Osborne McGraw-Hill

The Computer Font Book

Glenn Searfoss

- Practically Everything You've Ever Wanted to Know About Font Usage and Design on Your Computer
- The Most Requested Information on Fonts with Tips on How to Achieve a Professional Look
- Packed with Font Design Ideas and Samples of Font Libraries

Covers All IBM PC and Compatible Computers, Apple II, Macintosh and Other Desktop Computer Models

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This book is dedicated to computer users everywhere. If you have ever thrown up your hands or gnashed your teeth in frustration when confronted with unexpected results in font output, this book is for you.

Contents at a Glance

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Acknowledgments

There are many people who deserve recognition for their influence in the fashioning of this book. I would like to thank the following people and organizations:

- The editors and production staff at Osborne/McGraw-Hill who made this book possible
- All of the companies who participated in the presentation of Appendix B by providing samples of type styles from their font libraries
- My computer gurus, Bob Van Arsdale and Steve Boker, without whose encouragement I would never have touched a computer

Introduction

The Mayans did it with chisels as did the Egyptians, who also used ink on papyrus. The Chinese used ink on scrolls as did Byzantine monks. Gutenberg made it easier and faster by using carved wooden blocks and a press. Today it is easier still—we do it electronically with computers. I'm talking about the presentation of the written word through the use of fonts.

What are fonts? Fonts can be described as interrelated groups or sets of characters that share a specific size and style. They can encompass English alphanumerics, foreign languages, symbols, and more. In the past, the creation and use of fonts was the domain of professional printers and type foundries. However, today's computerized world allows the average person access to the field of electronic printing, publishing and, should they desire, font design.

Computers, especially personal computers, have completely altered the field of font usage. Old typographic tools have become obsolete with the introduction of tools based on electronic technology. To use computer fonts effectively, it is essential that you understand the effect of computer technology on fonts. This book is dedicated to helping you achieve this goal.

About This Book

Since 1982, I have provided technical support, consulting, and font development services in the computer graphics and typesetting industry. I have fielded many questions about fonts from users of all levels. In nearly all cases the questions were the same: they were about font availability and usage, font terminology, font formats, and the effects of hardware and software on font usage and output quality. The frequency of these questions impressed upon me the need for a book that took an interactive, nontypographic approach to font usage.

While many books in today's marketplace address the topics of typography, font design, and desktop publishing, there are few, if any, that detail the basics of computer fonts and their interaction with computer hardware and software systems. This book was designed to address these issues.

It is my hope that this book will aid you in your quest for fonts by providing a basic, realistic understanding of computer fonts and how they work within a computer system. Designed for beginning to intermediate level users, the information here provides a strong foundation for understanding computer font and basic font usage concepts. Sources listed in the bibliography provide further references on specific font-related topics.

This book assumes you have the following computer knowledge and needs:

- Access to or the intent to purchase a computer and software system capable of using fonts
- Basic knowledge of computers and how their components are interconnected. In other words, you know that a monitor, printer, keyboard, and computer are connected via cables.
- Basic understanding of the computer's operating system, such as DOS, or another shell-like interface, such as Windows
- The need to use fonts in the production of some form of screen or printed page output
- Knowledge of computer fonts that ranges from none to intermediate

How This Book Is Organized

The Computer Font Book is designed to provide font-related information in a progressive fashion. Themes are presented in order of complexity and on a need-to-know basis. Depending upon your needs, this book may be used in several ways:

- An introduction to the basics of computer font usage
- A source for manufacturers and suppliers of fonts and font-related products
- A source of printed type styles and typeface samples from various font manufacturers and suppliers
- A source for definitions of font and font-related terminology
- A quick reference for font topics and other publications on font-related topics

If you are a beginner in the computer font world the material in this book will provide you with a background on computer font usage which will prove invaluable in understanding other sources of font-related information. Following are brief descriptions of topics covered in the book.

Chapter 1 discusses basic concepts of computer fonts and their usage. Generic font usage applications of printing and display are also discussed.

Chapter 2 has detailed definitions of selected font terminology.

