *only* good for PC-DOS 2.X. If DOS 3.X is used, the minimum amount of total system RAM is 448K bytes.

Second, you will need to add a second floppy disk drive (or a hard disk drive) to the PCjr. Several independent manufacturers have supplied these drives through the years. Unfortunately, when IBM elected to officially discontinue the PCjr, many of these suppliers left the "*junior*" market. One manufacturer who supplied both memory upgrades and second disk drives for the PCjr was Legacy Technologies, Ltd. (4817 N. 56th Street, Lincoln, NE 68504). If you are interested in turning your PCjr into a GEM, send an inquiry to Legacy Technologies and find out if they are still in the junior business.

By adding these products to the standard IBM PCjr, you MIGHT be able to run GEM. There are still several problems with the junior's video display mapping technique. The biggest problem is that GEM lacks a suitable driver for this display. Therefore, even with the extra memory and another disk drive, the PCjr remains GEM-less.

COMPAQ

COMPAQ manufactures numerous computer models. Of these, the Portable, PLUS, PORTABLE 286, and comparable DESKPRO series offer a verified ability to run GEM. Each of these computer models mimics a specific IBM model. For example, the Portable is COMPAQ's IBM PC representative. By using the same MPU, clock speed, disk drive configuration, memory characteristics, and display characteristics, the Portable is an accurate duplicate of the IBM PC.

The IBM PC XT is copied by the PLUS. This portable computer faithfully follows the MPU, clock speed, drive storage configuration, and display characteristics established by the PC XT. Even the XT's powerful 10M byte hard drive is somehow squeezed into the small confines of the PLUS. One deficient area on the PLUS, however, is the standard amount of RAM found on the main system board. Only 128K bytes RAM is available on a standard PLUS. Granted, the RAM can be expanded on the system board, but this point should be considered prior to attempting to install GEM on an unexpanded standard PLUS.

COMPAQ's clone of the IBM PC AT, the PORTABLE 286, exactly follows all of the AT's hardware specifications except one. The PORTABLE 286 uses two different, switch-selectable clock speeds—6 MHz (the IBM PC AT standard) and 8 MHz.

This second clock is used for speeding up applications. By using this special clock speed switch, GEM can be operated at the higher speed with a noticeable increase in its performance.

Zenith

Another computer manufacturer whose products successfully handle the GEM environment is Zenith. Two models were tested for GEM compatibility: the ZF-148-42 and the ZF-158-42. One point to keep in mind with the ZF-148-42 and the ZF-158-42 is that, although two standard video outputs are built into each of these computers, they are unacceptable for using GEM. In order to bring these Zenith computers up to GEM tolerances, you will need to add one of the display adapter cards that are described in the next section.

Both of these computers come equipped with 256K bytes RAM (which can be expanded to 640K bytes on the system board by using 256K × 1 byte dynamic RAM chips), two double-sided, double-density 360K byte floppy disk drives, and an IBM-compatible ROM. An attractive feature found on these Zeniths is a dual switch-selectable clock speed. A standard IBM 4.77 MHz clock speed is supplemented by an additional 8 MHz speed. This "high speed" setting really makes GEM shine.

The major difference between the ZF-148-42 and the ZF-158-42 is the presence of six IBM-compatible expansion slots inside the ZF-158-42. On the other hand, the ZF-148-42 has one Heath/Zenith expansion slot that can accept any IBM expansion card through an optional adapter board.

If you are willing to spend several nights slaving over a hot soldering iron, a tremendous price savings can be realized on these two Zenith computers. Special kit versions of the ZF-148-42 and the ZF-158-42 are available from Heath Company (a corporate partner with Zenith). Following assembly (you will need to add one double-sided, double-density 360K byte floppy drive to the Heathkit models), the Heathkit HS-148-41 and the HS-158-41 are both functionally identical to their Zenith counterparts. Assembling a computer kit is exciting, as well as educational; but should you goof up, Heath will quickly get you back on the right track.

Other Computers

There are probably more 8088-based IBM PC clones running around than all of the other computers with different MPUs added together. For this reason, GEM compatibility cannot be tested for every model that mimics an IBM PC. Listed below are some of the probable GEM cutters:

AT&T 6300. When somebody as big as the telephone company steps into a market, you had better see what they're hawking. In this case, it's the computer market; and AT&T has decided to do things just a little differently from all of the other PC clones. Instead of using the standard 8088 and 4.77 MHz clock speed, the AT&T 6300 features an 8086-2 operating at a blistering 8 MHz. The result is a computer that is more of an alternative than a copy. Beware of the base model AT&T 6300 which contains only 128K bytes RAM. This version will need a memory upgrade prior to using GEM.

ITT XTRA. Yet another large corporation with a PC-compatible release. There

are no pleasant (or unpleasant) surprises in this IBM look-alike, however. All of the stock PC features are found inside the XTRA's unusually shaped exterior. Only the base model is unable to use GEM without the addition of extra memory and another floppy disk drive. All in all, there's not much extra in the XTRA.

Sperry PC. By using its clout as a major government supplier, Sperry hopes that larger firms will look their way instead of always settling for an IBM system. Actually, the Sperry PC offers some advantages (increased program execution speed, built-in clock, high-resolution graphics) over the IBM alternative that may turn the heads of a few corporate buyers. Once again, the entry model of the Sperry PC is equipped with only 128K bytes RAM. This memory amount will have to be increased before GEM will run on the Sperry.

Tandy 1000 & 1200 HD. Two well-made PC and PC XT copies from one of the founding names in the personal home computer market. Tandy's service is extremely professional and there is a store in practically every major city in the United States. The Tandy 1000 will need two major upgrades (an increase in RAM and another floppy disk drive) before it can use GEM.

Displays

There are two general categories of displays that will operate with GEM: monochrome and color. There are also a limited number of display adapters that can be installed with comparable GEM device drivers. Selecting the wrong display combination usually results in a blank screen and a need to reinstall GEM through GEMPREP.

Monochrome

Monochrome monitors must adhere to the TTL (transistor-transistor logic) signal loads used by the IBM Monochrome Display for complete GEM compatibility. There are also several monochrome display adapters that are supported by GEM.

Monochrome Monitors:

COMPAQ Display. These built-in, nine-inch green monitors require a special display driver that is supplied with GEM.

IBM Monochrome Display. This is the standard upon which all other monochrome monitors are based. The green phosphor, 11 1/2" screen provides crisp text and high-quality graphics.

Princeton Graphics Systems MAX-12. A high-resolution amber monitor with automatic pixel adjustment for different resolution display adapters.

Tandy VM-3 Monochrome Monitor. A 12" green phosphor screen that is matched for the Tandy 1000 and Tandy 1200 HD computers.

Zenith ZVM-1240. This 12" green CRT (cathode-ray tube) has a special anti-glare filter that is supposed to reduce eye strain during prolonged use.

Monochrome Display Adapters:

AST Preview!. This adapter exactingly mimics the popular Hercules Graphics Card. As such, special device drivers written for the Hercules card will work with the Preview!. Use the special Hercules device driver for installing this adapter in GEM.

COMPAQ Display Adapter. A special device driver packaged with GEM supports this adapter.

Hercules Graphics Card. For the absolutely *best* GEM resolution, use the Hercules Graphics Card. A fantastic 720 by 348 pixels are possible with this adapter and a monochrome display. By using the Hercules Graphics Card and the IBM Monochrome Display, it is even possible to make Macintosh owners green with envy. GEM has provided a special device driver just for installing the Hercules Graphics Card.

Paradise Modular Graphics Card. A unique multifunction display adapter that is capable of supporting high-resolution text and graphics on a monochrome screen. This card is also able to supply output for an RGB (red-green-blue) monitor and a composite video display. Special Paradise add-on modules can give this display adapter a serial port, a parallel port, 384K bytes RAM, and a clock. This adapter is installed as an IBM Color/Graphics Monitor Adapter.

Color

There are two general color camps with GEM. One side is the standard IBM Color Display type of monitor that is able to generate only two different colors. The opposition is the monitors and adapters that support the IBM Enhanced Color Display standards. It is only with this second group that true color can be had with GEM.

Color Display Monitors:

IBM Color Display. A 12 1/2" RGB monitor with text and graphics ability. In GEM, this monitor is only able to generate two colors when used with a conventional color adapter. When an enhanced color adapter is used, however, GEM is able to display several colors on this display.

Princeton Graphic Systems HX-12. An IBM Color Display compatible monitor with superior resolution in pixel pitch. The result is sharper graphics and text. An ideal monitor for using GEM.

Tandy CM-2 High-Resolution Color Monitor. A close following to the IBM Color Display.

Tatung CM1380. This 13" CRT has dual scan frequencies—one for matching the IBM Color Display and another for providing higher resolution.

Taxan 630. A high-resolution monitor that offers four text modes and a faster scanning frequency. A special Taxan color graphics adapter, the 555 Super Color Graphics Board, adds even greater performance to the 630.

Thomson .38mm Color. Like the Princeton HX-12, this Thomson display uses a finer resolution in its pixel pitch. Unlike the Princeton HX-12, this monitor has an extremely attractive ergonomic exterior that makes it stay beautiful even when the power is off.

Zenith ZVM-1330. The standard text and graphics modes of the IBM Color Display are fully supported by this 13" RGB monitor.

Color Display Adapters:

Hercules Color Card. The major advantage that this card has over its IBM competition is that the Hercules Color Card will fit into an IBM PC XT short slot. The Hercules Color Card also "throws in" a parallel port. But most systems are already overrun with this port. Therefore, this bonus is questionable.

IBM Color/Graphics Monitor Adapter. GEM installs this adapter (and all of the ones under this category) as a two-color graphics board. This is exclusive of the

type of monitor that is used with this adapter. For example, even if this adapter is used with an enhanced color display, the results will still be a two-color display.

Paradise Modular Graphics Card. Any of the above color displays can be used with this adapter. Only one jumper must be changed on this card for receiving a color display.

Enhanced Color Display Monitors:

IBM Enhanced Color Display. Many of the failings with the IBM Color Display have been successfully addressed by this monitor. Increased text resolution, greater color display, and greater pixel numbers are all present in the Enhanced Color Display.

NEC MultiSync. A wide range in scanning frequencies makes this monitor adaptable to an equally wide range of display adapters. Its extremely high resolution graphics ability (a maximum of 800 by 560 pixels), however, makes this monitor best suited for enhanced graphics.

Princeton Graphic Systems HX-12E. An enhanced version of their popular HX-12 color monitor. In trying to match the superior performance that the HX-12 demonstrated over the IBM Color Display through pixel pitch, the HX-12E doesn't fair as well against the IBM Enhanced Color Display. Only a modest increase in pixel pitch has been accomplished this time around.

Enhanced Color Display Adapters:

IBM Enhanced Graphics Adapter. This versatile adapter is able to work with all three of IBM's microcomputer displays.

STB EGA Plus. Each of the graphics and text feature of the IBM EGA are accurately duplicated on this adapter with the addition of a bonus parallel port. The value of this "extra" is dubious on a fully equipped computer.

Orchid TurboEGA. Now this is an adapter for the future. Instead of just copying the technical features of IBM's EGA, Orchid added a faster 7.2 MHz 80286 MPU for processing all of the video information. By including this special high-speed chip, all graphics, which are a major part of GEM, now explosively burst onto the screen in blinding colors. This adapter is even able to support the Hercules Graphics Card monochrome resolution. This is truly the finest display adapter for using with GEM.

Input

There are three different methods of inputting data into the GEM environment: a keyboard, a mouse, and a tablet. A keyboard is an integral part of every computer system and, therefore, requires no further explanation. On the other hand, several different mouse and tablet brands are supported by GEM device drivers.

Mouse Input Devices:

LOGITECH LOGIMOUSE C7. A three-button mouse with a difference. That difference is the independence from both an external power supply and an optical pad. The LOGIMOUSE C7 is a mechanical mouse with extremely fine resolution for its breed. Up to 200 dots per inch can be resolved on any smooth surface. This is by far the best input device for use with GEM.

Microsoft Mouse. Two different models of this mouse are manufactured by Microsoft. The first version uses a special interface card that plugs into one of the IBM's expansion slots. This is the Bus Mouse. The jumper block of the Bus Mouse must be set to jumper position 3 for proper operation with GEM.

The other Microsoft Mouse runs out of any RS-232C port. This is the Serial Mouse. In either case, whichever mouse you use, you will need the special Microsoft Mouse driver software that is shipped with this mouse. During GEMPREP you will be prompted for this disk. Both of these mouses use two buttons.

Mouse Systems Mouse. This three-button mouse, known as PC Mouse, is a radical departure from other conventional mechanical mouses. A special metal pad is placed underneath the PC Mouse during operation. The mouse then "reads" its location with a red LED (light emitting diode) that is located on its ventral side. This technique classifies this mouse as an *optical mouse.* There are several drawbacks to this mouse—the need for the special optic pad being chief among them.

SummaMouse. Another three-button, optical mouse that is an exact copy of the Mouse Systems Mouse. None of the weak points that are so prevalent in this mouse's parent have been corrected in this offspring.

Tablet Input Devices:

Summagraphics MM Series Tablets. There are two different sizes of Summagraphics Tablets: 12 by 12 inch (designated the 1201) and 9 by 6 inch (designated the 961). Both of these tablets connect to any RS-232C port. Holding a large, awkward tablet over a keyboard and trying to move the GEM pointer is pointless. Tablets of any make have a limited practical application with GEM. Look for these "tablets" in the Mouse Options of GEMSETUP.

Output

In order to obtain a hard copy printout from GEM's OUTPUT, an output device must be properly connected to your computer. A rich and diverse group of peripherals is supported by GEM device drivers. Four different groups of output devices are available to OUTPUT: dot matrix printers, plotters, laser printers, and photographic cameras. To a certain extent, daisy wheel printers are also supported by GEM, but strictly for text production.

Too many serial devices can cause problems for the GEM system that tries to use a mouse, a plotter, and a printer. In these cases, you will have to make some special allowances. First, only two RS-232C ports are recognized by GEM. These are labeled as COM1 and COM2. It doesn't matter if you have three serial devices, only two of these peripherals can be connected to GEM at one time. One solution to this limitation is to install a standard version of the GEM Desktop with your mouse on COM1 and your plotter attached to COM2. Then, when you want to use your serial printer, all you have to do is run GEMSETUP and install the printer at COM2. The biggest drawback to this solution is that you will have to restart your system in order for the new setup summary to take effect.

Another possibility for handling several serial devices is to install several unique versions of the GEM Desktop. Each of these various desktops could then address a different set of peripherals. Once again, you would have to reboot your system to realize the full use of this technique.

If one of these serial peripherals is an output device, like a plotter, printer, or camera, then GEM will automatically create two additional lines for a batch file that is on the GEM STARTUP disk. This batch file will be either the GEM-created GEM.BAT or the user-created AUTOEXEC.BAT. These lines serve as a means for telling DOS

to redirect all output from the parallel port (LPT1) to the designated RS-232C port (COM1 or COM2) and to use a special communications protocol during all future output. The DOS MODE command is used for signaling this port and protocol change. Therefore, MODE will be on your GEM STARTUP disk for executing either of these modified batch files (GEM copies this file onto the disk automatically).

Dot Matrix Printers:

Epson FX, JX, MX, and RX. These are the classics of the dot matrix printer field. No other printer has achieved such a clear domination of a market segment as that expressed by Epson printers. Two resolution modes are supported for these printers in GEM. With the MX, however, only the low-resolution graphics mode should be used. If you have further questions about dot matrix printers, please refer to the definitive book on the subject, *EPSON, EPSON, Read All About It!* (Addison-Wesley, 1985), which just so happens to have been co-authored by me.

IBM Color Jetprinter. If you need a color dot matrix printout from any GEM application, this is the printer for you. While the output won't be as precise as that generated by a plotter, the copies will be suitable for draft purposes.

IBM Graphics Printer. Who's kidding who? This printer from IBM is nothing more than an Epson RX printer with a different ROM and nameplate. Of course, the different ROM on this IBM printer has the ability to print all of IBM's oddball character set. This point, however, doesn't mean much in GEM.

Juki 5510. Now here is a printer that doesn't know what to be when it grows up. By flipping several internal DIP (dual in-line package) switches, you can turn the Juki into an Epson or the Juki into an IBM or the Juki into a color dot matrix printer. Each of these different modes has further variations on its character set and foreign language font. Two GEM installations are possible with the Juki 5510: as an Epson and as an IBM Graphics Printer. This versatility endears the Juki to the GEM environment.

Star Micronics SG, SD, and SR. Star knows a good thing when they see it. All of their printers follow the escape code sequences used by the Epson printers. Therefore, all graphics and text that is sent to an Epson will print equally well on a Star. These printers should be installed with GEM's IBM/Epson drivers.

Plotters:

Hewlett-Packard 7470A, 7475A, 7440, and 7550 and IBM 7372. These plotters connect to any RS-232C port. DIP switch settings, pen placement, and paper adjustment are left to the user. With a plotter installed in GEM, high-resolution color output is possible. This quality is particularly important when using GEM Graph.

Laser Printers:

Apple Computer LaserWriter. Nothing can compare to the print quality of a laser printer. And, in laser printers, the Apple LaserWriter represents a landmark achievement. This is one of the first commercially successful laser printers that addresses the personal computer market. Originally intended to connect with a Macintosh computer, the LaserWriter is also able to interface with an IBM microcomputer (through any RS-232C port).

Resolution is superb and the speed of production is outstanding. For GEM OUTPUT, this is the ultimate output device.

Hewlett-Packard LaserJet+. This is the most recent release of the original

personal computer market laser printer. Even this newest model, however, loses a little in performance to the LaserWriter. The older LaserJet I is also supported by GEM.
Photographic Cameras:

Polaroid Palette. Recording GEM documents off of a standard display is an impractical proposition. Very few office environments would permit a total exclusion of overhead lighting for snapping a few screen shots. Furthermore, setting up a camera and tripod would try any executive's patience. Leave it to Polaroid to come up with the perfect solution. Just connect the Palette to an RS-232C port and a composite video signal port and you can snap screen pics without a tripod or dimming any room lights. Each GEM image is first saved on a floppy disk by the Palette and then processed later. The actual processing takes place on the Palette with a built-in 35mm camera (an optional Polaroid back will give you instant results). After the film has been exposed by the Palette, it is developed by conventional means. This is the best method for converting GEM Graph and GEM WordChart documents into presentation-quality transparencies.

Memory

GEM isn't near the memory hog as are some of the other alternate DOS environments. Both DESQview and Windows require memory amounts of 512K bytes RAM, with 640K bytes RAM being the preferred value (see Chapter 9). GEM, on the other hand, can get by with considerably smaller RAM values.

These GEM memory sizes are determined by the version of DOS that you will be using. For example, the version 2 DOS family has a GEM RAM minimum of 256K bytes. Alternatively, when a version 3 DOS family is used, this minimum RAM value increases to 320K bytes. Therefore, any IBM PC user who installs the GEM Desktop with PC-DOS 3.21, for example, will need at least 320K bytes of RAM for proper system operation. Achieving this necessary RAM value in an IBM PC with a maximum system board configuration of 256K bytes RAM is only possible through memory-laden expansion boards.

Note: While GEM can "get by" with these minimums, the best performance will only be realized through larger memory computers. In this case, 640K bytes RAM should be considered the ideal memory size.

One of the better ways to improve your GEM performance is through the addition of one or more RAM drives. These RAM drives are volatile data storage devices that will lose all of their information each time the computer's power is turned off. They can, however, dramatically increase the overall speed of application loading by avoiding the inevitable delays invoked by mechanical drives (yes, this also includes hard drives).

Because of GEM's need for conventional memory, a RAM drive can only be used in expanded memory. Expanded memory is a special convention established by several manufacturers as a way of circumventing DOS's 640K byte RAM limit (see below under Intel Above Board). If you elect to use a RAM drive with GEM, make sure that you correctly notify DOS of this drive's existence. Additionally, use the GEM Desktop for assigning an icon to the RAM drive. The **Install Disk Drive . . .** command under the Options Menu is used for giving the RAM drive its designation (usually C: in a dual floppy system or D: in a hard drive system) and its icon. Due to the RAM drive's

speed factor, you might prefer to use a hard drive icon for identification on the GEM Desktop (although either a floppy or a hard icon will work).

The RAM drive itself will have to be configured during the GEM startup phase. This usually involves placing special commands inside a CONFIG.SYS file. In the case of most RAM drive software, DOS's **DEVICE=** command is used along with the name of this software and any of its special RAM drive parameters. Once this RAM drive has been installed during GEM STARTUP, the icon assignment will take place following the loading of the GEM DESKTOP directory. After you have completed all of these chores, applications and documents can then be copied to the RAM drive through standard GEM icon dragging techniques.

Memory Expansion Boards:

AST SixPakPlus. This is one of the first multifunction memory expansion cards for the IBM PC. A maximum of 384K bytes RAM can be installed on this board. The SixPakPlus also has a serial port, a parallel port, a battery powered clock/calendar, and a software package that provides RAM drive and print spooler applications for the additional RAM.

IBM 64/256Kb Memory Expansion Option. IBM must feel that this market is being adequately satisfied by independent manufacturers. Their cast into the memory expansion board arena is a weak product that is a throwback to the days when 256K bytes RAM was enough memory to choke a spreadsheet. Today's power GEM user, however, needs huge amounts of memory where even 640K bytes RAM is an inadequate amount.

Intel Above Board. Lotus, Intel, and Microsoft put their corporate heads together and concocted a method for breaking DOS's self-imposed 640K bytes RAM barrier. This method, known as the Expanded Memory Specification (EMS), can provide up to 8M bytes RAM for programming, RAM drives, and print spoolers. The only problem with EMS is that software manufacturers must adhere to this specification in order for their programs to use this extra memory. Intel supplies this type of special programming for placing RAM drives and print spoolers inside this expanded memory. This leaves GEM free to exploit a full 640K bytes of conventional RAM.

Orchid Conquest. Add a multifunction board to an EMS board and you have the Conquest. The Conquest is an attempt by Orchid to kill several markets with one card. By combining 2M bytes RAM with a serial port, a parallel port, and a battery powered clock/calendar, Orchid hopes that all of your expansion needs will be satisfied. There is also the now requisite software package with RAM drive and print spooler applications. To be fair, Intel also offers a multifunction EMS board. The Intel board, however, is only able to supply 1.5M bytes RAM. In either case, one of these two expansion boards is the ideal GEM memory embellishment.

Hard Disk Drives

Using GEM on a twin floppy disk drive system can cause problems—namely disk swapping (although the number of swaps is relatively minor). The best way to avoid these infrequent disk changes is to place GEM and all of its associated applications onto a hard disk drive.

Contrary to popular belief, hard drives can be installed by the user. The entire process can usually be performed in under 30 minutes and the results are of a profes-

sional stature. No special tools are required and no soldering is needed. Just disconnect the power cables and remove the right-hand floppy disk drive from your IBM (this drive slides forward after a side mounted set screw has been removed). Next slide in the new internal hard drive. Finally, install the hard drive's controller board and connect the necessary cables. You can now install GEM with GEMPREP onto this hard drive.

Hard Disk Drives:

Mountain Computer 20M byte DriveCard. This revolutionary device is a functionally complete hard drive and controller housed on a single expansion board. The drive itself is a 3 1/2" technological breakthrough. Installation of the DriveCard differs dramatically from that of a more conventional hard drive. A single expansion slot is used for holding this hard drive and there is no wrestling with cables or mounting hardware. Even better, installing the DriveCard does not require the removal of a floppy disk drive. Therefore, a system equipped with the DriveCard retains the dual floppy drives for added storage. An unfortunate blemish on the DriveCard is its excessive depth. Even though this card installs in one slot, its thickness blocks an adjacent slot. Therefore, the DriveCard actually uses two slots.

Plus Development Hardcard. A complete 10M or 20M byte hard disk drive and controller all on a single expansion board. Actually, the Hardcard was the first of these new "hard drive on a card" products. Its ability to slip into a single IBM expansion slot has made the Hardcard an attractive alternative to the standard internal hard drive. In the case of the Hardcard, only one expansion slot is actually used. This highly regarded feature separates the Hardcard from the rest of the hard disk drive card market. Furthermore, the Hardcard comes with a marvelous directory program that enhances GEM's ease of use. Another Hardcard plus is that both floppy disk drives can stay in the system. By far, the Hardcard is the best storage method for using GEM.

Seagate 20M byte Internal Hard Drive. Of all the common hard drives, this brand and size remains the most popular for the GEM user. Each Seagate (there is a version for XT, as well as AT computers) hard drive comes with all of the necessary mounting hardware and cables. A Western Digital Controller board also comes with the Seagate (like the drive that it drives, this is one of the better controller cards).

Chapter 3

GEM Collection

When you hand someone a pencil and a piece of blank paper, what do they do? Some people sketch a portraiture of a classmate, others calculate their checking account's balance, and still others set their pen to a short piece of prose. No matter which action is undertaken, the end result is always the same—people are being creative.

If we distill the myriad of possible pencil and paper actions down into their most basic elements, we are left with two broad categories of action: writing and drawing. Coincidentally, these are also the two most prominent categories in computer software. In the terminology of computers, however, these writing and drawing categories are known as *word processing software* and *graphics software,* respectively. Of the hundreds of programs that fill both of these select software niches, very few reach a point of consumer recognition. Even fewer of these packages become widely accepted enough to be considered a standard for their specific category. WordStar, in the word processing category, is probably the best example of a program that has reached this coveted celebrity status. Unfortunately, there is no similarly definitive product for graphics software. Well, GEM Collection is out to change the complexion of both the word processing software standard and the graphics software standard.

DRI has combined these two prominent software categories into a single package that is known as GEM Collection. Actually, GEM Collection is two separate software disks, GEM Paint and GEM Write, that are linked together by the GEM Desktop. These are true GEM applications, which fully exploit all of the mouse, menu, and command activities that you discovered in Chapter 1.

Basically, there are two ways of working with GEM Collection. GEM Paint and GEM Write can either be used individually from the GEM Desktop or they can be com-

bined into a powerful word processing/graphics package that would make even WordStar envious. But which mode of operation is best?

The real beauty of working with GEM Paint and GEM Write on the GEM Desktop is that you don't have to make a choice. Just point and click and you'll be using these applications individually, or point and click again for placing GEM Paint images inside a GEM Write document. During all of your carefree pointing and clicking, GEM manages all of the file and disk dirty work and lets you print a full-color, illustrated text (if your system is so configured), which will generate avaricious thoughts from your corporate competition. Attempting a similar process through DOS and software like WordStar would be literally impossible. Happy painting and writing.

GEM PAINT

Imagine a blank sheet of paper and an unlimited supply of paintbrushes and pigments. Couple to this vast assortment of tools the ability to draw perfectly straight lines, gracefully smooth arcs, and finely detailed patterns. Believe it or not, you have just highlighted the outstanding features found in GEM Paint.

GEM Paint is a graphics development package that deals with imagery on the pixel level. In other words, each line, arc, and pattern that you place on the GEM Paint Painting Surface is composed of numerous screen pixels. In turn, each of these pixels can be individually controlled through GEM Paint and placed in either an "on" or an "off" condition. This "on" and "off" state is equivalent to a dark pixel and a light pixel, respectively. The result is a detailed, high-resolution picture that can be transcribed "pixel for pixel" onto a dot matrix printer.

Note: This pixel method of graphics production is radically different from the technique used by GEM's other graphics program, GEM Draw. GEM Draw creates its imagery on an element level. Refer to Chapter 4 for more information on GEM Draw.

The one drawback to this type of image creation is the enormous consumption of disk storage space. Basically, each pixel is represented by one or more bits of data (the extra bits serve as characteristics of color, hierarchy, etc.). Subsequently, each of these bits are stored on the disk media (either floppy or hard). All of this means that an average GEM Paint image will cost around 18K bytes of disk storage space. Conversely, a highly detailed image could run up to 35K bytes of data. These are important points to remember when committing your images to storage.

Tip: Based on this knowledge of GEM Paint image size, hard disk drive users should realize that it is far more practical to use a floppy disk for holding all of your GEM Paint work. This strategy prevents the wasting of precious hard disk space with memory-hungry graphics imagery. Additionally, a nice graphics library can be constructed from this practice.

INSTALLING GEM PAINT

DRI sells GEM Paint on one floppy disk. In GEM Collection, this disk is identified as disk 1 of 2 (disk 2 of 2 is GEM Write). Before you go any further, you should make a backup copy of this floppy disk. You will then use this backup copy for your GEM Paint installation. An unfortunate oversight by DRI has left this GEM Paint master disk in a write-enabled condition. In other words, if you use the wrong DOS command,

you could erase this disk and destroy GEM Paint. Remember, in first grade, when Tommy Baker broke all of your crayons? Well, to prevent this possible calamity, immediately write protect your DRI-issued GEM Paint master disk (use the small sheet of rectangular, self-adhesive tabs that came packaged with your floppy disks). Now, you are ready to back up your GEM Paint disk.

Backing Up GEM Paint

☐ Place your DOS disk in drive A:.

Format a floppy disk.

☐ Type: **FORMAT**

☐ Press the ENTER key.

Follow the formatting instructions. (Remember to remove your DOS disk from A: before you begin.)

☐ Insert the GEM Paint master disk in drive A:. (Make sure that you have *write protected* this disk.)
☐ Insert your newly formatted disk in drive B:. (This disk should NOT be write protected.)

Copy the root directory.

☐ Type: **COPY A:*.* B:**
☐ Press the ENTER key.

This command will copy INSTALL.APP and INSTALL.TXT.

Make two new subdirectories on the disk in drive B:. (The abbreviation MD will be used for the make directory command MKDIR.)

☐ Type: **MD B:\GEMAPPS**
☐ Press the ENTER key.
☐ Type: **MD B:\IMAGES**
☐ Press the ENTER Key.

Copy the contents of one master disk subdirectory to the disk in drive B:.

☐ Type: **COPY A:\GEMAPPS B:\GEMAPPS**
☐ Press the ENTER key.

This command will copy PAINT.APP, PAINTH.RSC, PAINT.RSC, SNAPSHOT,ACC, and SNAPSHOT.RSC.

Copy the contents of the other master disk subdirectory to the disk in drive B:.

☐ Type: **COPY A:\IMAGES B:\IMAGES**
☐ Press the ENTER key.

This command will copy TIGER.GEM, FLORPLAN.GEM, MAP.GEM, POREQ.GEM, RPTCOVER.GEM, SHORTHI.GEM, SHORTCUT.GEM, HOUSE.GEM, SHIP.GEM, FLORPLAN.IMG, MAP.IMG, POREQ.IMG, RPTCOVER.IMG, TIGER.IMG, SHORTCUT.IMG, SHORTHI.IMG, SHIP.IMG, and HOUSE.IMG.

Make an additional subdirectory for a subdirectory.

☐ Type: **MD B:\GEMAPPS\PATTERNS**
☐ Press the ENTER key.

Copy the contents of the master subdirectory subdirectory to the disk in drive B:.

☐ Type: **COPY A:\GEMAPPS\PATTERNS B:\GEMAPPS\PATTERNS**

☐ Press the ENTER key.

This command will copy COLOR0.PAT, COLOR1.PAT, COLOR2.PAT, COLOR3.PAT, COLOR4.PAT, COLOR5.PAT, COLOR6.PAT, MONO1.PAT, MONO2.PAT, MONO3.PAT, COLOR.PAT, LINES.PAT, and MONO0.PAT.

The backup disk is complete. Remove and label this disk. Place the DRI GEM Paint master disk in a Swiss bank vault.

Installing GEM Paint

You are now ready to install GEM Paint on the GEM Desktop. To perform this installation, you will need two blank floppy disks.

☐ Start the GEM Desktop.
☐ Select the floppy disk B: icon.
☐ Display the File Menu.
☐ Choose the **Format . . .** command. The warning dialog appears.
☐ Insert a blank floppy disk in drive B:.
☐ Click on the "ok" button. (Label this disk "GEM Paint Application.")
☐ Repeat the above steps for the second blank floppy disk. (Label this disk "GEM Paint Data.")
☐ Insert the copied GEM Paint disk in drive A:.
☐ Double-click on the floppy disk A: icon.
☐ Double-click on the INSTALL.APP icon (Fig. 3-1).
☐ A warning dialog appears informing you that this installation requires two formatted floppy disks, called GEM Paint Application disk and GEM Paint Data disk.
☐ An insert dialog appears. Insert GEM Paint Application disk in drive B:.
☐ An insert dialog appears. Insert GEM Paint Data disk in drive B:.
☐ An insert dialog appears. Insert GEM STARTUP in drive B:.
☐ An insert dialog appears. Insert GEM DESKTOP in drive A:.

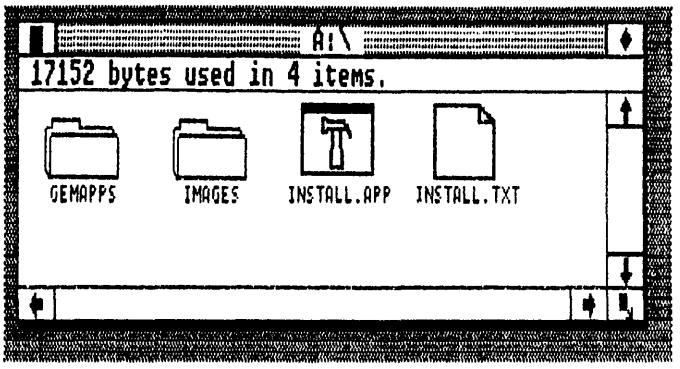


Fig. 3-1. Double-click on the INSTALL.APP icon for installing GEM Paint.

Warning! Failure to place the GEM DESKTOP disk in drive A: will result in a complete system crash. This error can't be corrected by a normal system reset. You will have to turn the computer off and then restart the *entire* installation procedure again.

- ☐ An insert dialog appears. Insert GEM Paint Application disk in drive B:.
- ☐ A finish dialog appears. GEM Paint is now in the GEMAPPS folder on the GEM Paint Application disk and several sample images are on the GEM Paint Data disk.
- ☐ Return to the GEM Desktop.

Granted, several of the DRI-provided GEM Paint images are quite pretty, but they are wasteful of disk space. For example, the nine type .IMG images on the GEM Paint Data disk use 108K bytes. After you have had a chance to examine them, erase them from your GEM Paint Data disk (they will still be on your copy of the GEM Paint master disk, as well as the GEM Paint master disk itself). This will leave you plenty of room for your own images. Additionally, new image disk should mimic the directory path naming convention used on the GEM Paint Data disk. This information is entered through an ITEM SELECTOR dialog. The proper directory path for hard drives is:

Directory: C:\IMAGES*.IMG

or, for floppy drives:

Directory: B:\IMAGES*.IMG

There is a valuable desk accessory that comes packaged with GEM Paint. This accessory, which is found on the Desk Menu, is called Snapshot. The operation of this utility is explained more fully later in this chapter. You will, however, only be able to use Snapshot on systems with a minimum of 320K bytes RAM (this value is inclusive of your DOS version). Furthermore, Snapshot is automatically copied onto your GEM STARTUP disk. Therefore, you will have Snapshot permanently available on both the GEM Desktop and in other GEM applications as well.

USING GEM PAINT

To start GEM Paint, enter the GEM Desktop and insert the GEM Paint Application disk into drive A: and your GEM Paint Data disk in drive B:.

- ☐ Double-click on floppy disk A: icon.
- ☐ Double-click on GEMAPPS folder icon.
- ☐ Double-click on PAINT.APP icon.

Following this brief loading exercise, you are greeted by a blank GEM Paint screen (Fig. 3-2). There are seven landmark features on the GEM Paint screen: the Menu Bar, the Title Bar, the Pattern Palette, the Line Palette, the Color Palette, the Tools Palette, and the Painting Surface. Each of these features performs exactly like their siblings on the GEM Desktop.

Menu Bar

Along the top border of the GEM Paint screen, is a line containing all of the drop-down menus. Every GEM Paint command is accessed by displaying these menus. There are seven GEM Paint menus: Desk, File, Tools, Selection, Patterns, Font, and Style. Each of these menus is described in complete detail in the Gem Paint Reference section later in this chapter.

Title Bar

This explanatory line at the top of the Painting Surface provides all of the disk

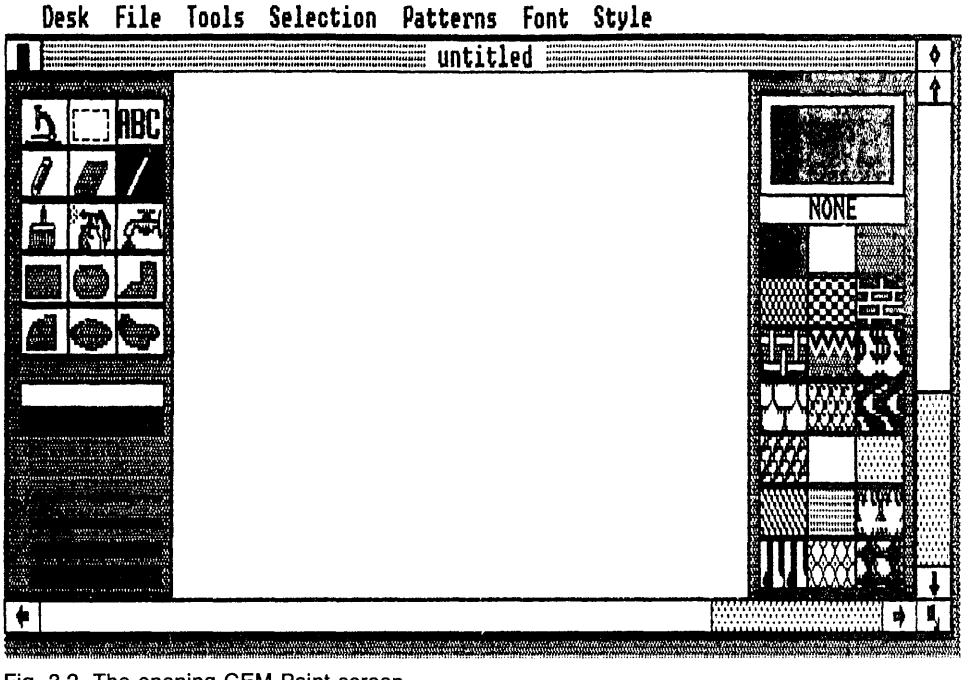


Fig. 3-2. The opening GEM Paint screen.

information related to the current picture. These descriptive elements include: the drive designation, the Directory Path Name, the Picture Name, and the Picture Type. While three of these elements can vary, the Picture Type will always be .IMG when dealing with GEM Paint pictures.

Pattern Palette

Occupying the entire right-hand side of the GEM Paint screen is the Pattern Palette, giving you a selection of 22 different patterns. Each pattern is individually selected, with the currently chosen pattern being displayed in the Current Pattern box located at the top of the Pattern Palette. When you select a pattern, all subsequent painting is carried out in this new design scheme.

Line Palette

Situated along the bottom of the left-hand border is the Line Palette, which offers a selection of five different line widths. A check mark is placed next to the currently selected line width. Once a selection has been made from the Line Palette, GEM Paint uses this line for painting any geometric shape. The dashed line at the top of the Line Palette signifies a transparent line.

Color Palette

The variably-sized Color Palette section lies in the middle of the left-hand border. The actual number of colors filling this palette is determined by the color capabilities of your graphics card/monitor combination. For example, IBM Enhanced Display Adapters are capable of displaying the GEM Paint maximum of eight colors. At the other end of this color spectrum lies the monochrome boards, which can display only four colors in the Color Palette. Once you click on a Color Palette choice, the selected color is applied by the tools during painting. In order to keep track of the currently selected color, the lines in the Line Palette are used to represent the selected color.

Tools Palette

Sitting on top of the other two palettes along the left-hand side of the GEM Paint screen, is GEM Paint's major work palette, the Tools Palette. These fifteen tools are individually selected and used for working on the Painting Surface. Each tool brings with it a unique painting attribute.

Painting Surface

The Painting Surface is the large blank space that fills the entire center of the GEM Paint screen. Think of the Painting Surface as a piece of paper. GEM Paint is able to work with large 8 1/2" × 11" pieces of artwork, but can only display small portions of this image size on the screen. Various menu-driven commands allow you to control the presentation size of your picture on the Painting Surface.

GEM PAINT REFERENCE

The numerous elements found in the Menu Bar and in the Tools Palette can lend profes-

sional results to a picture created with GEM Paint. Each menu contains several different commands that control the Painting Surface's visual activity, as well as the file-related picture archiving. The tools found in the Tools Palette, on the other hand, perform the actual picture creation. This difference in duty can be simplified even further by labeling all tools as pixel controllers and referencing all commands as picture controllers.

Desk Menu (Fig. 3-3)

This menu contains the GEM Paint information and desk accessories. Note: These desk accessories will only be visible and, therefore, active on systems with a minimum of 320K bytes RAM. Without this extra memory, the Desk Menu will not display any desk accessories.

Paint Info . . . displays an information dialog containing the copyright assignment and the number and byte size of pictures which can be painted on the GEM Paint screen.

Calculator displays a multifunction calculator. Refer to Chapter 1 for complete operation instructions.

Clock displays a real-time clock and calendar. Refer to Chapter 1 for complete operation information.

Print Spooler creates a list of documents for output. Refer to Chapter 1 for complete operation information.

Snapshot displays a screen "camera" which can store any GEM Desktop or GEM application image on a disk (Fig. 3-4).

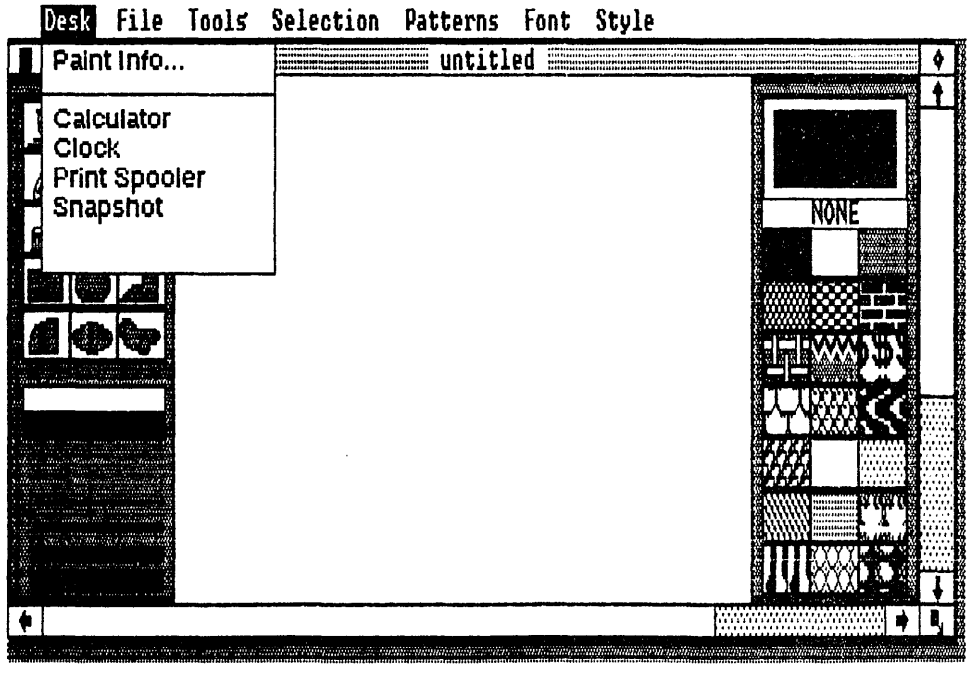


Fig. 3-3. The GEM Paint Desk Menu.

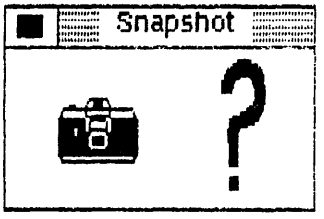


Fig. 3-4. A new desk accessory is added by GEM Paint—**Snapshot**.

During GEM Paint installation this desk accessory is automatically copied onto both your GEM Paint Application disk and your GEM STARTUP disk. On the GEM STARTUP disk you will find the **Snapshot** utility in the GEMBOOT folder.

Any image saved with **Snapshot** becomes a graphics image file on the designated disk. By using a GEM Paint file type (i.e., .IMG), you will be able to load this **Snapshot** image into GEM Paint for composition, revision, and output.

Tip: Use floppy disks for holding your **Snapshot** pictures. This way you can build a complete graphics file library without wasting valuable hard drive space.

To Use the **Snapshot** Command:

- ☐ Display the Desk Menu.
- ☐ Choose the **Snapshot** command. The **Snapshot** window appears.
- ☐ Click on the camera icon inside the **Snapshot** window. The ITEM SELECTOR dialog appears.
- ☐ Enter a directory path name for your **Snapshot** disk in the Directory field. (Be sure to include a drive designation different from the GEM Paint Application disk drive.)
- ☐ Enter a name for your **Snapshot** picture in the Selection field. (If you plan on working with this picture in GEM Paint, you *have* to use a GEM Paint file type. Therefore, use .IMG after your chosen name (remember, the period is already in the Selection field).
- ☐ Click on the "ok" button.
- ☐ The pointer changes to a cross hair.
- ☐ Drag the cross hair from upper left corner of the desired **Snapshot** area to the lower right corner. A dashed rectangle appears around the selected area.
- ☐ Release the mouse button. **Snapshot** saves the selected area onto the designated disk under the specified name.
- ☐ Repeat this process for as many pictures as you want.
- ☐ Click on the **Snapshot** window close box to stop.

On-screen Snapshot Help is available through the presence of friendly, on-screen operational information (Fig. 3-5).

- ☐ Display the Desk Menu.
- ☐ Choose the **Snapshot** command. The **Snapshot** window appears.
- ☐ Click on the question mark icon (?). The **Snapshot** information dialog appears.
- ☐ Click on the "ok" button.

File Menu (Fig. 3-6)

New erases the current picture and creates a blank Painting Surface. This command does not save an active picture.

Open . . . loads the specified picture from disk into GEM Paint. This loaded picture becomes the active window. For information on loading two different pictures, see the Advanced Techniques section later in this chapter.

Close removes the active window picture from the Painting Surface. This command saves the removed picture onto the specified disk drive.

Tip: The Close Box on the active window functions identically to the **Close** command. Use the Close Box as a shortcut for saving a finished picture.

Save saves the active window picture on the specified disk drive under its current name. This action will replace the picture with the same name on the disk with the active window one. This command does not remove the picture from the active window. Another name for this action is "updating."

Save as . . . saves the active window picture on the specified disk drive under a requested name. This name should be different from the current name. A dialog prompts you for this name change. Another name for this action is "backing up."

Abandon restores the original picture prior to the current non-saved changes.

To Output . . . generates the hardcopy output of a GEM Paint picture. Refer to Chapter 1 for operation information.

Quit ends GEM Paint and returns to the GEM Desktop.