Chapter 3 provides background on type style classification and usage methods. Topics discussed include traditional, classic, decorative, artistic, symbolic, and graphic classifications (examples of each type style are provided), as well as basic concepts to consider when selecting type styles for your application.

Chapter 4 delves into scalable (vector and outline) and nonscalable (bitmap) format methods used for font storage. Usage implications associated with each method and product-specific scalable and nonscalable font formats used in today's market are discussed.

Chapter 5 covers various types of font storage media used by font suppliers. Hardware and software access methods commonly employed when retrieving font data from this media are also discussed.

Chapter 6 deals with font availability. Legal issues, general sources for fonts, font libraries, and suppliers are covered. Also discussed are utilities for converting font formats and software for creating your own fonts.

Chapter 7 deals with font creation. For those of you who wish to try your hand at editing fonts, this chapter provides basic concepts concerning the design of scalable and nonscalable fonts. Topics include application and output device design considerations, general font design and sizing considerations, and creation power tools commonly found in font editors.

Chapter 8 addresses printers and how they affect the legibility of hard copy output. Printer technologies and printer components are compared, and there is a discussion of common printer problems and their effects on output quality.

Chapter 9 covers computer display systems and how they affect the legibility of screen display output. Among the topics discussed are the components of a display system, common display modes, factors to consider when determining the quality of a display, and the overall effect of these elements on font display quality.

Perhaps the most important topic of computer font usage—sizing fonts—is covered in Chapter 10. Basic sizing methods used for scalable and nonscalable fonts, factors to consider when sizing fonts, and the information you should have before sizing a font are discussed. Equations for determining font sizes in both horizontal and vertical dimensions are provided.

Chapter 11 deals with screen or printed page layout, including the determination of your application (screen display or printed page), the basic components of a layout, and the use of font and graphic images within the layout. A few step-by-step examples of screen and printed page layouts are provided.

Chapter 12 provides a quick overview of factors for screen display and printing applications. Several specific software applications that use fonts are discussed. The software products used in these discussions are given as well as the names, addresses, and telephone numbers of the products' manufacturers.

Appendix A is a listing of font libraries, font-related products, and their associated manufacturers. Company names, addresses, and telephone numbers are provided.

Appendix B is a sampler of type styles available from selected font manufacturers and suppliers. In most cases there are many more fonts available than those shown.

The glossary provides brief definitions of terms used throughout this book. Finally, a bibliography lists reference texts and articles about computer font-related topics.

Special Information

Before moving on to the rest of the book, there are two issues that need to be addressed: clarification of the use of font names and piracy in the font industry.

Use of Font Names

In this book, font names such as Helvetica, Caslon, Times Roman, Old English, Peignot, Avant Garde, Script, Gil Sans, Univers, and Broadway are used as stylistic reference terms. While these terms are also copyrighted font names, they are used in this book primarily for ease of understanding. For example, when discussing a sans serif style of type, it is much clearer to use a commonly understood name, such as Helvetica, than to use a product name like Helvet80.

Typefaces used to represent the stylistic font types in the figures and illustrations of this book are similar, but not identical to, the fonts designed under the copyrighted font names. They are associated with these copyrighted names in a stylistic frame of reference only.

The actual fonts used in this book are from the Data Transforms Fontpak Font Library. The names of the fonts used for this purpose are Ascii, Helvet80, Caslon80, Times80, Press80, OldEng80, Peignt80, Avant80, Script80, Broad80, Gil70, Univ70, Illumina, Kudzu, Barefoot, Calliope, Chrome, Punk, Penguins, Icons, Signs, Music, Topog1&2, Hyvac, Flrplan, Greekmth, Electrn, Eyes, Lips, Nose-ear, Leaves, Rules, Opus, and Beasties. (All Data Transforms' font names have a .SET extension.)

Note When known, proper product trademark and copyright accreditations are given. Helvetica, Times, Peignot, and Univers are typeface trademarks of Linotype-Hell Company. Other brand or product names are trademarks or registered trademarks of their respective holders.

Piracy

Piracy is rampant in the computer industry and excessively so in the font industry. This thieving ranges from stealing a product to a subtler method of copying artwork. While unethical and usually illegal, piracy also is manifested in higher costs for fonts and font-related products. I urge you not to knowingly participate in actions of this nature.

As of September 1992, a number of type foundries in the U.S. are embarking on a joint anti-piracy venture in an attempt to stop, or at least inhibit, the stealing of copyrighted products. This U.S. group is part of the larger international organization, Association Typographique Internationale (ATypI). The problems of piracy and copyright violations are also being addressed by the national organization, Software Publishers Association (SPA). For further information, the section on piracy and copyright in Chapter 6 provides addresses and telephone numbers for these organizations.

CHAPTER

1

Introduction to Computer Fonts

Confronting all the font libraries and font usage programs that glut today's marketplace may overwhelm you. In this state of mind, the task of simply using fonts may quickly reach monumental proportions. If you're at this point, don't panic. Font usage, while complicated at times, is not difficult.

When using computer fonts it is important to have a basic understanding of their structure, their terminology, and the technology they represent. This knowledge provides access to the world of a sometimes intimidating, sometimes confusing, always challenging technology. Besides it's always gratifying when a bell rings and you say to yourself: "Oh, that's how it works. Why that's simple."

To begin understanding computer font technology, it is important to grasp the concept of a computer font.

A Computer Font

According to *Webster's New Collegiate Dictionary*, a *font* is an assortment of type, all of one size and style. *Type* refers to an individual character, say an *A* or *9*. This definition, while accurate in a traditional typographic sense, requires modification when applied to computer applications. Traditionally fonts have been limited to a specific physical format such as carved wooden blocks, the lead-cast characters of movable type, or even a typewriter key or ball. In turn, the size of any single font was limited by the format in which it was created. For example, once carved, it is impossible to enlarge a piece of wood type. If a larger character is desired, it must be carved. Computers have changed this.

Basic Concepts Behind Computer Font Usage

The concept behind computer font usage is essentially that of an alteration in usage format. Lead type and wood blocks have given way to groupings of patterns in magnetic oxides (hard disks and diskettes) and predetermined electrical pathways (hardware chips).

Fonts are stored by encoding the information which makes up the individual font characters in the computer as bits of information. The arrangement of this stored information is called the *font format.* (See Chapters 2 and 4 for descriptions of the basic ways in which this is done.) Because font information is stored in this fashion, it is easy, through software, to manipulate an individual font. This medium allows an ease and flexibility of use impossible in traditional typesetting methods.

A printing press and racks of movable lead type are no longer required to choose and to use fonts. Font selections can now be made from a computerized library of fonts. Through software, these fonts can be manipulated in a variety of ways. See Chapter 2 for details. For example, you can now:

- Alter a font's size through a process of scaling or magnification.
- Set the font as proportional or nonproportional (monospaced).
- Alter the space between two adjacent characters. This process is called *kerning.*
- Globally alter the space between all the characters within a font. This process is called *tracking* or *character compensation.*
- Alter the space between lines of text (*leading*).
- Choose how the lines of font text will conform to the margins on a page. This process is called *justification of text on a line.*
- Automatically have a font set or individual character boldfaced and/or italicized.

In short, computerization provides, through a few keypresses, the ability to perform all traditional typesetting tasks and more.

This change in usage format provides you with the ability to graphically create fonts. By its very nature this capability provides flexibility in image construction. Fonts are no longer restricted to specific type styles and basic symbols, but can take the shape of almost any image. These images may range from standard alphanumerics (*A-Z, 0-9*, and punctuation), to a foreign language like French, German, Russian, or Japanese, to pictograms such as Egyptian hieroglyphics, or symbols like mathematics, topography, and flags. Your ability to create such images depends upon the specific computer font formats used and your own artistic abilities. A font sampler is shown in Figure 1-1.

FIGURE 1-1 Examples of alphanumeric and non-alphanumeric type styles

A Font Versus a Graphic Image

Any computer application that renders information for final display to a computer screen or printer does so graphically. This means the final data is always rendered as *dots*—single dots rendered by a printing device—or *pixels*—single dots rendered by a computer screen. All computer graphic images are composed of dots or pixels. Font characters are special graphic images used for a specific application. The final arrangement and application of graphic images are what separate fonts from the general mass of graphics.