Tools Menu (Fig. 3-7)

Undo removes the action created by the last tool use. An action refers to a mouse

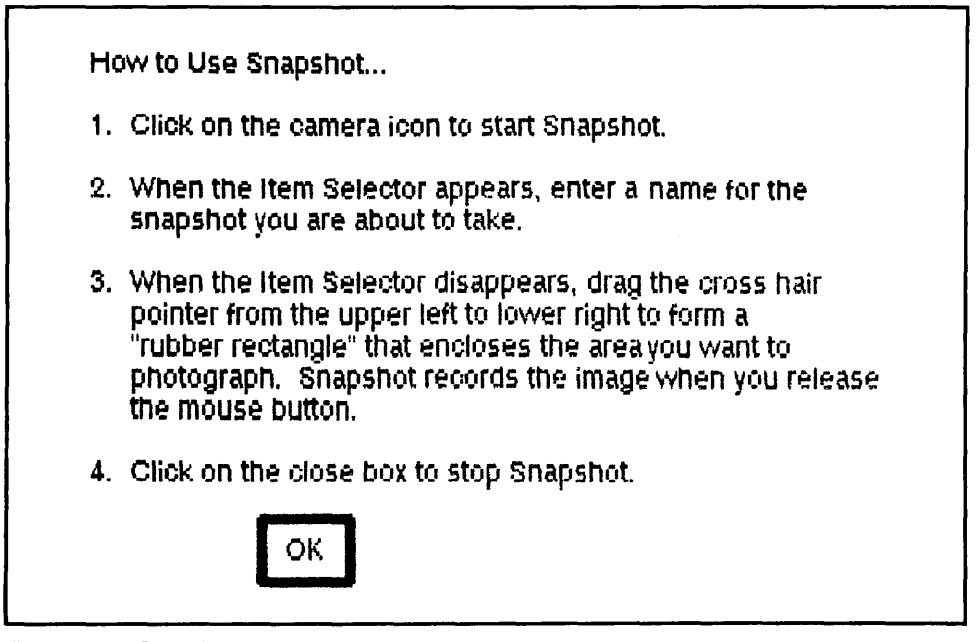


Fig. 3-5. The **Snapshot** help screen.

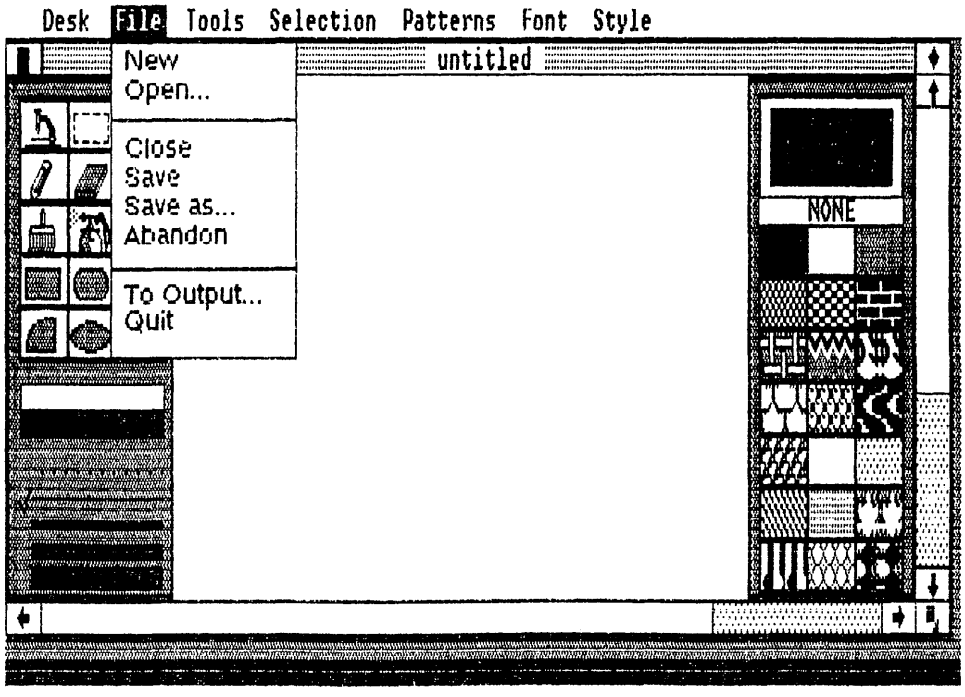


Fig. 3-6. The GEM Paint File Menu.

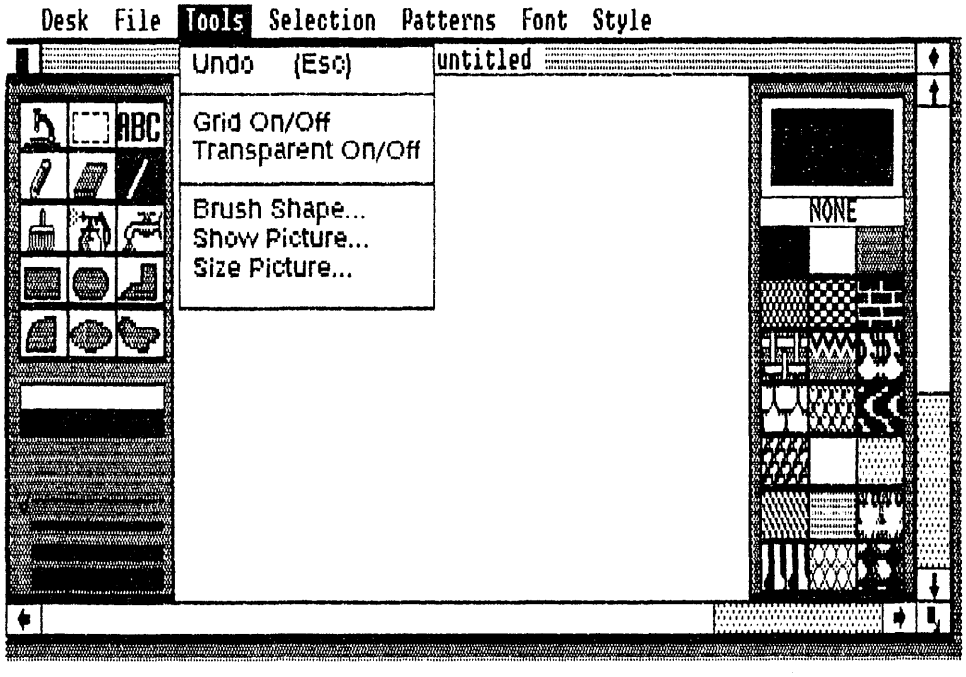


Fig. 3-7. The GEM Paint Tools Menu.

click-defined painting "stroke." For example, if three stray lines have been painted with the **Line** tool, only the last line will be removed with **Undo.** This is due to the last mouse click coming on the third, and final, line.

Grid On/Off activates or removes the grid plotting system. The grid is an invisible piece of graph paper that can be placed underneath the Painting Surface. The **Grid On** command places this grid in the active window. The **Grid Off** command removes the grid from this window. When the grid is active, every tool action "snaps" to the nearest grid point. By using this command, perfect alignment of every paint action is ensured.

Transparent On/Off causes overlaying patterns to become transparent and reveal lower pattern layers. The **Transparent On** command makes the light-colored areas in the topmost pattern transparent. The **Transparent Off** command restores the native opacity of each pattern layer.

Brush Shape . . . offers a selection between several different Paint Brush shapes.

To Use the **Brush Shape . . . Command:**

- ☐ Display the Tools Menu.
- ☐ Choose the **Brush Shape . . .** command. The brush shape box appears.
- ☐ Click on the desired brush shape. A box forms around your selection.
- ☐ Click on the "ok" button.

Show Picture . . . shows your entire picture on the GEM Paint screen. If your current picture is larger than the Painting Surface, this command places the entire picture on the screen.

Tip: When you use the **Show Picture . . .** command, a dashed rectangle frames the part of the picture that is currently visible on the Painting Surface. You can drag this rectangle around on the picture for framing any area that you want to view on the Painting Surface.

Size Picture . . . is a dialog for changing the size of your active window picture. Any change in size that eliminates a portion of your current picture will permanently erase this area from the picture. If this erasure is going to happen, a warning dialog will announce this effect.

Selection Menu (Fig. 3-8)

Note: All of the commands in this menu work concurrently with the **Selector** tool. If the **Selector** tool has not been used, then all of these commands are dimmed and ineffective.

Clear erases the **Selector**-defined area.

Complement reverses the colors in the **Selector**-defined area. For example, all black lines will change to white and all white spaces will reverse to black.

Flip Horizontal flips the **Selector**-defined area around its horizontal axis.

Flip Vertical flips the **Selector**-defined area around its vertical axis.

Patterns Menu (Fig. 3-9)

Hide/Show Patterns activates and removes the Pattern Palette from the GEM

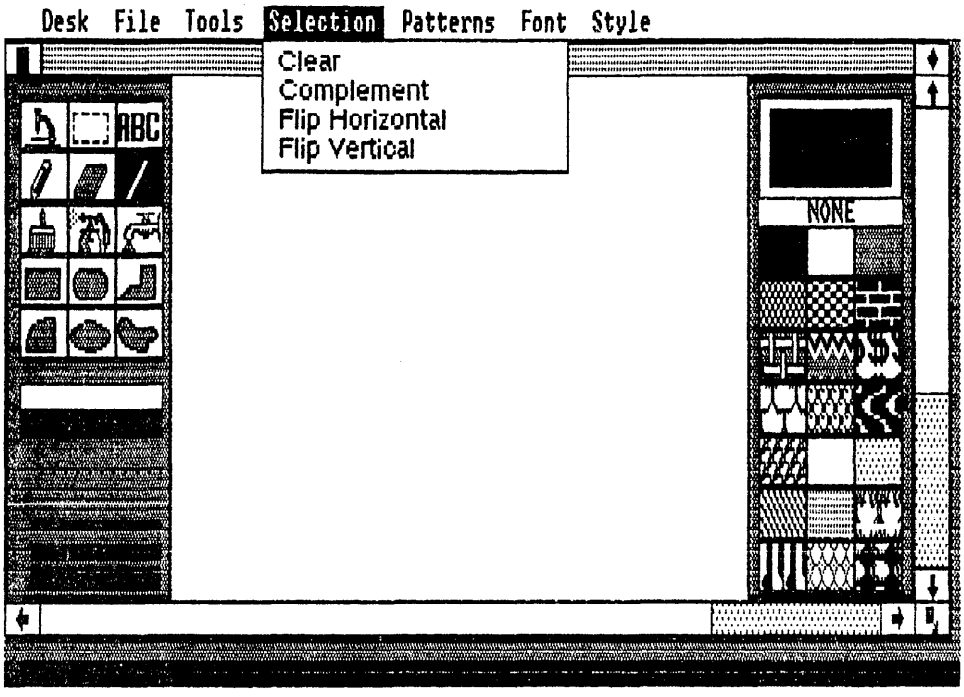


Fig. 3-8. The GEM Paint Selection Menu.

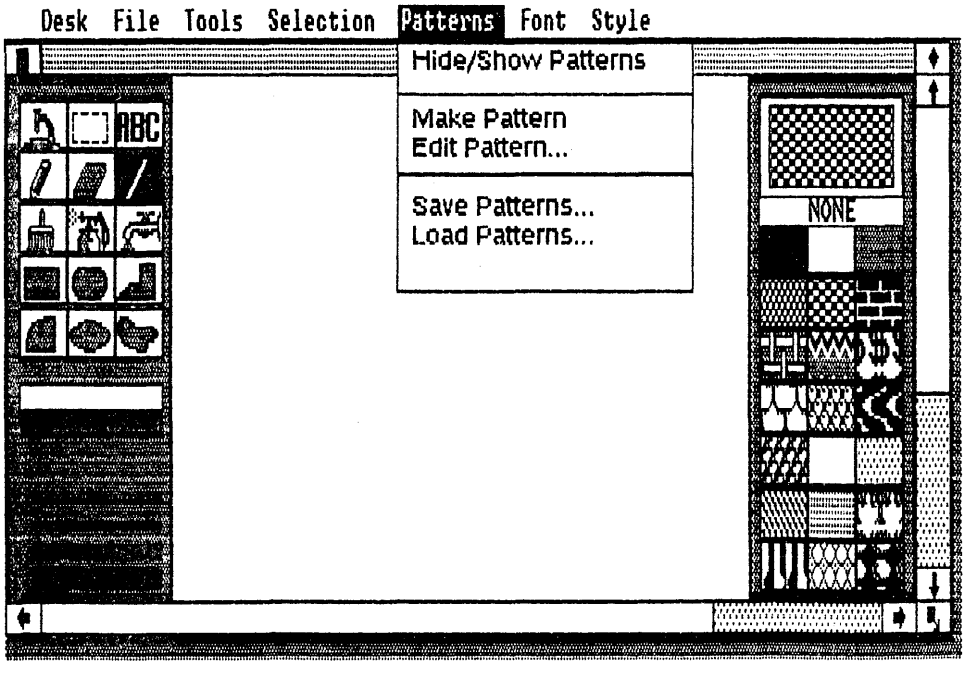


Fig. 3-9. The GEM Paint Patterns Menu.

Paint screen. The **Hide Patterns** command removes the Pattern Palette from the screen. The **Show Patterns** command places the Pattern Palette on the screen.

Make Pattern creates a pattern based on a selected region on the Painting Surface.

To Use the **Make Pattern** Command:

- ☐ Click on the Pattern Palette pattern that you want to replace.
- ☐ Click on the **Selector** tool.
- ☐ Place the pointer in the upper left corner of the new pattern.
- ☐ Click the mouse button. A dashed square, 16 pixels by 16 pixels, will outline the new pattern area.
- ☐ Display the Patterns Menu.
- ☐ Choose the **Make Pattern** command.
- ☐ The new pattern replaces the old pattern in the Pattern Palette.

Tip: When placing the **Selector** pointer in the correct spot for the new pattern, first determine the exact center of the new pattern. Then count eight pixels up and eight pixels to the left, before fixing the new pattern outline with the mouse button click.

Edit Pattern . . . customizes the preparation and illustration of a new pattern.

To Use the **Edit Pattern . . .** Command:

- ☐ Display the Pattern Menu.
- ☐ Choose the **Edit Pattern . . .** command. An editing box appears.
- ☐ There are three windows for editing a pattern:
  - Click on the desired color window.
  - Place pixels inside the work window.
  - Observe the final pattern's appearance in the pattern window.
- ☐ Click on the "ok" button.

Save Patterns . . . saves the current Pattern Palette on the designated disk drive. An ITEM SELECTOR dialog appears after you choose this command. Pattern documents saved with this command should be labeled with the type .PAT. Later, the **Load Patterns . . .** command is used for loading this Pattern Palette into GEM Paint.

Tip: Monochrome system users can create a custom Pattern Palette that will be automatically loaded during the starting of GEM Paint.

- ☐ Create a custom Pattern Palette.
- ☐ Display the Patterns Menu.
- ☐ Choose the **Save Patterns . . .** command. An ITEM SELECTOR dialog appears.
- ☐ Type the following name and type in the Selection field:

MONO.PAT

- ☐ Click on the "ok" button.

Now, every time you start GEM Paint, this custom Pattern Palette will be loaded

automatically. When you want to switch back to the default Pattern Palette during GEM Paint starts, just remove MONO.PAT.

Load Patterns . . . loads a previously saved pattern set into the Pattern Palette. An ITEM SELECTOR dialog appears with this command and prompts you for the name of the desired pattern set.

Font Menu (Fig. 3-10)

All of the commands in this menu are only active when the **Text** tool has been selected. A check mark is placed next to each currently active command.

System. This command activates the standard IBM system font.

Swiss. This is an optional font that won't be available on all systems.

Point. This command allows you to select one of seven different text point sizes, each of which is relative to the system's screen. These actual text sizes might vary on the selected output device. The **Point** command has the following sizes: 8, 10, 14, 16, 18, 20, 28, 36, and 72.

Style Menu (Fig. 3-11)

All of the commands in this menu are only active when the **Text** tool has been selected. A check mark is placed next to each currently active command.

Normal. The **Normal** command selects the standard text style.

Bold. The **Bold** command selects a dark, emphasized text style.

Italic. The **Italic** command selects an italic text style.

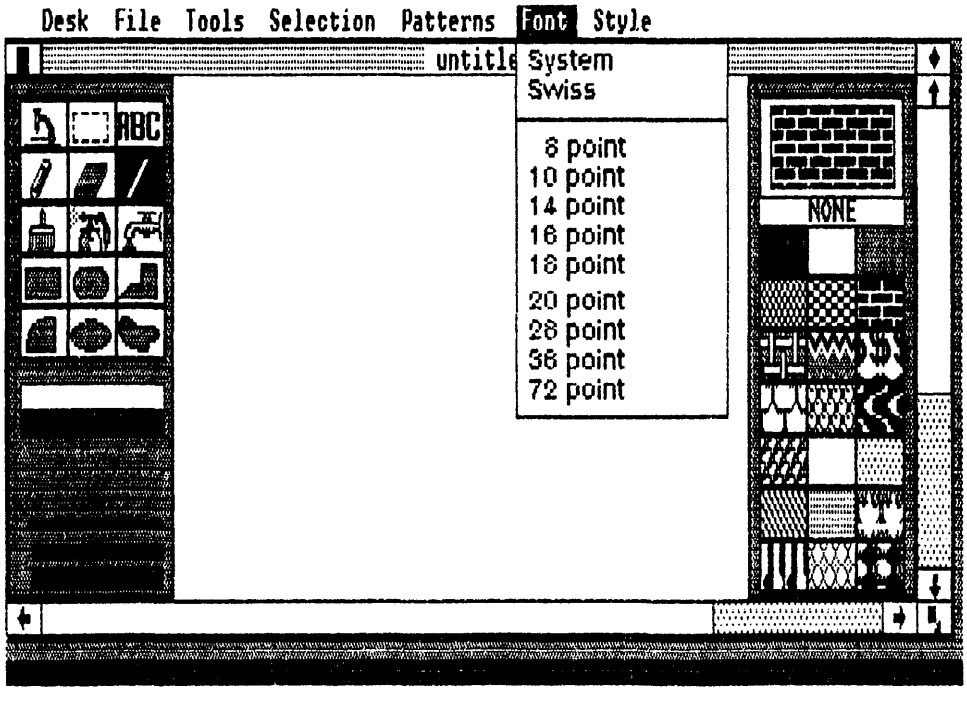


Fig. 3-10. The GEM Paint Font Menu.

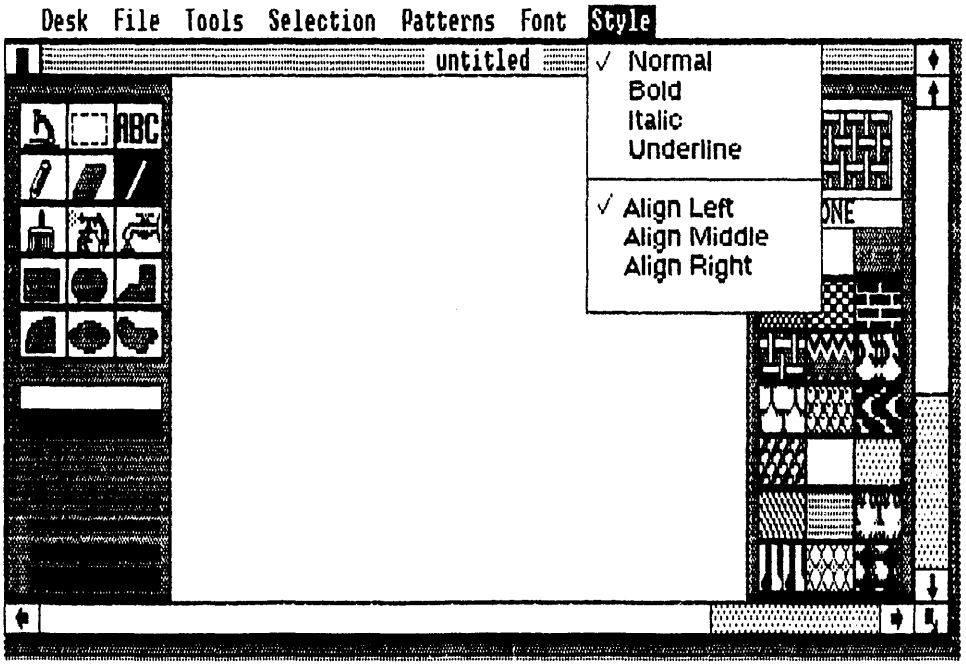


Fig. 3-11. The GEM Paint Style Menu.

Underline. The **Underline** command selects an underlined text style.

Align Left. When the **Align Left** command is selected, the text is justified along the left-hand border of the selected area.

Align Middle. When the **Align Middle** command is selected, the text is evenly centered in the selected area.

Align Right. When the **Align Right** command is selected, the text is justified along the right-hand border of the selected area.

Tools Palette (Fig. 3-12)

Microscope enlarges the selected area for highly detailed work.

To Use the **Microscope** Tool:

- ☐ Click on the **Microscope** tool.
- ☐ Place the pointer over the area that is to be magnified.
- ☐ Click the mouse button. The **Microscope** window appears.
- ☐ The **Microscope** window has four parts (Fig. 3-13):

The exit window shows the area of the Painting Surface where you are working. Click in this window to exit the **Microscope** window.

The *movement window* is used for moving the main **Microscope** window around. To move, drag the small rectangle, in this window, to a new location.

The *color window* is used for selecting the current pixel color. Click on the color of your choice.

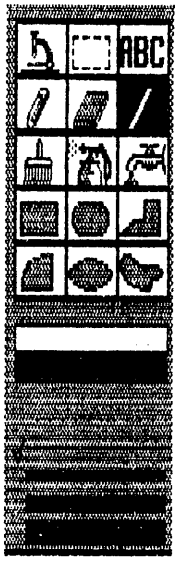


Fig. 3-12. The GEM Paint Tools Palette.

The main **Microscope** window is used for turning pixels on and off, by clicking the mouse button on the desired spot.

Selector defines a work area. This selected area is marked by a dashed border. All of the commands in the Selection Menu are activated when this tool is used. This tool is also used with the **Make Pattern** command (see above).

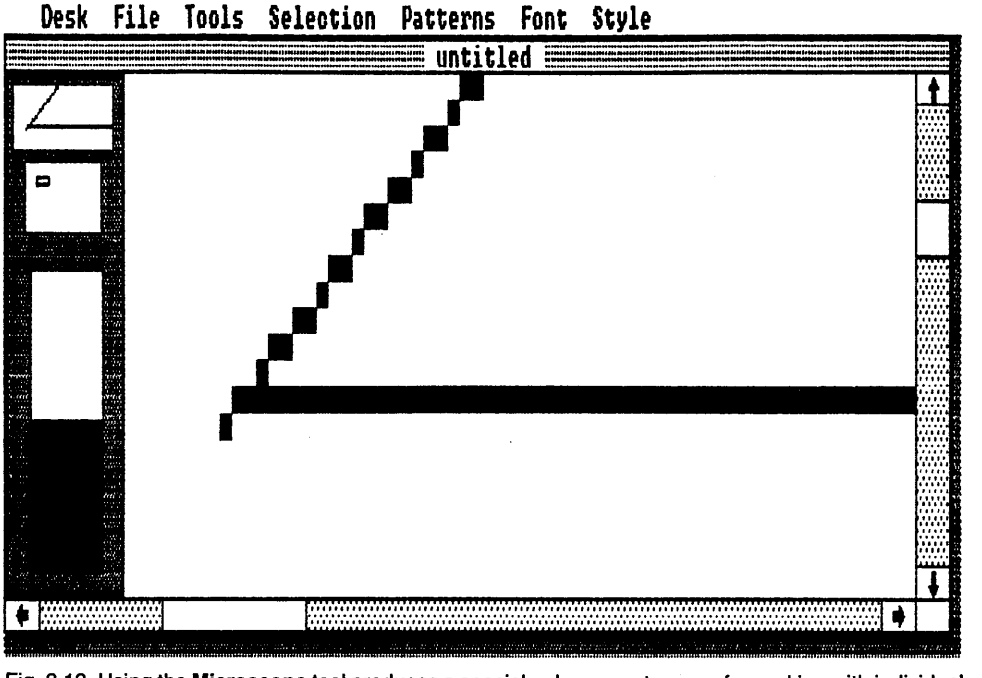


Fig. 3-13. Using the **Microscope** tool produces a special enlargement screen for working with individual pixels.

ABC or **Text** adds keyboard-typed text to your picture. All of the commands in both the Font Menu and the Style Menu are activated when this tool is used.

To Use the **ABC** Tool:

- ☐ Click on the **ABC** tool.
- ☐ Move the pointer to the position for text placement.
- ☐ Click the mouse button.
- ☐ Type the text.
- ☐ Press the ENTER key or move the pointer to a new location to stop text entry on that line.

Pencil draws a single pixel-width line. Drag the pointer to produce a line. Release the mouse button to stop.

Eraser removes any painted area on the Painting Surface. Drag the pointer to erase pixels. Release the mouse button to stop. Selective areas can be erased by clicking the mouse button while the pointer is over the objectionable area.

Line paints a straight line. To make a line, drag the pointer from the line's starting point to its ending point. Release the mouse button to "fix" the line.

Paint Brush paints a line whose size, shape, and pattern have been determined by various commands. The current Pattern Palette choice establishes the **Paint Brush** pattern. The **Brush Shape . . .** command sets the size and shape of the painted line. Drag the pointer to paint a line. Release the mouse button to stop.

Paint Sprayer paints an irregular blob whose size, shape, and pattern are set by the **Brush Shape . . .** command and the Pattern Palette, respectively. Click the mouse button to paint a single blob.

Paint Tap fills the defined area with the selected pattern. The pattern is determined by the Pattern Palette. Click inside the area that you want filled by the selected pattern.

Warning: Any gaps in the defined area will cause the pattern to "leak" outside into the surrounding picture. Even a gap of only one pixel width will start a leak. To stop a leak or to halt a **Paint Tap** fill at anytime, press the mouse button (or, press any keyboard key).

Rectangle paints a rectangle. To make a rectangle, drag the pointer from one corner of the rectangle to its opposite corner. Release the mouse button when the rectangle is the right size and shape.

Rounded Box paints a rounded box. To make a rounded box, drag the pointer from one corner of the rounded box to its opposite corner. Release the mouse button when the rounded box is the right size and shape.

Polygon paints a multi-sided shape. To make a polygon, click the mouse button at the starting point of the first side. Move the mouse to the ending point for the first side and click. Repeat this click-move-click procedure until the polygon is complete. Double-click when you are finished. If you fail to finish your polygon, GEM Paint will automatically connect your starting and ending side for you.

Arc paints an arc. First, click for your center starting point. Now, drag the pointer along the outside periphery of the arc. Release the mouse button when the arc is the right size and shape.

Circle paints a circle. To make a circle, drag the pointer from the center of the circle to its outside radius. Release the mouse button when the circle is the right diameter.

Free Form paints any freehand shape. Drag the pointer around the circumference of the shape. Release the mouse button when the shape is complete.

ADVANCED TECHNIQUES

There are several tricks and shortcuts that can make your GEM Paint life much easier. In many cases, these examples are time-saving alternatives to the standard GEM Paint techniques. Others in this group, however, serve as methods for exploiting all of GEM Paint's power. Learning this little bit of mouse magic will enable you to fully exercise your creative talents.

Alt Key is used with the **Microscope** tool. Hold this key while clicking in the **Microscope** window for changing a pixel to its complementary color.

Backspace Key is used with the **Text** tool. Press this key for erasing typing mistakes prior to changing lines.

Ctrl Key is used with the **Selector** tool. Hold this key while dragging the selected area for moving the selected area without duplication.

Escape Key executes the **Undo** command. Press this key instead of using the menu selection.

Shift Key is used for making accurate geometric shapes. For example:

- ☐ SHIFT + Any Geometric Tool—Constrains the alignment into a perfect shape.
- ☐ SHIFT + **Selector** Tool—Makes the selected area a perfect square.

Space Bar is used with the **Selector** tool. After making an initial duplicate, press this key once before each drag for making additional duplicates.

Item Selector is used for disk and picture maintenance.

Open . . . Command is used for copying graphics between two different pictures (Fig. 3-14).

- ☐ Open your first picture.
- ☐ Open your second picture.
- ☐ Size the two windows so that they are both visible on the screen.
- ☐ Use the **Selector** tool for outlining the area to be copied in the active window.
- ☐ Drag the selected area from one window to the other window.
- ☐ Dragging will duplicate the selected area into both windows.
- ☐ Using the Ctrl key will move the selected area without duplication. Also, this method permanently removes the selected area from the first window.

Edit Pattern . . . Command. Click in the pattern window for filling the pattern with the current color.

Selector. Drag the selected area for a single duplicate.

Selector. Double-click on this tool for selecting the entire Painting Surface.

Eraser. Double-click on this tool for erasing the entire Painting Surface.

Paint Brush. Double-click on this tool for displaying the **Brush Shape . . .** dialog.

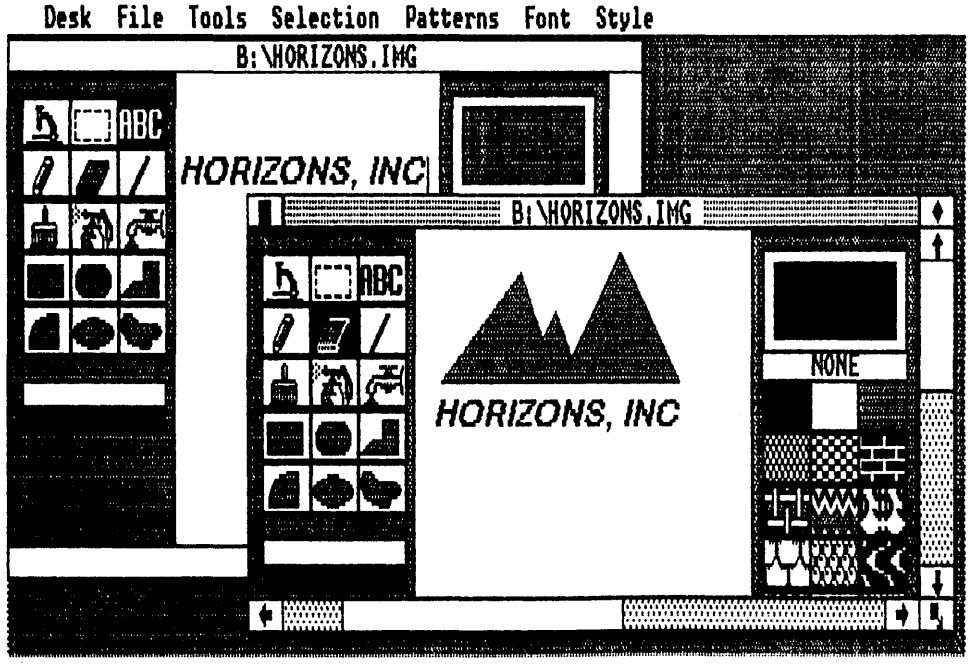


Fig. 3-14. Two different GEM Paint windows may be opened at the same time for exchanging pictures between them.

Paint Sprayer. Double-click on this tool for displaying the **Brush Shape . . .** dialog.

Free Form. Use this geometric tool as a paint brush.

- ☐ Choose a line width from the Line Palette.
- ☐ Select the None pattern from the Pattern Palette.
- ☐ Choose a color from the Color Palette.
- ☐ Drag the pointer to paint with this new "brush."

Pattern Palette. Double-click on any pattern for executing the **Edit Pattern . . .** command.

GEM WRITE

First of all, GEM Write is not WordStar, nor is it a WordStar clone. GEM Write is a powerful graphics-based superset of the Volkswriter Deluxe word processing program developed by Lifetree Software. This distinguishing heritage is an important point to remember when dealing with GEM Write. Other graphics-based word processing software, most notably MacWrite, fail to provide enough feature enhancement over conventional programs. Conversely, GEM Write has enough features, power, and performance to endorse it as a strong word processing alternative.

A graphics-based word processing program offers a strong compositional tool over packages like WordStar. Pictures, images, and designs can be imported into the text

of this graphics-based writing software. GEM Write takes this graphics insertion ability one step further by working with pictures from any GEM application. Therefore, you can write a business report that is fully illustrated with charts from GEM Graph, layouts from GEM Draw, and even a corporate logo from GEM Paint. Each picture is faithfully inserted into the text at the desired location. This ability eliminates the need for a separate illustration packet with accompanying figure referencing. In an overworked art department, this graphics-text merging ability will bring dividends.

A frequently leveled criticism of WordStar centers on command memorization. Granted, WordStar supplies an excellent reference card and a thorough set of online help screens, but your productivity with this program is restricted until you can execute the commands spontaneously. And this spontaneity translates into memorization. GEM Write has completely eliminated this need for command memorization by using an extensive set of drop-down menus that adhere to the simplicity of the GEM Desktop. Every command that is used in GEM Write is contained on these menus. Relying exclusively on these menus for complete command execution might retard the productivity of the mentally gifted GEM Write user who wants to type for speed. Therefore, there are numerous keyboard equivalents for these menu resident commands. This duality gives GEM Write the best of both worlds.

One final valuable commodity with a word processing program is the ability to demonstrate an exact reproduction of your final printed output on the computer's monitor screen. In the jargon of the word processing crowd, this feature is called what-you-see-is-what-you-get (or, WYSIWYG). To a limited extent, WordStar has this ability, but only if you are able to decipher the exact meaning of numerous control codes. GEM Write, on the other hand, displays a completely accurate WYSIWYG screen. For example, fonts, underlining, and margins are all visible on the screen in the exact form that they will appear on the printed page. This versatility removes any chance for an unpleasant surprise spoiling the final GEM Write output.

INSTALLING GEM WRITE

DRI sells GEM Write on one floppy disk. In GEM Collection, this disk is identified as disk 2 of 2 (disk 1 of 2 is GEM Paint). Before you go any further, you should make a backup copy of this floppy disk. You will then use this backup copy for your GEM Write installation.

Backing Up GEM Write

- ☐ Place your DOS disk in drive A:.
- ☐ Format a floppy disk.

Type: **FORMAT**

- ☐ Press the ENTER key.
- ☐ Follow the formatting instructions. (Remember to remove your DOS disk from A: before you begin.)
- ☐ Insert the GEM Write master disk in drive A:.
- ☐ Insert your newly formatted disk in drive B:.

Copy the root directory.

- ☐ Type: **COPY A:*.* B:**
- ☐ Press the ENTER key.

This command will copy INSTALL.APP and INSTALL.TXT.

Make two new subdirectories on the disk in drive B:. (The abbreviation MD will be used for the make directory command MKDIR.)

- ☐ Type: **MD B:\GEMAPPS**
- ☐ Press the ENTER key.
- ☐ Type: **MD B:\DOCUMENT**
- ☐ Press the ENTER Key.

Copy the contents of one master disk subdirectory to the disk in drive B:

- ☐ Type: **COPY A:\GEMAPPS B:\GEMAPPS**
- ☐ Press the ENTER key.

This command will copy WRITE.APP, WRITE.RSC, WRITE.FMT, and WRITE.INF.

Copy the contents of the other master disk subdirectory to the disk in drive B:.

- ☐ Type: **COPY A:\DOCUMENT B:\DOCUMENT**
- ☐ Press the ENTER key.

This command will copy README.DOC and README.FMT.

Make an additional subdirectory for a subdirectory.

- ☐ Type: **MD B:\DOCUMENT\TUTORIAL**
- ☐ Press the ENTER key.

Copy the contents of the master subdirectory subdirectory to the disk in drive B:.

- ☐ Type: **COPY A:\DOCUMENT\TUTORIAL B:\DOCUMENT\TUTORIAL**
- ☐ Press the ENTER key.

This command will copy TUTOR1.DOC, TUTOR2.DOC, TUTOR3.DOC, TUTOR1.FMT, TUTOR2.FMT, TUTOR3.FMT, and GEMLOGO.GEM.

The backup disk is complete. Remove and label this disk. Place the DRI GEM Write master disk in a mayonnaise jar and bury it in your backyard.

Installing GEM Write

You are now ready to install GEM Write on the GEM Desktop. To perform this installation, you will need two, blank floppy disks.

- ☐ Start the GEM Desktop.
- ☐ Select the floppy disk B: icon.

- ☐ Display the File Menu.
- ☐ Choose the **Format . . .** command. The warning dialog appears.
- ☐ Insert a blank floppy disk in drive B:.
- ☐ Click on the "ok" button. (Label this disk "GEM Write Application.")
- ☐ Repeat the above steps for the second blank floppy disk. (Label this disk "GEM Write Documents.")
- ☐ Insert the copied GEM Write disk in drive A:.
- ☐ Double-click on the floppy disk A icon.
- ☐ Double-click on the INSTALL.APP icon (Fig. 3-15).
- ☐ A warning dialog appears informing you that this installation requires two formatted floppy disks, GEM Write Application disk and GEM Write Documents disk.
- ☐ An insert dialog appears. Insert GEM Write Application disk in drive B:.
- ☐ An insert dialog appears. Insert GEM Write Documents disk in drive B:.
- ☐ An insert dialog appears. Insert GEM DESKTOP in drive A:.

Warning! Failure to place the GEM DESKTOP disk in drive A: will result in a complete system crash. This error can't be corrected by a normal system reset. You will have to turn the computer off for a full 5 minutes and then restart the *entire* installation procedure again.

- ☐ An insert dialog appears. Insert GEM Write Application disk in drive B:.
- ☐ A finish dialog appears. GEM Write is now in the GEMAPPS folder on the GEM Write Application disk and a tutorial is on the GEM Write Documents disk.
- ☐ Return to the GEM Desktop. (Optionally, you can go directly into GEM Write from this step.)

The GEM Write Documents disk contains a set of three tutorials that demonstrate many of GEM Write's word processing features. The educational nature of these documents makes their retention worthwhile. Therefore, this disk should be used strictly as a tutorial disk. All of your "working" documents, letters, and reports that are created with GEM Write should be saved on other floppy disks (or, even a hard disk). A good practice with this technique is to devote a floppy disk to each unique document form.

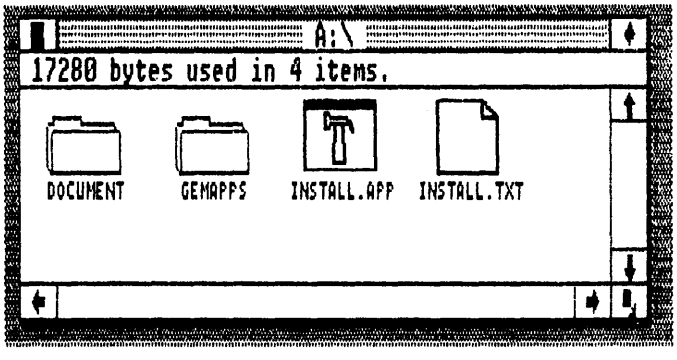


Fig. 3-15. Double-click on the INSTALL.APP icon for installing GEM Write.

For example, you might create a GEM Write Letters disk and a GEM Write Reports disk. This filing method will simplify your efforts in locating a needed reference.

Whatever disk labeling method you adopt, there are several specific GEM Write-dictated guidelines that must be followed.

1. Always allow plenty of free disk space on your GEM Write Documents disk. This free space is used for holding "spill" files. A spill file is created when you compose a document which is larger than your available system memory. These are temporary files that are automatically created, edited, and erased by GEM Write. In terms of free disk space, allow one and one-half times the byte count of the current, working document.

Warning! Never change Documents disks during editing, writing, or reading. Temporary files, such as spill files, are constantly being written, erased, and updated by GEM Write. Inserting a new Documents disk will upset this automatic and invisible file management system. Always save your current document before changing disks.

2. Approximately 75 pages of GEM Write text can be held on a single 360K byte floppy disk.
3. Roughly 30 pages of text can be held in a 256K byte system with accommodations for 250 pages in 640K bytes RAM.
4. When inserting graphics into a GEM Write document, make sure that there is sufficient disk space for holding the picture.

Warning! Never attempt to insert a graphics picture inside another graphics picture. The printed results will be erratic and unpredictable.

USING GEM WRITE

To start GEM Write, enter the GEM Desktop and insert the GEM Write Application disk into drive A: and your GEM Write Documents disk in drive B:.

- ☐ Double-click on the floppy disk A icon.
- ☐ Double-click on the GEMAPPS folder icon.
- ☐ Double-click on the WRITE.APP icon. The **WELCOME TO GEM WRITE!** dialog appears. (This dialog only appears during the initial starting of GEM Write.)
- ☐ Type your name in the name field.
- ☐ Click on the mass storage method used by your system.
- ☐ Click on the "ok" button.

Following this brief loading exercise, you are greeted by the GEM Write identification dialog. A click on the "ok" button of this ID dialog takes you to a blank GEM Write document window (Fig. 3-16). There are four distinct features on the GEM Write document window: the Menu Bar, the Title Bar, the Status Line, and the Cursor. Each of these features, plus the others accompanying them (Slider, Scroll Bar, up-arrow, down-arrow, Size Box, and Full Box), functions exactly like those found on the GEM Desktop.

Menu Bar

Running along the top of the GEM Write document window, is a "bar" containing

all of the drop-down menus. In turn, each of these menus holds all of the commands that can be called during composition with GEM Write. Seven different menus are found on the Menu Bar: Desk, File, Edit, Search, Font, Page, and Options. For complete information on each of these menus, refer to the Gem Write Reference section later in this chapter.

Title Bar

This explanatory line situated underneath the Menu Bar, presents all of the disk information that is relevant to the current document. This information includes: the drive designation, the Directory Path Name, the Document Name, and the Document Type. As a rule, there are two accepted Document Types for dealing with GEM Write: .DOC and .FMT. Only the former of these two types is applied by the user. The latter type refers to a format file (containing the margin, line spacing, page length, etc.), which is automatically saved by GEM Write for recreating the file's visual characteristics on both the computer's screen and the selected output device. During operation one .FMT file is saved for *every* file of the *same* name. For example:

File Saved	*.FMT File Saved*
FORM.LTR	FORM.FMT
PRESS.DOC	PRESS.FMT
JOURNAL.TXT	JOURNAL.FMT
PRESS.LTR	PRESS.FMT
SALES.RPT	SALES.FMT

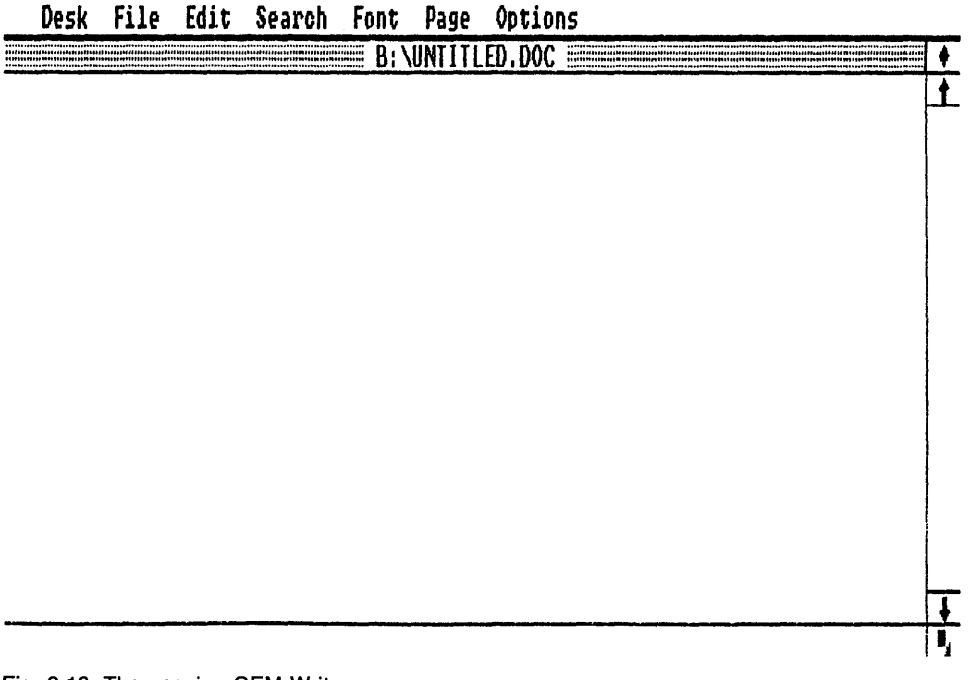


Fig. 3-16. The opening GEM Write screen.

From this example, the format file for PRESS.LTR and PRESS.DOC would be identical. Unpredictable results will occur from this double format file conflict. To avoid this potentially damaging event, *always* supply unique Document Names to each GEM Write document.

Status Line

This information area sitting along the bottom of the GEM write document window continually displays the present location of the cursor. Two values, a page number (in the field Page X), and a line number (in the field Line X), relay the exact cursor location. In reading these values, the page number refers to the full, formatted page, while the line number indicates the line on that page containing the cursor. The Status Line is also used for displaying command messages.

Cursor

Unlike other GEM applications, GEM Write makes use of two indicators. The first indicator is the standard mouse-controlled GEM *pointer.* In GEM Write, the pointer is used for many of the same functions that receives its attention on the GEM Desktop. For example, displaying menus, choosing commands, clicking, and dragging. Another function of the pointer, that is a departure from these GEM standards, is cursor placement. Simply place the pointer anywhere within the document and click. The cursor immediately jumps to this new location (also the Status Line indicates this change in location).

The other GEM Write indicator is the *cursor.* The cursor is a flashing line segment used for referencing the point for text insertion. Once the pointer has positioned the cursor for text entry (or for editing purposes), the pointer disappears whenever text is typed from the keyboard. Any movement of the mouse will make the pointer visible again, however.

Highlighting Text

During the text editing phases of GEM Write, the selected character, word, phrase, or section of text must be highlighted. This highlighting procedure is similar to icon clicking on the GEM Desktop. Following the identification of the text which is ready for editing, the required menu is displayed and the needed command is chosen.
Methods for Text Highlighting:

Dragging. Drag the pointer across the selected text. Place the pointer prior to the beginning of the dubious text (e.g., character, word, line, phrase, etc.). Now drag the pointer (horizontally, vertically, or both) over the erroneous passage. Release the mouse button and execute the desired editing command.

Tip: You can drag in both a horizontal and a vertical line of travel. The vertical drag allows you to highlight several lines, sentences, and paragraphs at the same time.

Column Clicking. Place the pointer in the far left, blank column of the line for highlighting. Click the mouse button for selecting that line. Other lines can be simultaneously highlighted by dragging the pointer down along this column.

Shift-Clicking. Place the cursor at the beginning of the text that is ready for highlighting. Now, shift-click. All of the text from the cursor location to the end of the docu-

ment is highlighted.

If you only want to highlight a portion of the remainder of the document's text, perform the above shift-click technique. Then move the cursor to the end of the text that you want to highlight (use either the scroll method or the **Go To . . .** command). Now, shift-click. This second method highlights a defined portion of text that lies between the two shift-clicks.

Function Keys. Two function keys, F5 and F6, perform the same actions as the previously described double shift-click method. The F5 key is used to indicate the initial shift-click. The F6 key is equivalent to the second constraining shift-click. Similar to the shift-click method, the cursor placement is vital to the proper execution of the function key highlighting.

There will be times when you accidentally highlight the wrong textual passage. In this case, there are several ways that you can "de-highlight" the selected portion of text. The simplest way to remove a text highlighting is to click the mouse button. This click can occur anywhere in the document. Pressing the F10 function key will also de-highlight text. Finally, if you change your mind in mid-drag, you can just reverse your flow and drag the pointer to the line *above* the beginning of the drag. Now, release the mouse button and GEM Write will not highlight the text.