A *computer font* is an association of special graphic images that form an interrelated group. A *computer font set* is a group of these images arranged in a specific order, assigned specific reference codes, and saved together as one file or font set. A *computer font character* is an individual image within this set of images.

The maximum number of characters in a font set is determined by the character encoding method used. There are several "character encoding standards" in use today. The most popular in the United States and Europe are ASCII and Extended ASCII. ASCII stands for the *American Standard Code for Information Interchange*. Using ASCII it is possible to encode up to 94 printable characters (these characters correspond to the

IBM keyboard). Extended ASCII allows an additional 125 printable foreign language characters to be encoded. Because of keyboard restrictions font sets often remain fixed at 94 printable characters per set. These characters are shown in Figure 1-2.

How Fonts Are Used

Most fonts are used by accessing a font file, identifying and correctly interpreting the data for particular font characters, and finally, reconstituting the font data as a series of dots or pixels for the required output mode (screen display or printed hard copy). This basic methodology of font usage remains consistent regardless of the font format type or intended application. In the real world of software applications, a user never sees this. Usually the only interaction a user will have with this process is to type on a keyboard and to get the specific font character assigned to that keypress. If you type a *B* you get a *B*. If you type a *z* you get a *z*. Chapter 5 provides greater detail on this area.

Font Use as an Interrelated System

Any computer application is an integration of hardware and software components. The integration of these components forms an interrelated

FIGURE 1-2 Examples of lower and upper ASCII

Lower ASCII

! " # $ % & ' ( ) * + , - / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N
O P Q R S T U V W X Y Z [\ ] ^ _ ' a b c d e f g h i j k l m n o p q r s t u v w x y z { |
} ~

Upper ASCII

Ç ü é â ä à å ç ê ë è ï î ì Ä Å æ Æ ô ö ò û ù ÿ Ö Ü ¢ £ ¥ ₧ ƒ á í ó ú ñ Ñ ª º ¿ ⌐ ¬
½ ¼ ¡ « » ░ ▒ ▓ │ ┤ ╡ ╢ ╖ ╕ ╣ ║ ╗ ╝ ╜ ╛ ┐ └ ┴ ┬ ├ ─ ┼ ╞
╟ ╚ ╔ ╩ ╦ ╠ ═ ╬ ╧ ╨ ╤ ╥ ╙ ╘ ╒ ╓ ╫ ╪ ┘ ┌

system. The effect of each component on the system determines the system's abilities and capabilities.

A system's components are comprised of more than just tangible hardware and software. They also consist of intangible elements. The decisions made and the methods employed by programmers and engineers are vital to the workings of a system. Even marketing has a say, since often it determines the direction of development and decides what gets released to the public for consumption.

All of these elements must be considered when understanding computer font usage. In a computer system designed to use fonts, each of these factors will interact to determine the font format used, its method of usage, and the ever-present nuances attendant to its use, such as print speed and the appearance of font characters displayed to a screen.

As an example of an interrelated system and how it affects font usage, the following is an outline of a simple, limited system composed of a printer and a piece of software. The application is printing. A brief description of each component and how it uses fonts follows.

Printers

Printers are designed to interpret the data stream sent from a host computer, usually a text file from a word processor, and render on paper printable ASCII characters. This is called *printing in the printer's text mode.* The fonts used by the printer are on the printer's internal firmware or accessed from a cartridge. (*Firmware* is designed into the printer—see the Glossary for a detailed definition.) These fonts are in a special type of format called *text format.* (See Chapter 2 for details.) Text format fonts are used because they allow fast printing and provide the printer with the ability to print text independent of software font sources. Different fonts can be "added" to the printer for access by the printer's firmware. This capability is provided through fonts residing on cartridges. *Cartridges* are a form of media on which fonts are supplied. For this scenario assume the fonts available on the cartridges are text format fonts only. (See Chapter 2 or the Glossary for definitions.)

The printer has a graphic printing mode engineered into its firmware. The graphic mode is accessed and controlled by software external to the printer. The choice of mode (text or graphic) used when printing is up to the external software. It should be noted that the print speed of graphic mode is much slower than text mode. In fact, it is approximately 1/4 to 1/16 the speed of text mode.

Software

A software package is designed to use the graphic mode of a screen display. Its programming allows you to format an 8 1/2-by-11-inch page as a graphic image and type text onto a graphic screen associated with that image. Because the display is graphic, its inherent flexibility concerning image display is incorporated, and fonts whose format is of a graphic nature are used.

The format of these particular fonts provides the user with the ability to size fonts on the screen. (*Graphic* or *soft format* refers to fonts whose format is primarily designed for graphic printing or display. See Chapter 2 or the Glossary for detailed definitions.) Large libraries of soft fonts in this format are available on disk and accessible through the software.

In this scenario, the printer mentioned previously is supported by the printing portion of the software. The software supports the text and graphic printing modes on the printer.

Integration

The use of the printer's internal text fonts has the advantages of print speed and font source independence when printing. These internal fonts are accessed more quickly than external soft fonts. However, the internal fonts lack variety and flexibility. A software package using graphic fonts for onscreen display is wonderful in its font flexibility and variety. It often becomes a disappointment, however, when it cannot generate hard copy identical or nearly identical to the screen display. Each application excels when used within its limits. When the two components are integrated, three font source options are available for printing:

- *Fonts found in a supported printer's firmware* If this option is used, the best that can be achieved is to find a general compatibility between the fonts used for display and those available for printing. This option is unsatisfactory for some people.

- *Add-on fonts from cartridges compatible with the printer* This option can offer a wider variety of fonts and provide a greater chance of matching the font(s) used in the display, but it can be as limiting as the first option.

- *Fonts used for the software screen display* This option requires the software to use the printer's graphic printing mode, which in turn allows the software to use the same fonts for printing as it uses for display. By using the graphic mode, this software provides the capability of printing fonts from a variety of software sources. These fonts, called *graphic* or *soft fonts*, offer larger fonts in a wider variety of image styles for printing applications. It is important to note that some software packages save as a graphic the entire image created on the screen. The various graphic fonts used for text may be contained as part of the image. In this instance, the fonts are not really used for printing; instead they are simply part of a larger graphic.

Note Remember this interrelated system is a limited scenario used for instruction purposes only. Current technology is such that given different system components, the "font matching problems" mentioned in the preceding example can be alleviated. In today's world of technology crossover, the firmware of printing devices can contain soft fonts, cartridges can contain soft fonts, and software can provide the same fonts used for screen display to a printer. In these instances there can be an exact match between printed fonts and the fonts used for screen display.

Where Are Fonts Used?

Fonts are used in every computer application requiring the output of text to a screen or printer. The following are rules of thumb for the two basic applications (printing and screen display), and the two basic modes (text and graphic) in which fonts are used. Because there is a great deal of overlap of font access methods for the various applications, these "rules" should be seen as guides only and not laws etched in stone.

Printing Applications

When asked to consider the various applications for which fonts are used, most people automatically think of printing. People who use computers are familiar with the "written word" and are used to seeing text on a page. These same people are usually acquainted with the process of printing documents (hard copy) on their printers. For the purpose of printing, there are two basic modes by which a printer may be addressed: text mode and graphic mode.

Text Mode A printer, when addressed in text mode, uses its internal hard fonts or plugged-in cartridge fonts to render ASCII text. This type of printing is indicative of applications that use only a computer's firmware when sending information to the printer such as screen dumps, Hex dumps, standard ASCII text files, word processor text files, and so on.

Graphic Mode A printer's graphic mode is initiated through software. At this point soft fonts may be used for rendering text. This method is consistent with software programs that utilize graphic format fonts. (See Chapters 2 and 4 for details on formats.)

Screen Display Applications

Using fonts for display on a computer screen is nearly identical to using fonts for printing. Both applications use fonts for the display of text and graphic symbol information to an output device. There are two basic modes by which this information may be displayed to a computer screen: text mode and graphic mode.

Text Mode When ASCII data is input, a computer uses its internal hard fonts to display this data as text to the screen. This type of text mode display is indicative of applications that use only a computer's firmware when rendering information to a computer screen. Data may be received from sources such as input from the keyboard, up-loaded text files, entered DOS commands, and word processor text.