GEM Write Keystrokes

A unique characteristic of GEM Write, which separates it from GEM Paint, is that the keyboard, instead of the mouse, serves as the primary input device. Obviously, writing is a text-oriented process and the keyboard is the ideal interface for generating this product. There are times, however, when the preferred GEM interface, the mouse, must be used. Examples of this mouse activity include: cursor placement, editing, and command selection. Unfortunately, each time you remove one of your hands from the keyboard to use the mouse you suffer a typing lapse. Some typists even find that this lapse can lead to a disconcerting loss in continuity. GEM Write's solution to this predicament is to include a set of keyboard equivalents for certain mouse activities.

Table 3-1 contains all of the mouse activities that have equivalent GEM Write keyboard representatives. When using this table, the notation that links two keys together (+) is defined as pressing and holding the first key, followed by pressing the second key. Furthermore, the notation that indicates that two keys are pressed in succession (,) means that two individual keystrokes (the first key followed by the second key) are needed for executing the specified action.

Note: The keyboard arrow keys can direct the movement of either the cursor or the pointer. Press the Ctrl key to toggle the function of the arrow keys back and forth between cursor direction control and pointer movement.

Special GEM Write Features

When you are typing with GEM Write, the RETURN key is pressed *only* at the conclusion of each paragraph (or fixed line, e.g., titles, subheads, and addresses). This is called a *hard return.* In the case of paragraphs, GEM Write compensates for this continuous string of text with a process known as *word wrap.* Word wrap conveniently breaks each line of text at a space or hyphen adhering to your formatting commands.

ACTION	KEYSTROKE(s)
Backspace	Backspace
Center, line	Alt + F9
Copy, text	Alt + F6
Delete	Delete
, from cursor to line's end	Alt + F4
, line	Ctrl + F4
, text	Alt + F8
Find, next occurence	F7
Font, bold	Shift + F7
, italic	Shift + F10
, underline	Shift + F9
Format . . .	Ctrl + F1
Go to . . .	Ctrl + F7
Insert, line	Alt + F3
, mode	Insert
, text	Alt + F2
Line, beginning	Home, Left-arrow
, beginning	F3
, end	F3
, end	Home, Right-arrow
Margin, set	F9
Move, text	Alt + F5
New	Alt + F10
Page, 1, line 1	Ctrl + Home
, 1, line 1	Home, Home, Home
, closest previous top	Ctrl + PgUp
, last, last line	Ctrl + End
, last. last line	Home, End
, top of next	Ctrl + PgDn
Print Draft	Alt + F1
Reformat, paragraph	F8
Replace, next occurrence	Alt + F7
Save	F2
Screen, bottom, same column	Home, Down-arrow
, down one	Home, PgDn
, lower left corner	End
, top, same column	Home, Up-arrow
, up one	Home, PgUp
, upper left	Home, Home
Short Cuts . . .	F1
Space, forced	Ctrl + Z
STOP . . .	F10
Symbols, show/hide	Ctrl + F3
Tab,	Tab
, set	F9
Word, delete	F4
, next	Ctrl + Right-arrow
, previous	Ctrl + Left-arrow

Table 3-1. A Listing of Mouse Activities and Their GEM Write Keyboard Equivalents.

In other words, all of the text will be automatically aligned with both the left and right margins and no words will be cut off at the end of a line.

Every time you press the RETURN key at the end of a paragraph or other fixed line, a proofreader's paragraph symbol appears (¶). In addition to indicating the presence of hard returns, the paragraph symbol also prevents the highlighting of text. Therefore, the keyboard command **Ctrl + F3** (see above) is used for hiding these symbols

during editing and text highlighting. After these symbols have been hidden, pressing **Ctrl+F3,** again, causes them to reappear on the screen.

Tip: If you do a lot of text editing, and that is one of GEM Write's strong points, then you should leave the paragraph symbols permanently hidden. Two hard returns at the end of each paragraph will serve as an alternate marking method.

There may be times when you will want a phrase to stay together. For example, the pronouncement "You're fired!" loses much of its impact if the two words are written on separate lines. In this case, a *forced space* should be placed between the contraction "You're" and the word "fired!." A forced space fixes words and phrases together so that they can't be separated by formatting and automatic word wrap. To make a forced space, type **Ctrl+Z,** instead of pressing the spacebar, between each word of the phrase.

Altering the right margin will also prevent words and phrases from being separated. Up to 250 characters can be carried on one line of GEM Write by adjusting the left and right margins. Most computer monitors lack the resolution for displaying this wide of a manuscript, however. Therefore, GEM Write can horizontally scroll in ten-character jumps with the arrow keys. Alternatively, the **F3** function key (see above) can be used for quickly jumping to the beginning or the end of any given line.

Two final GEM Write features concern file management. Any document that carries the .DOC type can be used for quickly loading and starting GEM Write. Just double-click on any icon with a .DOC type and GEM Write will be loaded and the selected document will be opened. The selected .DOC type file can be on any disk drive (hard or floppy, A: or B:) and any floppy disk (GEM Write Application disk or GEM Write Documents disk). This technique can eliminate several steps when leaving the GEM Desktop to enter GEM Write.

GEM Write also has the facilities for importing other files, documents, and graphics. Other than graphics, a file created by any word processing program can be used by GEM Write. The only provision that GEM Write exercises over these outside word processed files is that they must be written in a standard ASCII format.

In dealing with outside graphics, GEM Write can only use pictures that have a .GEM type. This restriction includes pictures that have been produced by GEM Draw and GEM Paint (GEM Graph pictures must be converted from their .GRF type to a .GEM type before use with GEM Write).

GEM WRITE REFERENCE

Each of GEM Write's menus contains several different commands that can be accessed either with the mouse or by typing a special command keystroke. The following section describes all of GEM Write's menus and the function of their individual commands. In applicable cases, the keystrokes necessary for choosing the command are also provided.

Desk Menu (Fig. 3-17)

GEM Write Info . . . displays a dialog containing author and copyright information. A point of interest with this dialog is that the Licensed to field contains the name that you supplied in the **WELCOME TO GEM WRITE!** dialog during the initial starting of GEM Write.

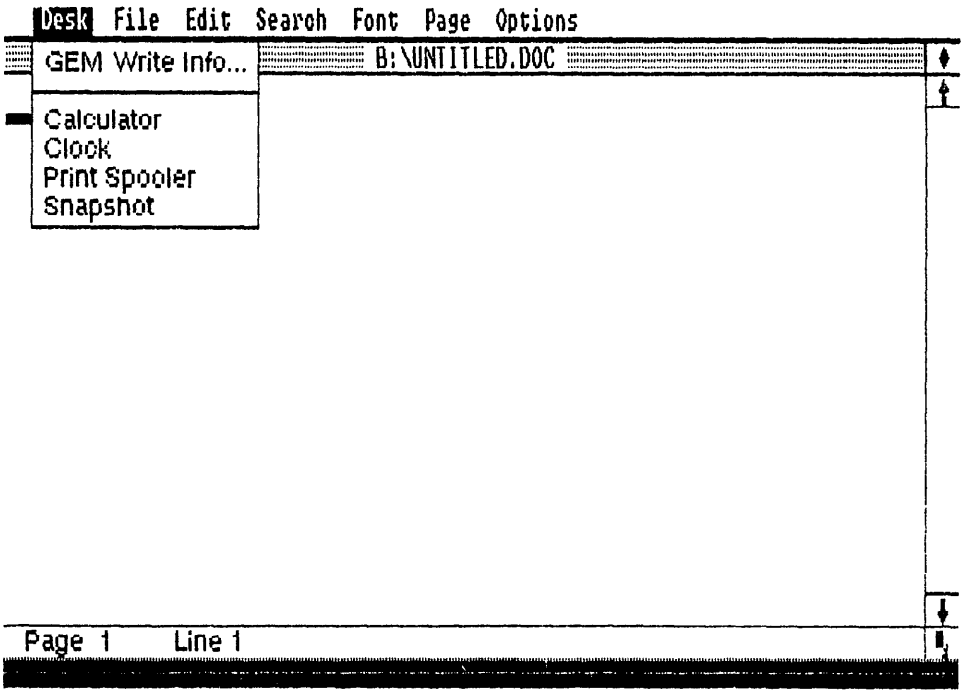


Fig. 3-17. The GEM Write Desk Menu.

Calculator displays a full function desktop calculator. Refer to Chapter 1 for complete operation information.

Clock displays a real-time clock and calendar. Refer to Chapter 1 for complete operation information.

Print Spooler displays a list of GEM documents waiting for output. Refer to Chapter 1 for complete operation information.

Snapshot. This desk accessory is available only from the previous installation of GEM Paint. Refer to the GEM PAINT REFERENCE section earlier in this chapter.

File Menu (Fig. 3-18)

New creates a new, blank document named "UNTITLED.DOC."

☐ Press: **Alt+F10**

Open . . . displays an ITEM SELECTOR dialog for selecting a document which will be read from the specified disk into GEM Write. Manipulation of this dialog follows the conventions discussed previously in this book.

Insert Text . . . reads a document from disk into the current document at the specified cursor location.

☐ Press: **Alt+F2**
☐ Place the cursor at the desired insertion point.

☐ Display the File Menu.
☐ Choose the **Insert Text . . .** command. The ITEM SELECTOR dialog appears.
☐ Double-click on the document that is going to be inserted.

This selected document is then read into the current document at the cursor's location. All of the text following the cursor is automatically moved "down" to make room for this new text. There is no limit as to the number of times that any given document can be inserted into another document.

Insert Graphics . . . reads a .GEM type picture into the current document at the specified cursor position.

☐ Place the cursor at the desired insertion point.
☐ Display the File Menu.
☐ Choose the **Insert Graphics . . .** command. The ITEM SELECTOR dialog appears.
☐ Double-click on the picture that is going to be inserted.

This selected picture is then read into the current document at the cursor's present location. All of the text following the cursor is automatically moved "down" to make room for this graphics image. The selected .GEM type picture can be used more than once and in as many different documents as is needed.

Two other GEM Write commands play an important role in the successful inser-

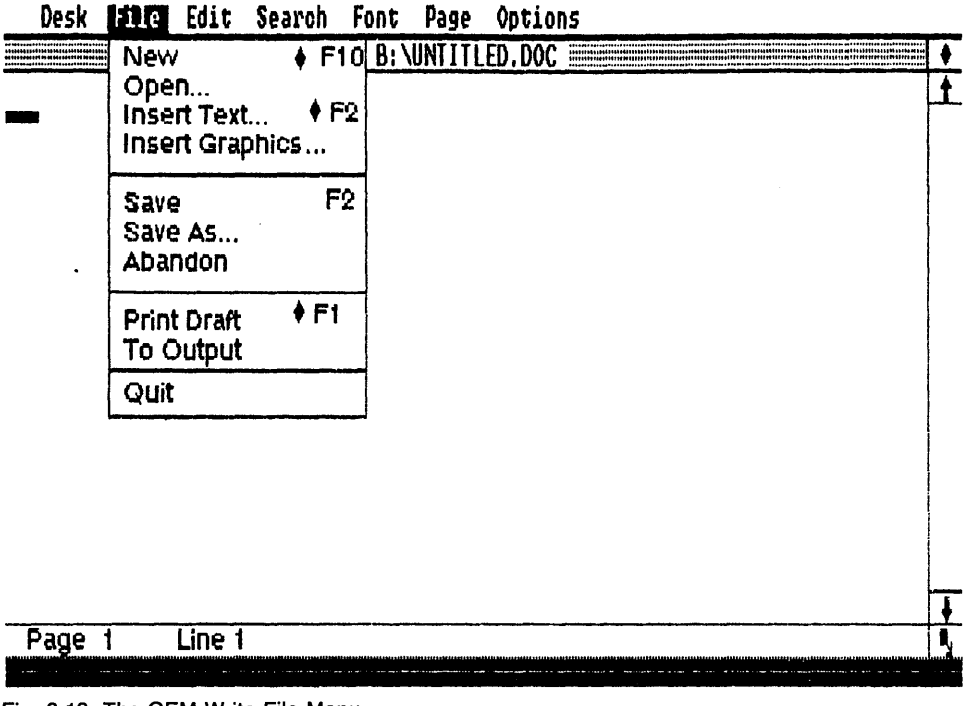


Fig. 3-18. The GEM Write File Menu.

tion of graphics into a document. The current status of the **Turn Graphics On/Off** command will determine whether or not the inserted graphics is visible on the screen. If this command is **Off,** then GEM Write inserts a special "double-dot" command (see the **ADVANCED TECHNIQUES** section later in this chapter) at the picture's insertion point.

The other GEM Write command that can affect an inserted graphics picture is **Format . . .** (from the Page Menu). Several different elements are influenced through this command. Both the Pagination and Page Length field will determine the final success or failure of a graphics insertion. As a rule of thumb, if the graphics picture runs over a page break (which is set by the page length and made visible through pagination), then unpredictable and incorrect results will occur during output.

Removing an Inserted Graphics Picture. There may be times when you have accidentally inserted a picture that runs over a page break. To remove this picture:

- ☐ Turn graphics **Off** with the **Turn Graphics On/Off** command.
- ☐ Highlight the double-dot command line and all of its associated spacing lines.
- ☐ Erase the picture with the **Delete** command.

Tip: You can also move and copy this highlighted picture, just like a block of text, with the **Move** and **Copy** commands, respectively.

Save saves the current document on the current disk under its same name. This command is also called "updating."

- ☐ Press: **F2**

Tip: Use this command frequently during your writing process. This practice ensures that your disk contains a reasonably up-to-date copy of your document. Then, in the event of a power failure, you won't have to spend all day recreating what you have already typed.

Save As . . . saves the current document on the current disk under the specified name. This command can also be used for saving a highlighted portion of a document. This command is also known as "backing up."

- ☐ Highlight the text portion of the document.
- ☐ Display the File Menu.
- ☐ Choose the **Save As . . .** command. The ITEM SELECTOR dialog appears.
- ☐ Type a new name for this document portion.
- ☐ Click on the "ok" button.

Abandon erases the current document and reads the *same* document from a disk. This command is similar to "starting over." For example, if you have been editing a document and you dislike the changes that you have made, the **Abandon** command will remove this edited copy from the screen and replace it with the original document.

Print Draft quickly prints a document from the current cursor location to the end of the file. Only a draft printer mode is used for this output, therefore, no text characteristics, fonts, or graphics are printed. Because of the elimination of these fea-

tures, this output is ideal for virtually any printer. This command is exclusive of GEM's OUTPUT.

☐ Press: **Alt+F1**

To Output transfers control of GEM Write to GEM OUTPUT. Under OUTPUT's direction the current document is placed in an output list ready for production on the selected output device. This command is used for making final, presentation copies of documents. Refer to Chapter 1 for complete OUTPUT operation information.

Quit exits GEM Write and returns you to the GEM Desktop.

Edit Menu (Fig. 3-19)

Many of the commands in this menu are unavailable unless a piece of text has been highlighted. These unavailable commands are indicated by light, dimmed command names. Once a portion of text has been highlighted these commands are active and represented by dark, bold names.

Insert Line inserts a blank line at the cursor's location. All text following the position of this blank line insertion point will be automatically moved down.

☐ Press: **Alt+F3**

Center Line centers a line of text, from the left margin to the right margin, at the cursor's location.

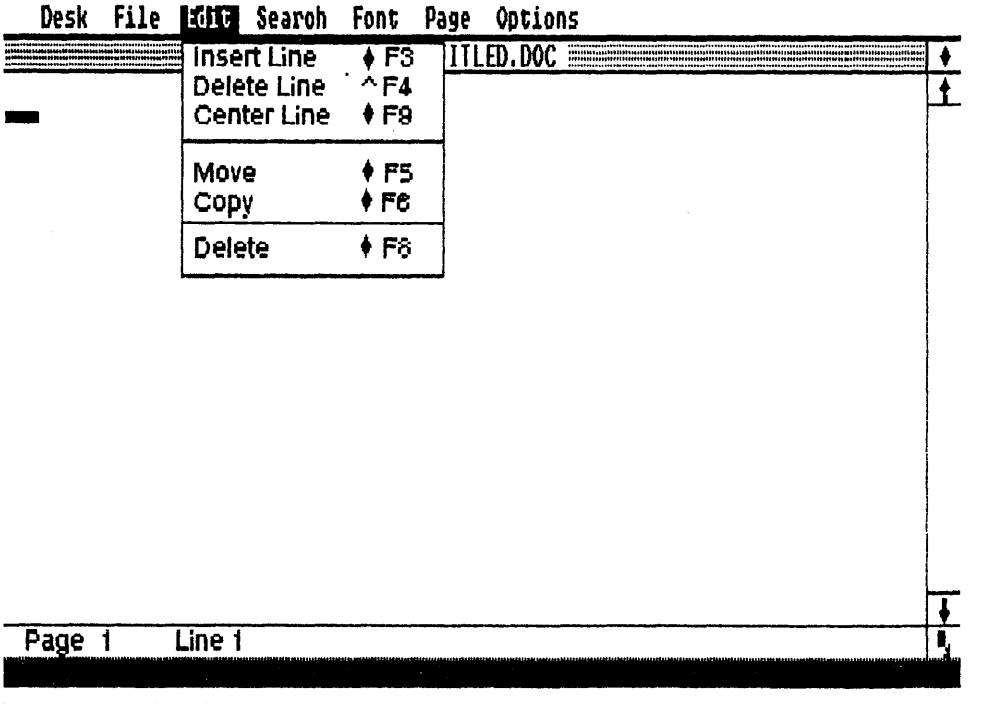


Fig. 3-19. The GEM Write Edit Menu.

☐ Press: **Alt + F9**

Delete Line deletes a line at the cursor's location. This deletion command does not require the highlighting of the line prior to execution.

☐ Press: **Ctrl + F4**

Move moves a highlighted portion of text from one location to another location anywhere within the current document. All of the text following the move's destination is automatically moved down. During a move the pointer changes its shape to that of a large "I."

☐ Press: **Alt + F5**
☐ Highlight the text for moving.
☐ Display the Edit Menu.
☐ Choose the **Move** command. The pointer changes into an "I."
☐ Place the pointer at the move's destination.
☐ Click the mouse button.

Copy duplicates a highlighted portion of text from one location to another location anywhere within the current document. All of the text following the duplicate's insertion point is automatically moved down. Both the pointer shape change and the procedure for using this command are similar to those same features found in the **Move** command.

☐ Press: **Alt + F6**

Delete permanently erases a highlighted portion of text from the current document.

☐ Press: **Alt + F8**

Search Menu (Fig. 3-20)

Two of the commands in this menu are unavailable unless one of the other commands in this menu is in current use. These unavailable commands are indicated by light, dimmed command names. Once a required command is in operation these commands are active and represented by dark, bold names.

Find . . . locates every occurrence of a character string within the current document. A maximum string length of 40 characters is permitted in this field.

☐ Display the Search Menu.
☐ Choose the **Find . . .** command. The Find dialog appears.
☐ Type the search string in the Find field. Any alphanumeric keyboard characters may be used in this search string.
☐ Click on the "ok" button.

The **Find . . .** command searches for the string exactly as it is typed in the Find

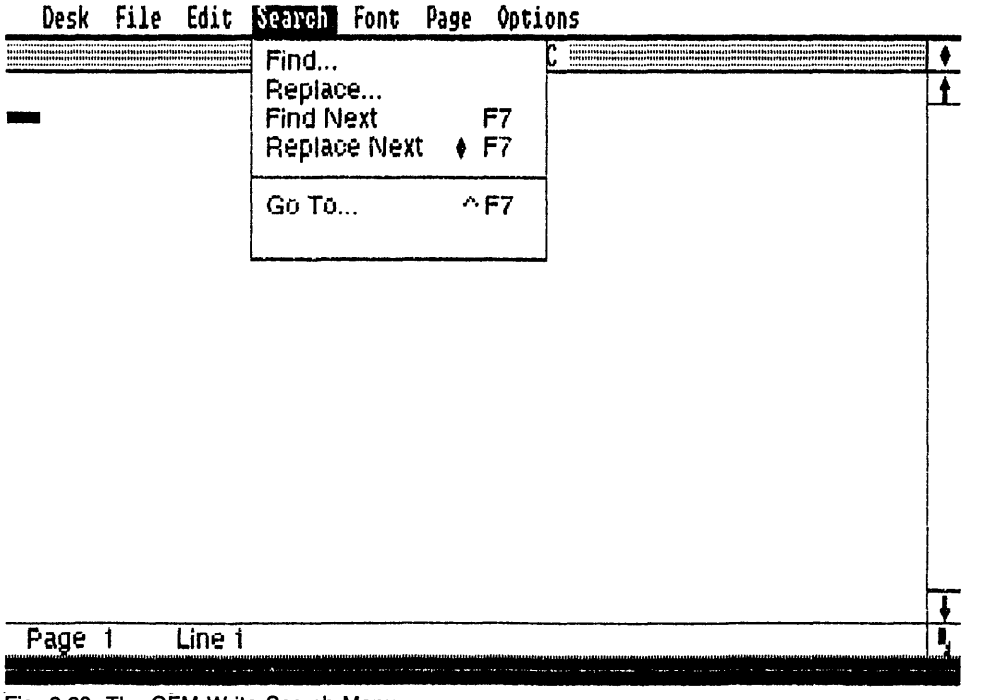


Fig. 3-20. The GEM Write Search Menu.

field. In other words, upper- and lowercase letters, spacing, and punctuation are all relevant in the identification of the search string. Additionally, **Find . . .** examines the entire document, no matter where the search is instigated. For example, if you start the search near the end of your document, the **Find . . .** command will first examine the end of the document followed by a search from the document's beginning to the current cursor location.

Replace . . . locates and substitutes the specified string for the search string. The substitution string is specified in the "Replace With" field of the **Replace . . .** command dialog. An optional field in this dialog also enables you to select the automatic replacement of every occurrence of the search string with the specified string. This automatic replacement is called "global substitution." A maximum string length of 40 characters is permitted in both fields. Other than these field differences, the execution of the **Replace . . .** command is exactly like that of the **Find . . .** command.

Find Next locates the next occurrence of the search string. This is a continuation command that is activated by using either the **Find . . .** command or the **Replace . . .** command.

☐ Press: **F7**

Replace Next locates and substitutes the specified string for the search string. This continuation command is only activated by using the **Replace . . .** command.

☐ Press: **Alt + F7**

Go To . . . jumps to the specified page and line number. This command displays a dialog for entering the exact page and line number where you want to move the cursor.

☐ Press: **Ctrl + F7**

Font Menu (Fig. 3-21)

Normal displays all typed text in the standard system font. This command also cancels the actions produced by the other Font Menu commands.

Tip: The effects of the **Normal** command can be duplicated by erasing all type style symbols from the margins of a document.

Bold displays all typed or highlighted text in a bold type style. This command remains in effect until it is canceled, reaches a hard return, or completes the conversion of a highlighted portion of text.

☐ Press: **Shift + F7**

Italic displays all typed or highlighted text in italics. This command remains in effect until it is canceled, reaches a hard return, or completes the conversion of a highlighted portion of text.

☐ Press: **Shift + F10**

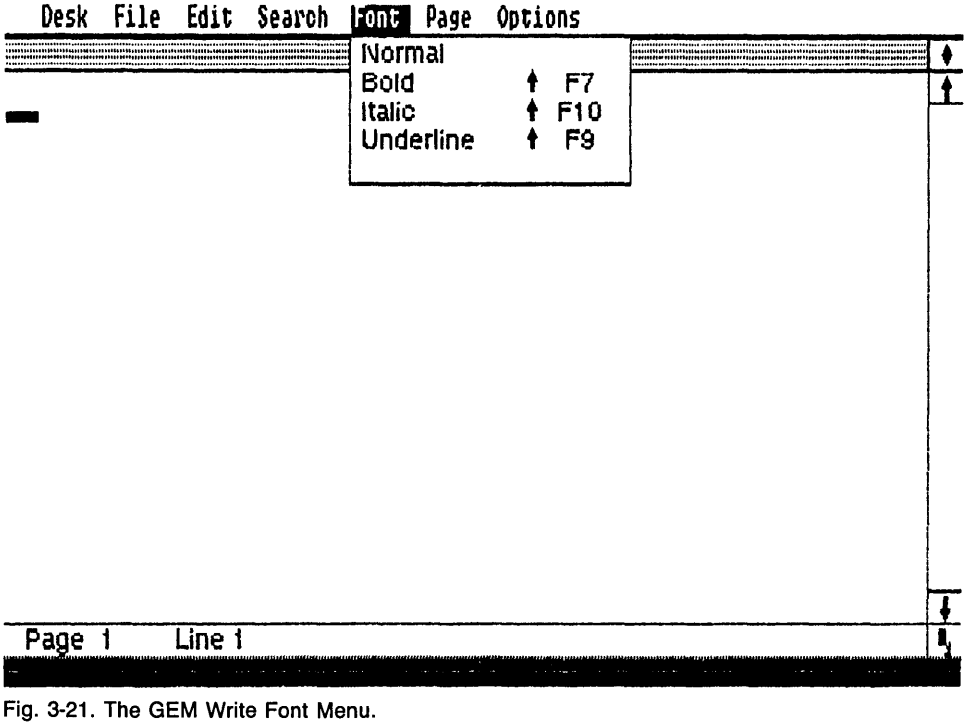


Fig. 3-21. The GEM Write Font Menu.

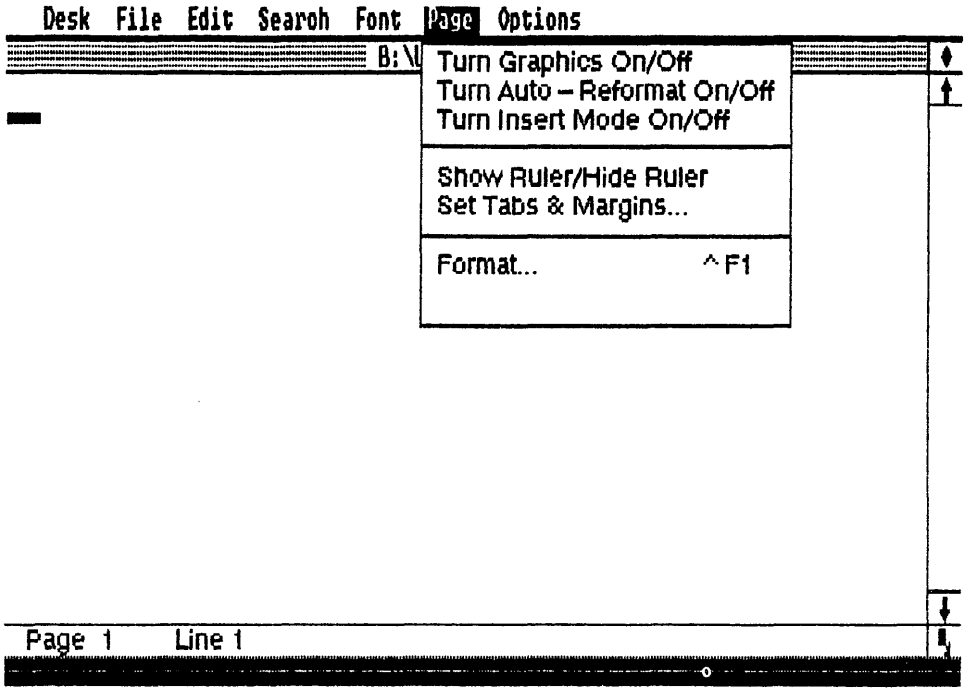


Fig. 3-22. The GEM Write Page Menu.

Underline displays all typed or highlighted text with underlining. This command remains in effect until it is canceled, reaches a hard return, or completes the conversion of a highlighted portion of text.

☐ Press: **Shift – F9**

Page Menu (Fig. 3-22)

Turn Graphics On/Off selectively displays or hides any graphics pictures that have been imported into the current GEM Write document. When the **Turn Graphics On/Off** command is **Off,** a double-dot command (. .GEM) is displayed at the point of the graphics picture insertion. Furthermore, blank lines are used to occupy the same space that will be filled by the picture after the **Turn Graphics On/Off** command is on.

Turn Auto-Reformat On/Off selectively reformats all edited text automatically. When the **Turn Auto-Reformat On/Off** command is **Off,** edited text will be left in an unformatted condition until you specifically reformat the passage with the F8 function key.

Turn Insert Mode On/Off selectively activates the character insertion mode. The default condition for this command is **Off.** In this mode, when a character is typed it replaces any character underneath it. When the **Turn Insert Mode On/Off** command is **On,** typed characters push all of the current characters to the right and down. The cursor changes to a vertical line when this command is **On.**

☐ Press: **Insert key**

Show Ruler/Hide Ruler selectively displays or removes a ruler along the top margin of the current document. This ruler is used for displaying the inch width of the document's page, the current left and right margin settings, and the current tab positions. Tenths of an inch gradations are used on this ruler. The ">" represents the left margin and the "<" is used for the right margin. Black diamonds are used for indicating the current tab positions.

The pointer changes its shape into a hand when crossing over the ruler. This hand pointer is used for changing the tab and margin positions. By placing the hand in the desired column and clicking the mouse button, a new tab position can be set. By the same token, tabs can be removed by clicking in an occupied column. Conversely, the margin settings are changed by dragging their respective markers to the desired column.

Set Tabs & Margins . . . alters tab and margin positions. This command is used when the ruler has been hidden. By using this command, the ruler is temporarily placed along the top margin of the current document and the pointer is changed into a hand shape. Also, the TABS & MARGINS dialog appears. This dialog outlines the procedure for changing tab and margin settings. After the tabs and margins have been changed (by using the same clicking and dragging techniques discussed under the **Show Ruler/Hide Ruler** command), a click on the "ok" button of the dialog saves these new settings.

☐ Press: **F9**

Tip: This command can also be used selectively for reformatting single paragraphs. In this case, choose the **Set Tabs & Margins . . .** command. Make all of your tab and margin adjustments. Now use the reformat keystroke (F8) only on the paragraphs (or other text passages delimited by hard returns) that require adjustment. By using this method, several different text formats can be included in the same document.

Format . . . controls the final printed output's characteristics. The PAGE FORMAT FOR OUTPUT dialog appears for determining these output parameters.

☐ Press: **Ctrl+F1**

There are eight fields in the PAGE FORMAT FOR OUTPUT dialog (Fig. 3-23): Document mode, Pagination, Justification, Line spacing, Page length, Text begins on, Text ends on, and Left margin.

Included below is a description of the **Format . . .** command's fields:

Document mode. There are two choices in this field: **On** and **Off.** Straight ASCII text is produced when the "Off" choice is selected. This text is devoid of all Font Menu commands, reformatting commands, and hard returns. Use this "**Off**" selection whenever you are working with non-GEM Write documents. The "On" selection generates GEM Write text.

Pagination. There are two choices in this field: **On** and **Off.** The "On" selection displays the correct page breaks for the final printed output on the GEM Write screen. The "**Off**" choice removes all page breaks from the displayed document.

Justification. There are two choices in this field: **On** and **Off.** "On," activates text justification (in other words, flush left and right margins). Justification is inactivated by the "**Off**" choice.

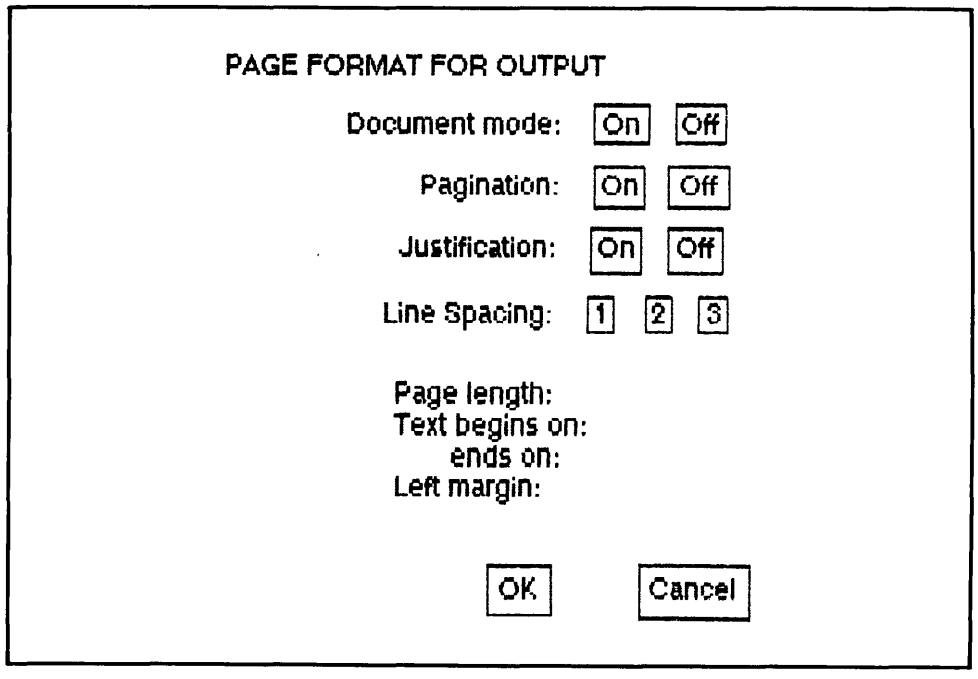


Fig. 3-23. The **Format . . .** command sets up the printed format of a GEM Write document.

Line Spacing. There are three choices in this field: 1, 2, and 3. Each of these values refers to the type of spacing that will be used in the text—single, double, or triple spacing.

Page length. Type the value for the number of lines which equals the length of your selected output device's page.

Text begins on. Type the value for the starting point of first printed line of text on each output page.

Text ends on. Type the value for the ending point for the last printed line of text on each output page.

Left margin. Type the character value for setting the left margin on the output page. This value is added to the left margin that is set on the document's ruler.

Options Menu (Fig. 3-24)

Short Cuts . . . displays the SHORTCUTS help dialog. This dialog is a brief listing of the keystroke equivalents used by GEM Write.

☐ Press: **F1**

Set Preferences . . . displays the SET PREFERENCES dialog. This dialog controls several of GEM Write's standard command default settings. Each of these settings can be overridden by their respective menu-driven command. There are six fields in this command: Turn Graphics, Turn Auto-Reformat, Create *.BAK files, Delete *.OUT files, Document Disk, and Spill-file Disk.

Listed below is a description of the **Set Preferences . . .** command fields:

Turn Graphics. There are two choices in this field: **On** and **Off.** This field determines whether or not graphics pictures are initially displayed in the current document.

Turn Auto-Reformat. There are two choices in this field: **On** and **Off.** The selection in this field determines whether or not text is automatically reformatted following each edit.

Create *.BAK files. There are two choices in this field: **On** and **Off.** The "On" choice makes automatic backup files (named with the .BAK type) of each document that is saved. These .BAK type files can be thought of as insurance should the original .DOC type file become unusable. An "Off" selection does not make these automatic backup files.

Caution! Using this field and creating .BAK type files will consume extra disk storage space.

Delete *.OUT files. There are two choices in this field: **On** and **Off.** When the "On" selection is used, GEM Write will automatically erase each output list following completion of the **To Output . . .** command. By using the "off" selection, each of these output lists are saved on the specified disk drive.

Document Disk. Type a letter disk drive designation which specifies the location of the GEM Write Documents disk.

Spill-file Disk. Type a letter disk drive designation which specifies the location of the spill-file disk. The letter "X" can be entered into this field for requesting the omission of spill-file usage.

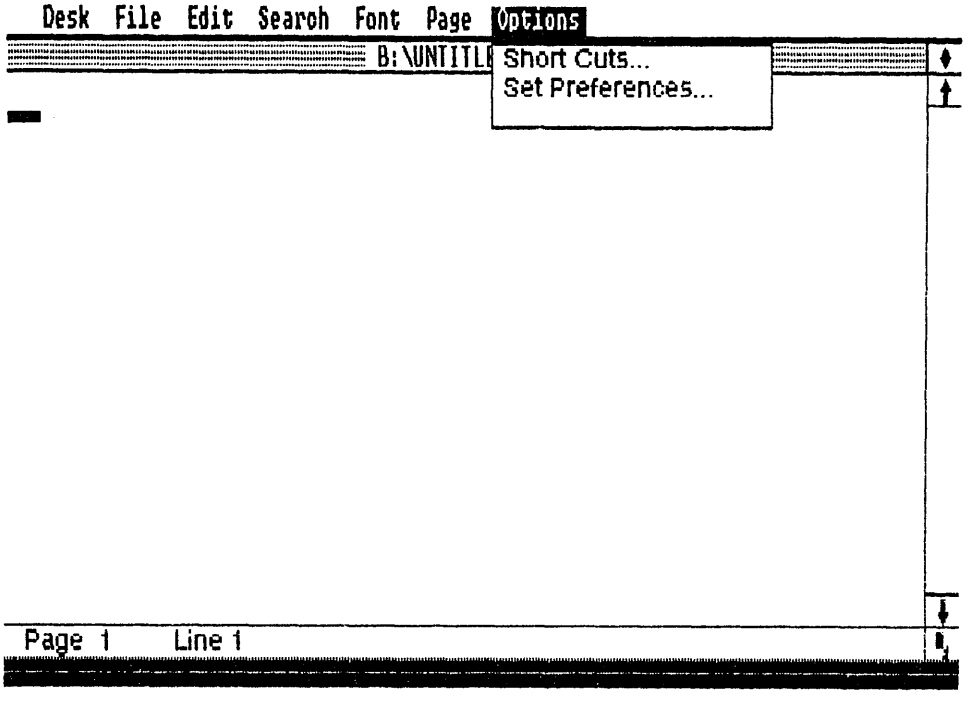


Fig. 3-24. The GEM Write Options Menu.

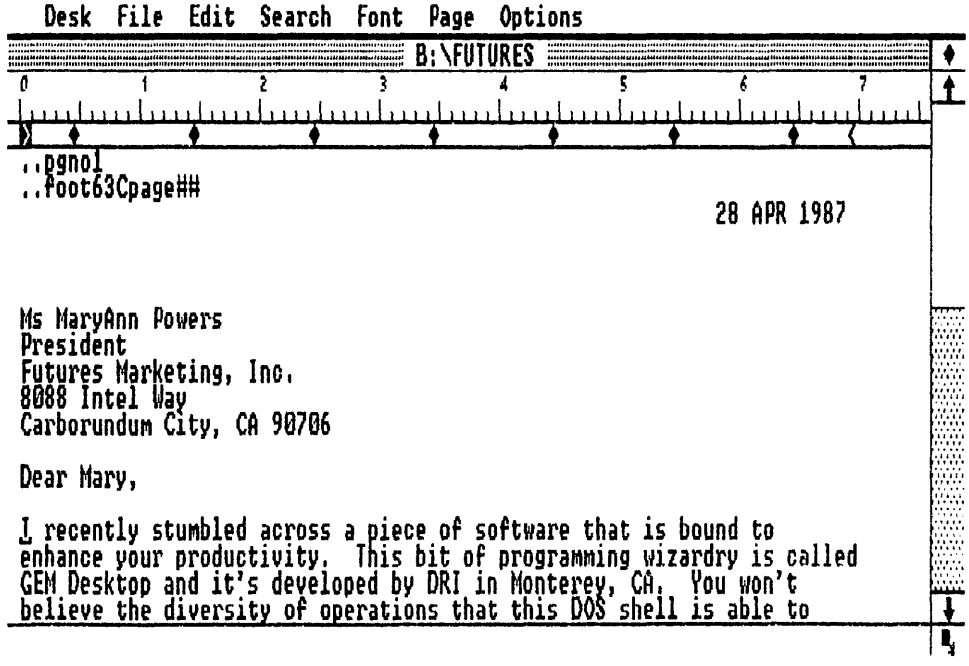


Fig. 3-25. Double-dot commands control the printing of GEM Write document characteristics.

ADVANCED TECHNIQUES

GEM Write's double-dot commands control several special printing effects that add the final professional touch to your document. The usage of these commands differs from all of your previous experiences with GEM applications. There are no menus to drop down and no commands to choose. A GEM Write double-dot command is typed into the text (Fig. 3-25). Another name for this type of textually inserted command is an *embedded* command. There are four simple rules that govern the use of these double-dot commands:

1. All double-dot commands must be preceded by two periods (..).
2. These two periods or dots must fall in columns one and two of the command line.
3. Double-dot commands are isolated on their own line. This line remains invisible to GEM Write's Status Line, pagination, and page length.
4. Either upper- or lowercase letters may be used in a double-dot command. But your character case must remain consistent throughout the command (e.g., ..page—good example; ..PaGe—bad example).

GEM Write Double-dot Commands

There are eight different double-dot commands. Several of these commands require parameters that must be typed immediately after the command. These parameters are inserted exclusive of spaces.

.. A comment or remark line which is only displayed on the computer's monitor. This comment is not sent to the output device. The comment's length is limited to docu-

ment's margin settings. Any characters can be placed in this comment.

Caution! Do not begin a comment with any of the other double-dot command words.

Example of a correct comment line: ..this memo is a rough draft

..page forces a page break at this location. This action will cause the printer to execute a form feed at this point.

..head prints a header on every page following its location. Three parameters are applied to this command: line number, position description, and header text.

..headLPT

L = line number—the two-digit line where the header is to be printed.
P = position description—indicates how the text should be printed in the header.
L displays text flush left
R displays text flush right
C displays text centered
A displays text alternating flush left and flush right
T = text—the text that is to be printed in the header.

Example: ..head03LChapter 3 - GEM COLLECTION

This example would place the header "Chapter 3 - GEM COLLECTION" flush left on line three of every page following this command.

Any number of different headers can be used throughout the document. Additionally, these headers can fill several lines on each page. If a header with the same line number is used later in the document, then the new header replaces the older one that shared the same line number. This is the same stunt that is used for canceling a header.

Example: ..head03

This command would cancel the previous header example.

..foot prints a footer on every page following its location. This command is best suited to placing page numbers on each page of text. Three parameters are applied to this command: line number, position description, and footer text.

..footLPT

L = line number—the two-digit line where the footer is to be printed.
P = position description—indicates how the text should be printed in the footer.
L displays text flush left
R displays text flush right
C displays text centered
A displays text alternating flush left and flush right
T = text—the text which is to be printed in the footer.

Example: ..foot54CPage 3-## -MORE-

This example would place the footer "Page 3-X -MORE-" centered on line 54 of every page following this command. The double number symbols (##) are used by GEM Write to indicate the insertion of the current page number. Therefore, if the printing was on page 43, the footer would read "Page 3-43 -MORE-."

Any number of different footers can be used throughout the document. Additionally, these footers can fill several lines on each page. If a footer with the same line number is used later in the document, then the new footer replaces the older one that shared the same line number. This technique is used for canceling a footer.

Example: ..foot54

This command would cancel the previous footer example.

..pgno resets the printed page number to the specified number.

Example: ..pgno44

This example would reset the page number to page 44.

This double-dot command can also be used with the footer command for placing a page number on the first page of any manuscript. In order for this action to be properly executed, the following two command lines must appear at the top of the first page.

Example:
```
..pgno1
..foot63Cpage##
```

These two commands would print "page 1" centered on the 63rd line of the first page.

..end stops all printing.

..cmd sends a special command sequence directly to the printer. This command is useful for transmitting special effects printer ASCII character codes to the selected output device. These codes must be typed with their exact keystroke representations, however.

Example: ..cmd<S1

This example activates the superscript printing mode on an Epson FX dot matrix printer. In this case, the "<" symbol is created by pressing the ESCAPE key. Remember, don't place unnecessary spaces in these character code sequences.

..gem labels a .GEM type graphics picture. Two parameters are used by this command: line number and graphics location.

..gem,L,G

L = line number—the number of document lines used by the graphics picture.
G = graphics location—the exact drive, directory, and file name location of the graphics picture.

Example: ..gem,13,B:\IMAGES\SALES.GEM

This example shows that 13 document lines are used by the .GEM type picture named SALES which can be found on the B: drive in the IMAGES subdirectory.

Finally, for those of you who can't wait to compare the strengths and weaknesses of GEM Write versus WordStar, Table 3-2 provides a complete command comparison. In addition to providing some concrete facts for direct competition between these two word processing programs, this table also serves as a "translation dictionary" for those WordStar users who've sought the quiet power of GEM Write.

Table 3-2. A Comparative Analysis of the WordStar 3.31 Command Structure and the Similar Command Counterparts Found in GEM Write 1.01.

Command	WordStar 3.31	GEM Write 1.0
Move Cursor		
Right one character	^D	Right Arrow
Left one character	^S	Left Arrow
Up one line	^E	Up Arrow
Down one line	^X	Down Arrow
Right one word	^F	^Right Arrow
Left one word	^A	^Left Arrow
Top of file	^QR	^Home
End of file	^QC	^End
Scroll (Move Screen)		
Up one line	^W	^E
Down one line	^Z	^X
Up one screen	^R	Home+PgUp
Down one screen	^C	Home+PgDn
Format		
Center text	^OC	Alt+F9
Re-form paragraph	^B	F8
Display Print menu	^P	^F1
Delete and Insert		
Delete character	^G	Del
Delete character left	Del	Backspace
Delete word right	^T	F4
Delete line	^Y	^F4
Delete to end of line	^QY	Alt+F4
Delete a block	^KY	Alt+F8
Insert On/Off	^V	Ins
Insert blank line	^N	Alt+F3
Find and Replace		
Find text	^QF	F7
Find and replace text	^QA	Alt+F7
Find text again	^L	F7
Replace text again	^L	Alt+F7
Save Files		
Save and resume edit	^KS	F2
Save and return to menu	^KD	F2+Alt+F10
Abandon file w/o saving	^KQ	Alt+F10
File and Block Operations		
Mark/unmark block beginning	^KB	F5
Mark/unmark block end	^KK	F6
Copy block	^KC	Alt+F6
Delete block	^KY	Alt+F8
Move block	^KV	Alt+F5
Write block into another file	^KW	F2
Read file into document	^KR	Alt+F2
Design the Printed Page		
Boldface	^PB	Shift+F7
Underline	^PS	Shift+F8
Italic	^PQ	Shift+F10
Dot Commands		
Comment	.IG	..
Footing	.fo	..foot
Heading	.he	..head
New page	.pa	..page
Page number	.pn	..pgno

Chapter 4

GEM Draw

Computer graphics have traditionally been *bit-mapped images*. GEM Paint pictures, for example, are bit-mapped graphics. By definition, these images are composed of individual screen pixels whose position and color characteristics are stored as bits of information. Therefore, everything that you see on a bit-mapped program's screen is composed of these singular pixels. Even GEM Paint's various tools and patterns are nothing more than pre-defined, bit-mapped shapes. Unfortunately, all is not bliss in the bit-mapped world.

There are three major strikes against graphics software that follows the bit-mapped tradition. First, no two bit storage methods are the same. This foul point melds into the second slap against this graphics method, namely, the inability to import images. Finally, the last empty swing by bit-mapped programming concerns the enormous consumption of storage memory. What all of this means is that, for the most part, bit-mapped graphics are unique to the program that created them. As a result, this singularity can lead to some serious limitations in an environment like GEM.

One graphics program that presents pictures in an entirely different framework is GEM Draw. All of the negative aspects cited for the bit-mapped graphics crowd become strengths with GEM Draw. GEM Draw pictures are portable; they can be used in every other GEM application. GEM Draw pictures are compact; they consume less disk storage space than an equivalent bit-mapped image. GEM Draw pictures are not bit-mapped; they are composed of picture elements. All of these strong points center around GEM Draw's different solution to the graphics creation game.

Instead of using individual pixels for picture illustration, GEM Draw uses picture *elements*. In this case, an element is a unique user-defined screen characteristics. For

example, a circle placed on the GEM Draw Drawing Surface is an element. So is a square that is placed inside the circle. Therefore, in GEM Draw, this picture of a square within a circle is actually composed of two separate elements. Whereas, the same picture in GEM Paint would be composed of hundreds of individual pixels. Likewise, the disk storage of the GEM Draw picture requires only elementary information (very punny), while the GEM Paint disk space is packed with a bit map of the picture. By using picture elements, GEM Draw is also able to read and write other GEM application pictures, like those of GEM Graph (see the Advanced Techniques section at the end of this chapter).

This power doesn't alter a commonly shared misconception about GEM Draw. Basically, the unjust rap against GEM Draw is that its picture production is limited to geometric shapes. This belief stems from the exclusive use of picture elements and the omission of a microscope-like tool. Counteracting this claim, however, is one of GEM Draw's more versatile elements—the **Sketch** element. **Sketch** is a freehand drawing element, which gives the design the flexibility of GEM Paint within the sophistication of GEM Draw.

INSTALLING GEM DRAW

GEM Draw is shipped on two floppy disks. The main GEM Draw application master disk is identified as disk 1 of 2, while the main Picture Library master disk is disk 2 of 2. Before you go any further, you should make a backup copy of these two floppy disks. Later, you will use these backup copies for your GEM Draw installation.

Backing Up GEM Draw

☐ Place your DOS disk in drive A:.

Format a floppy disk.

☐ Type: **FORMAT**
☐ Press the ENTER key.

Follow the formatting instructions. (Remember to remove your DOS disk from A: before you begin.)

Repeat this procedure for another floppy disk.

☐ Insert the GEM Draw master disk in drive A:.
☐ Insert one of your newly formatted disks in drive B:.

Make two new subdirectories on the disk in drive B:. (The abbreviation MD will be used for the make directory command MKDIR.)

☐ Type: **MD B:\GEMAPPS**
☐ Press the ENTER key.
☐ Type: **MD B:\PICTLIB1**
☐ Press the ENTER key.

Copy the contents of one master disk subdirectory to the disk in drive B:.

- ☐ Type: **COPY A:\GEMAPPS B:\GEMAPPS**
- ☐ Press the ENTER key.

This command will copy DRAW.APP and DRAW.RSC.

Copy the contents of the other master disk subdirectory to the disk in drive B:.

- ☐ Type: **COPY A:\PICTLIB1 B:\PICTLIB1**
- ☐ Press the ENTER key.

This command will copy BRITAIN.GEM, BULLETIN.GEM, CALIF.GEM, CITYHALL.GEM, EUROPE.GEM, FIRSTAID.GEM, FRTREES.GEM, FRUIT.GEM, H2OFACET.GEM, JAPAN.GEM, KIDBUS.GEM, and KIDCHOIR.GEM.

- ☐ Insert the Picture Library master disk in drive A:.
- ☐ Insert the other newly formatted disk in drive B:.

Make two new subdirectories on the disk in drive B:.

- ☐ Type: **MD B:\PICTLIB2**
- ☐ Press the ENTER key.
- ☐ Type: **MD B:\PICTLIB3**
- ☐ Press the ENTER key.

Copy the contents of one master disk subdirectory to the disk in drive B:.

- ☐ Type: **COPY A:\PICTLIB2 B:\PICTLIB3**
- ☐ Press the ENTER key.

This command will copy AUTOS.GEM, BANK.GEM, BIGTRUCK.GEM, BORDERS.GEM, BUS.GEM, CABOOSE.GEM, CAMERAS.GEM, CAPITOL.GEM, COALCAR.GEM, COMPUTER.GEM, CRANE.GEM, CYCLES.GEM, DOCTOR.GEM, FACES.GEM, FACES2.GEM, FACTORY.GEM, FORKLIFT.GEM, GASPUMP1.GEM, GEMS.GEM, HELICOPT.GEM, HOUSE.GEM, LIGHT.GEM, MANPOWER.GEM, MAP.GEM, MICSCOPE.GEM, MONEY.GEM, OBSERVAT.GEM, OIL.GEM, PENSETC.GEM, PHONE.GEM, POWERPLNT.GEM, README.GEM, SAFETY.GEM, SCARCROW.GEM, STUDENT.GEM, and TABLES.GEM.

Copy the contents of the other master disk subdirectory to the disk in drive B:.

- ☐ Type: **COPY A:\PICTLIB3 B:\PICTLIB3**
- ☐ Press the ENTER key.

This command will copy TELSCOPE.GEM, TOOLS.GEM, TRACTOR.GEM, TVS.GEM, WINDMILL.GEM, and TRAINS.GEM.

Both of the GEM Draw backup disks are now complete. Label both of these master disk copies and hide the originals in Al Capone's secret vault.

Installing GEM Draw

You are now ready to install GEM Draw on the GEM Desktop. This installation is completely different from the other GEM application installation procedures. In addition to two, blank floppy disks, you will also need your GEM DESKTOP disk.

Note: Systems with the GEM Desktop installed on a hard disk drive need only copy the GEMAPPS folder into the appropriate hard drive subdirectory. As for the three picture library folders, either place them on the hard drive or transfer them to separate floppy disks.

- ☐ Start the GEM Desktop.
- ☐ Select the floppy disk B icon.
- ☐ Display the File Menu.
- ☐ Choose the **Format . . .** command. The warning dialog appears.
- ☐ Insert a blank floppy disk in drive B:.
- ☐ Click on the "ok" button. (Label this disk "GEM Draw Application.")
- ☐ Repeat the above steps for a second floppy disk. (Label this disk "GEM Draw Pictures.")
- ☐ Insert the copied master GEM Draw disk in drive A:.
- ☐ Double-click on the floppy disk A icon (or press the Escape key, if this window is active).
- ☐ Insert the GEM Draw Application disk in drive B:.
- ☐ Drag the GEMAPPS folder from the disk in drive A: to the disk in drive B:.
- ☐ Insert the GEM Draw Pictures disk in drive B:.
- ☐ Drag the PICTLIB1 folder from the disk in drive A: to the disk in drive B:.
- ☐ Insert the GEM DESKTOP disk in drive A:.
- ☐ Insert the GEM Draw Application disk in drive B:.
- ☐ Drag the GEMSYS folder from the disk in drive A: to the disk in drive B:.
- ☐ Drag the COMMAND.COM application from the disk in drive A: to the disk in drive B:.
- ☐ The installation of GEM Draw is now complete (Fig. 4-1).

Warning: GEM Draw might not work properly following this installation. To avoid getting too technical, the nature of the GEM Desktop METAFIL.SYS application determines whether or not GEM Draw can be used. Basically, METAFIL5.SYS will run GEM Draw properly, while METAFIL4.SYS will not. These METAFIL.SYS applications come from the GEM DESKTOP GEMSYS folder. Only recent versions of the GEM Desktop have the METAFIL5.SYS application (look for Serial Numbers above 5054-0000-092578 or purchase GEM WordChart). Therefore, if you are having problems running GEM Draw, consult with DRI about a GEM Desktop upgrade. Once you upgrade to this desktop, you will have to reinstall all of your other GEM applications (refer to Chapter 1 for GEM Desktop installation instructions).

Two unique warning dialogs will appear when GEM Draw is NOT running properly. The first dialog notes that it can't find the Metafile. This dialog returns you to

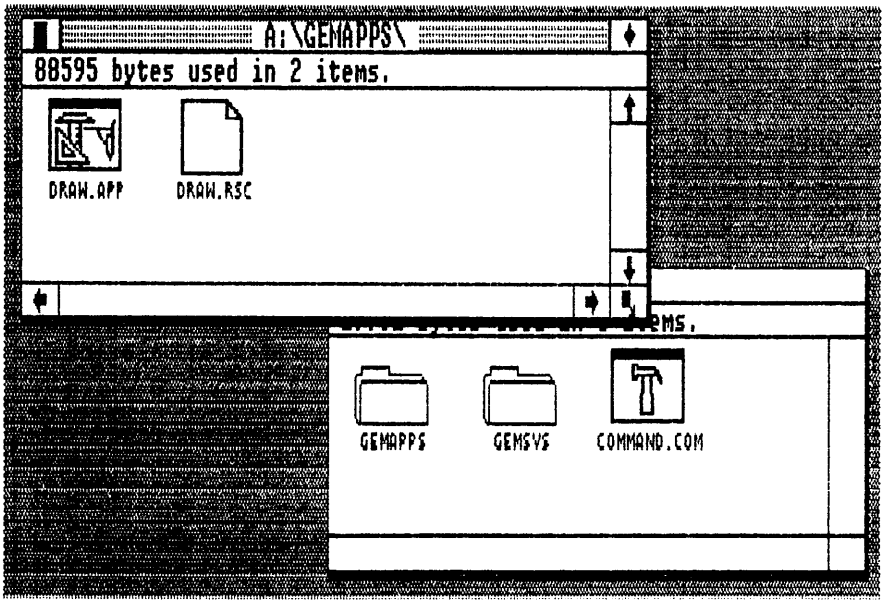


Fig. 4-1. A properly completed GEM Draw Application disk.

the GEM Desktop and cancels your attempt to run GEM Draw. The other dialog notes that you should insert your font disk. "What the font?" you ask. There is no font disk with GEM Draw. Once again, the wrong Metafile has caused program execution to return to the GEM Desktop. If you get either one or both of these warning dialogs during the initial running of GEM Draw, you will need a more recent version of the GEM Desktop.

USING GEM DRAW

To start GEM Draw, enter the GEM Desktop and insert the GEM Draw Application disk into drive A: and your GEM Draw Pictures disk in drive B:.

- ☐ Double-click on the floppy disk A icon.
- ☐ Double-click on the GEMAPPS folder icon.
- ☐ Double-click on the DRAW.APP icon. (A better starting method is to double-click on a .GEM type document. This ensures the proper drive alignment in subsequent saves.)

Following this brief loading exercise, you are greeted by a blank GEM Draw screen (Fig. 4-2). There are six distinguishing features on the GEM Draw screen: the Menu Bar, the Title Bar, the Drawing Surface, the Element Menu, the Panner, and the Select Mode Icon. Additionally, there are the other, now familiar, GEM attributes of Close Box, Full Box, Size Box, Sliders, Scroll Bars, and arrows. All of the members of this latter group of GEM Draw features are described more fully in Chapter 1.

Menu Bar

Covering the top of the GEM Draw screen, is a line containing all of the drop-down

menus. All of GEM Draw's commands are found on these menus. There are nine menus on the GEM Draw Menu Bar: Desk, File, Edit, Font, Page, Arrange, Pattern, Line, and Color. The **GEM DRAW REFERENCE** section later in this chapter fully annotates all of the commands found on each of these menus.

Title Bar

This descriptive line situated underneath the Menu Bar displays all of the disk information concerning the current picture. This disk data includes: the drive designation, the Directory Path Name, the Picture Name, and the Picture Type. When dealing with GEM Draw pictures, the Picture Type will always be .GEM.

Drawing Surface

The central portion of the GEM Draw screen is the **Drawing Surface**. This is the element work area where each picture is created and edited. The size, format, and view of the Drawing Surface is controlled through various menu-resident commands.

Element Menu

This menu running along the far left-hand border of the Drawing Surface, holds eight different icons. Each of these icons represents a GEM Draw element. The eight GEM Draw elements are: Rectangle, Rounded Box, Circle, Polygon, Sketch, Line, Arc, and Text. These elements are individually selected and then applied directly on the Drawing Surface.

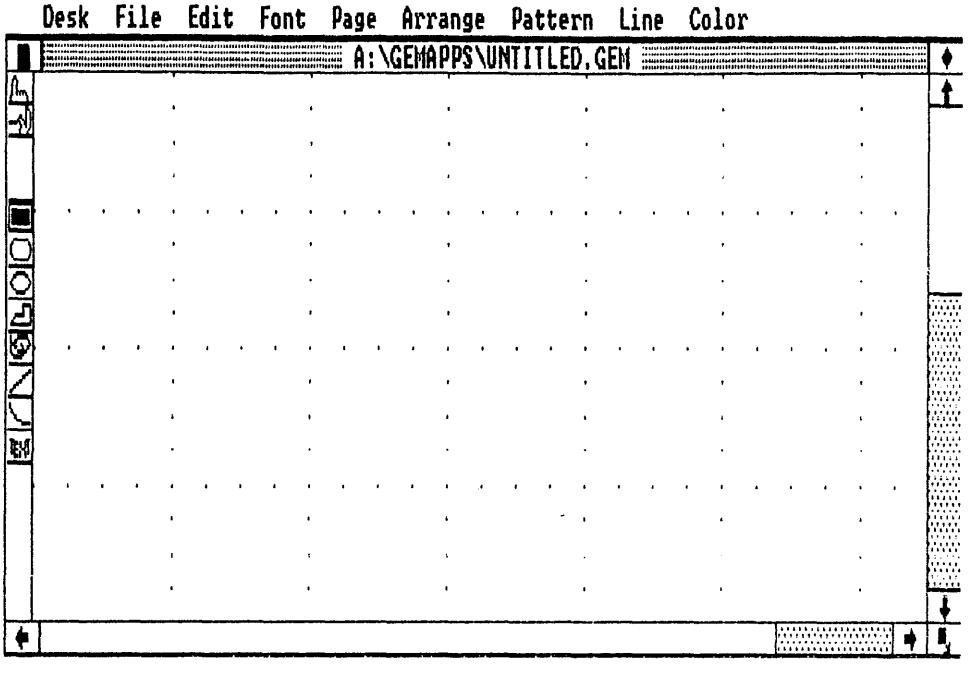


Fig. 4-2. The opening GEM Draw screen.

Panner

The next icon directly above the Element Menu is the *Panner*. Panner is used for selectively moving the view window to a new location. The final results are similar to those obtained with Scroll Bars, Sliders, and arrows, but the process is much more precise. This precision comes from the Panner switching your viewpoint to that of a full page view. With this new vantage point, you are able to move the view window quickly to a new location. Panner cannot be used with the **Full View** command (refer to the next section for an explanation of this command).

Select Mode Icon

The last GEM Draw screen feature is an icon that sits above the Panner. Selecting this icon changes the function of the pointer. When the pointer is in this mode, the following actions can be performed: select elements, move elements, scale elements, and make a selection from the Font, Line, Pattern, and Color menus. During the execution of some of these actions the pointer can change from its traditional arrow to either a hand or a finger. These changes will only take place, however, when the Select Mode Icon is highlighted.

Picture Element Control

GEM Draw's usage of elements for picture creation requires a special set of identification, movement, and shape controls. These controls are not commands. Rather they serve as aids in managing element design.

The Current Element is the *active* element. This element can be easily identified by the presence of a surrounding field of extents (Fig. 4-3).

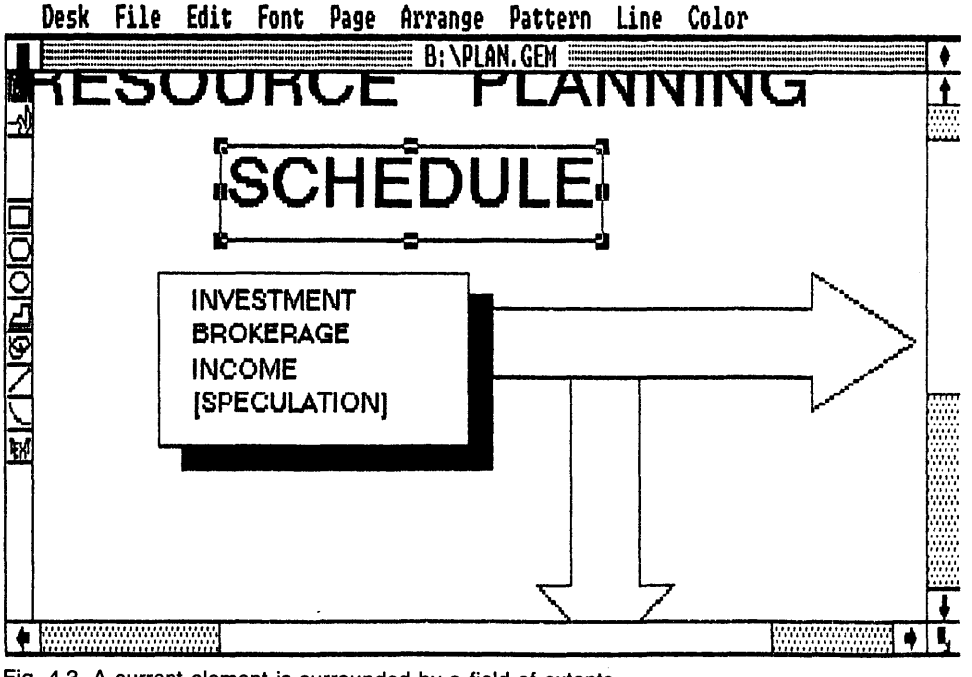


Fig. 4-3. A current element is surrounded by a field of extents.

To Make an Element Current:

- ☐ Choose the Select Mode Icon.
- ☐ Place the pointer directly over the element.
- ☐ Click the mouse button. The extent field surrounds the element.

To Make Multiple Elements Current:

- ☐ Choose the Select Mode Icon.
- ☐ Place the pointer directly over the first element.
- ☐ Click the mouse button. The extent field surrounds the first element.
- ☐ Press and hold the Shift key while positioning the pointer over each other element and clicking the mouse button.

Or,

- ☐ Choose the Select Mode Icon.
- ☐ Place the pointer in an upper left area of the element group.
- ☐ Drag the pointer to a lower right area of the element group.
- ☐ When the dashed rectangle completely encloses the elements, release the mouse button.

To make a Selective Element Current (Use this method when you have one or more elements sitting on top of each other):

- ☐ Choose the Select Mode Icon.
- ☐ Place the pointer directly over the layered elements.
- ☐ Press and hold the Ctrl key while clicking the mouse button. The extent field surrounds the first layered element.

Extents identify the current element. Extents are the combination of a black, rectangular border and several small, black boxes that encrust its border. Besides labeling the current element, this extent field is also used for moving and sizing an element.

To Move an Element:

- ☐ Choose the Select Mode Icon.
- ☐ Place the pointer directly over the element.
- ☐ Click the mouse button. The extent field surrounds the element.
- ☐ Place the pointer inside the extents.
- ☐ Press and hold the mouse button. The pointer changes into a hand.
- ☐ Drag the element to its new location.
- ☐ Release the mouse button.

To Size an Element:

- ☐ Choose the Select Mode Icon.
- ☐ Place the pointer directly over the element.

- ☐ Click the mouse button. The extent field surrounds the element.
- ☐ Place the pointer on one of the extent field's small black boxes.
- ☐ Press and hold the mouse button. The pointer changes into a finger.
- ☐ Drag the element to its new size.
- ☐ Release the mouse button.

Tip: Use this method on the corner extents to change an element's size in both a vertical and a horizontal direction.

Warning! You cannot size **Text** elements with this method. To change the size of text, use the point commands on the Font Menu.

GEM DRAW REFERENCE

Total element control is directed by commands found on the Menu Bar. While several of these menus and the commands that they contain are familiar to every veteran GEM Desktop user, the bulk of these nine menus support the composition and design of elements on the Drawing Surface. Likewise, the resource pool of these elements, the Element Menu, is unique to GEM Draw. Even though each element has an equivalent in the GEM Paint Tools Palette, their application in GEM Draw is completely different and will require an alteration in your mental visualization during picture creation.

Desk Menu (Fig. 4-4)

Draw Info . . . displays an information dialog containing copyright and author

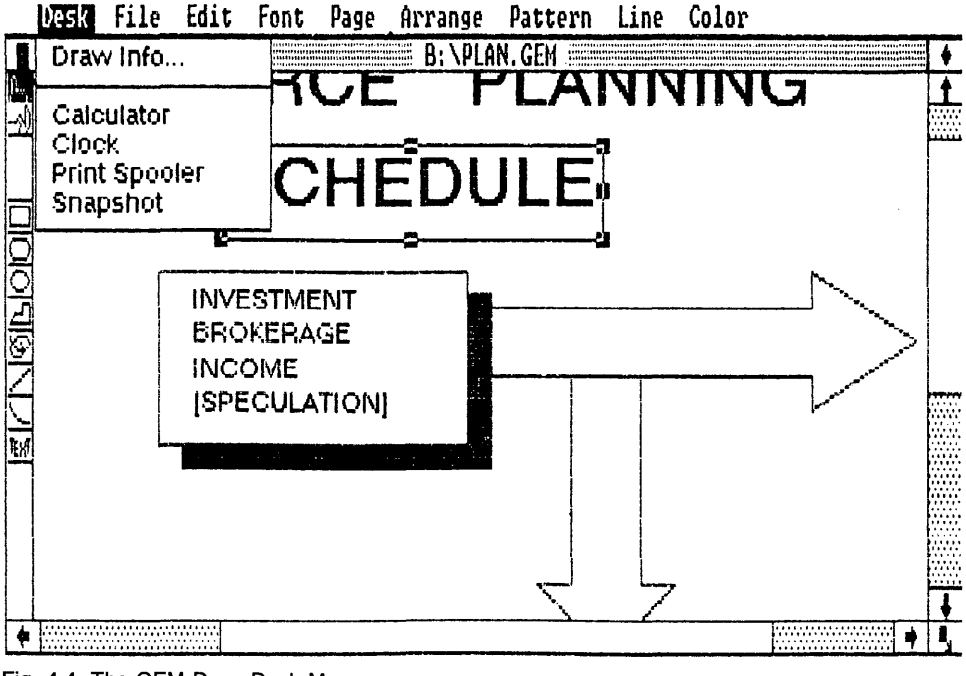


Fig. 4-4. The GEM Draw Desk Menu.

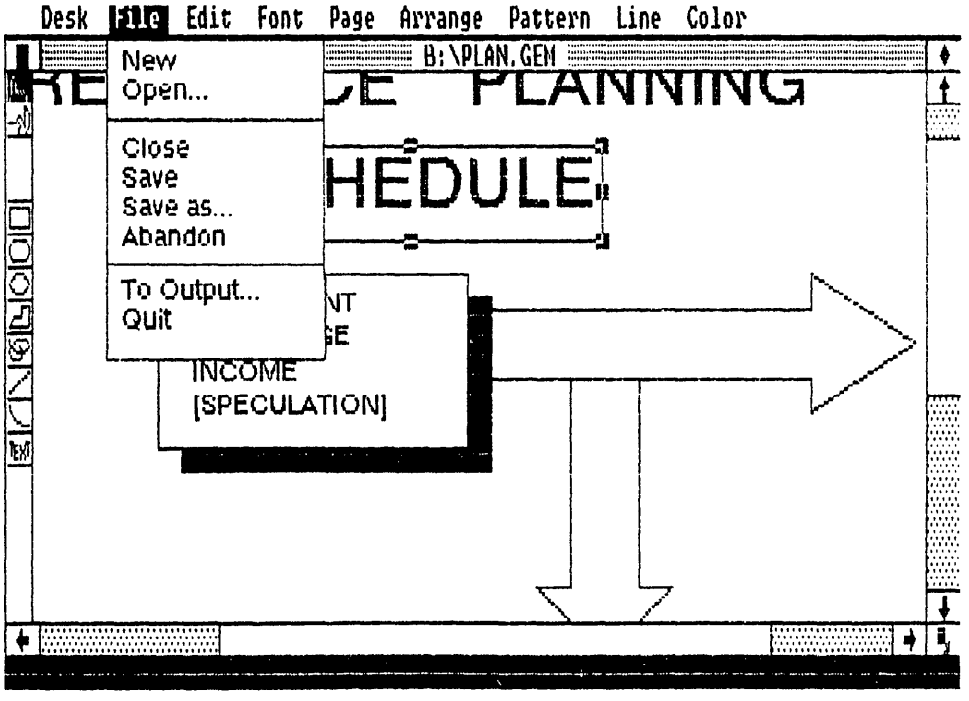


Fig. 4-5. The GEM Draw File Menu.

identification and a value indicating the percentage of memory space available for picture creation.

Calculator displays a multifunction calculator. Refer to Chapter 1 for complete operation instructions.

Clock displays a real-time clock and calendar. Refer to Chapter 1 for complete operation instructions.

Print Spooler displays a list of documents and pictures for printing. Refer to Chapter 1 for complete operation instructions.

Snapshot displays a screen-to-disk camera. Refer to Chapter 3 for complete operation instructions.

File Menu (Fig. 4-5)

New creates a new, blank picture. If you are working on a picture when you choose this command, GEM Draw erases this picture without saving it.

Open . . . loads a previously saved picture into GEM Draw. You can use this command to load and work on two different pictures simultaneously.

To Work on two pictures:

- ☐ Display the File Menu.
- ☐ Choose the **Open . . .** command. The ITEM SELECTOR dialog appears.
- ☐ Double-click on the first picture's name. This picture will be loaded into GEM Draw.

- ☐ Reduce the size of the current GEM Draw window with the Size Box.
- ☐ Display the File Menu.
- ☐ Choose the **Open . . .** command. The ITEM SELECTOR dialog appears.
- ☐ Double-click on the second picture's name. This picture will be loaded into GEM Draw.
- ☐ Position the second picture's window.
- ☐ Click in the window that you will be copying from.
- ☐ Choose the Select Mode Icon.
- ☐ Place the pointer directly over the element.
- ☐ Click the mouse button.
- ☐ Drag the element to the window that you will be copying to.

Repeat these last five steps for all elements that need to be copied.

- ☐ Close and save both of the windows.

Close closes the active window and saves the current picture, if any changes were made. The picture is removed from the Drawing Surface.

Save saves the current picture under its same name. This is also called "updating." The picture stays on the Drawing Surface following the save.

Save as . . . saves the current picture under any specified name. An ITEM SELECTOR dialog appears for naming this picture. The picture stays on the Drawing Surface following this save. This is known as "backing up."

Abandon erases the current picture and replaces it with a picture of the same name from the storage disk.

To Output . . . sends one or more pictures to the selected output device via the OUTPUT application. Refer to Chapter 1 for complete operation instructions on GEM OUTPUT.

Quit erases the current picture without saving it, exits GEM Draw, and returns to the GEM Desktop.

Edit Menu (Fig. 4-6)

Delete erases the current element from the Drawing Surface.

Undelete restores the *last* element that was erased from the Drawing Surface. The action of this command is dependent on any layer changes that you make between the element deletion and restoration. In other words, barring any changes, an element will be restored to its original layer. If any layer changes have occurred, then the restored element will be placed in the top layer.

Duplicate makes a single copy of the current element. This copy is placed in the top layer and in the grid unit that is to the right and down. The copy then becomes the current element.

Select All makes *every* element in the picture current. With this command, extents appear around every element. Clicking the pointer in an open space on the Drawing Surface will cancel this command.

Font Menu (Fig. 4-7)

Font Faces comprises the top command section of this menu. Determines the font that will be used with the **Text** element. The leading font is Swiss. Other **Font Faces** will be installed as they become available. If a font is unavailable, it appears as a light, dimmed name. A check mark is placed next to the current **Font Face.**

Font Point comprises the middle command section of this menu. Sets the font point or size characteristic. Sizes range from 10 point to 72 point. This command is used for changing the size of **Text** elements. A check mark is placed next to the current **Font Point.**

Font Style comprises the bottom command section of this menu. Selects the font style or print characteristics. The styles include: Normal, Bold, Italic, and Underline. A check mark is placed next to the current **Font Style.** More than one of these styles can be used at the same time. To deactivate a style, click on the same command and remove the check mark.

Page Menu (Fig. 4-8)

Full View places the complete picture in the active window.

Normal View displays **Text** elements in their proper proportions. The preferred view for dealing with pictures containing text.

Zoom in magnifies the selected portion of a picture. Choosing this command increases the size of the picture window by a factor of two. A maximum enlargement of six times is obtainable through this command.

Zoom out reduces the selected portion of a picture. Choosing this command

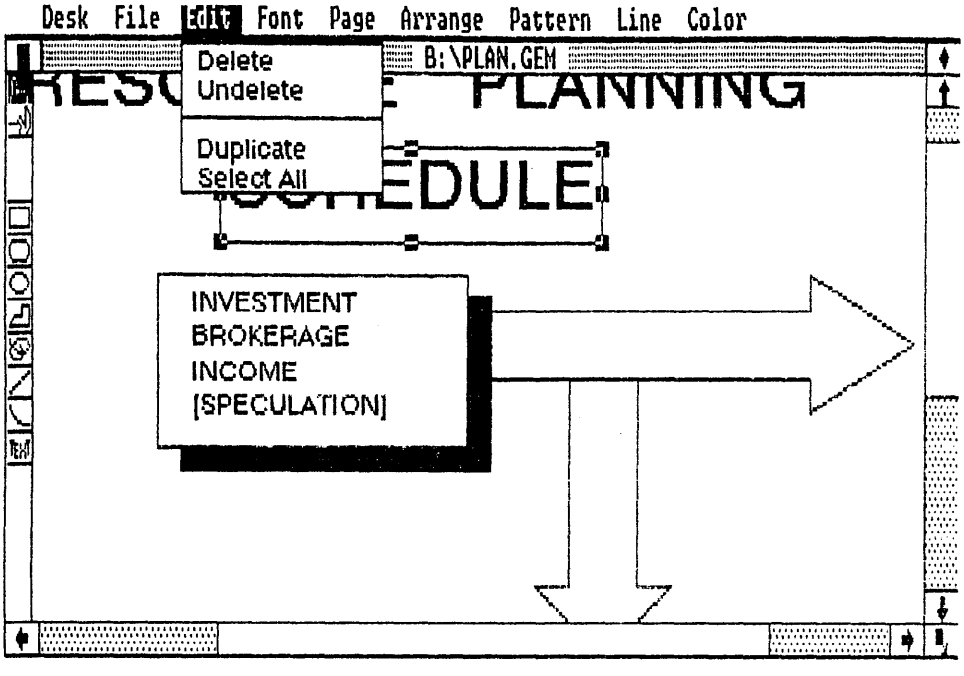


Fig. 4-6. The GEM Draw Edit Menu.

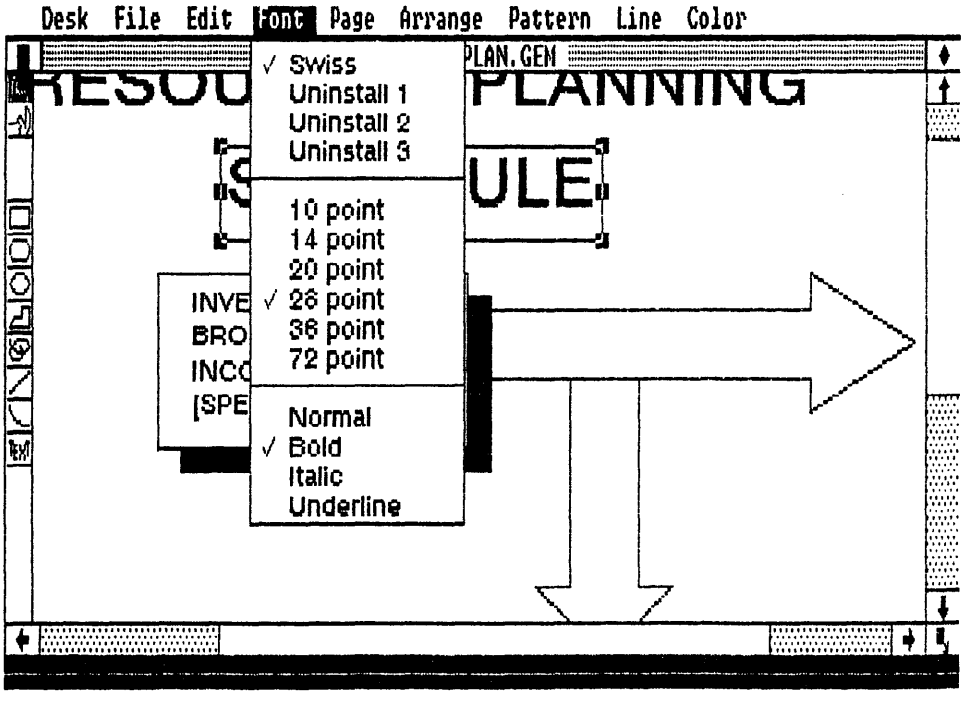


Fig. 4-7. The GEM Draw Font Menu.

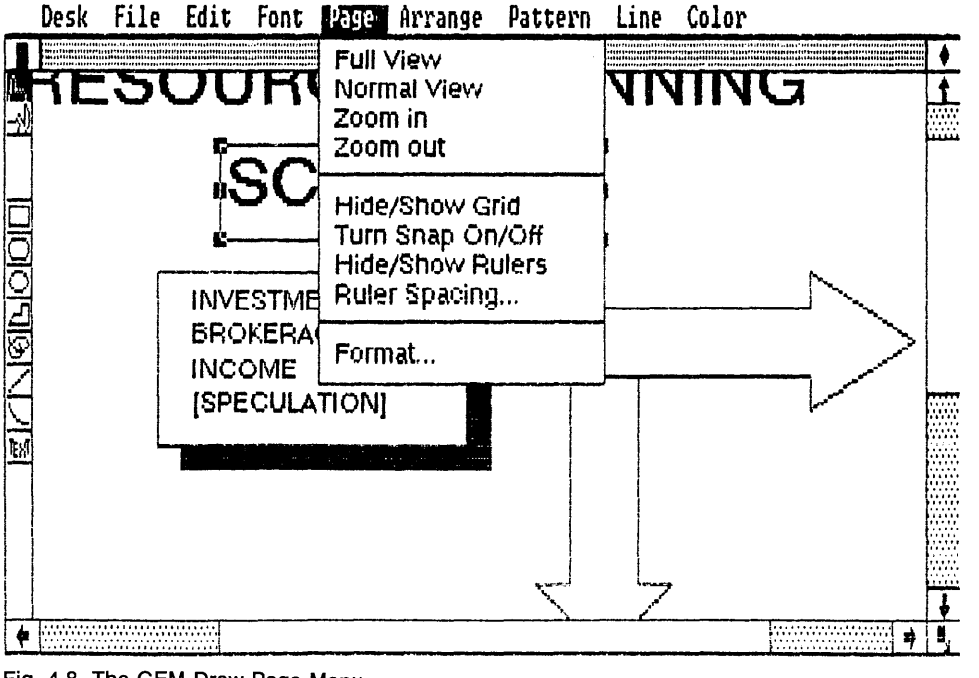


Fig. 4-8. The GEM Draw Page Menu.

decreases the size of the picture window by a factor of two. A maximum reduction to an equivalent **Full View** condition is obtainable through this command.

Hide/Show Grid removes or displays the Drawing Surface grid. This grid is similar to a sheet of graph paper being placed over the GEM Draw active window.

Turn Snap On/Off. In the "On" state, this command causes each element to be placed at the nearest grid intersection. The grid does not need to be visible for this command to be used. Only the element "snaps" to this grid position and not the pointer.

Hide/Show Rulers removes or displays a pair of scaled drawing rulers. These rulers appear along the top and left-hand borders of the Drawing Surface. Either metric or U.S. measurements can be set on these rulers. The type of measurements is determined by the current settings of the **Format . . .** command. These rulers will not print on any output device.

Ruler Spacing . . . sets the measurement units for the rulers. Choosing this command displays the RULER SPACING dialog. This dialog contains two selection fields: inches and centimeters. Only one of these fields can be active at a single time. The **Format . . .** command determines which of these fields is active.

In the inches selection field there are six choices: 1/32, 1/16, 1/8, 1/4, 1/2, and 1. This field sets the U.S. measurement units that will be used by the rulers.

In the centimeters selection field there are six choices: .1, .2, .5, 1, 2, and 3. This field sets the metric measurement units that will be used by the rulers.

Format . . . controls the physical layout of the picture. Choosing this command displays the FORMAT dialog. This dialog contains three fields: layout, paper, and border. The choices made in these fields will affect many of the other commands in the Page Menu.

The *Layout* **Format . . .** Field contains two choices: portrait and landscape. This field determines how the picture will be oriented during drawing and in any subsequent output.

Portrait—A vertical placement.
Landscape—A horizontal placement.

The *Paper* **Format . . .** Field contains six choices: letter, legal, double, A5, A4, and A3. Each of these choices also has an accompanying set of dimensions. Two additional subfields serve to separate these choices into U.S. and metric measurements.

U.S.—Letter, legal, and double.
Metric—A5, A4, and A3.

The *Border* **Format . . .** Field contains six choices: .5, 1, 1.5, 2, 3, and 4. Once again, these choices are further subdivided into U.S and metric subfields.

U.S.—.5, 1, and 1.5.
Metric—2, 3, and 4.

Arrange Menu (Fig. 4-9)

All of the commands in this menu are inactive until an element has been made current. These inactive commands are displayed as light, dimmed names. When an element is current all of these commands will have dark, bold names, which indicates that they are active.

Put in Front places the current element in the top layer. In a group of elements,

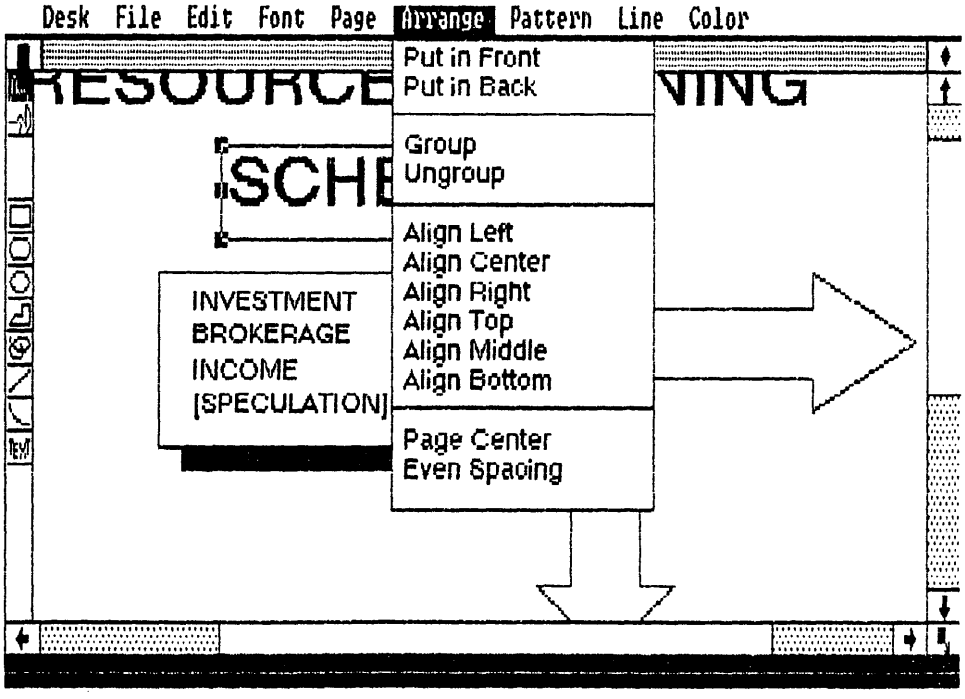


Fig. 4-9. The GEM Draw Arrange Menu.

this command puts the current element on top of the other elements.

Put in Back places the current element in the bottom layer. In a group of elements, this command puts the current element underneath the other elements.

Group collects all current elements into a single "grouped" element. This command combines multiple current elements into one element (refer to the Using GEM Draw section for instruction on making multiple elements current). These grouped elements are treated by GEM Draw as a single element. One extent field surrounds this new, single element.

Ungroup breaks a current grouped element into its former multiple elements. This command reverses the action of the **Group** command.

Align Left aligns all current elements with the left boundary of the farthest left element.

Align Center aligns all current elements halfway between the left boundary of the farthest left element and the right boundary of the farthest right element.

Align Right aligns all current elements with the right boundary of the farthest right element.

Align Top aligns all current elements with the top boundary of the top element.

Align Middle aligns all current elements halfway between the top boundary of top element and the bottom boundary of the bottom element.

Align Bottom aligns all current elements with the bottom boundary of the bottom element.

Page Center aligns all current elements halfway between the left and right borders of the current picture.

Even Spacing places all current elements within the top boundary of the top element and the bottom boundary of the bottom element with equal vertical spacing between each element. This command does NOT align the current elements.

Pattern Menu

This menu contains 39 different patterns, which can be used to fill any current element. A check mark is placed next to the currently selected pattern. The **None** pattern is transparent. Any bottom layer element will be visible through this pattern. The **Shadow** pattern places a proportional, black shadow under and to the lower right of the current element.

Line Menu

This two-part menu holds line style and arrowhead selections. There are nine different line styles, ranging from **None** and dashed lines to thick, solid lines. The arrowhead portion of the menu forms lines with triangular arrowheads on various ends of the line. A check mark is placed next to the currently selected line style and arrowhead. Both a line style and an arrowhead can be selected at the same time.

Color Menu

Color can be applied to the current element by choosing one of the sixteen colors from this menu. Each color is assigned a numerical code between zero and fifteen. The degree of visibility of these colors on both the computer screen and the selected output device will vary according to the system. One standard does exist, however. The color code "0" is used to represent the background color. Therefore, using this color will cause an element to "disappear" into the background. A check mark is placed next to the currently selected color code.

Element Menu (Fig. 4-10)

This menu is different from the standard drop-down GEM menu. Each "command"

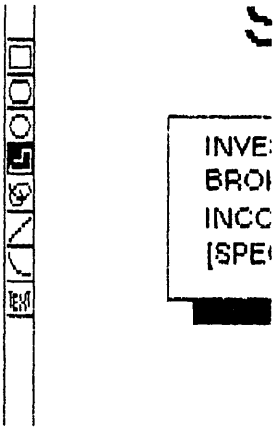


Fig. 4-10. The GEM Draw Element Menu.

or, in this case, element is constantly visible. Contrary to some other GEM Draw menu commands, only one element may be used at a time. Once an element has been selected, its icon remains highlighted on the Element Menu. All of the governing command selections can be altered after the element has been drawn. Just make the element current and choose a new command.

Rectangle draws a four-sided element.
Governing Commands: **Line Style, Pattern,** and **Color.**
Rounded Box draws a four-sided, rounded corner element.
Governing Commands: **Line Style, Pattern,** and **Color.**
Circle draws a circle or ellipse element.
Governing Commands: **Line Style, Pattern,** and **Color.**
Polygon draws a multi-sided element.
Governing Commands: **Line Style, Pattern,** and **Color.**
Sketch draws a freehand element.
Governing Commands: **Line Style** and **Color.**

A pattern can be added from the Pattern Menu after the **Sketch** element has been completed.

Line draws a straight line segment element.
Governing Commands: **Line Style** and **Color.**
Arc draws one-quarter of a circle or ellipse element.
Governing Commands: **Line Style, Pattern,** and **Color.**
Text draws a text element.
Governing Commands: **Font Face, Font Point,** and **Font Style**

ADVANCED TECHNIQUES

As pointed out at the beginning of this chapter, one of GEM Draw's strong points is that it is able to work with documents and pictures created by other GEM applications. Two of these "other" GEM applications are GEM Graph and GEM WordChart. The graphs and wordcharts created by these two applications can be directly modified through GEM Draw (see the **ADVANCED TECHNIQUES** sections of Chapter 5 on GEM Graph, and Chapter 6 on GEM WordChart, for information on using GEM Draw in this manner).

Another use for GEM Draw that is directly related to GEM Graph is in creating Symbol Graph symbols. A *Symbol Graph* displays data with descriptive symbols arranged in a Bar Graph fashion. These symbols are used to represent a given unit on the graph. This symbol is then repeated until the graph amount has been reached. When GEM Graph is in the Symbol Graph mode it reads a special file for obtaining these symbols. This file is labeled GRAPH.SYM. Actually, GRAPH.SYM is a GEM Draw picture file that has been created especially for use in GEM Graph with a Symbol Graph. By using GEM Draw, you can make your own custom symbol library and .SYM document.

- ☐ Choose the **Rectangle** element.
- ☐ Draw a rectangle on a **New** Drawing Surface. (This rectangle should be proportional to the final symbols dimensions.)
- ☐ Fill this rectangle with the solid pattern.
- ☐ Choose the appropriate elements and draw the symbol inside the box. (This symbol should be in the top layer and the box in the bottom layer.)
- ☐ Make the entire symbol and box current.
- ☐ Display the Arrange Menu.
- ☐ Choose the **Group** command. The entire symbol and box are a single element (Fig. 4-11).
- ☐ Display the File Menu.
- ☐ Choose the **Save as . . .** command. The ITEM SELECTOR dialog appears.
- ☐ Type in the picture name and type: MY.GEM.
- ☐ Display the File Menu.
- ☐ Choose the **Quit** command. Return to the GEM Desktop.
- ☐ Click on the MY.GEM picture icon.
- ☐ Display the File Menu.
- ☐ Choose the **Show Info . . .** command. The ITEM INFORMATION dialog appears.
- ☐ Change picture types. Type **MY.SYM** in the Name field.
- ☐ Drag this renamed document to the GRAFSYMS folder. (Floppy users, this

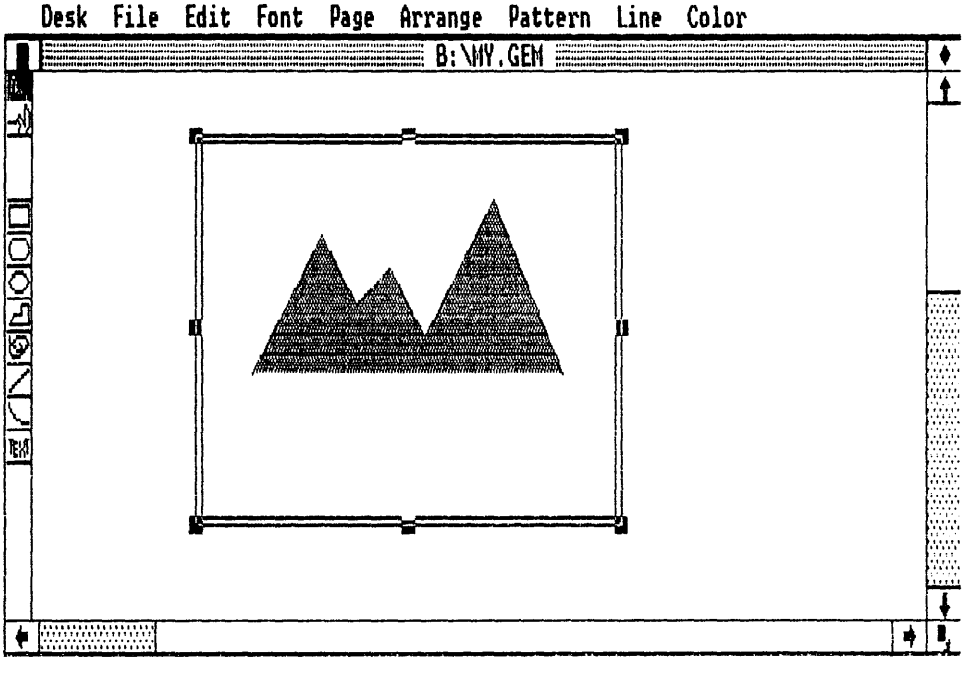


Fig. 4-11. Designing a symbol for use in a GEM Graph Symbol Graph. The Group command is used for making all of the elements current.

is on the GEM Graph Data disk. Hard users, this is in the root directory.)