Graphic Mode A computer's graphic display mode is initiated through software. At this point soft fonts are used to render text on the graphic screen. This method requires software or firmware programming to utilize graphic format fonts.

A Few Specific Industry Applications

To illustrate how pervasive computer fonts are in the computer field, here is a brief list of several specific industry applications. Often the same applications that display fonts to a computer screen also print with these same fonts on a printer.

Banner-making programs
Computer-Aided Design/Drafting (CAD)
Desktop publishing
Desktop video titling programs
Forms generation
Font printing enhancement programs
Graphic typesetting
Label generation
Language translation
Presentations and demos
Programming
Typesetting
Word processing

Fonts are used with any screen display application requiring the display of text or icons, and with any printing application requiring the output of text or icons.

CHAPTER

2

Computer Font Terminology

Computer font technology uses many of the terms from traditional (noncomputer-based) typographic technology. Additional terms are required for the description of components unique to computer font technology.

Usage is straightforward. However, due to misuse, "redefinition," and overlap of terms, understanding and correct usage can quickly become confusing. Add to this a proclivity among marketers and salespeople to coin new "descriptive" terms and you may soon wish the services of a translator.

In an effort to smooth the way, font terminology is divided into nine categories. These categories cover the basic terms used in computer font technology. The terms associated with each category coincide with the majority of formatting and usage applications that fall in the users' way when they manipulate fonts. In addition, the Glossary included with this book will provide more terms and definitions. The nine categories are

Font-specific terms
Font media terms
Font format terms
Font character-specific terms
Basic character formatting terms
Font sizing terms
Basic stylistic terms
Character enhancement terms
Page description language terms

Font-Specific Terms

To understand computer font technology, it is essential to clarify the term "font," which is often used to describe a wide variety of computer font terminology.

Font *Font* is a generic label and an add-on descriptor for many terms. Font can refer to font character, font set, font style, font file, font format, or font data. Its actual meaning depends on the context in which it is used. Problems arise when the single term "font" is used in an attempt to communicate several meanings at once.

Font Style *Font style* specifies a design and *attitude* indicative of a font's characters. The following illustration provides examples of three font styles: Helvetica, Times Roman, and Old English. (Chapter 3 provides greater detail concerning this topic.)

Helvetica	A B C D E F G a b c d e f g
Times Roman	A B C D E F G a b c d e f g
Old English	A B C D E F G a b c d e f g

Font Set *Font set* refers to a series of interrelated font characters saved as one file. The following example illustrates a typical 94-character font set.

! " # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G
H I J K L M N O P Q R S T U V W X Y Z [\ ] ^ _ ` a b c d e f g h i j k l
m n o p q r s t u v w x y z { | } ~

Font Character *Font character* denotes a particular image within a font set. Each of the images (*A, K, g, z, !, }*, or *) from the previous illustration is a font character.

Font Data *Font data* means the actual bit and byte data that make up an individual font character or set of font characters.

Font Format *Font format* indicates the system by which font data is arranged and reconstituted for use. Descriptive classification of these formats range from general terms like text fonts, graphic fonts, and soft fonts to specific terms like bitmap, outline, and vector. These terms are defined later in this chapter.

Font Header *Font header* describes the information located at the beginning of a font file. The header specifies formatting and organizational information concerning the font, such as font name, character cell size, the number of characters in the font, spacing, whether the font is proportional or nonproportional, and so on.