- ☐ Double-click on the GRAPH.APP icon. This starts GEM Graph.
- ☐ Display the File Menu.
- ☐ Choose the **Load Symbols . . .** command. The ITEM SELECTOR dialog appears.
- ☐ Double-click on MY.SYM.
- ☐ Begin the procedure for making a Symbol Graph.

When making your own symbol document, pay attention to these points:

1. The beginning rectangle can be any size. GEM Graph automatically reduces each symbol to the correct graph size.
2. Use uniform rectangles for consistent symbols.
3. Symbol spacing within the rectangle is part of the final printed symbol.
4. A maximum of 12 symbols can be placed inside a single .SYM document.
5. Neither the **Text** nor the **Sketch** element should be used in symbol creation.
6. Finally, KISS (or Keep It Simple Stupid). This is the most important point to successful symbols. A complex symbol will print as an amorphous blob, while a discreet symbol will convey the full impact of your graph.

Chapter 5

GEM Graph

Data is dry. No matter how you slice the pie chart, data that is presented in a tabular form is bound to bore any business presentation to a screeching halt. Nevertheless, dull, dry figures are continually hurled unmercifully on audiences, from boardrooms to poster sessions. The reason for this sadistic behavior is based on a failure to master the basic art of data-to-graph conversion. So much mystery is steeped into the process of taking data from spreadsheets to graphs that this activity is usually reserved for the corporate figure alchemist. This secrecy is unwarranted.

Good graph and chart preparation is a time-consuming chore that requires the dexterity of a juggler, the composure of a jeweler, and the strength of an orthopedic surgeon. During a typical graph development session, the initial step is to determine the best method for displaying the data. In this example, let's use a standard bar graph. Next, the values of both the x and y axis must be established with reference to the range of figures contained in the original data. After these definitions have been fixed, we can begin plotting our data. Once all of the data has been plotted, we can add labels and the bar graph is complete. Of course, this four sentence outline camouflages the length of time necessary for accomplishing this bar graph result.

What if a microcomputer is assigned to this graph and chart preparation? Computer-generated graphs and charts can lend a dramatic impact to the final business report. The only problem is finding the appropriate software for realizing these spectacular goals. Up until this point, two GEM applications would be adequate for designing graphs and charts. Both GEM Paint and GEM Draw are capable of turning data into pictures. The only problem with this approach is that you must still perform the conversion by hand. Therefore, the assignment of the microcomputer to this task has made our graphs

prettier, but still has not enhanced our productivity.

One GEM application that is dedicated to the painless conversion of data into graphs and charts is GEM Graph. This highly specialized program is a professional presentation graphics studio that takes your data and automatically creates the specified graph or chart. With GEM Graph, you have a choice of eight different graph and chart forms, numerous labeling possibilities, and the ability to directly import spreadsheet data into the program. Actually, this spreadsheet data can be either created at the GEM Graph keyboard or read from Lotus 1-2-3 and dBase III files.

Once you have created your perfect graph or chart, you can print it on a wide selection of output devices. One virtue of this output method is that after you examine this printout, you can quickly and easily edit the results. Adding to this virtue is GEM Draw's ability to manipulate GEM Graph produced graphs and charts. Without a doubt, using GEM Graph for your data duties will help turn the boredroom back into the boardroom.

INSTALLING GEM GRAPH

GEM Graph is sold on one floppy disk. You should immediately make a backup copy of this floppy disk before attempting to install GEM Graph. This backup copy will then be used for the actual installation. An unfortunate oversight by DRI has left this GEM Graph master disk in a write-enabled condition. In other words, if you use the wrong DOS command, you could erase this disk and destroy GEM Graph; good-bye boardroom, hello boredroom. Well, to prevent this possible calamity, immediately write protect your DRI-issued GEM Graph master disk (use the small sheet of rectangular, self-adhesive tabs that come packaged with your floppy disks). Now, you are ready to back up your GEM Graph disk.

Backing Up GEM Graph

☐ Place your DOS disk in drive A:.

Format a floppy disk.

☐ Type: **FORMAT**
☐ Press the ENTER key.

Follow the formatting instructions. (Remember to remove your DOS disk from A: before you begin.)

☐ Insert the GEM Graph master disk in drive A:. (Make sure that you have *write protected* this disk.)
☐ Insert your newly formatted disk in drive B:. (This disk should NOT be write protected.)

Copy the root directory.

☐ Type: **COPY A:*.* B:**
☐ Press the ENTER key.

This command will copy INSTALL.APP, INSTALL.TXT, and READ.ME.

Make four new subdirectories on the disk in drive B:. (The abbreviation MD will be used for the make directory command MKDIR.)

- ☐ Type: **MD B:\GEMAPPS**
- ☐ Press the ENTER key.
- ☐ Type: **MD B:\GRAFMAPS**
- ☐ Press the ENTER key.
- ☐ Type: **MD B:\GRAFSYMS**
- ☐ Press the ENTER key.
- ☐ Type: **MD B:\GRAPHS**
- ☐ Press the ENTER key.

Copy the contents of the first master disk subdirectory to the disk in drive B:.

- ☐ Type: **COPY A:\GEMAPPS B:\GEMAPPS**
- ☐ Press the ENTER key.

This command will copy GRAPH.APP, GRAPH.RSC, and HGRAPH.RSC.

Copy the contents of the second master disk subdirectory to the disk in drive B:.

- ☐ Type: COPY A:**GRAFMAPS B:\GRAFMAPS**
- ☐ Press the ENTER key.

This command will copy USMAP.MAP and EUROMAP.MAP.

Copy the contents of the third master disk subdirectory to the disk in drive B:

- ☐ Type: **COPY A:\GRAFSYMS B:\GRAFSYMS**
- ☐ Press the ENTER key.

This command will copy GRAPH.SYM.

Copy the contents of the last master disk subdirectory to the disk in drive B:

- ☐ Type: **COPY A:\GRAPHS B:\GRAPHS**
- ☐ Press the ENTER key.

This command will copy SPREAD.WKS, AREA.GRF, BAR3D.GRF, BARLINE.GRF, and STBARVER.GRF.

The backup disk is complete. Remove and label this disk. Place the original GEM Graph master disk in a rolled-up sock, in the fourth shoe from the left, in the upstairs closet.

Installing GEM Graph

You are now ready to install GEM Graph on the GEM Desktop. To perform this installation, you will need two, blank floppy disks.

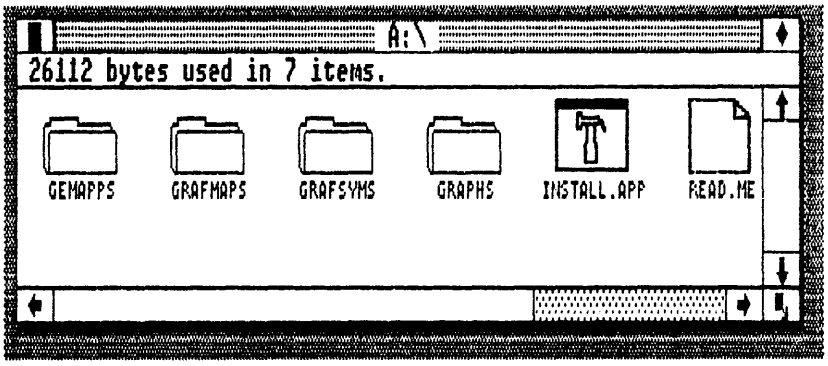


Fig. 5-1. Double-click on the INSTALL.APP icon for installing GEM Graph.

- ☐ Start the GEM Desktop.
- ☐ Select the floppy disk B icon.
- ☐ Display the File Menu.
- ☐ Choose the **Format . . .** command. The warning dialog appears.
- ☐ Insert a blank floppy disk in drive B:.
- ☐ Click on the "ok" button. (Label this disk "GEM Graph Application.")
- ☐ Repeat the above steps for a second blank floppy disk. (Label this disk "GEM Graph Data.")
- ☐ Insert the copied GEM Graph disk in drive A:.
- ☐ Double-click on the floppy disk A icon.
- ☐ Double-click on the INSTALL.APP icon (Fig. 5-1).
- ☐ A warning dialog appears informing you that this installation requires two formatted floppy disks, GEM Graph Application disk and GEM Graph Data disk.
- ☐ An insert dialog appears. Insert GEM Graph Application disk in drive B:.
- ☐ An insert dialog appears. Insert GEM Graph Data disk in drive B:.
- ☐ An insert dialog appears. Insert GEM DESKTOP in drive A:.
- ☐ An insert dialog appears. Insert GEM Graph Application disk in drive B:.
- ☐ A finish dialog appears. GEM Graph is now in the GEMAPPS folder on the GEM Graph Application disk and several sample graphs, maps, and symbols are on the GEM Graph Data disk.
- ☐ Return to the GEM Desktop.

If you fill up your GEM Graph Data disk, you can easily make additional work copies for holding maps, symbol libraries, and graphs. Preparation of these extra work disks requires the creation of three folders on each GEM Graph Data disk. These folders are named: GRAFMAPS, GRAFSYMS, and GRAPHS. You can place these folders on a GEM Graph Data disk with either the DOS MD command or the GEM Desktop **New Folder . . .** command (look for this command on the File Menu). Whichever method you use, make sure that you are in the root directory (this directory is identified by A:\, B:\, or C:\) when you add these subdirectories/folders.

USING GEM GRAPH

To start GEM Graph, enter the GEM Desktop and insert the GEM Graph Application

disk into drive A: and your GEM Graph Data disk in drive B:.

- ☐ Double-click on the floppy disk A icon.
- ☐ Double-click on the GEMAPPS folder icon.
- ☐ Double-click on the GRAPH.APP icon.

Following this brief loading exercise, you are deposited on a blank GEM Graph screen (Fig. 5-2). There are three predominant features on the GEM Graph screen: the Menu Bar, the Title Bar, and the Data Window. In addition to these features, the GEM Graph screen also contains the standard GEM control attributes: Close Box, Full Box, Size Box, Sliders, Scroll Bars, and arrows.

Menu Bar

Running across the top border of the GEM Graph screen is the Menu Bar, a line containing the drop-down menus. All of GEM Graph's commands are located on these menus. There are six menus on GEM Graph's Menu Bar: Desk, File, Edit, Gallery, Options, and Font. A complete explanation of each of these menus can be found in the **GEM GRAPH REFERENCE** section later in this chapter.

Title Bar

Directly underneath the Menu Bar is the Title Bar, a disk information line. Everything related to the exact disk location of the current document is registered on the Title Bar. This document disk data includes: the drive designation, the Directory Path

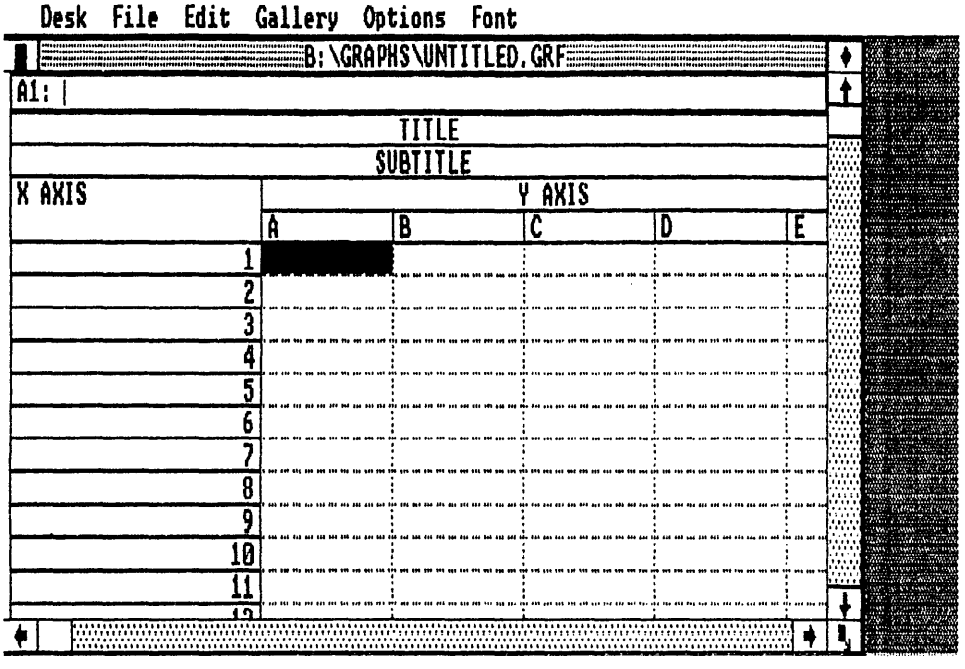


Fig. 5-2. The opening GEM Graph screen.

Name, the Document Name, and the Document Type. Only documents with a .GRF type can be used by GEM Graph. This type is automatically appended to every GEM Graph document.

Data Window

The remainder of the GEM Graph screen comprises the Data Window. There are seven parts to the Data Window: The Editing Line, the Title Line, the Subtitle Line, the X Axis Label, the X Axis Row Labels, the Y Axis Label, and the Y Axis Column Labels. A special highlight box indicates which of these Data Window parts is currently active. Only an active part can be written on or edited. Both the Enter key and the mouse can be used for moving the highlight box (of course, you keyboard fans can also use the arrow keys).

Editing Line. This is the only Data Window part that is never highlighted. The Editing Line is used exclusively for composing the data and text that will be written on the highlighted box. At the beginning of the Editing Line is the name of the current location of the highlighted box. If this box already contains data or text, then the Editing Line displays this information. Use either the Backspace key or the Escape key for clearing the Editing Line. Subsequently, you can edit this information and the highlighted box will receive this new information when the Enter key is pressed or the mouse button is clicked.

Title Line. The title of your graph is typed on this line. Use the highlight box to mark this line and then enter the title on the Editing Line.

Subtitle Line. This line places a subtitle on your graph. When the highlight box is marking this line, type the subtitle on the Editing Line.

X Axis Label. Place the highlight box on this line to enter an X Axis name.

X Axis Row Labels. Place the highlight box on each of these lines to enter individual X Axis Row names.

Y Axis Label. Place the highlight box on this line to enter a name for the Y Axis.

Y Axis Column Labels. Place the highlight box on each of these lines to enter individual Y Axis Column names.

After you have assigned all of the names and labels that will be used in your graph, it is time to add the data. Data is entered in GEM Graph's Data Window by using the mouse and keyboard. The mouse is used for moving the highlight box and the keyboard is used to type in the data.

- ☐ Place the pointer in the first box of Column A and Row 1.
- ☐ Click the mouse button. The highlight box fills this box. The Editing Line shows the box's name with the original coordinate system, A1:.
- ☐ Type the data on the Editing Line.
- ☐ Press the ENTER key. The data now fills Column A and Row 1. (Alternatively, you could move the pointer to a new column and row and click the mouse button to enter the data.)

When all the labels, names, and data have been added to the Data Window, GEM Graph is able to automatically convert this information into the graph or chart of your

choice. The graph or chart format is selected from the Gallery Menu (a complete explanation of this menu is provided in the GEM Graph Reference section later in this chapter). As soon as your choice is made, the Data Window changes into the Display Window.

The Display Window contains two points of interest: the Toolkit and the graph. The Toolkit is a series of four different tools that can be applied to the graph that is in the active Display Window. Opposite the Toolkit is the graph. This graph is derived from your Data Window information and is arranged in the graph format that you selected from the Gallery Menu.

Toolkit

The Toolkit is located along the left-hand border of the Display Window. There are four tools in the Toolkit: the Pointer Icon, the Text Icon, Color Boxes, and the Pattern Boxes. The exact nature of the Toolkit's tools will vary according to the type of graph that has been selected in the Gallery Menu. For example, a symbol graph will display a Symbol Library tool in the Toolkit.

Pointer Icon: This option selects any graph element.

Text Icon: This selection enters comments on a graph.

Color Boxes: This Option applies colors to any graph element.

Pattern Boxes: This Option changes patterns on any graph Data Set.

Graph

The remainder of the Display Window is filled with the **graph.** The graph's form is determined by a selection from the Gallery Menu. Regardless of which graph form is used, there are eight basic graph elements: the Axis Scale, the Data Set, the Grid Lines, the Labels, the Legend, the Tick Marks, the X Axis and the Y Axis.

Axis Scale. This scale represents the numeric increments between Tick Marks on both axes.

Data Set. This is the data that constitutes the graph plot.

Grid Lines. These lines are extensions of the axes' Tick Marks.

Labels. The labels define each axis measurement.

Legend. The Legend assigns descriptions to graph patterns, lines, and symbols.

Tick Marks. These are the individual measurement units on each axis.

X Axis. This is the horizontal axis—usually reserved for classification labels.

Y Axis. This is the vertical axis—usually reserved for graph measurement.

Working in the Display Window

A graph can be altered once it is in the Display Window. These modifications are made possible through the tools in the Toolkit. When you choose a symbol graph, pie chart, line graph, or a bar and line graph a fifth tool is added to the standard four tool Toolkit. This extra tool is a symbol library, explode-slice icon, and line-thickness indicator, respectively, depending on the type of graph. In addition to the tools in the Toolkit, you can also use the commands on the Options and Font menus for manipulating a graph in the Display Window.

To change Colors, Patterns, Lines, Symbols, and Slice Explosions:

- ☐ Choose the Pointer Icon.
- ☐ Place the pointer on the graph element for changing.
- ☐ Click the mouse button. The selector field surrounds the graph element. (The selector field is a series of small boxes, which marks a selected graph element.)
- ☐ Place the pointer on the new color, pattern, line, symbol, or slice explosion.
- ☐ Click the mouse button.

To Move Graph Elements:

- ☐ Choose the Pointer Icon.
- ☐ Place the pointer on the graph element for moving.
- ☐ Click the mouse button. The selector field surrounds the graph element.
- ☐ Keep the pointer on the graph element and drag it to its new location.

Note: Certain graph elements are unmovable. When the selector field is connected by a line, the graph element is movable. Conversely, if there is no connecting line, then the graph element can't be moved.

To Add Text Comments:

- ☐ Choose the Text Icon. The pointer changes its shape to a large "I." (Alternatively, you can double-click the pointer in the Display Window to activate the Text Icon.)
- ☐ Place the pointer at the site for the comment.
- ☐ Click the mouse button. This indicates the starting position for the comment.
- ☐ Type the comment.

GEM GRAPH REFERENCE

The six menus found on the Menu Bar hold all of the commands used by GEM Graph.

Desk Menu (Fig. 5-3)

Graph Info . . . displays the copyright and author information for GEM Graph.

Calculator displays a multifunction calculator. Refer to Chapter 1 for complete operation instructions.

Clock displays a real-time clock and calendar. Refer to Chapter 1 for complete operation instructions.

Print Spooler displays a list of documents for output. Refer to Chapter 1 for complete operation instructions.

Snapshot displays a screen-dump camera. Refer to Chapter 3 for complete operation instructions.

File Menu (Fig. 5-4)

New erases the current Data and Display Windows without saving the document.

Open . . . loads the specified .GRF type document. The ITEM SELECTOR dia-

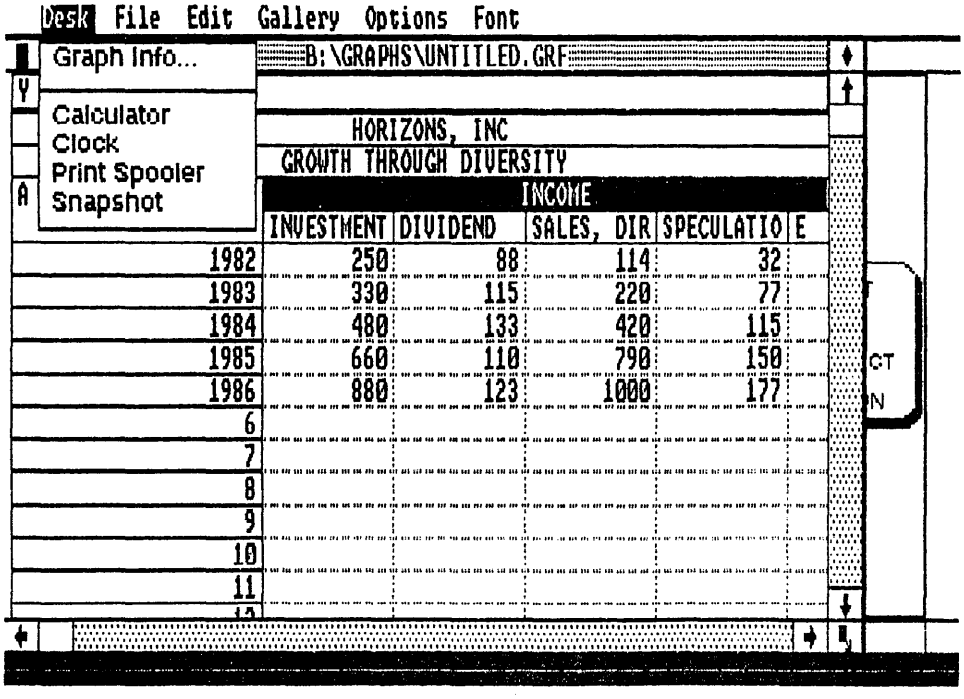


Fig. 5-3. The GEM Graph Desk Menu.

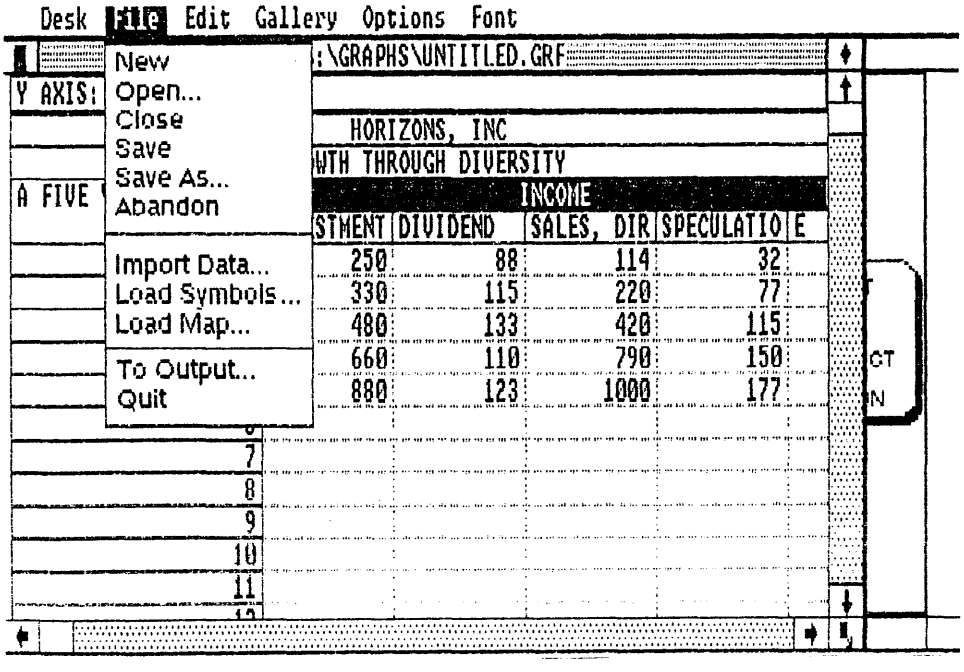


Fig. 5-4. The GEM Graph File Menu.

log appears for selecting the document.

Close Closes the active window and stays in GEM Graph.

Save saves the current document under its same name. This save will replace the previous document. Another name for this action is "updating."

Save As . . . saves the current document under the specified name. The ITEM SELECTOR dialog appears for naming the document. This action is called "backing up."

Abandon erases the current document and replaces it with the most recently saved version of the same document.

Import Data . . .loads data from another non-GEM application into GEM Graph. The ITEM SELECTOR dialog appears for selecting the spreadsheet or database document.

Load Symbols . . . loads a symbol library for use in the Toolkit. The ITEM SELECTOR dialog appears for selecting the symbol library document. Refer to the Advanced Techniques section of Chapter 4 for instruction in making a symbol library document.

Load Map . . . loads a map for use in making a map chart. The ITEM SELECTOR dialog appears for selecting the map document.

To Output . . . starts the OUTPUT application and sends the specified document to the selected output device. This command will only work on hard drive systems. Using this command with a floppy drive system will generate a warning dialog.

To use the **To Output . . .** Command with a Floppy System:

- ☐ Save the current graph.
- ☐ Display the File Menu.
- ☐ Choose the **Quit** command. Remove the GEM Graph Application disk and insert the GEM DESKTOP disk in drive A:.
- ☐ Display the File Menu.
- ☐ Choose the **To Output** command. The ITEM SELECTOR dialog appears.
- ☐ Specify the graph for printing.
- ☐ Proceed with the remainder of the OUTPUT application.

Quit exits GEM Graph and returns to the GEM Desktop.

Edit Menu (Fig. 5-5)

The commands in the Edit Menu are only active in the Data Window. Light, dimmed commands indicate that they are inactive. When the Data Window is active these commands become dark and can then be selected.

Cut erases data and stores it in memory for later action through the **Paste** command.

Copy duplicates data and stores the duplicate in memory for later action through the **Paste** command.

Paste prints data from **Cut** and **Copy** commands to the lower right of the highlighted box location.

Delete erases the selected data.

Insert places a blank column to the left of the highlighted column label or places

a blank row above the highlighted row label.

Plot alternates between "Plot" and "Don't Plot" for the highlighted row or column. This command is used primarily with imported non-GEM application data.

Clear Data erases all data from the Data Window. All of the labels, titles, and subtitles remain intact, only the row and column data is removed.

Flip Data changes all row data and row labels into column data and column labels. This command will also do the converse and change all column data and column labels into row data and row labels.

Gallery Menu

Pie Chart displays all data as a pie chart. Slice size is set by the first Y Axis column, while the number of slices is determined by the number of X Axis labels. A slice can be "exploded" in the Display Window by clicking on the explode-slice icon in the Toolkit.

Line Graph displays all data as a line graph. Usually, the X Axis is used as a time factor and the Y Axis is used for a quantity. Both the pattern filling the lines and the thickness of each line can be altered by tools in the Toolkit.

Area Graph shows data as an area graph. Either single or multiple data sets can be used with this graph. With single data sets an area graph is just a variation of a line graph. When several data sets are used, however, each Y value becomes a sum of all Y values up until that point.

Bar Graph depicts data as rectangular bars of varying magnitude in a bar graph. The Y Axis of data from the Data Window creates the bars. These bars can be ar-

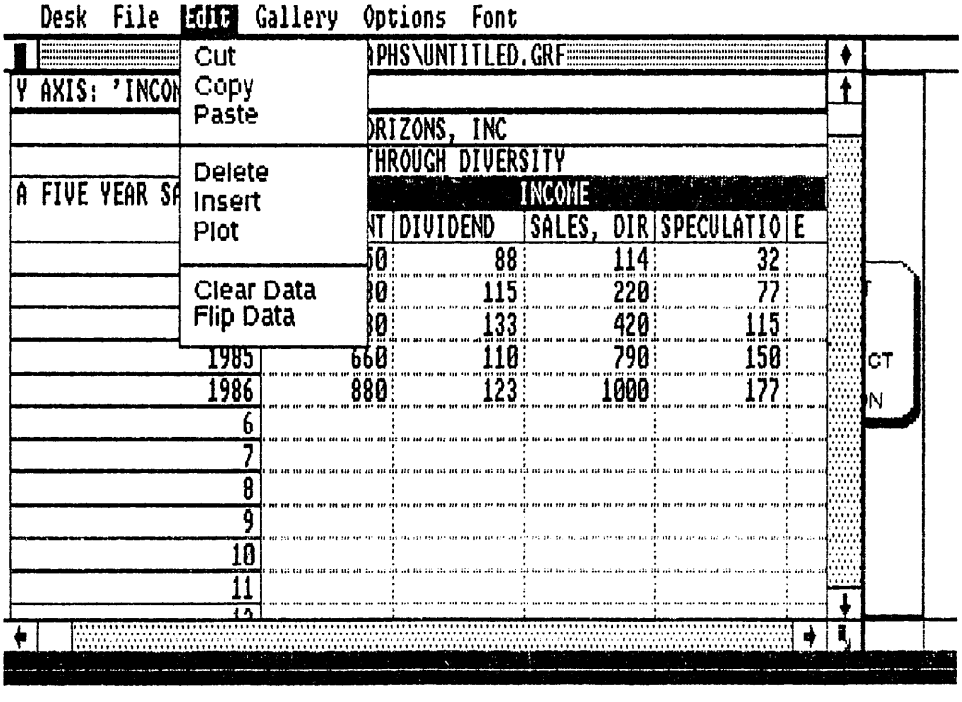


Fig. 5-5. The GEM Graph Edit Menu.

ranged in either a vertical or an horizontal fashion. GEM Graph has four possible bar graph arrangements:

Vertical Clustered Bar Graph—Data bars are placed side-by-side. The Y Axis is used for quantity and the X Axis shows the time factor.

Vertical Stacked Bar Graph—Data bars are placed on top of each other. The results are cumulative over time. This graph shows data effects over time.

Horizontal Clustered Bar Graph—Data bars are placed side-by-side. The Y Axis is used to label the X Axis measured data.

Horizontal Stacked Bar Graph—Data bars are placed on top of each other. The Y Axis values are the sum of every Y column value up until that point. This graph is used for item comparisons.

Three-Dimensional Bar Graph displays data as a set of 3-D bars vertically arranged from front to back. The first column of Data Window data is shown in the front with each following column placed towards the back.

Bar and Line Graph shows two different data sets linked through a common element as a bar and line graph. The final right-hand column of data is used for the line portion of this graph. Various tools in the Toolkit can be used for changing the pattern and line thickness in this graph.

Symbol Graph displays data as a bar graph composed of meaningful symbols. The left-hand Y Axis column is used for plotting the symbol data. A special symbol library tool is placed in the Toolkit when this graph is selected.

Map Chart depicts data as a map chart. The left-hand Y Axis column of data is used for plotting the map chart. GEM Graph can make two different types of map charts:

Statistical Map Chart—Shows every region in the map that contains the specified range of data. Values are given in the Y Axis column under each GEM Graph generated regional name.

Regional Map Chart—Shows the actual data value for every region inside a given region. The display of this data can be altered through the **Preferences . . .** command on the Options Menu.

Options Menu (Fig. 5-6)

Preferences . . . controls the visual display of a graph. The dialog that appears will contain several different selection fields. These fields are different depending on the type of graph that has been selected from the Gallery Menu.

For Pie Charts, there are two selection fields:

Slice Names—Place slice names in legend or on chart.

Value Labels—Use numbers, percentages, or neither.

For Axis Graphs, there are four selection fields:

Column Labels—Place line, bar, and area labels in legend or on graph.

Value Labels—Place values on the graph or not.

Accumulate—Sums Y values up until the current point or not.

Percent—Makes Y values a percent of the total or not.

For Map Charts, there are two selection fields:

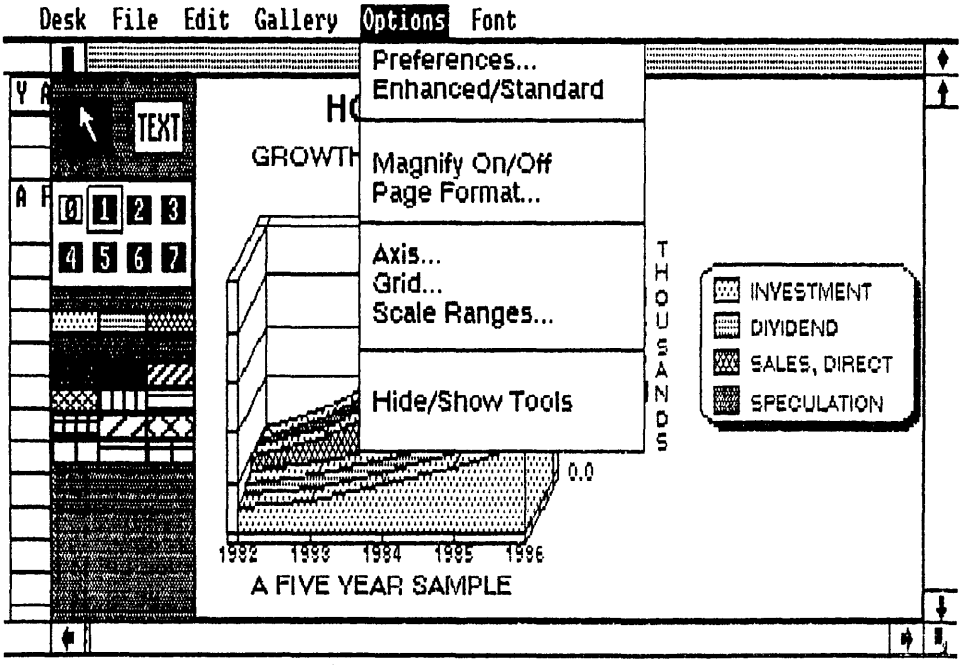


Fig. 5-6. The GEM Graph Options Menu.

Region Names—Places region names on the chart or not.

Value Labels—Use numbers, percentages, or neither.

Enhanced/Standard displays the current graph as a three-dimensional enhanced graph or as a standard two-dimensional graph.

Magnify On/Off selectively enlarges a portion of a graph for detailed work. **Magnify Off** returns the graph to a normal, full-size view.

Page Format . . . displays the PAGE FORMAT dialog for selecting the final printed appearance of the graph. This command should be used prior to saving the final version of the graph for subsequent output.

Axis . . . displays the AXIS dialog for setting your own axes. There are five fields in this dialog:

Axis Scale—GEM Graph will set the axes.

Minimum—Sets the smallest value on an axis.

Maximum—Sets the largest value on an axis.

Step—Sets the incremental units between tick marks.

Axis Crosses At—Sets the value for the intersection of the X and Y Axis.

Grid . . . displays the GRID dialog for setting the type of line used by the Grid Lines on the graph. There are three choices in this dialog: dotted, dashed, or solid.

Scale Ranges . . . displays the SCALE RANGE dialog for setting the ranges used in a statistical map chart. There are two selection fields in this dialog:

Range Number—Sets the number of ranges for the map chart. The maximum range number is 9.

Range Indicator—Sets the size for each range. This size is changed by dragging

the range boundary to the desired level.

Hide/Show Tools removes or displays the Toolkit in the Display Window.

Font Menu (Fig. 5-7)

Font Style. A choice of five different font styles are available : Normal, Bold, Italic, Underlined, and Boxed. Several of these styles can be combined together. A check mark is placed next to the currently active style. The Normal style is used to cancel all other styles. Text that is going to be placed inside a patterned area should be printed with the Boxed style. This will make the text appear isolated from the pattern.

Font Point. Six different text sizes can be selected through this command, ranging from 10 Point to 72 Point. A check mark is placed next to the currently active point.

Font Face. This selection sets the type of font that will be used for text appearing on the graph. Unavailable fonts have light, dimmed names. After these fonts have been installed, their names will become dark and they will be active on the Font Menu.

ADVANCED TECHNIQUES

There are several popular spreadsheet and database programs on the market that would benefit from GEM Graph's remarkable graphing prowess. These non-GEM applications are able to transfer their files, documents, and data to GEM Graph through a simple data importation and conversion process. In order for this data transfer to work, the outside files must correspond to one of five GEM Graph-accepted formats. These usable formats are:

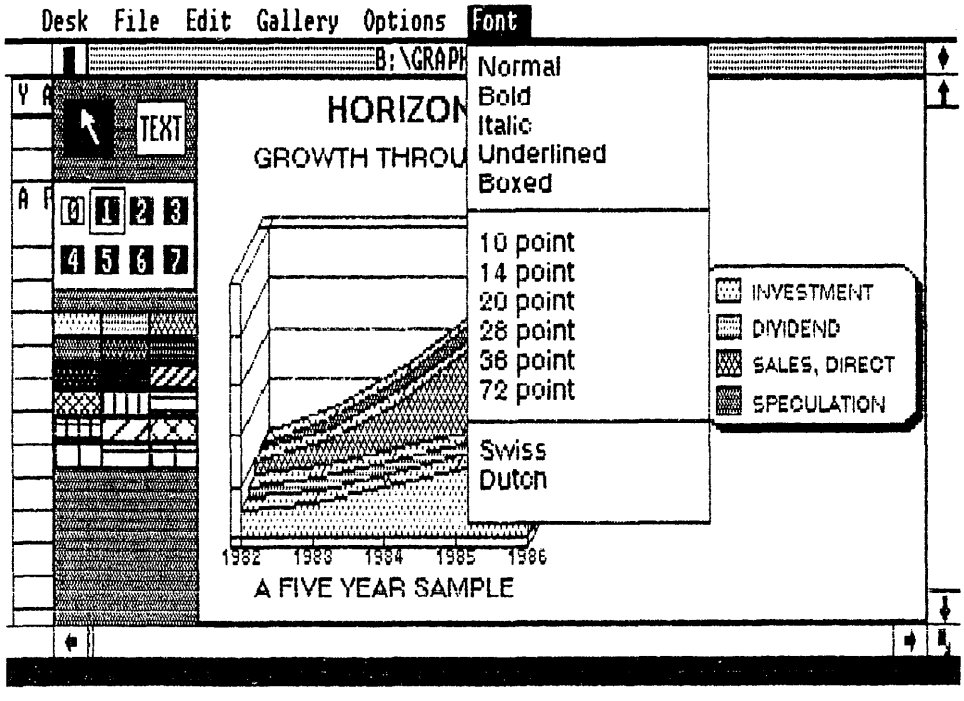


Fig. 5-7. The GEM Graph Font Menu.

Format	*Definition*
CSV	Comma Separated Values; from dBase II and dBase III.
DIF	Data Interchange Format; from Lotus 1-2-3 and VisiCalc.
PRN	ASCII printer output files.
WK1	Lotus 1-2-3 worksheet document.
WKS	Lotus 1-2-3 worksheet document.

Note: The PRN format might cause problems with GEM Graph. Empty cells and erroneous carriage returns are the major culprits in fouling the smooth importing of this data format. The best method for dealing with these incompatible areas is to examine the output from this file prior to sending it to GEM Graph. Then go through the PRN file and manually eliminate all of these trouble spots.

Importing Data into GEM Graph

- ☐ Display the File Menu.
- ☐ Choose the **Import Data . . .** command. The ITEM SELECTOR dialog appears. (Make sure that you have inserted the correct data disk in drive B:.)
- ☐ Double-click on the name of the foreign document.
- ☐ The data is entered into the Data Window beginning underneath the Y Axis column labels.
- ☐ No data is entered into the title, subtitle, and X Axis row labels.
- ☐ Use the **Cut** and **Paste** commands on the Edit Menu for arranging the data into their proper boxes.

Another interesting application for GEM Graph is modifying its graphs with GEM Draw. In Chapter 4, GEM Draw was used for creating a symbol library (see the **ADVANCED TECHNIQUES** section of that chapter). Additionally, GEM Draw can be used for combining multiple graphs on the same page.

Placing Two Graphs on a Single Page

- ☐ While in GEM Graph, display the Options Menu.
- ☐ Choose the **Page Format . . .** command. The PAGE FORMAT dialog appears.
- ☐ Set the graph size to either half page or quarter page.
- ☐ Save the graph. (Repeat this procedure for the other graph.)
- ☐ Exit GEM Graph and start GEM Draw.
- ☐ Display the File Menu.
- ☐ Choose the **Open . . .** command. The ITEM SELECTOR dialog appears.
- ☐ Double-click on the name of the first graph.
- ☐ Size the window to fit on half of the GEM Draw screen.
- ☐ Load the other graph with the **Open. . .** command.
- ☐ Display the Edit Menu and choose the **Select All** command.
- ☐ Display the Arrange Menu and choose the **Group** command.
- ☐ Drag the grouped second graph into the window of the first graph (Fig. 5-8)

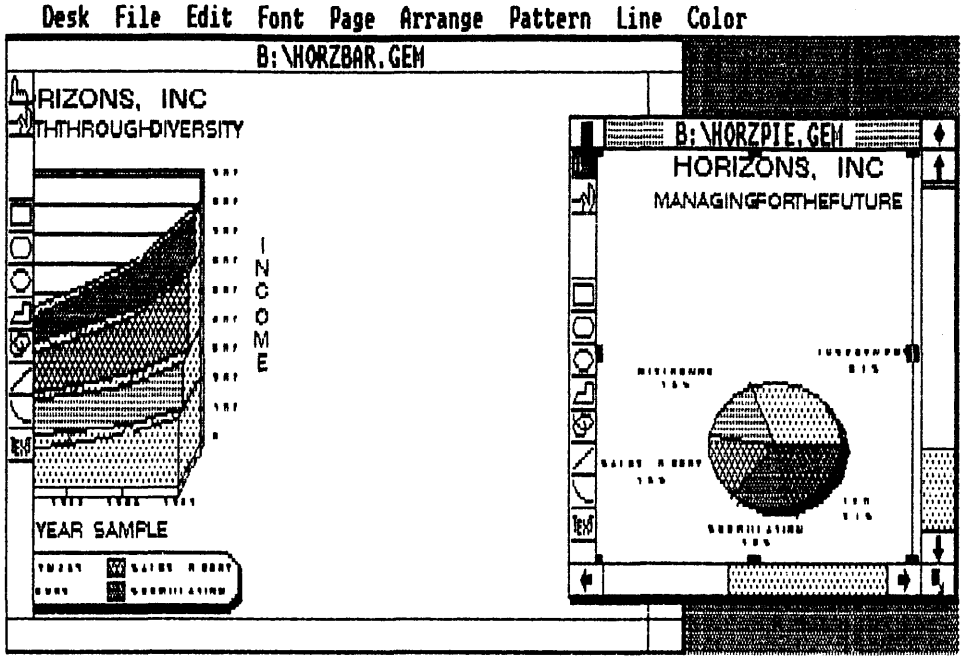


Fig. 5-8. GEM Draw can be used for combining two separate GEM Graph graphs onto the same page.

☐ Arrange, rearrange, and edit the two graphs on the single page.

A special program that is marketed by DRI for use with GEM Graph is the GEM Map Editor. The GEM Map Editor is used for modifying the characteristics of GEM Graph map charts. This application can be identified by its name, MAPED.APP. When the GEM Map Editor application is being run, its operation is similar to GEM Graph in the Display Window. There are several different tools and command features, however. For example, in the GEM Map Editor Toolkit, a special Map Symbol library might be available. The presence of this tool is controlled by a document called MAP.SYM. If MAP.SYM is missing, then this special library tool will not be available.

A much more dramatic difference between the standard GEM Graph Display Window and the GEM Map Editor can be found on the Edit Menu. A new set of commands are on the GEM Map Editor's Edit Menu:

Make Region . . . displays a dialog for naming the selected region. Multiple regions can be combined under one name with this command.

Break Region dispels a combined region into its original regions.

Delete erases the selected region or symbol.

Undelete replaces the last deletion.

Hide/Show Text removes or displays region names and data.

Magnify On/Off enlarges the selected portion of the map or returns the map to a full-size, normal view.

Chapter 6

GEM WordChart

An increasingly popular supplement to every business presentation is textual charts. A textual chart is usually composed of straight text organized on a plain field. These charts serve as a method for breaking up a continual stream of graphs, drawings, and spreadsheet data into more digestible parts. While the amount of actual text contained on a chart is minimal, the information achieves its impact through selective and creative arrangement. Granted, any word processing program is marginally capable of producing a textual chart, but the results from this attempt suffer from a loss of impact.

The trouble with using standard word processing software, like WordStar, to make these charts is that these programs lack the special capabilities that will make a textual chart both impressive and informative. Even powerful word processing software, like GEM Write, lacks the necessary "extras," which translate into a captivating textual chart. Basically, in order to create the type of textual chart that will compliment a business presentation, a word processing package needs to be able to generate variably spaced text, situated on flexible margins, with numerous font styles. An added enhancement for this chart-creating word processing program would be the ability to insert graphics "bullets" into the text for selective emphasis.

Digital Research has done every business person a favor by assembling all of these capabilities, plus a few that haven't even been mentioned yet, into a dedicated, textual chart preparation program called GEM WordChart. Creating textual charts or, as DRI calls them, *wordcharts* is virtually automatic with GEM WordChart. Only three basic actions are necessary for making a wordchart. First, you specify the wordchart's format. This step creates a template on the GEM WordChart screen. Next, you type the needed text into the GEM WordChart-supplied text blanks. These blanks are prepared,

controlled, and arranged by GEM WordChart as you enter the text. The results from this step are automatic and provide instant "feedback" as to what the final appearance of the wordchart will be. As a bonus, you can even add text bullets during this step. A healthy Toolkit supplies both graphics and alphanumeric bullets for insertion into the wordchart. Finally, you complete the wordchart by adding a border around the text template. This final feature is sadly missing from standard word processing software and serves as an ideal finishing touch for every wordchart.

Warning! GEM WordChart has different memory requirements from all of the other GEM applications. You will need a minimum of 320K bytes RAM for DOS 2.X and 384K bytes RAM for DOS 3.X. These increased memory requirements stem from the incorporation of a new font, Dutch, into the GEM environment. Refer to the next section for information about installing this new font.

INSTALLING GEM WORDCHART

GEM WordChart is sold as a three-disk set. The master application disk is identified as disk 1 of 3, with Font Disk #1 labeled 2 of 3, and Font Disk #2 called 3 of 3. Before you perform the GEM WordChart installation, you should back up all three of these floppy disks. These backup copies will then be used for the actual installation. An unfortunate oversight by DRI has left all three of these GEM WordChart disks in a write-enabled condition. In other words, if you use the wrong DOS command, you could erase any of these disks and destroy GEM WordChart. To prevent this error in good disk management, immediately write protect each of the DRI-issued GEM WordChart disks (use the small sheet of rectangular, self-adhesive tabs that came packaged with your floppy disks). With this disk protection ensured, you are ready to back up your GEM WordChart disks.

Backing Up GEM WordChart

☐ Place your DOS disk in drive A:.

Format a floppy disk.

☐ Type: **FORMAT**
☐ Press the ENTER key.

Follow the formatting instructions. (Remember to remove your DOS disk from A: before you begin.)

Repeat these steps for the other two floppy disks.

☐ Insert the GEM WordChart master disk in drive A:. (Make sure that you have *write protected* this disk.)
☐ Insert one of your newly formatted disks in drive B:. (This disk should NOT be write protected.)

Copy the root directory.

☐ Type: **COPY A:*.* B:**
☐ Press the ENTER key.

This command will copy INSTALL.APP, READ.ME, and INSTALL.TXT.

Make two new subdirectories on the disk in drive B:. (The abbreviation MD will be used for the make directory command MKDIR.)

☐ Type: **MD B:\GEMAPPS**
☐ Press the ENTER key.
☐ Type: **MD B:\WCHARTS**
☐ Press the ENTER key.

Copy the contents of one master disk subdirectory to the disk in drive B:.

☐ Type: **COPY A:\GEMAPPS B:\GEMAPPS**
☐ Press the ENTER key.

This command will copy WORDCHRT.APP, WRDCHTHI.RSC, and WRDCHTLO.RSC.

Copy the contents of the other master disk subdirectory to the disk in drive B:.

☐ Type: **COPY A:\WCHARTS B:\WCHARTS**
☐ Press the ENTER key.

This command will copy FREEFORM.WCH, METRIC.WCH, SALARY.WCH, AGENDA.WCH, and CHILL.WCH.

Make an additional subdirectory for a subdirectory.

☐ Type: **MD B:\GEMAPPS\BORDERS**
☐ Press the ENTER key.

Copy the contents of the master subdirectory subdirectory to the disk in drive B:.

☐ Type: **COPY A:\GEMAPPS\BORDERS B:\GEMAPPS\BORDERS**
☐ Press the ENTER key.

This command will copy 1__P.GEM, 2__L.GEM, 2__P.GEM, 3__L.GEM, 5__P.GEM, 6__L.GEM, 6__P.GEM, 7__L.GEM, 9__P.GEM, SAMPLE__L.GEM, 4__L.GEM, 3__P.GEM, 5__L.GEM, 4__P.GEM, 8__L.GEM, 7__P.GEM, 9__L.GEM, 8__P.GEM, and 1__L.GEM.

The backup disk for the GEM WordChart master disk is complete. Remove and label your backup disk. Place the DRI GEM WordChart disk inside a hollow copy of Thomas Carlyle's *The French Revolution.*

Insert the master copy of Font Disk #1 in drive A: and another formatted disk in drive B:. (Be sure to observe the proper write protect practices.)

Copy the root directory. This will copy all 42 files on this disk.

Remove both disks, label the copy, and place the original in spot where the sun don't shine.

Repeat these last three steps for the final GEM WordChart disk, Font Disk #2.

Installing GEM WordChart

With the backup disks in hand, you are now ready to install GEM WordChart on the GEM Desktop. To perform this installation, you will need two, blank floppy disks.

- ☐ Start the GEM Desktop.
- ☐ Select the floppy disk B icon.
- ☐ Display the File Menu.
- ☐ Choose the **Format . . .** command. The warning dialog appears.
- ☐ Insert a blank floppy disk in drive B:.
- ☐ Click on the "ok" button. (Label this disk "GEM WordChart Application.")
- ☐ Repeat the above steps for the second blank floppy disk. (Label this disk "GEM WordChart Data.")
- ☐ Insert the copied GEM WordChart disk in drive A:.
- ☐ Double-click on the floppy disk A icon.
- ☐ Double-click on the INSTALL.APP icon (Fig. 6-1).
- ☐ A warning dialog appears informing you that this installation requires two formatted floppy disks, named GEM WordChart Application and GEM WordChart Data.
- ☐ An insert dialog appears. Insert GEM WordChart Application disk in drive B:.
- ☐ An insert dialog appears. Insert GEM WordChart Data disk in drive B:.
- ☐ An insert dialog appears. Insert GEM DESKTOP in drive A:.
- ☐ An insert dialog appears. Insert GEM WordChart Application in drive B:.
- ☐ A finish dialog appears. GEM WordChart is now in the GEMAPPS folder on the GEM WordChart Application disk and some sample wordcharts are in the WCHARTS folder and sample borders are in the BORDERS folder on the GEM WordChart Data disk.
- ☐ Return to the GEM Desktop.

If you ever need to make additional GEM WordChart Data disks, they will need

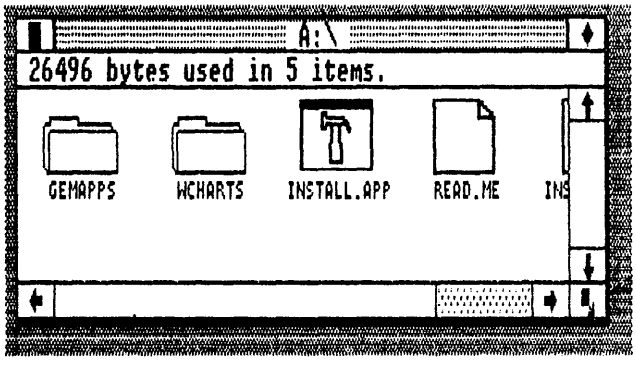


Fig. 6-1. Double-click on the INSTALL.APP icon for installing GEM WordChart.

to contain a WCHARTS folder. This folder can be made directly from the GEM Desktop with the **New Folder . . .** command on the File Menu.

Installing the Dutch Font

An optional font is included with GEM WordChart. This font and its associated setup application is located on the GEM WordChart Font Disk #1 and Font Disk #2. Before you attempt this installation consider these points:

1. This is an option and isn't required for GEM WordChart operation.
2. Using these fonts will consume extra disk storage space.
3. Using these fonts will consume extra system memory.
4. Only the GEM Desktop version that came with GEM WordChart can be used for this installation.
5. This Dutch font will NOT work with GEM Draw Version 1.0.

- ☐ Insert the copy of Font Disk #1 in drive A:. (Floppy systems use drive B:.)
- ☐ Double-click on the floppy disk A icon. (Floppy systems use drive B:.)
- ☐ Double-click on the GEMSETUP.APP icon.
- ☐ Floppy systems insert the GEM STARTUP disk in drive A:.
- ☐ Display the Categories Menu.
- ☐ Choose the **Screen Fonts** command.
- ☐ Drag all of the available fonts into the Chosen window.
- ☐ Display the Categories Menu.
- ☐ Choose the **Printer Fonts** command.
- ☐ Drag all of the available fonts into the Chosen window.
- ☐ Save this setup and follow the remainder of the dialogs.

USING GEM WORDCHART

To start GEM WordChart, enter the GEM Desktop and insert the GEM WordChart Application disk into drive A: and your GEM WordChart Data disk in drive B:.

- ☐ Double-click on the floppy disk A icon.
- ☐ Double-click on the GEMAPPS folder icon.
- ☐ Double-click on the WORDCHRT.APP icon.

Following this loading exercise, you are placed on a blank GEM WordChart screen (Fig. 6-2). There are six features marking the GEM WordChart landscape: the Menu Bar, the Title Bar, the Ruler, the Text Template, the Pointer, and the Toolkit. Supplementing these major features are Sliders and Scroll Bars, which function identically to their GEM Desktop cousins.

Menu Bar

Starting at the top of the GEM WordChart screen is the Menu Bar, a line that holds all of the drop-down menus. Every command used in GEM WordChart is directly addressable from these menus. There are five menus on GEM WordChart's Menu Bar:

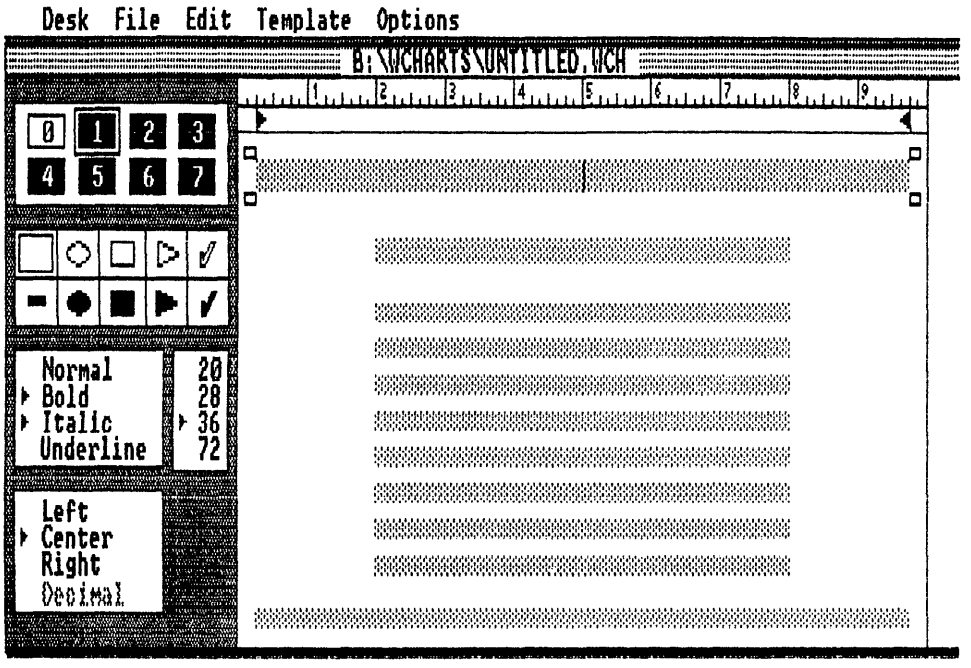


Fig. 6-2. The opening GEM WordChart screen.

Desk, File, Edit, Template, and Options. The **GEM WORDCHART REFERENCE** section later in this chapter describes each of these menus in detail.

Title Bar

Running underneath the Menu Bar is the Title Bar. This line holds all of the disk information related to the current wordchart. The information on this line consists of: the drive designation, the Directory Path Name, the Wordchart Name, and the Wordchart Type. GEM WordChart will always use a .WCH type on the Title Bar when dealing with a wordchart.

Ruler

The Ruler, located at the top of the Text Template, gives an accurate measurement of the horizontal working distance in the current wordchart. Also on the Ruler is a pair of movable *Margin Indicators*. These Margin Indicators are used for marking the left and right margins of the wordchart. To change the position of a Margin Indicator, place the pointer on the Margin Indicator, press the mouse button (the pointer will change into a finger), and drag the Margin Indicator to its new location.

Text Template

Filling the bulk of the GEM WordChart screen is the Text Template. The actual wordchart is composed on the Text Template. There are three parts to the Text Template: fields, rows, and zones.

Fields are the shaded rectangles that hold the typed text.
One or more fields on the same line in the Text Template make up a *Row*.
There are four subdivisions, called *Zones* in the Text Template.

1. Title—The zone at the top of the Text Template.
2. Column Head—A subtitle zone underneath the title.
3. Text Body—The major text zone.
4. Footer—A concluding zone at the bottom of the Text Template.

Text can only be typed into the *active zone*. Two different indicators are used to mark the active zone. The *text cursor* is a flashing vertical line that is only present in the active zone. Additionally, the text cursor shows the point where the typed text will be inserted.

Another indicator of the active zone is the presence of the *select boxes* at the zone's corners. These are small, clear boxes that appear at the four corners of the active zone.

An interesting characteristic of the four zones of the Text Template is that each one has a default set of features. These features govern the eventual display of the typed text. For example, the features will set the font style, font face, and font point for the active zone. You are free to alter any or all of these features with the Toolkit, however.

Pointer

This mouse-operated pointer is used for moving margins, choosing commands, and selecting Toolkit tools. The pointer is also used for marking active zones. When text is typed at the keyboard, the pointer disappears from the screen. This invisibility is merely a convenience. Once the mouse is moved, the pointer reappears.

Toolkit

This area sits on the left-hand border of the GEM WordChart screen and holds six different tools for altering the characteristics of text typed on the active zone. These tools are: text color, bullet style, text style, text size, text alignment, and font. The GEM Wordchart Reference section, later in this chapter, discusses each of these tools in greater depth.

Keyboard Commands

For those users who detest the intrusion of a mouse into a text-oriented application, GEM WordChart provides many keyboard command equivalents (Table 6-1). Each of these keyboard commands has a mouse-accessible representative on a drop-down menu.

GEM WORDCHART REFERENCE

Compared to the other GEM applications, GEM WordChart has only a modest number of menu-resident commands. Supporting these commands, however, is a comprehensive Toolkit. A unique feature of the GEM WordChart Toolkit is that several menu commands can alter the tools found in the Toolkit.

Command	Keyboard Command
Abandon	Ctrl + A
Bullets	Ctrl + K
Delete Row	Ctrl + Y
Get Border . . .	Ctrl + B
Insert Row	Ctrl + N
Landscape	Ctrl + L
Lines & Boxes . . .	Ctrl + Z
New	Ctrl + W
Numbers & Letters	Ctrl + K
Open . . .	Ctrl + O
Portrait	Ctrl + P
Quit	Ctrl + Q
Remember Template	Ctrl + R
Remove Border	Ctrl + F
Save	Ctrl + V
Save as . . .	Ctrl + M
Shortcuts . . .	Ctrl + C
Template Gallery . . .	Ctrl + G
To Output	Ctrl + U
Toolkit	Ctrl + J
Use Template from . . .	Ctrl + T
Zone Markers	Ctrl + J

Table 6-1. A Listing of Mouse Activities and Their GEM WordChart Equivalents.

Desk Menu (Fig. 6-3)

WordChart Info . . . displays author and copyright information in a dialog. **Calculator** displays a multifunction calculator. Refer to Chapter 1 for complete

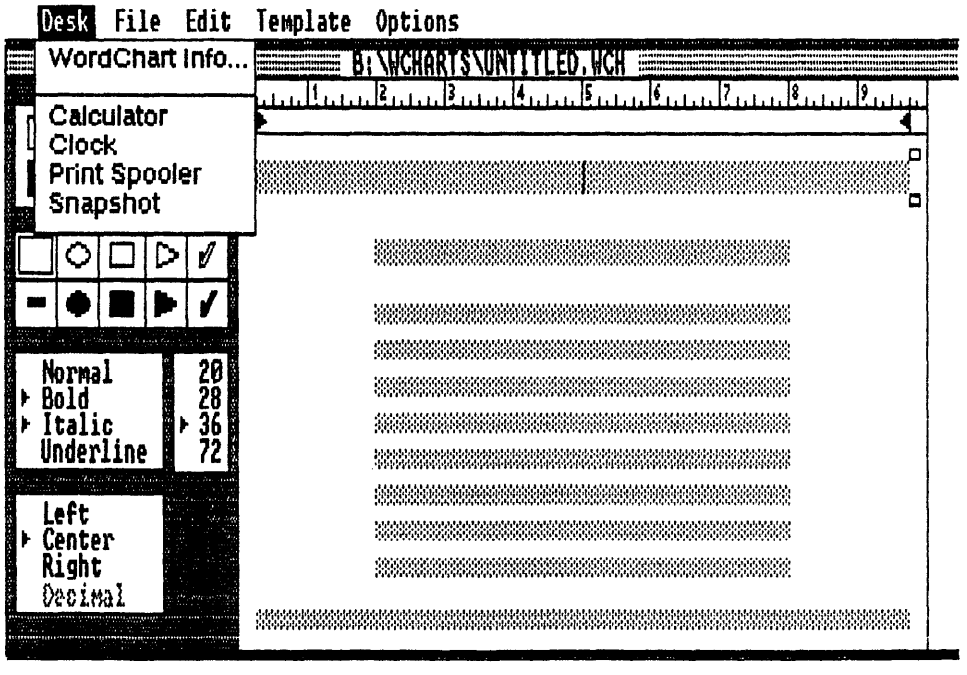


Fig. 6-3. The GEM WordChart Desk Menu.

operation instructions.

Clock displays a real-time clock and calendar. Refer to Chapter 1 for complete operation instructions.

Print Spooler displays a list of documents for output. Refer to Chapter 1 for complete operation instructions.

Snapshot displays a screen-dump camera. Refer to Chapter 3 for complete operation instructions.

File Menu (Fig. 6-4)

New erases the current wordchart and places a new, blank wordchart in the active window. This command retains the current template.

☐ Press: **Ctrl+W**

Open reads the specified wordchart from a storage disk. The ITEM SELECTOR dialog appears for identifying the required wordchart.

☐ Press: **Ctrl+O**

Save saves the current wordchart under its same name. This action is called "updating."

☐ Press: **Ctrl+V**

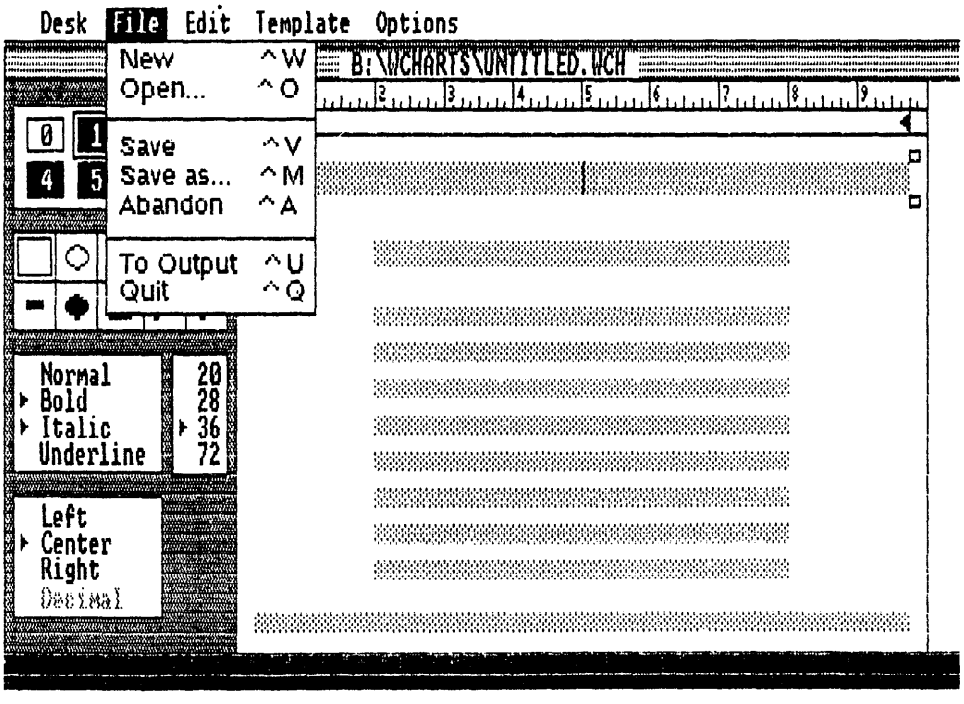


Fig. 6-4. The GEM WordChart File Menu.

Save as . . . saves the current wordchart under the specified name. The ITEM SELECTOR appears for providing this name. This action is called "backing up."

☐ Press: **Ctrl+M**

Abandon erases the current wordchart and places the most recently saved version of the same wordchart in the active window.

☐ Press: **Ctrl+A**

To Output starts the GEM OUTPUT application for sending the specified wordchart to the selected output device.

☐ Press: **Ctrl+U**

Quit ends GEM WordChart and returns to the GEM Desktop.

☐ Press: **Ctrl+Q**

Edit Menu (Fig. 6-5)

Insert Row Inserts a row in the active zone. This new row is placed directly above the current position of the text cursor.

☐ Press: **Ctrl+N**

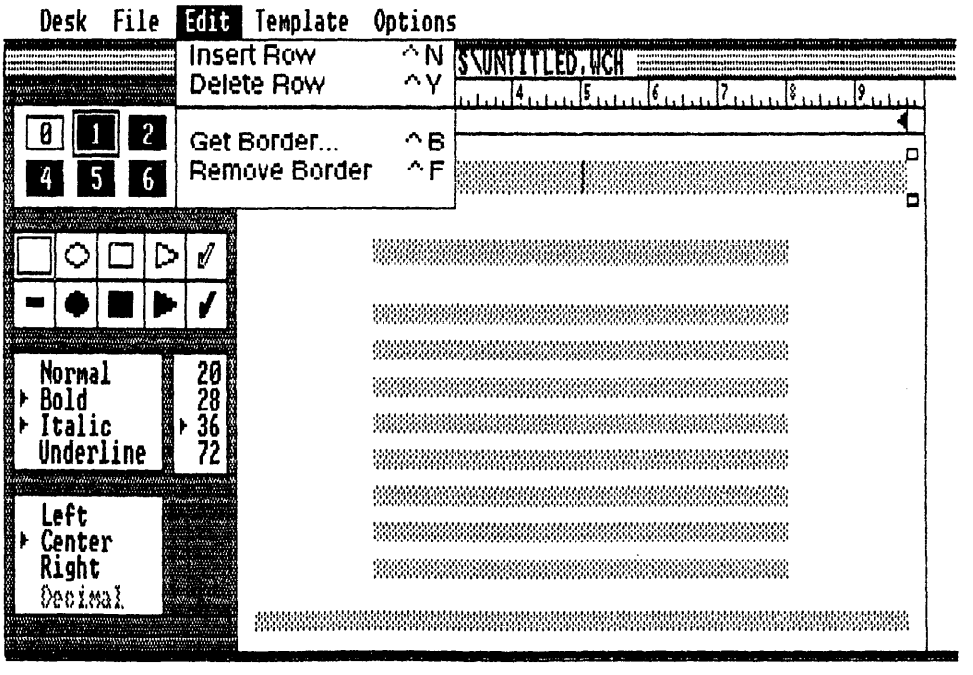


Fig. 6-5. The GEM WordChart Edit Menu.

Delete Row erases the row in the active zone at the exact location of the text cursor.

☐ Press: **Ctrl+Y**

Get Border . . . reads the specified border from the storage disk. The ITEM SELECTOR dialog appears for identifying the required border. All borders follow a standard wordchart naming convention:

Portrait borders—Wordchart Name = *__P Wordchart Type = .GEM
Landscape borders—Wordchart Name = *__L Wordchart Type = .GEM

In both of these cases, the asterisk (*) represents any six-letter word, name, or character set. To a limited extent, any border format (portrait or landscape) can be used with any wordchart format (portrait or landscape), as long as the border doesn't interfere with the text.

☐ Press: **Ctrl+B**

Remove Border erases the border that you added with the above command.

☐ Press: **Ctrl+F**

Designing Your Own Borders with GEM Draw

Be sure to observe these points when designing your own borders:

1. Don't create a border picture larger than 4K bytes in size.
2. Always save your final border in the BORDERS folder of your GEM WordChart Data disk.
3. Make the border fill the entire page, so that it will hold the Text Template.

☐ Start GEM Draw.
☐ Draw the border using any of GEM Draw's elements.
☐ Group the border's elements into a single element with the **Group** command on the Arrange Menu.
☐ Draw the locator rectangle inside the border. This rectangle is used for telling GEM WordChart where to place the Text Template. The locator rectangle needs to be 1/2" inside the border on all sides.
☐ Fill the locator rectangle with the solid pattern.
☐ Assign the Color 0 to the locator rectangle.
☐ Choose the **Put in Back** command. This moves the locator rectangle to the first element drawn in this picture.
☐ Label and save the completed border.

Template Menu (Fig. 6-6)

Use Template From . . . reads the Text Template from the specified word-

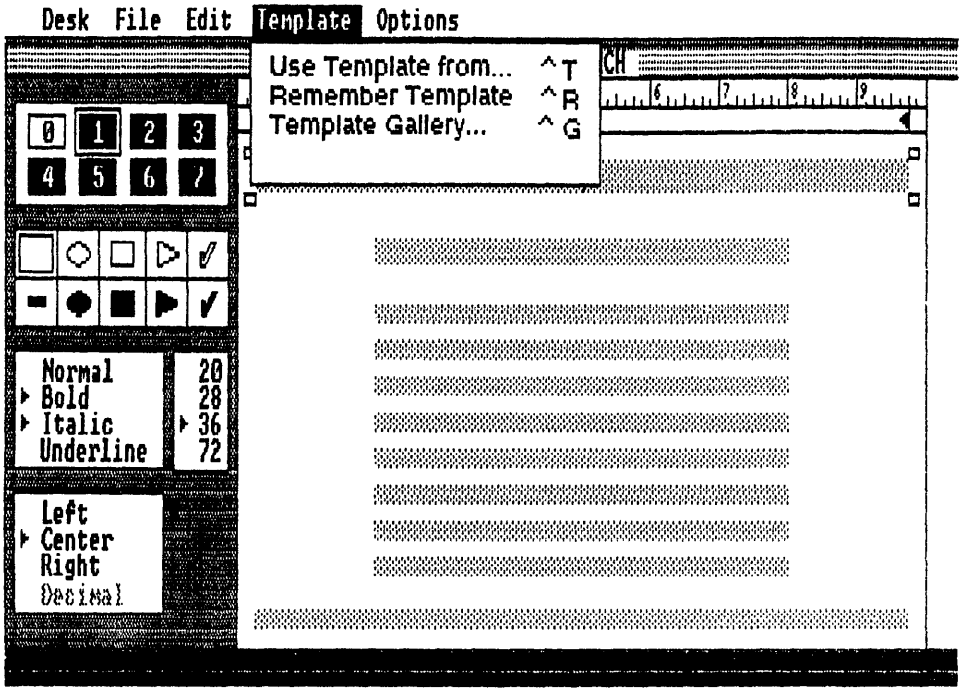


Fig. 6-6. The GEM WordChart Template Menu

chart. The ITEM SELECTOR dialog appears for naming the required wordchart. This command loads every feature, border, and Toolkit tool that is found on the named wordchart. This command does not, however, load the specified wordchart's text.

☐ Press: **Ctrl+T**

Remember Template replaces the specified template gallery wordchart with the current wordchart Text Template. This command permanently saves the current wordchart template in the template gallery replacing one of the resident templates. The template that is highlighted in the template gallery at the time of this command's execution is the template that will be replaced. The original templates can all be restored in the template gallery by erasing the documents DEFAULTP.WCT (for portrait formats) and DEFAULTL.WCT (for landscape formats) from the GEMAPPS folder on the GEM WordChart Application disk.

☐ Press: **Ctrl+R**

Template Gallery . . . displays the Template Gallery dialog for selecting the Text Template for the current wordchart. There are three general categories of templates: columnar, outline, and free form. Once you have made your Text Template selection by clicking on the template's icon, you exit the Template Gallery dialog by clicking on the "ok" button.

☐ Press: **Ctrl+G**

Options Menu (Fig. 6-7)

Portrait creates a vertical wordchart layout.

☐ Press: **Ctrl+P**

Landscape creates a horizontal wordchart layout.

☐ Press: **Ctrl+L**

Lines & Boxes . . . adds highlighting boxes and/or lines to active zones. The Lines & Boxes dialog appears for selecting or de-selecting the type of line and box. There are four fields in this dialog:

Boxes—Adds or removes a text highlighting box.

Lines—Adds or removes lines above, below, or above and below the text.

Line Length—Makes an added line outline the field or outline the text.

Thickness—Sets one of four different thicknesses for the line or box.

Numbers & Letters/Bullets alternates between a Numbers & Letters tool and a Bullets tool in the Toolkit. Generally, the Bullets tool is used for highlighting text, while the Numbers & Letters tool is used for itemizing text entries. No matter which tool is used, GEM WordChart automatically adds the selected field within each tool to the active zone. The selected field from each tool takes on the text features of the

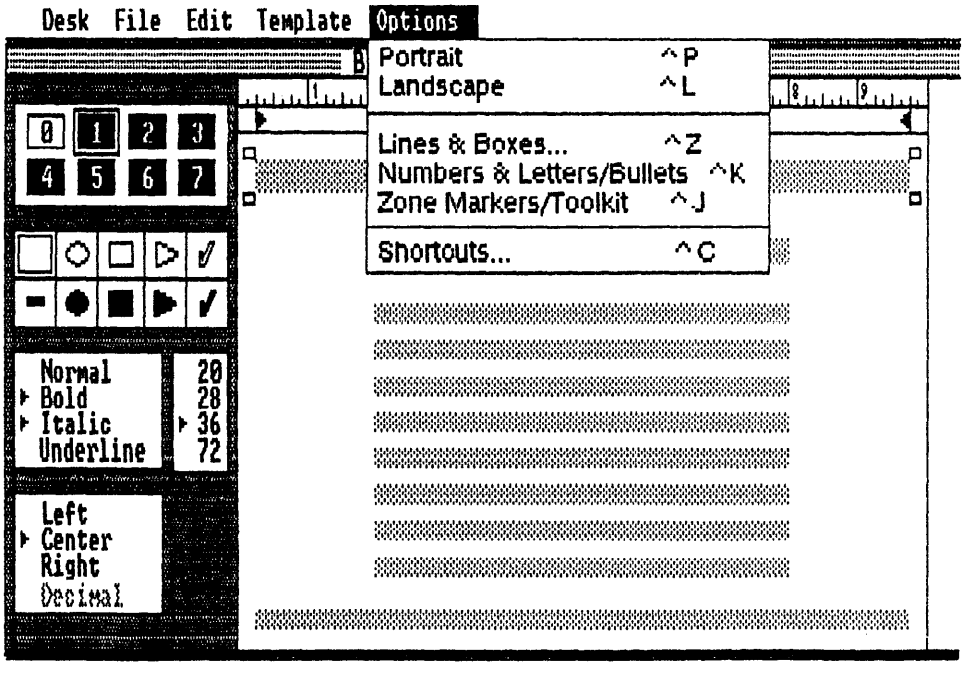


Fig. 6-7. The GEM WordChart Options Menu.

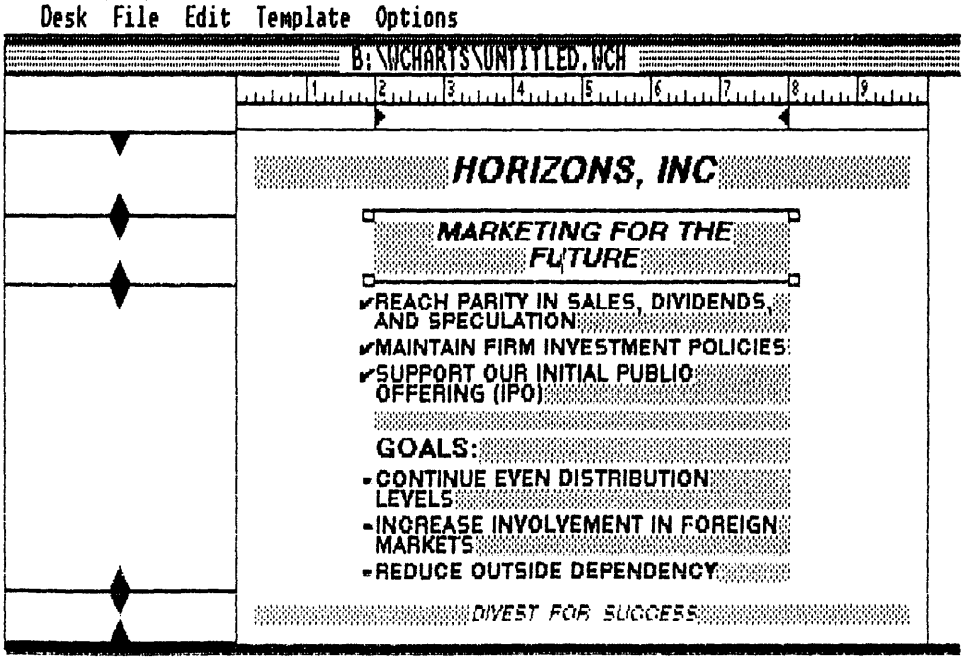


Fig. 6-8. Replacing the Toolkit with the Zone Markers gives you control over the position of the template's zones.

active zone with regard to font style (e.g., Bold) and font size (e.g., 28). The empty box field is used for removing the bullets, numbers, or letters from the active zone.

☐ Press: **Ctrl+K**

Zone Markers/Toolkit alternates between Zone Markers and the Toolkit being visible on the GEM WordChart screen. The Zone Markers are a group of sliders that are used for positioning and sizing the Text Template's zones (Fig. 6-8). These sliders are dragged with the mouse for moving them. The Toolkit, on the other hand, contains several tools, which can be used for directly controlling the appearance of the typed text. A description of the Toolkit's tools is at the conclusion of these menu/command definitions.

☐ Press: **Ctrl+J**

Shortcuts . . . displays a dialog listing the editing keystrokes used in GEM WordChart.

The Tools of the Toolkit

Color. This tool is at the top of the Toolkit. By selecting the differently numbered boxes in this tool, the final color output of the wordchart can be altered. A special color in this tool is the Color 0. This white color matches the standard background of GEM

WordChart. Only by using a different colored background will this color be visible. A different colored background can be created at the same time you make a border using GEM Draw. This background is added inside the border *before* you add the locator rectangle.

Bullets/Numbers & Letters. Underneath the **Color** tool is this variable tool. The **Numbers & Letters/Bullets** command on the Options Menu is used for alternating between these two different tools. By using the pointer, a different bullet, number, or letter can be selected for insertion into the active zone.

Fonts. This tool will only be present if you have installed the Dutch font. Installing this extra font gives you a choice between Swiss and Dutch. A mark is placed next to the currently selected font.

Font Style. One or more of these features can be combined for making a text style in the active zone. A mark is placed next to the currently selected style(s). You can remove a style by clicking on this mark.

Font Size. This tool sets the size of the text in the active zone. The actual number of points available with this tool is limited by the resolution of your system. The 7- and 14-point tools are only present on high-resolution systems using either the IBM Enhanced Graphics Adapter or the Hercules Graphics Card. A mark is placed next to the currently selected size.

Text Alignment. This tool determines the alignment of the text in the active zone. A mark is placed next to the currently selected alignment. The decimal alignment is used for aligning columns of numbers with reference to their decimal points. This method of alignment is only available in the text body zone.

ADVANCED TECHNIQUES

After you have completed your wordchart, you might want to add a suitable picture or alter the arrangement of the text in a fashion that is beyond the abilities of GEM WordChart. In these cases, you will need to import the wordchart into GEM Draw for modification.

GEM Draw is able to:

Manipulate text fields, rows, and zones.
Alter attributes in text fields, rows, and zones.
Group various fields, rows, and zones into single elements.
Change a border and background pattern.
Add a picture to the wordchart.

Using GEM Draw on a Wordchart

- ☐ Save the current wordchart.
- ☐ Display the File Menu and choose the **Quit** command.
- ☐ Start GEM Draw.
- ☐ Display the File Menu and choose the **Open . . .** command. The ITEM SELECTOR dialog appears.
- ☐ Move through the drives, folders, and documents until you find the required wordchart.

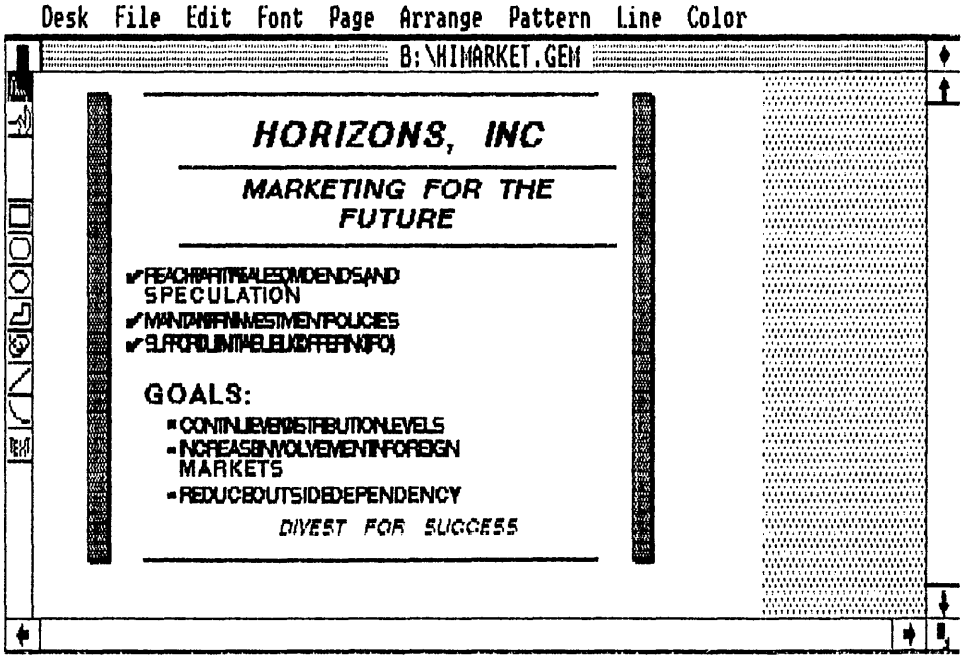


Fig. 6-9. GEM Draw can be used for enhancing a wordchart. Notice how the text is mishandled by GEM Draw.

- ☐ Double-click on the name of the wordchart.
- ☐ Modify the wordchart (Fig. 6-9).
- ☐ Display the File Menu and choose the **Save as . . .** command. The ITEM SELECTOR dialog appears.
- ☐ Type in a new name for this modified wordchart. (This step is necessary because GEM WordChart cannot read a GEM Draw modified wordchart.)
- ☐ The GEM Draw wordchart conversion is complete.

A valuable feature of GEM WordChart is the creation of automatic backup wordcharts. These documents are made each time a wordchart is updated with the **Save** command. A GEM WordChart backup wordchart has a .BAK type. Unfortunately, GEM WordChart is unable to read these .BAK wordcharts. Before you can "reuse" a .BAK wordchart, it must be converted into a .WCH wordchart.

Converting .BAK Wordcharts

- ☐ Start the GEM Desktop.
- ☐ Double-click on the drive icon with the .BAK wordchart.
- ☐ Click on the .BAK wordchart.
- ☐ Display the File Menu.
- ☐ Choose the **Show Info . . .** command. The ITEM INFORMATION dialog appears.

- ☐ Type a new name in the Name field with a .WCH type.
- ☐ Click on the "ok" button.

You will also need a .GEM type for sending this wordchart to the GEM OUTPUT application.

- ☐ Start GEM WordChart.
- ☐ Display the File Menu and choose the **Open . . .** command.
- ☐ Double-click on the newly renamed wordchart with .WCH type.
- ☐ When this wordchart is on the screen, display the File Menu.
- ☐ Choose the **Save** command. Click on the "replace" button.
- ☐ The .GEM type wordchart is now ready for OUTPUT.

Curiously enough, when you follow this procedure, another .BAK type wordchart is created.

Chapter 7

Some Notes on The GEM Programmer's Toolkit

Now that you have been filled with the wonder of GEM, you might like to test your hand at designing your own GEM application or desk accessory. Digital Research has a special programming package that enables you to do just that. The GEM Programmer's Toolkit is a three-disk set that contains a complete set of utility software for creating drop-down menus, designing icons, and arranging windows and dialogs. The only requirements for using these utilities are:

1. An 8088-based IBM PC-compatible computer (see Chapter 2 for a comprehensive listing of acceptable computers).
2. A minimum of 512K bytes RAM, regardless of the DOS version number that you use.
3. The Lattice C compiler. This is the preferred compiler, although others can be used. If you elect to use another C compiler, then you may have to rewrite the GEM bindings for successful application.
4. A C editor.
5. Copy all of the utilities from The GEM Programmer's Toolkit disks into a folder named TOOLS.

With these five steps taken care of, you can begin your GEM programming. Contained in this programming package are two complete GEM sample programs—one application and one desk accessory. DRI has supplied the source code, batch files, and resource files for both of these illustrative programs. By studying the construction of

each of these programs, you will have a comprehensive understanding of the techniques used in GEM programming.

A Sample GEM Application

The GEM application example is called DEMO.APP. Several different files support your programming education with this sample application:

DEMO.APP—actual GEM application.
DEMO.BAT—batch file for RASM.
DEMOM.BAT—batch file for MASM.
DEMO.C—Lattice C source code.
DEMO.DEF—definitions for DEMO.H.
DEMO.H—include file.
DEMO.INP—LINK-86 link input.
DEMO.RSC—resource file.

The two batch files are used for supporting different compilers.

Several different standard GEM Desktop operations are also demonstrated by DEMO.APP:

Drop-down menus
Error dialogs
Warning dialogs
Opening windows
Scrolling windows
Closing windows

The basic procedure for programming a GEM application, similar to DEMO.APP, follows these highly generalized steps:

1. Use the GEM Resource Construction Set for creating the Menu Bar and the dialogs.
2. Design the application's icons with the GEM ICONEDIT (Fig. 7-1).
3. Write the application source code in Lattice C and a word processing program (such as WordStar in Non-document mode).
4. Compile the source code.
5. Debug the compiled code with GEM-SID.
6. Market your completed application.

A Sample GEM Desk Accessory

The GEM Programmer's Toolkit-supplied desk accessory example is called HELLO.APP. Once again, several different files complement your programming education with this sample application:

HELLO.APP—actual GEM desk accessory.
HELLO.BAT—batch file for RASM.

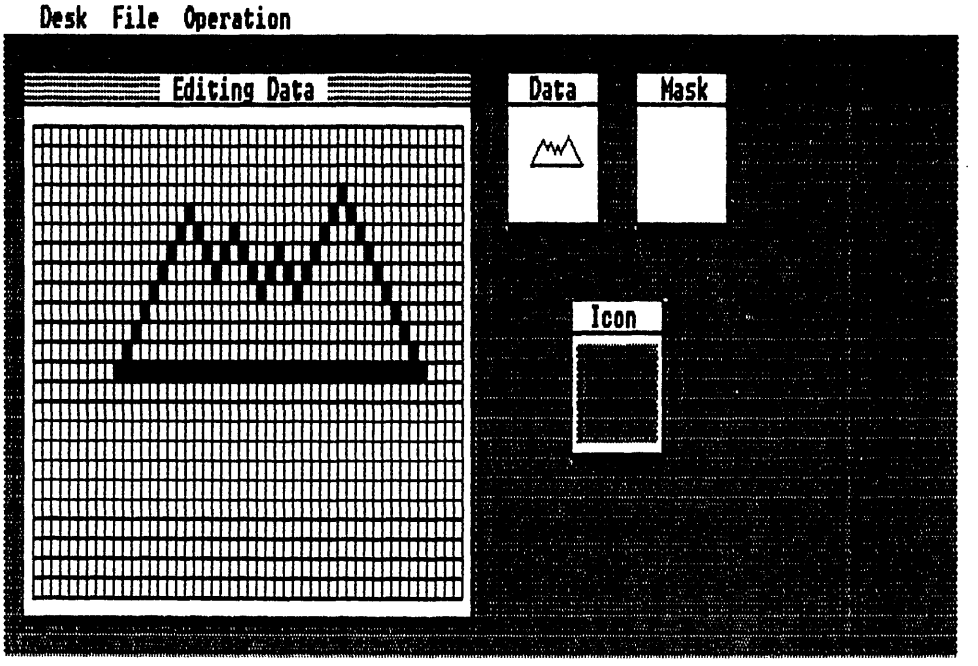


Fig. 7-1. ICONEDIT is used for designing GEM icons.

HELLOACC.BAT—batch file for RASM HELLO accessory.
HELLOM.BAT—batch file for MASM.
HELLOMAC.BAT—batch file for MASM HELLO accessory.
HELLO.C—Lattice C source code.
HELLO.INP—LINK-86 link input.
HELLOACC.INP—RASM link input as accessory.

The four batch files are used for supporting different compilers and for making HELLO an application, as well as a desk accessory.

The basic procedure for programming a GEM desk accessory, similar to HELLO.APP, follows these highly generalized steps:

1. Use the GEM Resource Construction Set for creating the Menu Bar and the dialogs.
2. Write the application source code in Lattice C and a word processing program (such as WordStar in Non-document mode).
3. Copy DESKAPPO.H to DESKACCO.H.
4. Compile the source code.
5. Debug the compiled code with GEM-SID.
6. Copy DESKAPP1.H to DESKACC.H.
7. Recompile.
8. Sell your completed desk accessory to the highest bidder.

The extra copy and recompile steps are necessary because a desk accessory is non-

executable during the debugging stages. Therefore, the accessory must be first converted into an application, debugged, and then converted back into an accessory. The batch files for the HELLO.APP accessory cover several methods for performing this conversion.

Porting GEM

The term *porting* is greatly misused in non-programming circles. The average computer user assumes that a portable program is one that can be made to run on vastly different computer systems. To a programmer, however, porting refers to the modification of a program so that it will run on any other computer. The computer being ported to can have either the same MPU as the original system or an entirely foreign MPU. Therefore, in a programmer's eyes, a GEM application would have to be ported to run on an IBM PCjr, for example. Conversely, the non-programmer would only consider taking GEM into the 68000 MPU environment as porting. Aside from all of this hairsplitting, suffice it to say that GEM applications are highly portable.

The included files (.H type) in The GEM Programmer's Toolkit are the site of the major porting chores. By altering these files with the new machine-specific function and system calls, a GEM application can be easily (this is a relative term) ported over to the new environment. Application areas that would require additional conversion would be those containing resolution-dependent features. Such features would include icons. By far, the best way of making a GEM application portable is to use a programming module approach that clearly labels each machine-specific portion. Then, when you decide to port the application to another environment, the new machine-specific code can be quickly (again, relatively speaking) substituted for the marked modules.

GEM VDI

The obvious strong suit of GEM is its graphics-oriented approach to solving operating system limitations. This graphics system also provides convenient "hooks" for organizing dissimilar applications into a common environment. One of the potential flaws in organizing a true graphics environment is incompatibility among the hundreds of possible graphics devices used with today's microcomputers. This diversity in hardware could actually destroy the ability of GEM to deal effectively within a graphics environment. In order to combat any possible degradation in GEM, DRI developed the VDI, or *virtual device interface*. The VDI gives GEM a portable hardware interface for dealing with graphics I/O (input/output).

Basically, the GEM VDI is a programming interface that offers operating system compatibility. Additionally, like on the open range, the GEM VDI rides herd over any connected I/O device. This leaves the programmer free to concentrate on the application creation without worrying about device drivers. Two major components make up the GEM VDI: the Graphics Device Operating System (GDOS) and the specific device driver and face file (or system fonts). The amount of system memory consumed by the GEM VDI is less a function of the GDOS than it is the device driver. On the average, the GDOS takes 5K-7K bytes, while the device driver takes 30K-40K bytes. In order to appreciate both the significance and the diverse memory use of the device driver, you must realize its function.

The device driver portion of the GEM VDI houses *all* of the device drivers used by the installed GEM Desktop. This includes the graphics card, mouse, printer, and font drivers. By using this method, DRI has removed a prime concern of the application programmer—peripheral support. Following a typical GEM application scenario, the program addresses each device in a standard method with the GEM VDI device driver performing all of the translation.

The other portion of the GEM VDI, the GDOS, controls the coordinate scaling system used on the particular computer system. This means that the GDOS is a machine-specific module within the GEM VDI. Two different types of coordinate scaling methods are used by the GDOS: Normalized Device Coordinate and Raster Coordinate systems. The Normalized Device Coordinate method transforms the display coordinates into device coordinates through a normalized space. Conversely, the Raster Coordinate system deals in real device coordinates without any transformation. Of these two coordinate methods, the Raster Coordinate system is stressed by The GEM Programmer's Toolkit. Supporting this recommendation are several raster operations that enhance the programming of a GEM application or desk accessory.

The Open Workstation function is used for setting the coordinate method:

```
v_opnwk( work_in, &handle, work_out )
```

This is the Lattice C binding supplied with The GEM Programmer's Toolkit.

The device drivers serve as translators between the graphics primitives of the GEM VDI and the connected graphics output device. Each device is given a specific driver, which is installed during GEMPREP (or added later with GEMSETUP). Based on this bit of information, your next question should be, "How is GEM able to manage the several device drivers that it uses?" In the GEM VDI, each memory-resident device driver is assigned a number. The currently running GEM application is then able to selectively output data to the specified device through the proper identification number.

This same installation and memory management system applies to the GEM VDI face files as well. In other words, the required system fonts are installed with GEMPREP (or added later with GEMSETUP). These system fonts are for both the screen and the selected output device. A special text file called ASSIGN.SYS holds a listing of the device drivers, the face files, and their associated device numbers. The device numbers are set by the selected output device. For example, the printer output device uses 21-30 as device numbers.

Displaying these system fonts can be performed in either the *Point mode* or the *Absolute mode*. In the Point mode, text created with the face files are fixed to either a 1X or a 2X size. On the other hand, text displayed with a face file in the Absolute mode uses variable scaling from 0X to 2X. There is a slight difference, however, in the way in which printer device drivers interpret these face file scaling modes. With the device printer drivers in The GEM Programmer's Toolkit, all face file text output to a printer is rounded down to the nearest scale.