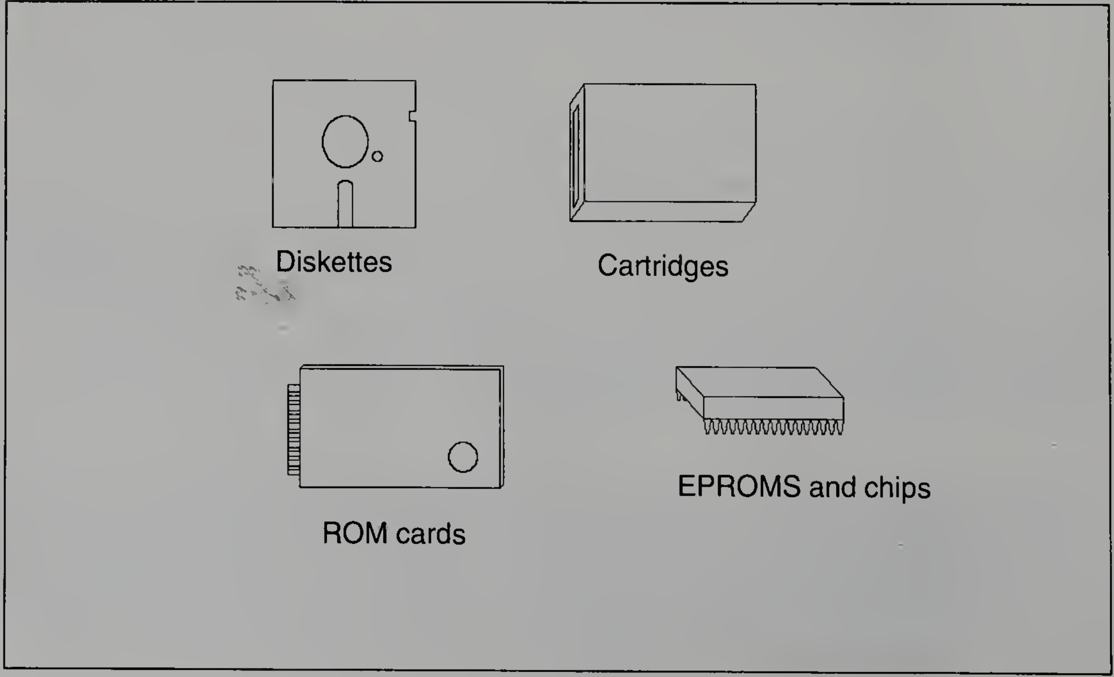
Font File *Font file* is a global term used to indicate the complete data concerning a font set. From a programming viewpoint, a font file specifies a file consisting of font header and font data information. From a general view it indicates a font set and all font characters within that set.

Font Media Terms

Fonts are supplied to the marketplace on many types of media. The media type used will depend upon the computer system and the intended application. There are four basic types of computer media used in today's marketplace. Figure 2-1 shows illustrations of the various media.

Font Diskettes *Font diskettes* are the media of choice for many software applications. These packages use fonts supplied on either 3 1/2-

FIGURE 2-1 Four basic types of computer media



inch or 5 1/4-inch diskettes. The fonts supplied on diskettes are called *soft fonts.*

Font Cartridges *Font cartridge* is the term specifying the plug-in media used to supply add-on fonts for printers. These cartridges are of the same dimensions as a deck of cards. The fonts supplied on this media are usually text format type fonts.

RAM/ROM Cards *RAM/ROM cards* as a form of font media are becoming more popular in the computer printer industry. These cards have the dimensions of a credit card and run about 1/4 inch thick. Their memory capacity is approximately 64K to 128K or more. Some cards are backed up by a calculator-type battery that resides on the card. (Others are preprogrammed with specific, unalterable, nonerasable fonts.) RAM cards are programmable; ROM cards are not. In either case, the cards may be moved from supporting printer to supporting printer. This is an area where soft font and hard font technology cross. The fonts residing on RAM/ROM cards are soft fonts used in the same fashion as text fonts.

Preprogrammed and Programmable EPROMS *Preprogrammed EPROMS* and *programmable EPROMS* are chips that reside in a printer as part of its firmware. Their memory capacity ranges from 32K, to 64K, to 128K. Either soft fonts or text fonts may be programmed onto an EProm. Once there, a font is not removed and is always available when the printer is turned on. This is another area where soft font and hard font technology intersect. The fonts that reside on EPROMS are soft fonts, but are used in the same fashion as text fonts. In the future they may come into vogue for use on computers.

Font Format Terms

The importance of understanding font format terminology is underscored by the variety of overlapping terms. Some terms act as generic descriptors for many formats, some are specific; still others are common slang terms with similar meanings. It is important from a communication standpoint to understand the definitions and differences.

General Font Format Terms

General font format terms are broad classifications of font formats based on usage. Two usage classes exist: graphic and text.