GEM AES

Whereas the GEM VDI served as the universal graphics output interface, the GEM

AES (Application Environment Services) handles all of the user-generated, graphics-based input through the GEM Desktop features. In other words, the GEM AES is able to read user input to icons, drop-down menus, dialogs, and menu-resident commands. Watching over these actions, there are five GEM AES parts that hold memory space: subroutine libraries, limited multitasking kernel, the Shell, desk accessory buffer, and menu/alert buffer.

The *subroutine libraries* provide all of the subroutines or mini-applications that perform windowing, mouse movement, error handling, and screen/object manipulation. The subroutines will remain memory resident until the programmer intentionally removes them.

Without a doubt, the success of GEM is hinged on the *limited multitasking kernel.* This AES component is directly responsible for dividing the 8088's time for the application, any background maintenance (including desk accessories), and the Screen Manager. Remarkably, this time division must be carried off without the user becoming aware of the missing MPU time. Additionally, the other elements receiving the 8088's attention can't remove too much time from the application's execution. Therefore, the Dispatcher watches the consumption of the MPU's time. Two lists are made by the Dispatcher for 8088 time use—the *Not-Ready List* and the *Ready List.*

The Not-Ready List holds all actions that are waiting for a particular series of events to occur. These events might be the press of a key, a wiggle of the mouse, or a tick on the clock. In contrast, the Ready List contains actions that are ready to run. Basically, an action is on the Ready List, if it is not waiting for one of the Not-Ready List events to happen. From these elementary descriptions, you can see that actions will move from one list to the other as one of the events occurs. Guiding the smooth transfer or dispatching of each of these moving actions is how the Dispatcher earned its name.

Only six desk accessories can be watched by the limited multitasking kernel. These six accessories are arranged into three different documents labeled DESK1.ACC, DESK2.ACC, and DESK3.ACC. These .ACC type documents are held in the desk accessory buffer of the GEM AES. For the programmer, there are three points to remember when dealing with accessories and the limited multitasking kernel.

1. Use the overlay option (03H) of the DOS EXEC function call (4BH; Load or Execute a Program) for loading the accessory into memory. This desk accessory will then stay in memory until the programmer removes it.
2. There must be at least 128K bytes RAM remaining after the desk accessory and the GEM application have both been loaded.
3. The desk accessory must register (use the menu_register call) with the GEM AES before it will appear on the Desk Menu.

In addition, you will need to know the accessory's:

a. process indentifier.
b. menu item indentifier.
c. text string address.

All mouse activities are monitored in the limited multitasking kernel by the *Screen*

Manager. The Screen Manager comes into play when the mouse leaves the area occupied by the active window. In particular, the Screen Manager is looking for mouse actions related to the following:

Sizing and other window scaling
Window movement
Menu Bar and drop-down menu selection
Limited shape change of the mouse to an arrow pointer
Non-active window icon selection

As its name implies, the *Shell* is an interactive layer between the subroutine libraries and the limited multitasking kernel. Granted, in the true context of the GEM AES, the Shell is a subroutine library, but it operates independently. These independent actions of the Shell are most visible when a GEM application is started from the GEM Desktop. Under these conditions the following happens:

1. The Shell determines the nature of the application

   Is it graphics based?
   Is it character based?
   Is it a DOS application?
   Is it a GEM application?

2. The GEM Desktop leaves the screen
3. The Shell takes control

no application is present—returns to the GEM Desktop
graphics based—converts the screen to graphics mode and initiates GEM VDI Open Workstation call
character based—converts the screen to character mode and initiates GEM VDI Close Workstation call
DOS application—follows character-based execution
GEM application—follows graphics-based execution

Finally, the GEM AES is associated with screen refreshment. No, this isn't a GEM breath mint. Whenever a dialog or a menu fills the screen two events occur. First, the displayed dialog or menu is placed in the top layer of the GEM screen. Second, this dialog or menu covers a portion of the underlying GEM screen. Following these two events is the subsequent removal of the dialog or menu. Along with this erasure goes the piece of the screen that was underneath the dialog or menu. Therefore, a problem in screen refreshment becomes vital.

The menu/alert buffer serves as a quick method for redrawing a portion of the screen that has been erased by a dialog or menu. Essentially, this buffer holds up to one fourth of the screen imagery prior to the arrival of the dialog or menu. After the dialog or menu is removed from the screen, the menu/alert buffer redraws the piece of the screen that had been covered. The speed of this redrawing is set by the buffer being memory

resident. Unfortunately, since this redraw buffer is located in the system memory, only a maximum of one fourth of the screen can be correctly restored. Therefore, limit the size of your dialogs and menus to less than one fourth the size of the screen.

GEM RESOURCE CONSTRUCTION SET

The finishing touch for a GEM application is the incorporation of icons, drop-down menus, and dialogs into the desktop. This last bit of graphics wizardry is accomplished with a tool found in The GEM Programmer's Toolkit—the Resource Construction Set (RCS). The RCS helps in the preparation of all of the key graphics features that are used by GEM. These graphics features are called *resources* in the parlance of the RCS. Adding a little bit of confusion to this issue is the naming convention that is used for the resource files that are created by the RCS. A file made by the RCS uses the .RSC type. In order to minimize this confusion, all .RSC files will be referred to as *resource files*.

A resource file contains object trees. The "objects" in these object trees include text strings, exit buttons (e.g., "ok" buttons), and icons. Using the RCS is quite similar to any other GEM application (Fig. 7-2).

- ☐ Choose the tree option.
- ☐ Name the tree option.
- ☐ Open the tree.
- ☐ Collect the objects.
- ☐ Name the objects.

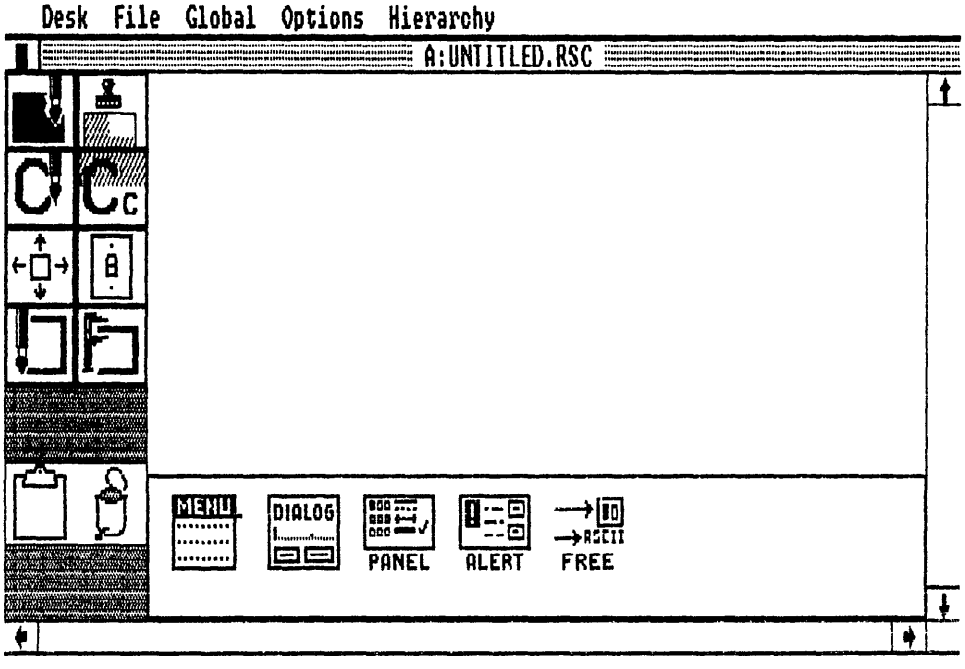


Fig. 7-2. The Resource Construction Set (RCS) develops the graphics for applications and desk accessories.

- ☐ Arrange the objects.
- ☐ Close the tree.
- ☐ Save the tree.

Dealing with object trees can lead to some complicated, if not amusing, side effects. The Options Menu of the RCS holds several commands that operate on object trees. These commands manipulate parents, children, and, even, grandchildren. While this might add a bit of whimsy to the otherwise dreary activity of C programming, abusing these commands can completely disrupt a resource file. The best advice here is to avoid the Options Menu, unless you are intimately familiar with the family operations of an object tree. Otherwise, you might see your resource file receive the **Snap, Flatten,** and **Hide** command treatment.

Chapter 8

Twin Gems

On September 30, 1985, the boom was lowered on Digital Research. It was on this date in history that Apple Computer struck a solid blow for visual copyright laws. But, given the proceedings in this case, this had to be the oddest legal battle ever fought in or out of a courtroom.

In a nutshell, Apple's contention against GEM was that it mimicked the Macintosh interface to such a faithful degree that GEM could be interpreted as a copyright infringement. Not being known for its fairness in this legal argument, the computer press belittled Apple's contentions by debasing its suit into a "look and feel" issue. Even magazine editorials (see *BYTE* Vol. 11 No. 1) childishly lambasted Apple for pursuing such a destabilizing action. But no matter what your opinion is in this case, Apple was justifiable in calling GEM to task for its overly familiar Macintosh interface. GEM does closely follow the visual interface of the Macintosh. Let me hasten to add that this statement isn't meant to suggest that the outcome of the eventual settlement was either fair or just. It only serves as reinforcement of the grounds that Apple used for basing its contention.

Actually, this is a court case that was never fought. The bottom line is that DRI settled out of court with Apple. Now, there are two sides to this type of settlement: the implied guilt side and the "cut your losses" side. With implied guilt, it is assumed that DRI was guilty of copyright infringement based solely on their pressing for an out-of-court settlement. This belief is pure hogwash.

A more truthful accounting of DRI's action in this non-case is that they realized the legal ramifications of Apple's suit and decided to stave off a considerable waste in resources by settling out of court. It wasn't the money so much that concerned DRI,

it was the market life of GEM that was presented as the perishable resource. Basically, this resource absorption wouldn't have been limited to financial wealth; it would almost have certainly included a suspension in GEM sales during the legal proceedings as well. The loss in revenue is a tangible fact, but the loss in sales is ephemeral and could spell the doom of GEM. In other words, a fickle market faced with Windows, DESQview, and TopView isn't about to wait several months or even one year for the eventual release of a legally contested product. The end to all of this legal intrigue arrived on March 24, 1986, when DRI formally announced that a new version of the GEM Desktop (version 2.1; refer to Appendix A for a complete introduction to the new GEM Desktop) had been officially sanctioned by Apple as not violating the Macintosh visual copyright.

How closely did the original GEM Desktop match the Macintosh interface? Just study the next few pages and judge for yourself.

FINDER

The operating system of the Macintosh was unlike that of any other contemporary microcomputer. This totally graphics-oriented environment is managed with icons through a graphics input device. Icons are used for representing physical disk drives, files, and a file deletion buffer (the Trash icon). By clicking, dragging, and double-clicking the mouse input device, the user can perform all of the Macintosh system management duties.

One file that supports the Macintosh operating system is Finder. Finder serves as the disk and file management segment of this no-name operating system. While much of the previous paragraph listed Macintosh features that have similar counterparts in GEM, there are several interesting differences between GEM and Finder. For one, Finder is slow. Finder is so slow, in fact, that RAM drives, file caching, and memory management systems are used to increase the performance of this lethargic operating system (Apple has even recognized this speed deficit and attempted several operating system upgrades).

Another area of difference between GEM and Finder is in the management of disk drives and disk files.

Disk Management

- ☐ Turn the Macintosh on.
- ☐ Insert the System Disk into the internal disk drive.
- ☐ Double-click on the System Disk icon.
- ☐ Eject the System Disk.
- ☐ Insert the MacWrite disk.
- ☐ Double-click on the Write disk icon.

The Macintosh desktop is now filled with two open windows and two floppy disk icons (Fig. 8-1). This is sloppy disk management. These windows and icons all came from the same physical disk drive, but were actually housed on two different floppy disks. This unusual one drive/multiple icon setup can lead to confusion. Just close both win-

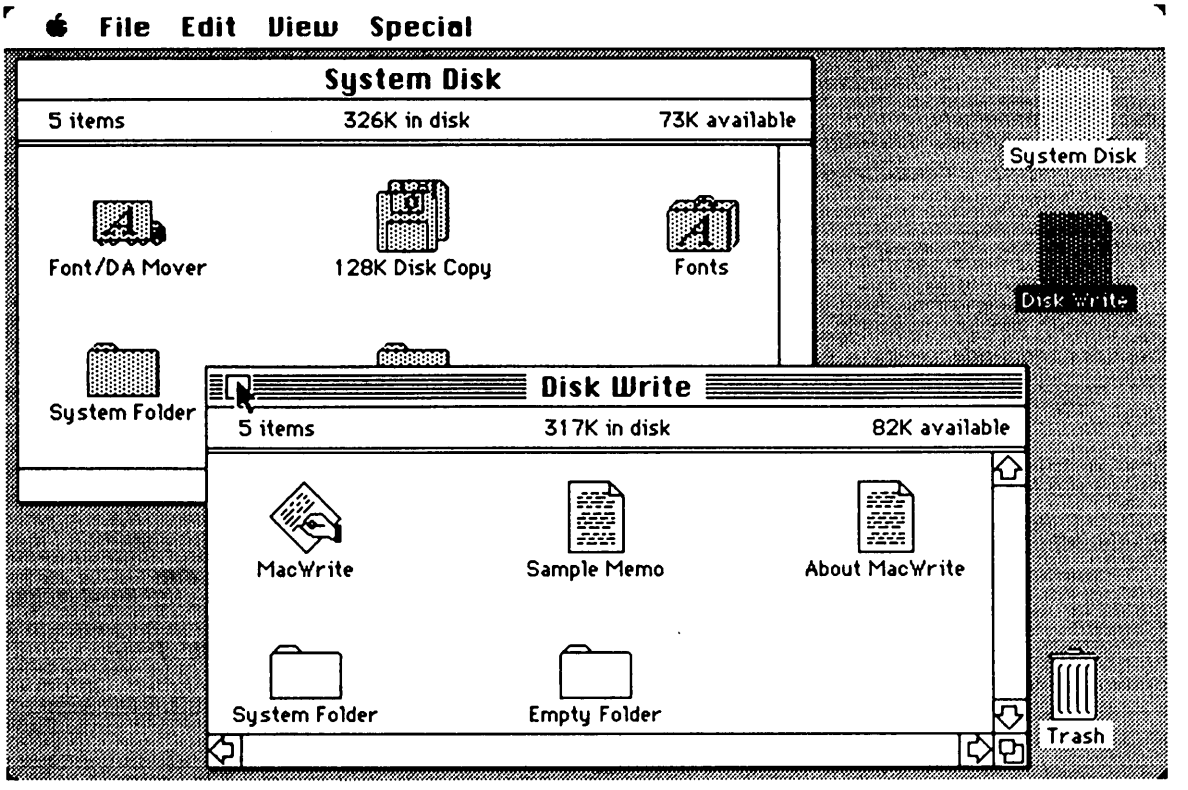


Fig. 8-1. Two open windows on the Macintosh. In this case, the disk icon is used for representing each physical disk and not the number of system disk drives.

dows and single click on the System Disk icon. Now, which disk is currently in the disk drive? Furthermore, try and open the System Disk (double-click on the icon). Finder certainly is not a very friendly operating system.

Renaming a File

- ☐ Click on the file's icon.
- ☐ Click the pointer on the name of the icon. A text cursor appears.
- ☐ Type the new name.
- ☐ Click anywhere else in the desktop. The new name is added to the disk's directory.

Several other Finder-related activities also differ from the equivalent action in GEM. An important point to remember here is that one operating system can't be judged as better than the other based on their relative merits and demerits in these disk and file management actions.

One area, however, where GEM holds a superior edge over Finder is in peripheral support. GEM offers a large assortment of graphics cards, printers, plotters, and cameras

for receiving its output. Conversely, Finder is limited to Apple products. Although, if you happen to own the Apple Computer's LaserWriter, then your Macintosh couldn't care less about not having a variety of output devices.

DESKTOP

The Macintosh uses the desktop metaphor for describing the visual appearance of its operating system. While Finder serves as the disk and file management portion of this operating system, several other files form the backbone of the Macintosh operating system. Collectively, these operating system files are known as the System Folder. Within this System Folder there are commonly six files: System, Finder, ImageWriter, Note Pad, Clipboard, and Scrapbook. There is one file, however, that you can't see in the System Folder. Desktop is an invisible file that is completely responsible for the maintenance of the Macintosh desktop (Fig. 8-2). Why is Desktop invisible? So that you won't accidentally remove this vital file from the System Folder.

Generally speaking, there are three highlights to the Macintosh desktop: the Menu Bar, the disk icon, and the Trash icon. The disk and Trash icons have already been mentioned. This leaves only the Menu Bar for receiving the final judgment.

Menu Bar

This command line runs along the top portion of the desktop. The Menu Bar holds

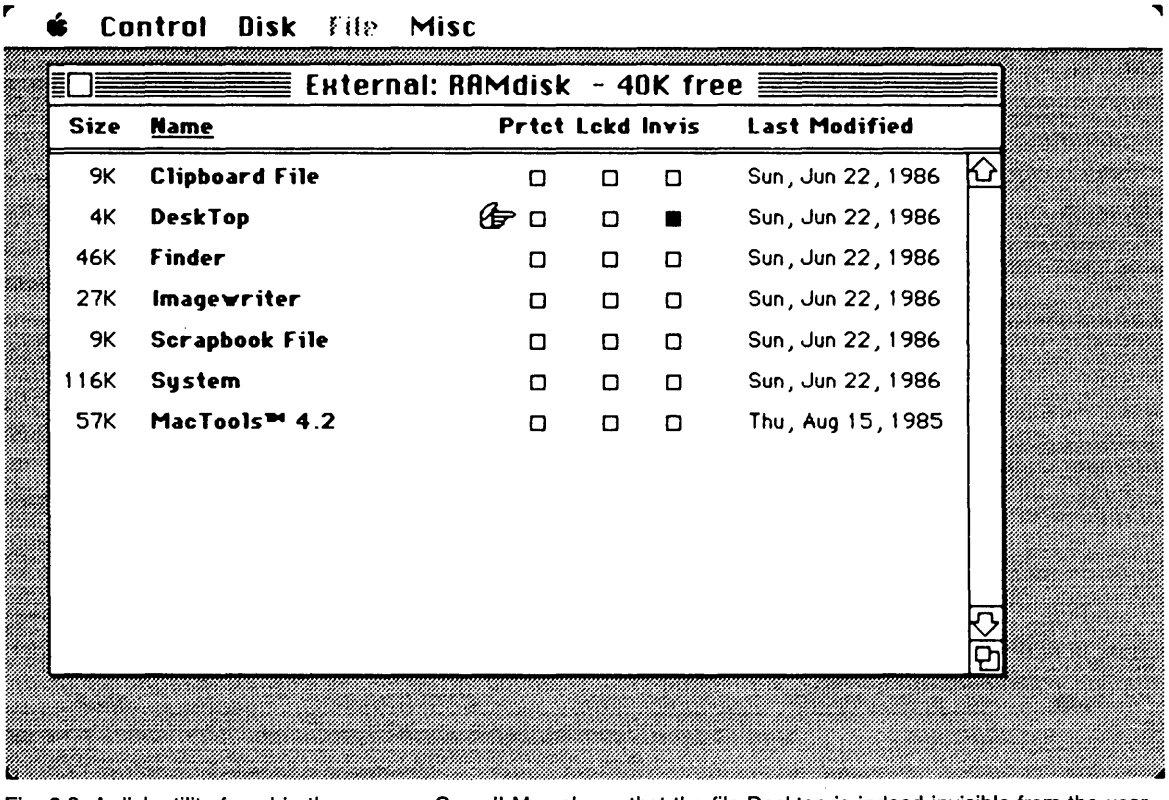


Fig. 8-2. A disk utility found in the program Copy II Mac shows that the file Desktop is indeed invisible from the user.

five menus: the Apple menu, the File menu, the View menu, and the Special menu. Each of these menus must be physically pulled down by placing the pointer over the menu name and clicking the mouse button. To continually display a menu for command selection, the mouse button must be held down until the command has been correctly highlighted. Then, once the command has been identified, the mouse button is released and the command is executed.

Apple Menu. This menu holds the desk accessories and information dialogs. These accessories can be selectively removed for increasing disk storage space.

About the Finder . . .
Scrapbook
Alarm Clock
Note Pad
Calculator
Key Caps
Control Panel
Puzzle

File Menu. This is the disk and file management menu.

Open
Duplicate
Get Info
Put Back
Close
Close All
Print
Eject

Edit Menu. The commands on this menu are used for editing text.

Undo
Cut
Copy
Paste
Clear
Select All
Show Clipboard

View Menu. These commands structure the icon directory arrangement for all windows.

By Icon
By Name
By Date
By Size
By Kind

Special Menu. This menu holds the commands for controlling the appearance of the desktop.

Clean Up
Empty Trash
Erase Disk
Set Startup

From this brief introduction to the Macintosh, what is your final verdict on the validity of Apple's claimed visual copyright infringement? Does GEM follow the Macintosh desktop and interface to a plagiaristic degree? How about the new version of GEM? Does it offer a completely unique graphics environment perspective? Of course, with the release of GEM version 2.1, this point is moot. The plaintiff in this case, Apple, has accepted GEM 2.1 as being within acceptable boundaries for avoiding copyright infringement. Once again, be your own judge. Compare GEM 2.1 from Appendix A with the information presented in this chapter. Who knows, you might just get an unexpected lesson in corporate law.

Chapter 9

Paste

Performing several functions, simultaneously—this is an adequate definition of *multitasking*. In reality, true multitasking on a microcomputer can't be accomplished. Because a microcomputer uses a single MPU, the time allotted for different functions must be shared. Therefore, a better definition of multitasking in the microcomputer environment would be "performing several functions so that they appear to be executed simultaneously."

A truer representative of multitasking with microcomputers is known as *concurrency*. With concurrency, programs are made to run in the background. This background operation is similar to the print queuing function of GEM's **Print Spooler** desk accessory (or for that matter, DOS's PRINT command). In this case, the listed documents are printed in the background, while the GEM application continues to run. Expanding this principle to other computer applications, a concurrent operating system enables several programs to operate from the same MPU. For example, you could have Lotus 1-2-3 recalculate a spreadsheet and WordStar reformat a manuscript, while you search a dBase III database. All three of these operations would be happening concurrently.

There are three popular operating systems that open an entirely new window on concurrent operation. DESQview, Windows, and TopView are DOS alternatives that support concurrent program execution. Furthermore, the use of icons, drop-down menus, and windows makes these three operating systems potential competition for GEM.

Much to the chagrin of DESQview, Windows, and TopView, GEM can be made to function as a concurrent operating system. The procedure is simple and the results are far more comprehensive than those that are available from these other three con-

current systems. By using Concurrent PC-DOS 4.1 (available from DRI) as a separate application, a concurrent graphics-based operating system can be created. There are two points to remember when making GEM concurrent, however. First, this application must be executed from the GEM Desktop. Second, and more important, the concurrent GEM can only be used on a hard drive system. If you obey these two minor rules, then you can turn GEM into a concurrent operating system that is capable of running up to four applications simultaneously.

DESQVIEW

DESQview is a character-based concurrent operating system (Fig. 9-1). Three special DESQview features are remarkably powerful: Learn, load files, and virtual memory. The remainder of DESQview leaves a lot to be desired.

Learn

If you need to type lengthy key sequences to perform a given task, then DESQview's Learn ability will save your fingers. With Learn, each key sequence, or *macro*,

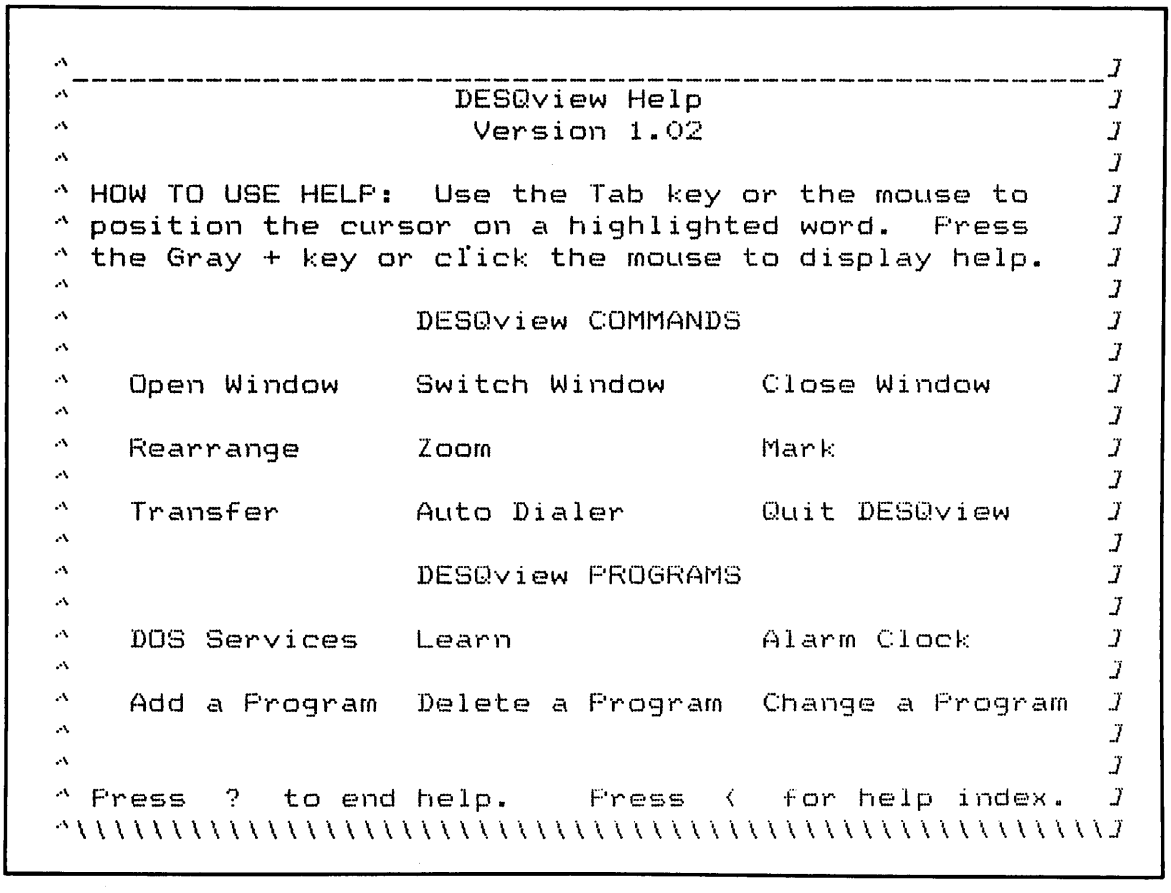


Fig. 9-1. The DESQview Help Screen.

is stored by DESQview in a buffer for subsequent recall. Later when you need to type in that sequence, just press a key and DESQview enters the information for you.

Load Files

A series of special load files enables DESQview to run several popular programs concurrently in its windowed environment. Now, these load files shouldn't be thought of as pedestrian device drivers that just shoehorn an application like Lotus 1-2-3 into a window. Quarterdeck Office Systems (the maker of DESQview) has cleverly written each load file for the named program, which gives a program like Lotus 1-2-3 true concurrency and windowing ability. For example, these Lotus windows run faithfully in the background, in any sized, colored, or positioned window.

Virtual Memory

This feature is nothing more than a fancy name for disk/file swapping. In other words, if an application is no longer in concurrent use, DESQview will "swap" it to the indicated storage medium (floppy, hard, or RAM). There are problems with this memory management technique (swapping active applications because of memory limitations) that can lead to a reduction in productivity.

WINDOWS

Windows is Microsoft's entry into the graphics-based operating system market. This much ballyhooed environment was originally scheduled for a mid-1985 release. Programming delays, however, pushed the official market arrival back until the first of 1986. Once Windows was on store shelves, it was quickly adopted as the leading competitor for GEM.

Windows approach to the graphics environment combines the power of a bit-mapped screen with the unpleasantness of DOS. This bizarre juxtapositioning seriously limits Windows replacement of conventional DOS or even Concurrent PC-DOS (if you need concurrency). For example, MS-DOS Executive is the original "desktop" that fills the PC screen. This application serves as the directory of the Windows Desktop Applications disk. The MS-DOS Executive sports the standard GEM-like features, including a Menu Bar, disk drive icons, and directory path names. Additionally, the MS-DOS Executive lists all of the Windows applications in a typically DOS-like manner (Fig. 9-2).

A typical session with Windows shares many of the same mouse actions that are found in GEM.

- ☐ Start Windows. (The Windows Startup disk goes in drive A: and the Windows System disk goes in drive B:.) (Hard drive users will have to change the directory with the CD command, first.)
- ☐ Insert a Windows application disk in drive A:. (e.g., Windows Desktop Applications disk.)
- ☐ Click the mouse button.
- ☐ Double-click on the Cardfile application. (CARDFILE.EXE)
- ☐ Cavort around the Cardfile index.
- ☐ Open the MS-DOS Executive application. (Drag the disk icon to the right border.)

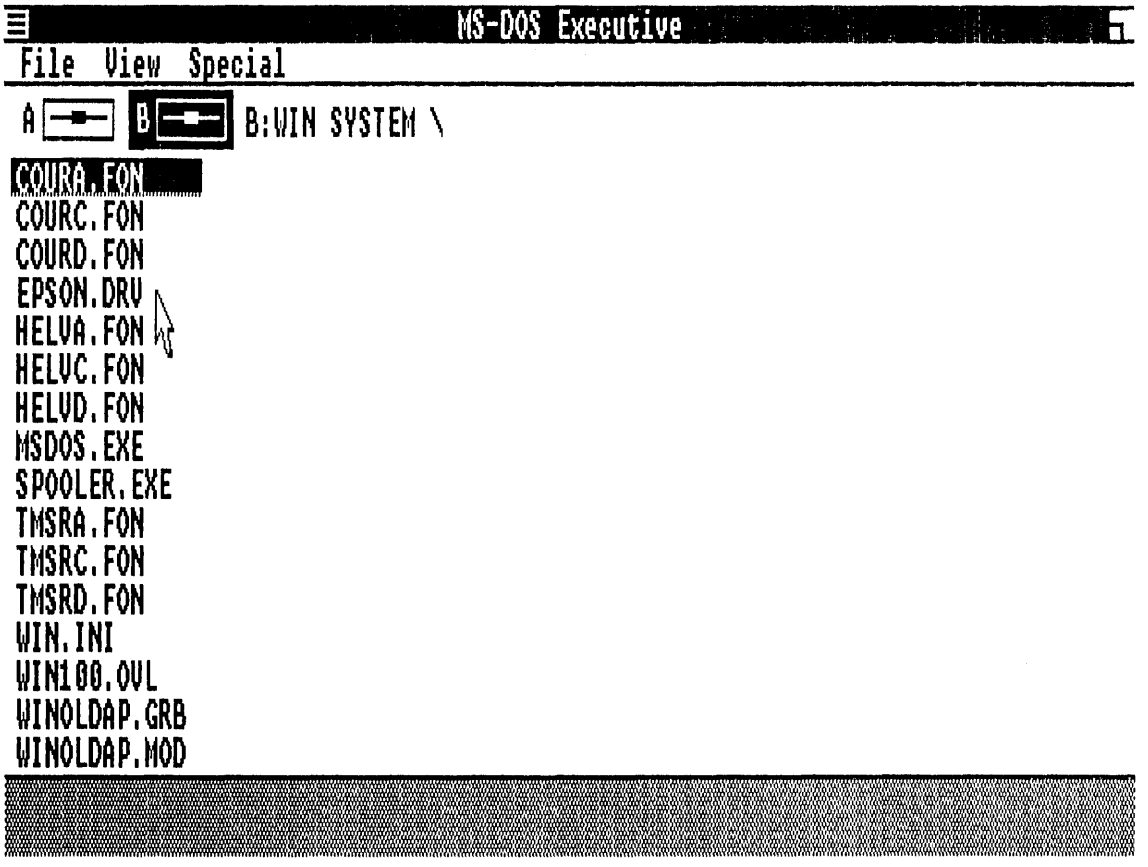


Fig. 9-2. The opening Windows MS-DOS Executive screen. Even IBM systems with PC-DOS will use the MS-DOS Executive window.

- ☐ See what time it is.
- ☐ Press and hold the Shift key.
- ☐ Double-click on CLOCK.EXE.
- ☐ Drag the Clock icon into active window border area.
- ☐ Size the Clock window.
- ☐ Display the System Menu and choose the **Size** command.
- ☐ Drag the size pointer to the needed size.
- ☐ Shrink the Cardfile. Drag the Cardfile's Title Bar into the lower icon area.
- ☐ Stop Windows. Display the Special Menu on the MS-DOS Executive's Menu Bar.
- ☐ Choose the **End Session** command.

Windows Menus

Just like in GEM, Windows applications have a unique Menu Bar. The basis for all desktop operations, however, stems from the System Menu and the MS-DOS Executive Menu Bar.

System Menu. This menu, which is represented by an icon located in the upper left corner of each application window, remains constant throughout all Windows applications (Fig. 9-3).

Size—the Size command.
Move—the Move command.
Icon—shrinks the active window into an icon.
Zoom—enlarges a window to full screen size.
Close—the Close command.
About . . .—displays information about the application.

MS-DOS Executive Menus. The commands on these menus operate as disk and file managers.

File Menu:

Run—the Run command.
Load—the Load command.

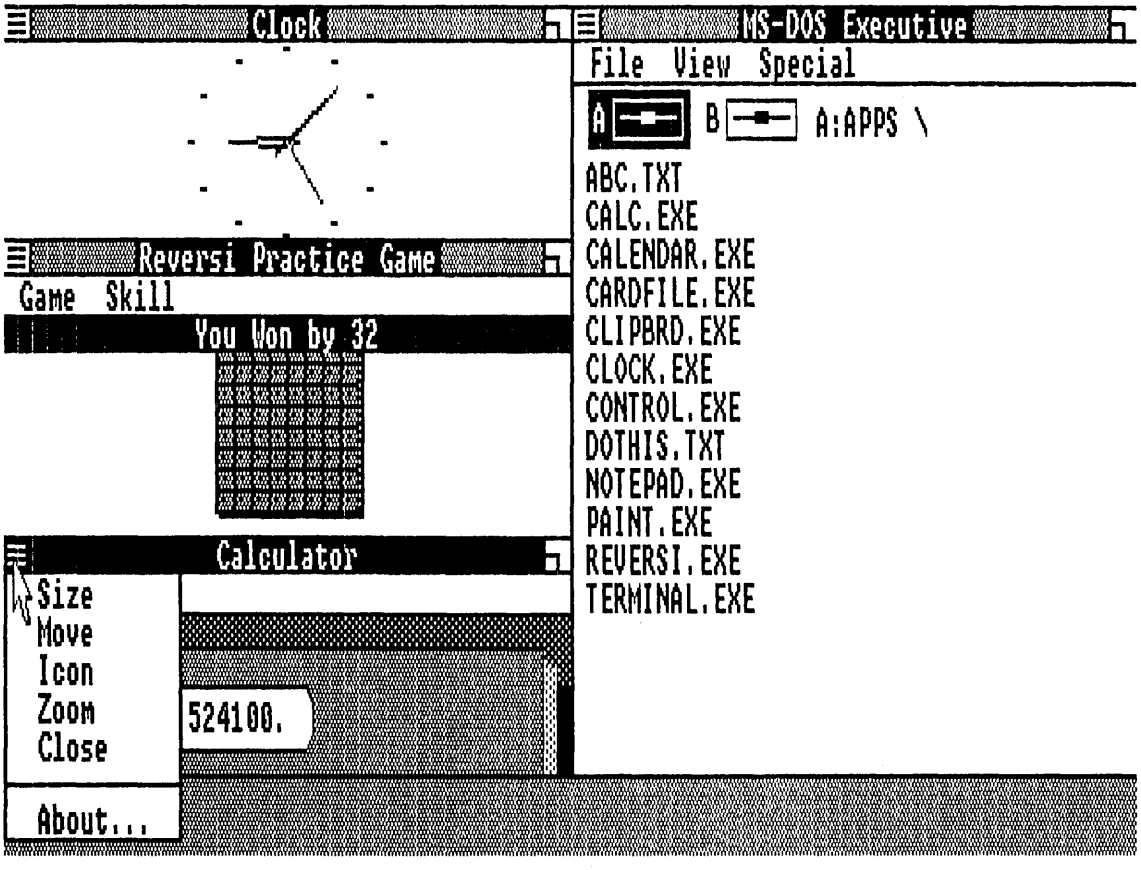


Fig. 9-3. The System Menu is displayed on the Calculator window.

Copy—the Copy command.
Get Info . . .—displays information about the selected file.
Delete—the Delete command.
Print—the Print command.
Rename—renames the selected file.

View Menu:

Short—displays the directory horizontally.
Long—displays the directory vertically.
All—displays all of the files in the directory.
Partial—displays a specified file list in the directory.
Programs—displays only program files in the directory.
By Name—sorts the directory alphabetically.
By Date—sorts the directory by creation dates.
By Size—sorts the directory by byte size.
By Kind—sorts the directory by file types.

Special Menu:

End Session—quits Windows
Create Directory—makes a new directory.
Change Directory—the Change Directory command.
Format Data Disk—the Format Data Disk command.
Make System Disk—the Make System Disk command.
Set Volume Name—gives a disk a name.

Tying down the graphics environment with excessive DOS-like commands pollutes the virtue of Windows. Maybe this is Microsoft's method for avoiding any legal tangles with Apple over visual copyright infringement. Regardless of the reasoning behind this odd combination, Windows loses much of its concurrent benefits by hamstringing its user interface.

POSTMORTEM

This last concurrent operating system doesn't present any competitive threat to GEM, DESQview, or Windows. IBM's TopView is a character-based environment that suffers from several performance flaws that seriously undermine either its recommendation or its endorsement. Two features stand out as prime examples of IBM TopView's failings. First, TopView tries its best to be a graphics environment as well as a text handler. This dual desire leads to enormous problems. For example, TopView's Calculator is a marvelous credit to character programming, but it is of little practical value in its current environment. IBM should heed DESQview's lead and stick to a true character-based operating system. The second major tick against TopView comes from IBM's insistence on paralleling DOS. This duplication is so complete, in fact, that several DOS commands appear verbatim in the TopView menus (e.g., DOS's TYPE = TopView's Type). What's the benefit of this "alternate" operating system? To IBM's credit, they have scheduled upgrades to TopView. Unfortunately, these "improvements" do very little to resuscitate the comatose TopView.

Appendix A

GEM Version 2.1 Summary

In the fall of 1986, DRI released a revised version of the GEM Desktop. The impetus for creating this physically remodeled GEM was a pending lawsuit initiated by Apple Computer (see Chapter 8). Dubbed GEM Version 2.1, this new desktop shared many of the same operations and functions found in the former GEM Version 1.0. Improvements to the GEM design, however, can be noted in several key areas:

1. The presence of optional keystrokes for specific menu commands.
2. Improved OUTPUT layout and function.
3. The addition of a new font set—Dutch.
4. Each drive has a window.
5. Each window is always active.
6. Pressing the Escape key (Esc) updates all active windows.
7. All Version 1.X GEM applications (GEM Collection, GEM Draw, GEM Graph, and GEM WordChart) can be installed on the GEM 2.1 Desktop.

Along with these enhancements, there are several disappointments in GEM Version 2.1:

1. There is no Size Box on the disk drive windows. (Curiously enough, there is a Size Box on the OUTPUT window.)
2. Disk drive windows can't be dragged to a new location on the GEM 2.1 Desktop.
3. The trash icon has been removed.
4. Menus on the Menu Bar are no longer grouped from left to right.

Before the GEM 2.1 Desktop can be used, it must be installed through the GEMPREP command. The procedure is identical to the GEM Version 1.0 GEMPREP installation, which is discussed in Chapter 1.

- ☐ Place your copy of the GEM SYSTEM MASTER disk in disk drive A:. (Yes, GEM Version 2.1 is not copy protected.)
- ☐ Type: **GEMPREP**
- ☐ Press the ENTER key.

You will be greeted by:

Welcome to GEMPREP! This procedure will install the GEM Desktop on your computer.
Do you want to put the GEM Desktop on a hard disk? Y/N?

Answer this question and proceed through the remainder to the installation.

Note: Dual-floppy-disk-drive systems will follow a slightly different installation path from that used by hard drive systems.

- ☐ Respond with "N" to the above question.

The following question appears:

Does your system have two floppy disk drives? Y/N?

- ☐ Type **Y**
- ☐ Prepare a GEM DESKTOP disk and a GEM STARTUP disk.

In both installation cases, you will be required to know the following hardware specifics:

1. Type of graphics display card.
2. Type of graphic input device (e.g., mouse).
3. The port that connects the graphic input device to your system (e.g., COM1).
4. The type of output device (e.g., Apple LaserWriter).
5. The port that connects the output device to your system (e.g., COM2)

Once all of these questions have been answered, the completed GEM 2.1 Desktop is configured and copied onto either the hard disk or the twin floppy disks. Table A-1 lists all of the subdirectories and files that constitute the GEM 2.1 Desktop.

Like its GEM 1.0 Desktop ancestor, the GEM 2.1 Desktop must be rebooted following the GEMPREP installation (floppy disk users, remember to place the GEM STARTUP disk in drive A: prior to using the Ctrl + Alt + Del rebooting keystroke sequence). After the computer has been restarted:

- ☐ Type: **GEM**
- ☐ Press the ENTER key.

STARTUP	DESKTOP
COMMAND.COM	EMAPPS <DIR>
MODE.COM	GEMDESK <DIR>
GEMBOOT <DIR>	DESKTOP.APP
GEM.EXE	DESKTOP.RSC
GEM.RSC	DESKTOP.INF
CALCLOCK.ACC	DESKTOP.ICN
GEMSYS <DIR>	DESKHI.ICN
GEMVDI.EXE	DESKLO.ICN
ASSIGN.SYS	GEMSYS <DIR>
IBMCHMP6.SYS	FORMAT.COM
GEM.BAT	*.FNT
	*.SYS
	METAFIL6.SYS
	OUTPUT.APP
	OUTPUT.RSC
	GEMSCRAP <DIR>
	COMMAND.COM

Table A-1. GEMPREP 2.1 Copies These Directories, Subdirectories, and Files onto Either a Hard Disk or Two Separate Floppy Disks.

Make sure that you are in the root directory before you enter this command (use the change directory DOS command, if necessary).

Figure A-1 fills your display as your initial welcome to the GEM 2.1 Desktop. Control of the new GEM Desktop, menu contents, and dramatic changes to specific control dialogs are illustrated in Figures A-2 through A-8.

Another area of the GEM Desktop that received drastic alteration was OUTPUT. Selecting the **To Output** command from the File Menu of the GEM Desktop places the OUTPUT application on the screen (Fig. A-9). Although the operation of OUTPUT 2.1 remains identical to its Version 1.0 cousin, there are major differences in the execution of OUTPUT 2.1. The most obvious changes are in:

1. Removal of the Edit Menu (Fig. A-10).
2. Numbered item entries (there are a total of 36 entry spaces).
3. Output device icons.
4. A new menu—Preferences (Fig. A-11).
5. Two new commands on the Preferences Menu:

Global . . . This command controls the preferences for all output devices, regardless of their type. For example, the number of output copies is set with this command (Fig. A-12).

Shortcuts . . . A two-page dialog listing several keystroke and mouse button shortcuts that can be used with OUTPUT (Fig. A-13).

The final area of the GEM 2.1 Desktop to receive a revamping was GEMSETUP. Unlike the Desktop and OUTPUT, GEMSETUP sports only a superficial physical "touchup." Other than a Menu Bar rearrangement, the repositioning of one command, the addition of several extra peripheral choices, and the inclusion of the "new" GEM look (no active windows, modified Sliders, and new direction arrows), GEMSETUP 2.1 is the same as GEMSETUP 1.0 (Fig. A-14 and Fig. A-15).

The bottom line with any revision as major as that found in the GEM 2.1 Desktop

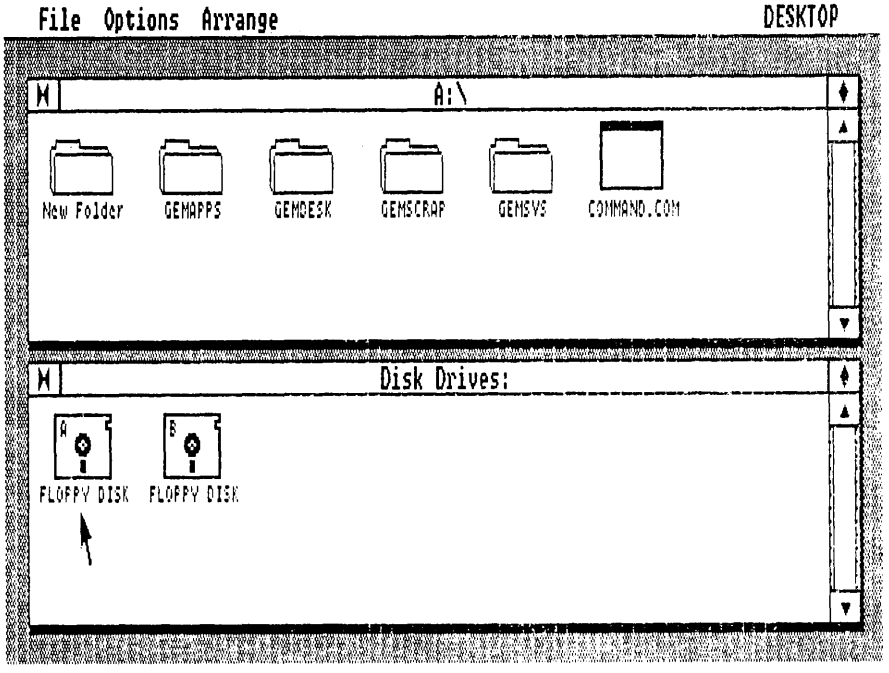


Fig. A-1. The GEM 2.1 Desktop.

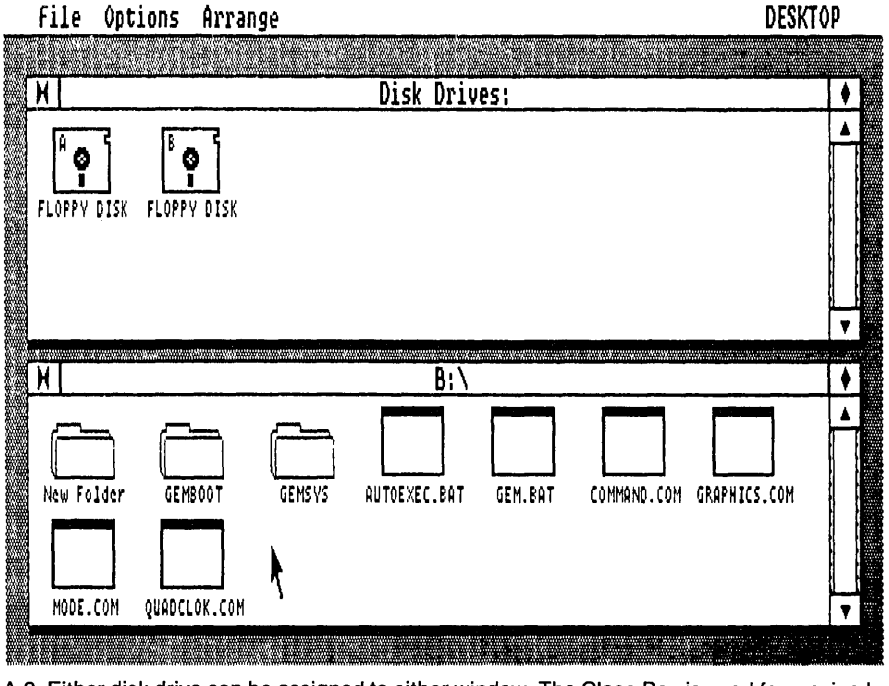


Fig. A-2. Either disk drive can be assigned to either window. The Close Box is used for moving backwards through a disk's subdirectories.

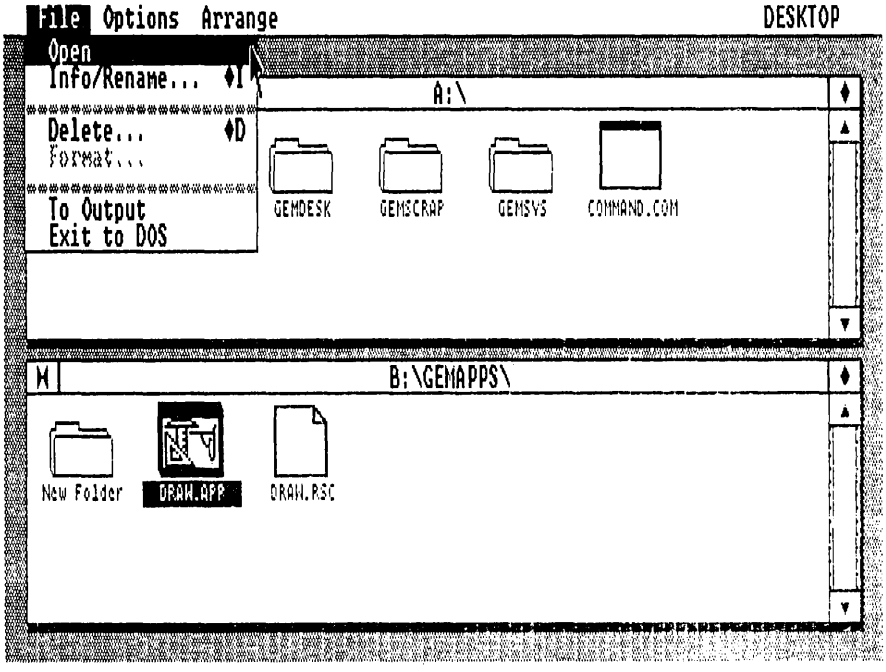


Fig. A-3. The GEM 2.1 Desktop File Menu. Notice the keystroke options for certain commands.

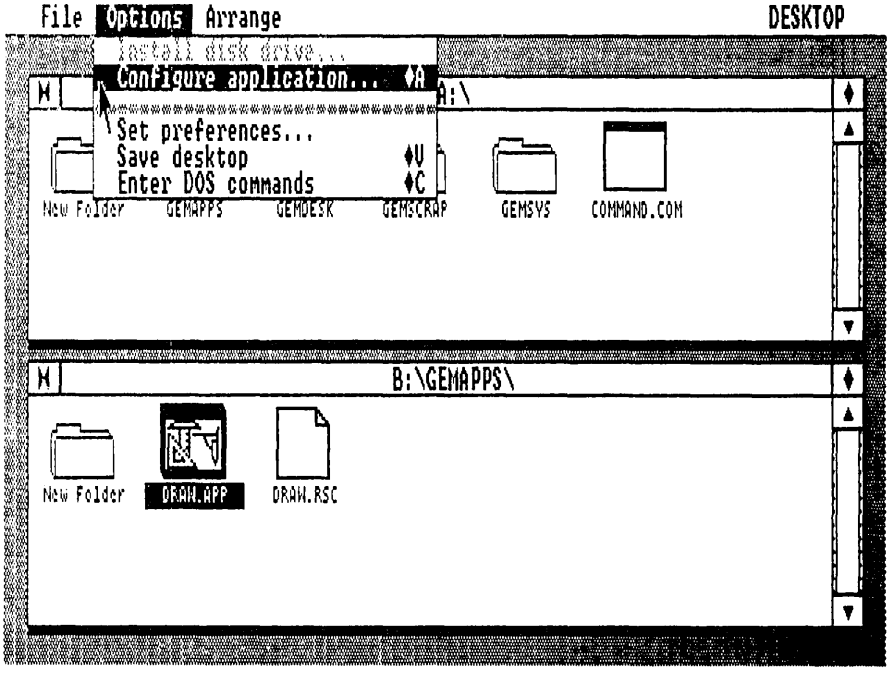


Fig. A-4. The GEM 2.1 Desktop Options Menu.

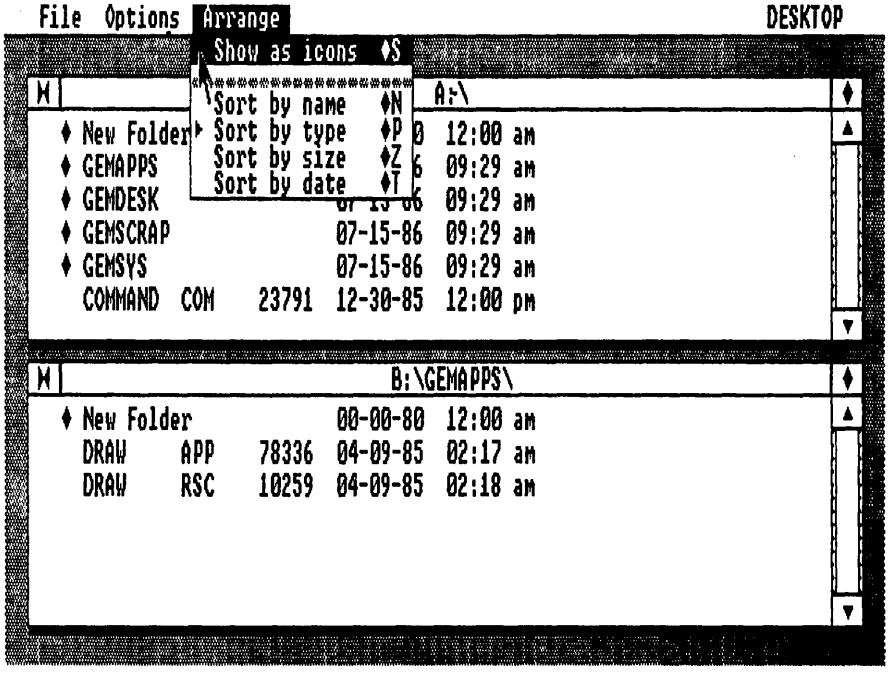


Fig. A-5. The GEM 2.1 Desktop Arrange Menu. The **Show as text** command has been previously selected.

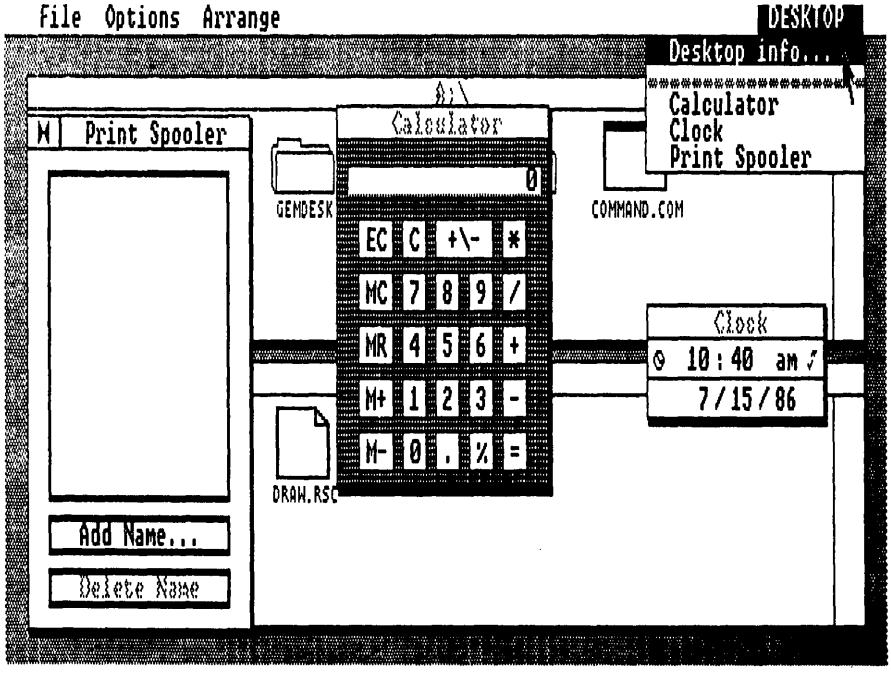


Fig. A-6. All of the standard 2.1 Desk Accessories are on the Desktop.

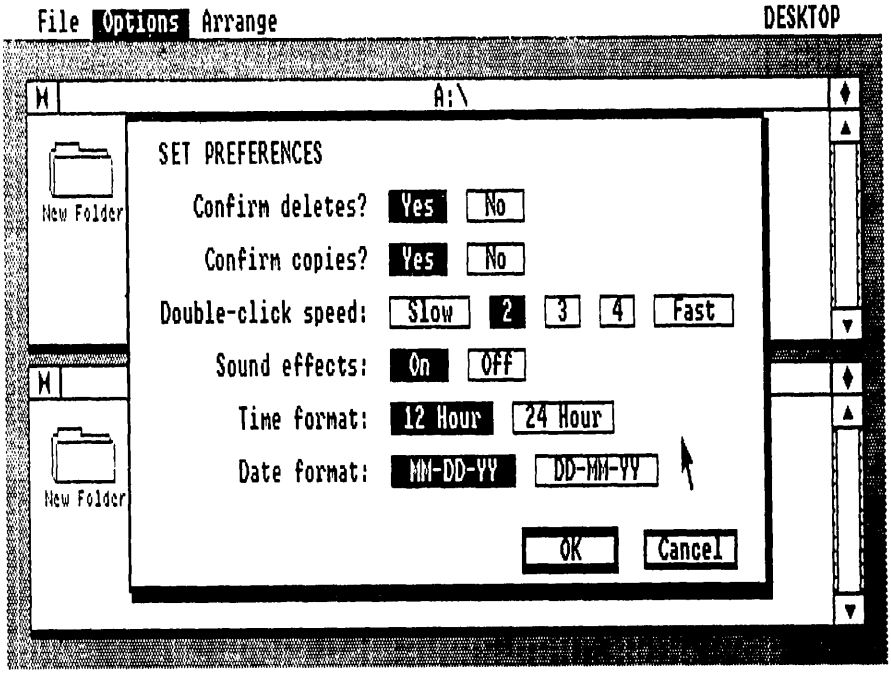


Fig. A-7. Two format parameters are now controllable with the **Set Preferences . . .** command on the Options Menu.

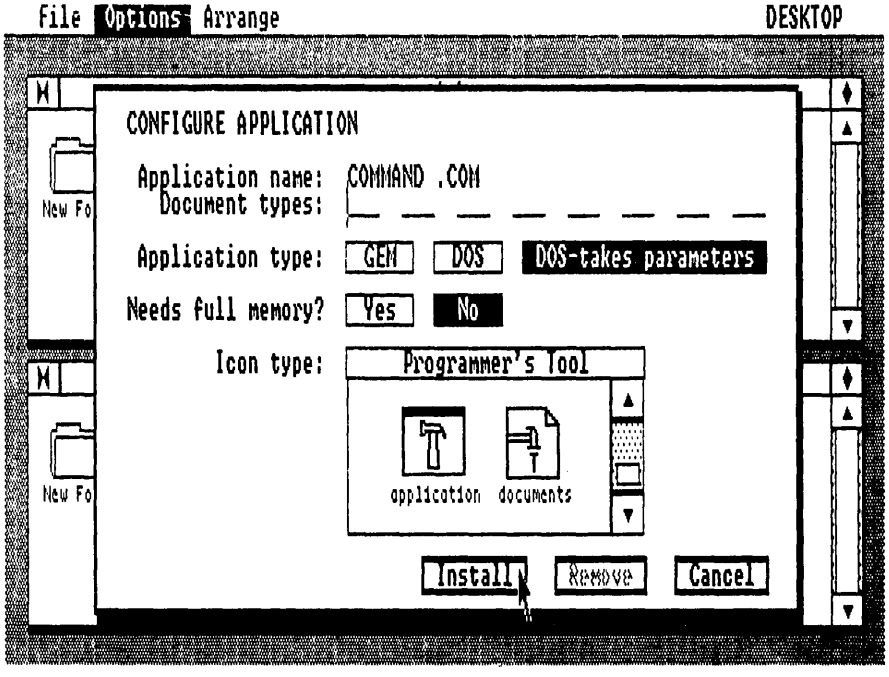


Fig. A-8. Very little has changed with the **Configure application . . .** command.

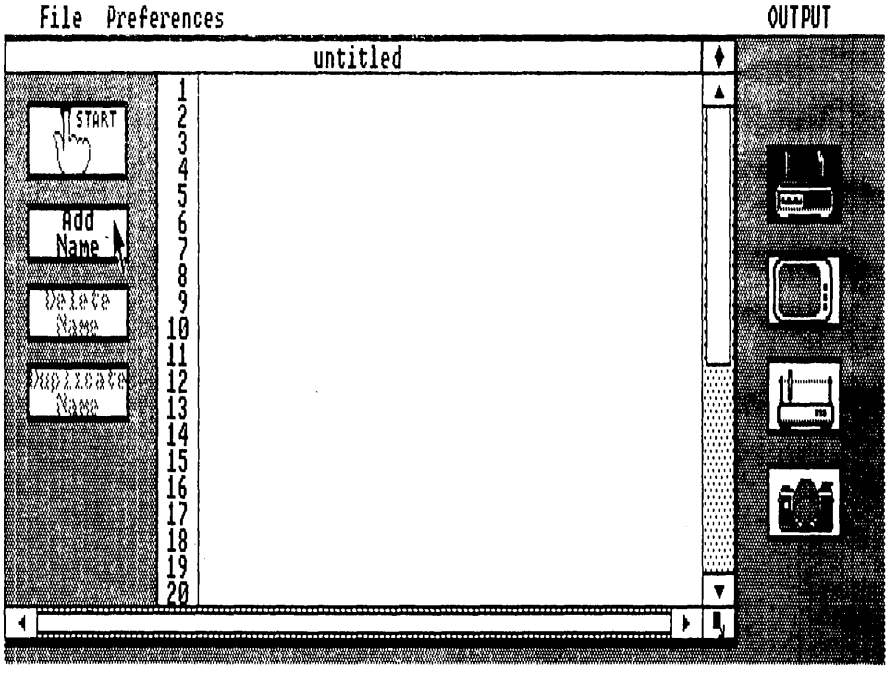


Fig. A-9. The OUTPUT 2.1 screen.

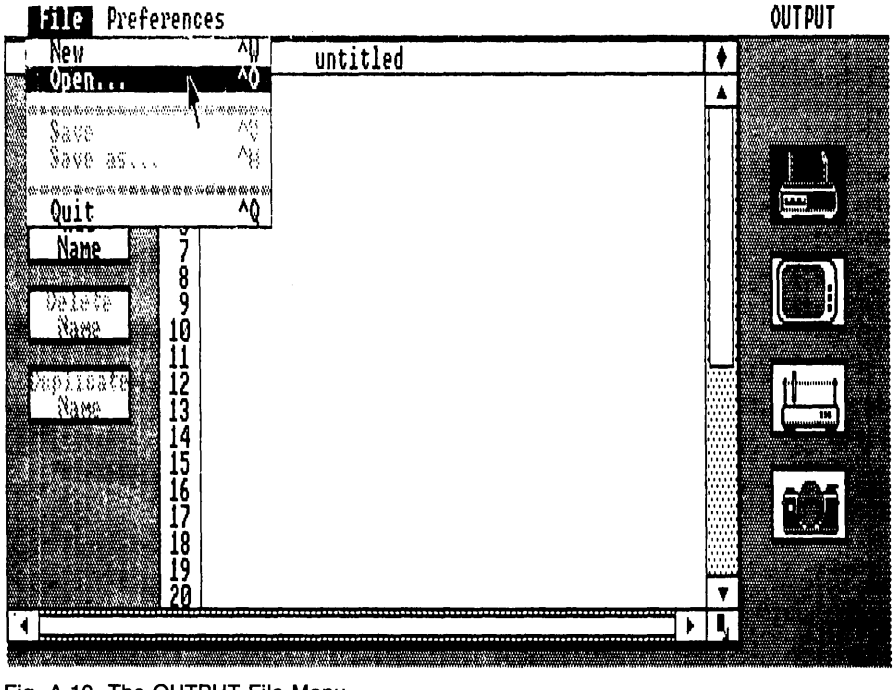


Fig. A-10. The OUTPUT File Menu.

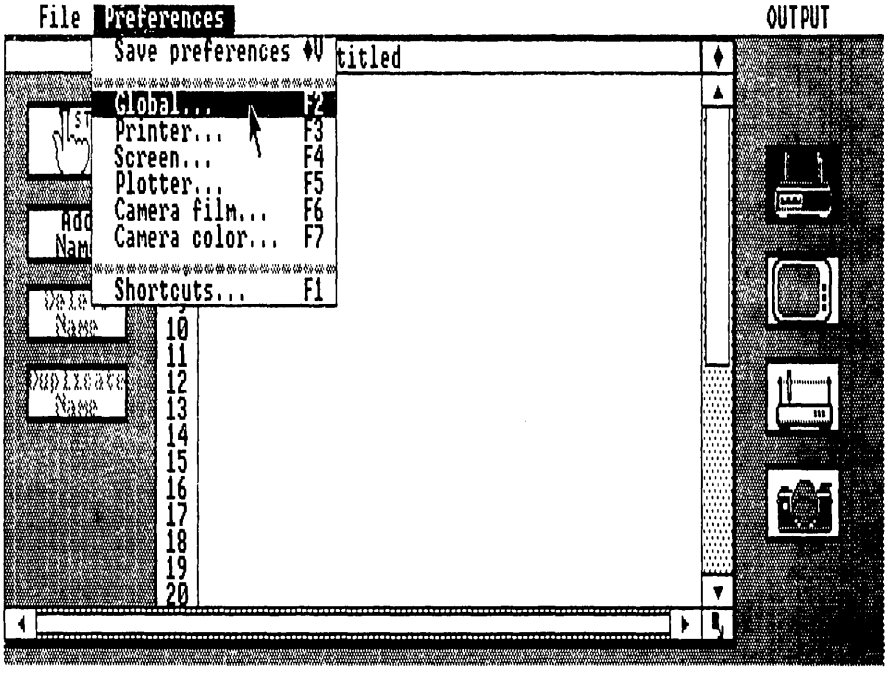


Fig. A-11. The OUTPUT Preferences Menu.

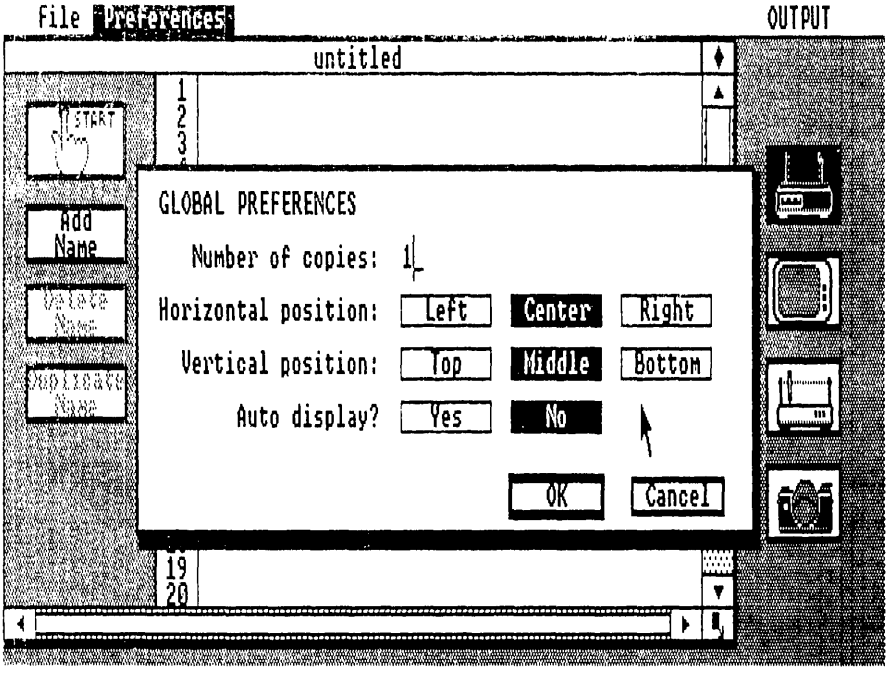


Fig. A-12. The **Global . . .** command is a new addition to OUTPUT 2.1.

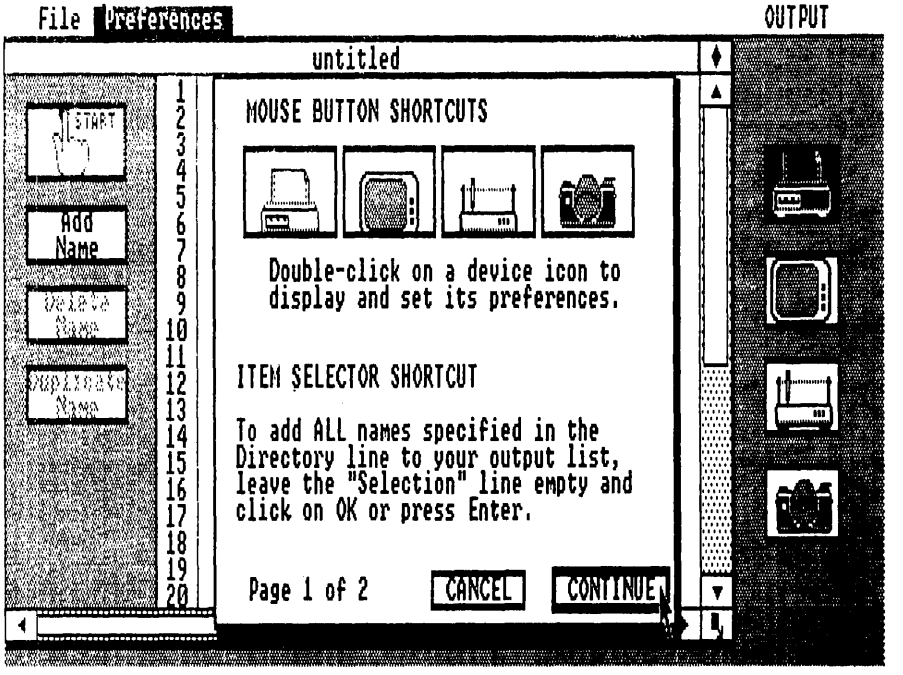


Fig. A-13. Selecting the **Shortcuts . . .** command displays a two-page dialog.

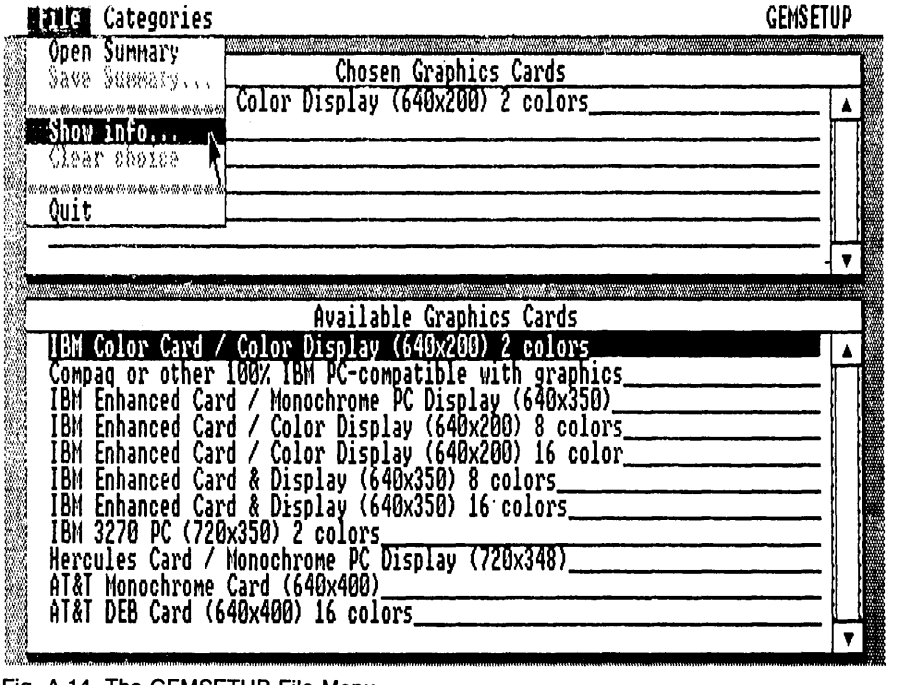


Fig. A-14. The GEMSETUP File Menu.

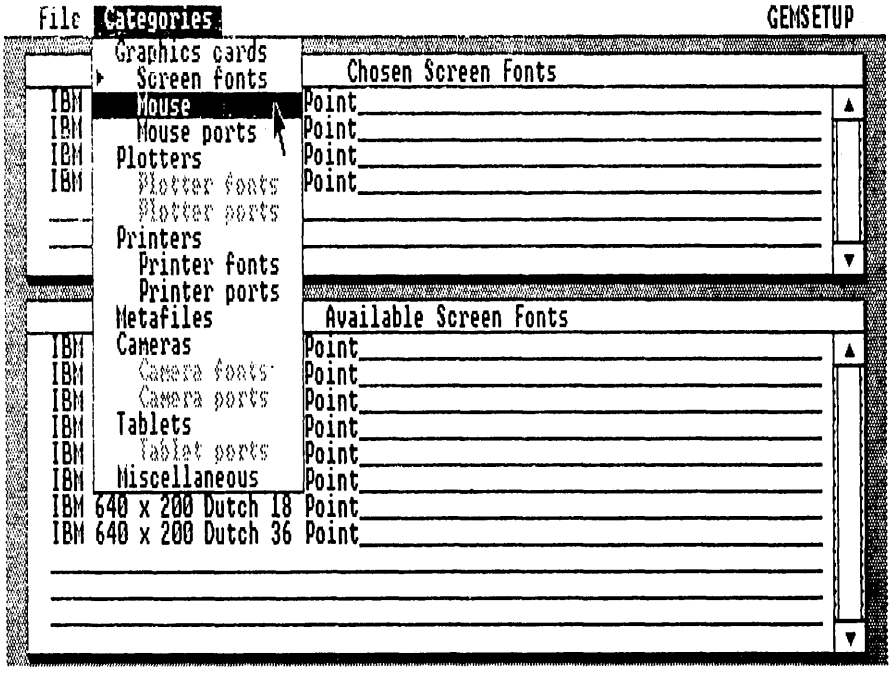


Fig. A-15. The GEMSETUP Categories Menu.

is, "should I upgrade?" Of course, the definitive answer in this situation is "maybe." Before you write off this response as being unduly flip, let's weigh the pros and cons of upgrading from the GEM 1.0 Desktop to the GEM 2.1 Desktop. First, the pros:

1. Approved desktop configuration.
2. Improved user interface through optional command keystrokes.
3. Enhanced output device control.
4. Addition of a new system font.
5. Future GEM applications will be compatible.

Now, the cons:

1. Unnecessary expense.
2. Reduced flexibility in Desktop management.
3. New Dutch font is available through GEM WordChart 1.0.
4. Restricted to GEM 1.0 applications.

In short, upgrade to the GEM 2.1 Desktop, if you wish to remain compatible with future version releases of GEM applications. On the other hand, if you are satisfied with the current crop of GEM applications, keep the GEM 1.0 Desktop. Either way, it sure beats plain DOS.

Appendix B

GEM/DOS Equivalents

The following list provides a reasonable comparison between GEM Desktop commands and their PC-DOS representatives.

GEM Desktop Command	*PC-DOS Command*
Calculator	-
Clock	TIME & DATE
Close	Ctrl + Alt + Del
Close Window	CLS
Drag icon	COPY
Desktop Info	VER
Enter DOS Commands	Default state
Format	FORMAT
Install Disk Drive	CONFIG.SYS w/LASTDRIVE =
Install Application	FDISK
ITEM INFORMATION dialog	RENAME
New Folder	MKDIR
Open	DIR
Print Spooler	PRINT
Quit	Ctrl + Alt + Del
Save Desktop	AUTOEXEC.BAT
Set Preferences	MODE

GEM Desktop Command	*PC-DOS Command*
Show as Icons	-
Show as Text	DIR
Show Info	CHKDSK
Snapshot	GRAPHICS
Sort by Date	-
Sort by Name	SORT (text files only)
Sort by Size	-
Sort by Type	-
To Output	MODE + PRINT
Trash	ERASE

Appendix C

GEM Icon Summary

Six standard icons are used through the GEM Desktop. These icons represent physical system contributions. Each icon, with its conventional written label, is illustrated in Fig. C-1.

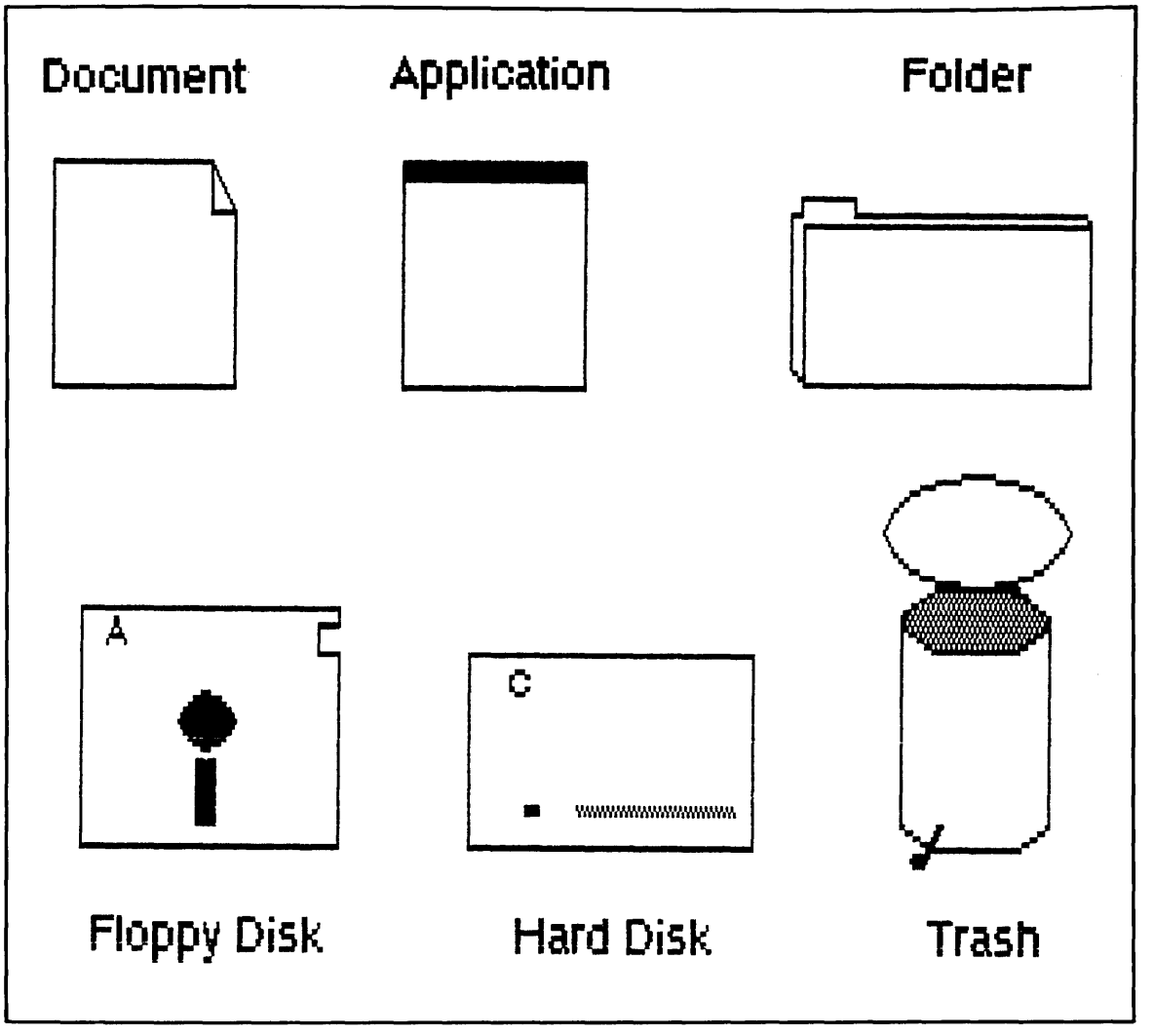

Document
Application
Folder
A
C
Floppy Disk
Hard Disk
Trash

Fig. C-1.

Appendix D

The GSX Standard

A precursor to the GEM VDI was the Graphics System Extension or GSX developed by DRI (refer to Chapter 7 for a complete discussion of the GEM VDI). The GSX program, like its VDI counterpart, added a device-independent graphics ability to an operating system. Therefore, applications written under the tutelage of the GSX standard would be highly portable programs with a ready implementation possible on any computer that is able to address the parental operating system.

A good example of the GSX is found in DRI's CP/M-86 operating system. GSX-86, as this GSX version is known, provides three general functions in the CP/M-86 environment (this can be either the "normal" CP/M-86 operating system or the multifunction Concurrent CP/M-86 operating system): coordinate translation, fielding graphic requests, and supporting device drivers.

The usual downfall for any graphics program centers around the handling of the *aspect ratio.* Generally speaking, the aspect ratio is what makes a circle look like a circle instead of appearing to be an oval. An example of a bad aspect ratio is seen when you draw a circle on the monitor and it prints as an oval on your output device. GSX-86 delivers a perfect aspect ratio by dealing in a separate set of two-dimensional, cartesian coordinates for both the monitor and the output device. A special translation formula provides the conversion between the monitor coordinate system and the version used by the output device. Therefore, any graphics image designed on the monitor shares the exact same proportions on the output device.

All graphics requests sent from the application to the output device are intercepted by GSX-86. This sidetrack allows GSX-86 to customize the graphics messages for un-

derstanding all of the special requirements exhibited by the selected output device. An attractive fringe benefit from this request fielding is that any application running under a GSX-86 supported operating system can remain detached from all matters that pertain to driving the connected peripherals.

The actual information that is used by GSX-86 for dealing with these peripherals is contained within unique, specialized utility programs known as *device drivers.* Each device driver used by GSX-86 is written specifically for the device that will be receiving the output. But GSX-86 is not limited to a single device driver. Even if you plan on using several different peripherals, GSX-86 can address all of the device drivers that are needed for supporting these multiple output devices. An ASSIGN.SYS file holds the device driver names that will be loaded by GSX-86. By modifying this file, extra drivers can be added as new peripherals are connected to your system.

Once GSX-86 has been installed and the device drivers have been read from the ASSIGN.SYS file, the application is able to deal with any connected peripheral and monitor combination. Of course, this action is familiar to every GEM user. Many elaborations have been added to the GEM VDI from this humble beginning at device independence. Probably the greatest attraction of this universal driver interface, however, is that the function of GSX-86 is invisible to the user. Thoughtfully, DRI retained this feature when they developed the GEM VDI.

Appendix E

Using DOS-based Software in the GEM Environment

Not only is the GEM Desktop able to utilize GEM-based applications, it is also able to manipulate numerous standard DOS-based applications as well. Before any of these DOS products can be used by GEM, however, they must be installed on the GEM Desktop. Any software product can be installed in this manner, including programs on both floppy and hard drives.

To Install a DOS-based application:

- ☐ Start GEM
- ☐ Select the blank icon that represents the DOS software for installation.
- ☐ Display the Options Menu.
- ☐ Choose the **Install Application . . .** command. The INSTALL APPLICATION dialog appears.
- ☐ Fill in the fields on the dialog.
- ☐ Click on the "install" button.
- ☐ Display the Options Menu.
- ☐ Choose the **Save Desktop** command.

These last two steps are vital for making GEM "memorize" this installed DOS program. In the future, whenever you start the GEM Desktop, this installed program will be both recognized by GEM and executable from the GEM Desktop.

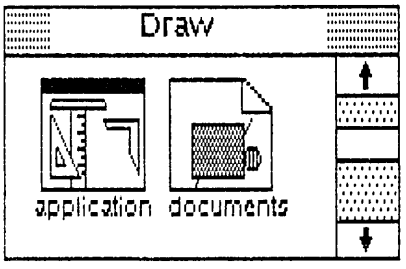
The following completed INSTALL APPLICATION dialogs (Fig. E-1 through Fig. E-5) will guide you during the installation of several popular DOS programs:

INSTALL APPLICATION

Application Name: ACAD.EXE
Document Types: DWG _ _ _ _ _ _ _ _

Application Type: GEM **DOS** DOS –takes parameters
Needs Full Memory: YES **NO**

Icon Type:



Install Remove Cancel

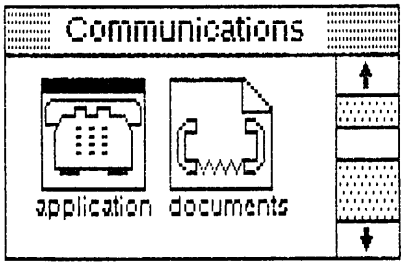
Fig. E-1.

INSTALL APPLICATION

Application Name: XTALK.COM
Document Types: XTK _ _ _ _ _ _ _ _

Application Type: GEM **DOS** DOS –takes parameters
Needs Full Memory: YES **NO**

Icon Type:



Install Remove Cancel

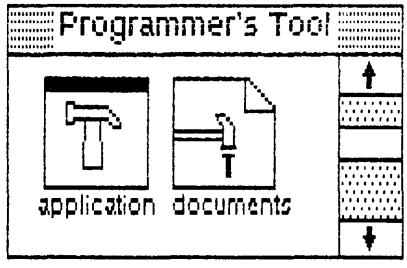
Fig. E-2

INSTALL APPLICATION

Application Name: COMMAND.COM
Document Types: _ _ _ _ _ _ _ _ _ _

Application Type: [GEM] [DOS] [DOS –takes parameters]
Needs Full Memory: [YES] [NO]

Icon Type:



[Install] [Remove] [Cancel]

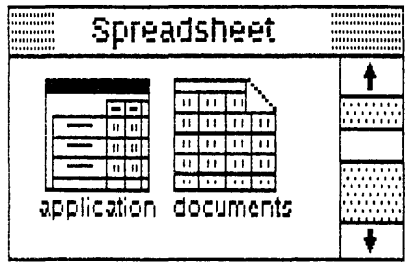
Fig. E-3.

INSTALL APPLICATION

Application Name: 123.EXE
Document Types: WKS WK1 _ _ _ _ _ _ _

Application Type: [GEM] [DOS] [DOS –takes parameters]
Needs Full Memory: [YES] [NO]

Icon Type:



[Install] [Remove] [Cancel]

Fig. E-4.

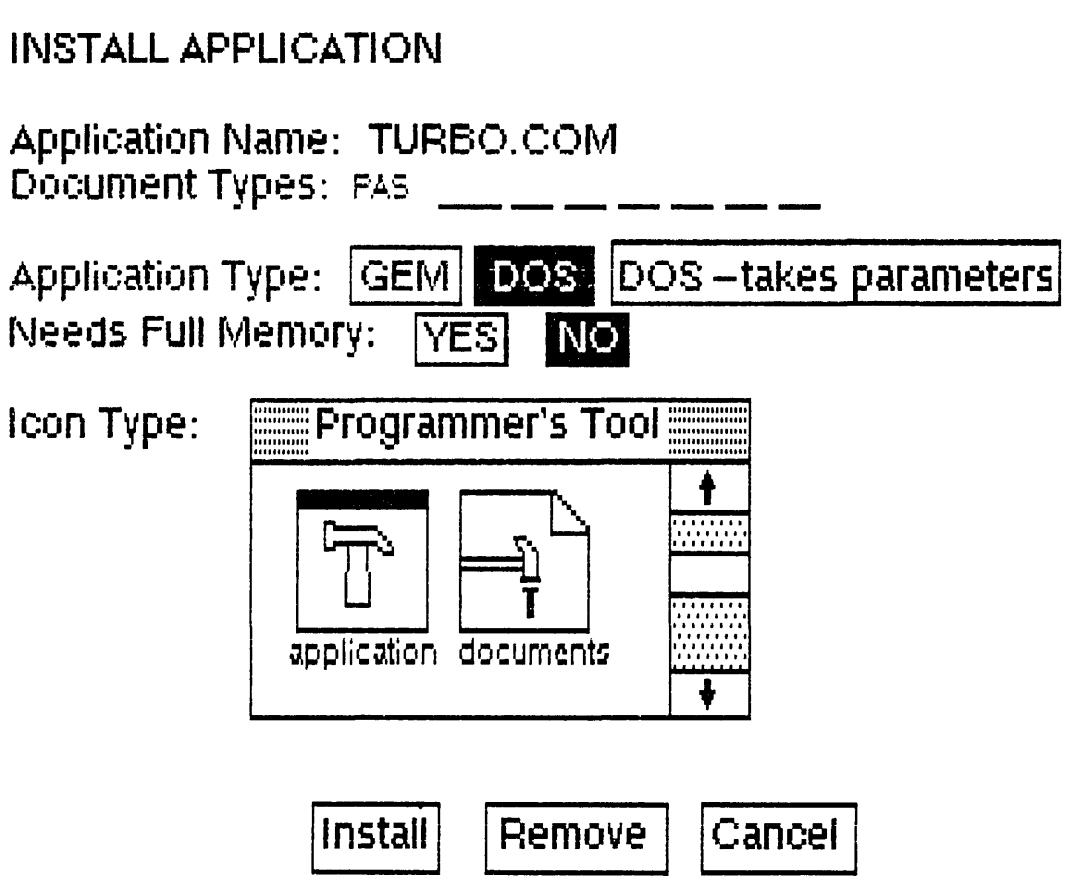

INSTALL APPLICATION
Application Name: TURBO.COM
Document Types: FAS
Application Type: GEM DOS DOS –takes parameters
Needs Full Memory: YES NO
Icon Type:
Programmer's Tool
application
documents
Install
Remove
Cancel

Fig. E-5.

Glossary

address—The location in memory where a given binary bit or word of information is stored.

alphanumeric—The set of alphabetic, numeric, and punctuation characters used for computer input.

analog/digital (A/D) conversion—A device that measures incoming voltages and outputs a corresponding digital number for each voltage.

ASCII—American Standard Code for Information Interchange.

assembly language—A low level symbolic programming language that comes close to programming a computer in its internal machine language.

binary—The base two number system, in which 1 and 0 represent the on and off states of a circuit.

bit—One binary digit.

boot—To start a computer.

bottom layer—The element or elements that are drawn first in GEM Draw. Contrast this definition with **top layer.**

byte—A group of eight bits.

chip—An integrated circuit.

click—One press of the mouse button.

concurrent operation—Executing two or more RAM-based applications through shared CPU time.

CP/M—Control Program for Microprocessors; an 8-bit microcomputer operating sys-

tem developed by DRI.

CPU—Central Processing Unit; the major operations center of the computer where decisions and calculations are made.

CPU time—The execution time used by the CPU, exclusive of I/O functions.

CMOS—A Complementary Metal Oxide Semiconductor IC that contains both P-channel and N-channel MOS transistors.

data—Information that the computer operates on.

data rate—The amount of data transmitted through a communications line per unit of time.

debug—To remove program errors, or "bugs," from a program.

digital—A circuit that has only two states, on and off, which are usually represented by the binary number system.

disk—The magnetic media on which computer programs and data are stored.

double-click—Two rapid clicks of the mouse button. The length of the pause between clicks can be set by the user through the **Set Preferences . . .** command.

DOS—Disk Operating System; allows the use of general commands to manipulate the data stored on a disk.

drag—Click on an icon and continue holding the mouse button down, while moving the mouse.

driver—A utility application containing the necessary information for supporting the specified peripheral.

EPROM—An Erasable Programmable Read-Only Memory semiconductor that can be user programmed.

firmware—Software instructions permanently stored within a computer using a read only memory (ROM) device.

floppy disk—See disk.

flowchart—A diagram of the various steps to be taken by a computer in running a program.

hardware—The computer and its associated peripherals, as opposed to the software programs that the computer runs.

hard disk—A non-removable storage medium with a fast access time. IBM refers to this media as fixed disks.

hexadecimal—A base sixteen number system often used in programming in assembly language.

icon—A pictorial representation of a definable object.

input—To send data into a computer.

input/output (I/O) devices—Peripheral hardware devices that exchange information with a computer.

interface—A device that converts electronic signals to enable communications between two devices; also called a port.

languages—The set of words and commands that is understood by the computer and used in writing a program.
loop—A programming technique that allows a portion of a program to be repeated several times.
LSI—Large Scale Integration; a layered semiconductor fabricated from approximately 10,000 discrete devices.

machine language—The internal, low level language of the computer.
memory—An area within a computer reserved for storing data and programs on which the computer operates.
microcomputer—A small computer, such as the Commodore Amiga, that contains all of the instructions it needs to operate on a few internal integrated circuits.
mnemonic—An abbreviation or word that represents another word or phrase.
mouse—A small desk-top rolling device that sends electronic codes to the computer, causing cursor movement.
moving—Moving the mouse on the physical desktop produces a representative movement on the GEM Desktop.
MOS—A Metal Oxide Semiconductor containing field-effect MOS transistors.
MPU—MicroProcessor Unit; the central processing IC or chip.
multitasking—Executing two or more applications or tasks at the same time.

NMOS—An N-channel Metal Oxide Semiconductor with N-type source and drain diffusions in a P substrate.

octal—A base eight number system often used in machine language programming.
opcode—An operation code signifying a particular task to be performed by the computer.

parallel port—A data communications channel that sends data out along several wires, so that entire bytes can be transmitted simultaneously, rather than by one single bit at a time.
peripheral—An external device that communicates with a computer, such as a printer, a modem, or a disk drive.
PMOS—A P-channel Metal Oxide Semiconductor with P-type source and drain diffusions in an N substrate.
point—A reference "mark" produced by moving the GEM Desktop pointer via a mouse movement.
program—A set of instructions for the computer to perform.
RAM—Random Access Memory; integrated circuits within the computer where data and programs can be stored and recalled. Data stored within RAM is lost when the computer's power is turned off.
ROM—Read-Only Memory; integrated circuits that permanently store data or programs. The information contained on a ROM chip cannot be changed and is not lost when the computer's power is turned off.
RS-232C—A standard form for serial computer interfaces.

select—Clicking the pointer on an icon.
serial communications—A method of data communication in which bits of information are sent consecutively through one wire.
soft crash—A system loss that can be recovered through rebooting the software disk. Data will still be lost through this crash, however.
software—A set of programmed instructions that the computer must execute.
statement—A single computer instruction.
subroutine—A small program routine contained within a larger program.

terminal—An input/output device that uses a keyboard and a video display.
top layer—The element or elements that are drawn last in GEM Draw. Contrast this definition with **bottom layer.**

tree—A hierarchical file or object structuring with the root or base element situated at the top of the network.

word—A basic unit of computer memory usually expressed in terms of a byte.
write protect—A technique for preventing a computer's disk drive from writing data to the storage medium.

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