Graphic Font *Graphic font* describes the category of fonts designed for storage on soft media, such as a floppy diskette, a hard disk, or a cartridge. These fonts are later accessed by software for printing or screen display applications.

Text Font *Text font* denotes the type of fonts designed for storage in and access by the firmware of a hardware device. These fonts, found in the firmware of printers, computers, and on cartridges, are primarily used for text (alphanumeric) display. For printers, this means printed hard copy output and for computers, screen display.

Note With current technology, these two terms can overlap. Occasionally fonts classified as graphic fonts are made available on and to the firmware of a hardware device. This is occurring most often in the laser printer industry and the high-end PC and workstation world.

Specific Font Format Types

There are four specific font format types used by software and hardware developers today: vector, outline, bitmap, and text.

Vector Format *Vector format* specifies a graphic font format in which font character data is stored as a series of mathematical equations. These equations describe the makeup and specific placement of the dots, lines, and curves that form a font character. The regenerated character "pieces" are positioned relative to an abstract absolute point. This point is usually analogous to the upper-left corner of a box in which a specific character would fit.

The equation method of storage allows for a great deal of flexibility when a software or firmware application interprets the dimensions of a character. Because of this, fonts in this format may be scaled to any size when they are used. This results in expanded clean-edged characters.

Outline Format *Outline format* describes a graphic font format in which font character data, stored as a series of mathematical equations, describes the mapping of dots selected from the edges of a font character. This mapping is based on the relative position between dots and their specific position in relation to an imaginary point, like that used for vector formats. Because this format uses an equation method of storage, fonts may be scaled to any size. This results in expanded smooth characters.

Bitmap Format *Bitmap format* describes a graphic font format where all font character data is stored as bit data and rendered as dots or pixels. Fonts in this format cannot be sized through a scaling process, but they can be magnified and smoothed. This method of sizing can produce adequate to horrible looking characters.

Text Format *Text format* is a special kind of bitmap format, because of its historically specialized application. Fonts in this format are of fixed sizes that are strictly regulated to produce a specific number of characters on one line. For example, an 80-column display uses 80 characters (including spaces) on one line extending the width of a computer screen. When used with printers, fonts in this format rarely exceed the size of a printer's printhead. They are usually designed for printing with one pass of the printer's printhead.

Note The final rendering of any font used for printing or screen display is as a bitmap. When a font is displayed to a computer screen or printed on a printer, it is always represented as a series of dots or pixels. This is true regardless of whether the font's initial format was a vector, outline, or bitmap format.

Common or Slang Font Terms

Common or slang font terms are popular in the sales world. These terms often overlap and can be synonymous. In some cases their meanings parallel those format classifications already discussed.

Soft Font *Soft font* is another name for graphic font. This term is used to describe the category of fonts stored on soft media, such as a diskette, and accessed by software.

Hard Font *Hard font* is synonymous with text font. This term describes the category of fonts stored in, and accessed by, the firmware of a hardware device.

Scalable Font *Scalable font* is a generic term used to describe vector or outline format fonts. These fonts are capable of being enlarged and automatically smoothed, using software, on a screen or printer.

Smooth Font *Smooth font* is often used as another name for scalable font. This, however, is not its only definition. It also describes a font that has undergone the treatment of a smoothing algorithm. This algorithm automatically smooths out any edges that may appear when a font is enlarged by scaling or magnification.

Cartridge Font *Cartridge font* is the term used to describe any font supplied on a cartridge. These cartridges are add-on devices for printers. The fonts supplied on this media are often text format type fonts, but they can also be soft fonts.

Anatomy of a Font Character: Font Character-Specific Terms

When a font character or a font set is formatted, it is important to understand the typographic terminology associated with its makeup. Some of these terms are straight definitions from traditional typography. Others, like pixel, dot, and character cell, are indicative of computer-based technology. (Typography concerns the style, arrangement, and appearance of typeset documents.)

Pixel *Pixel* designates an individual screen dot on a graphic display. This term is often interchangeable with "dot."

Dot *Dot* describes an individual dot on printer hard copy. This term is often interchangeable with "pixel."

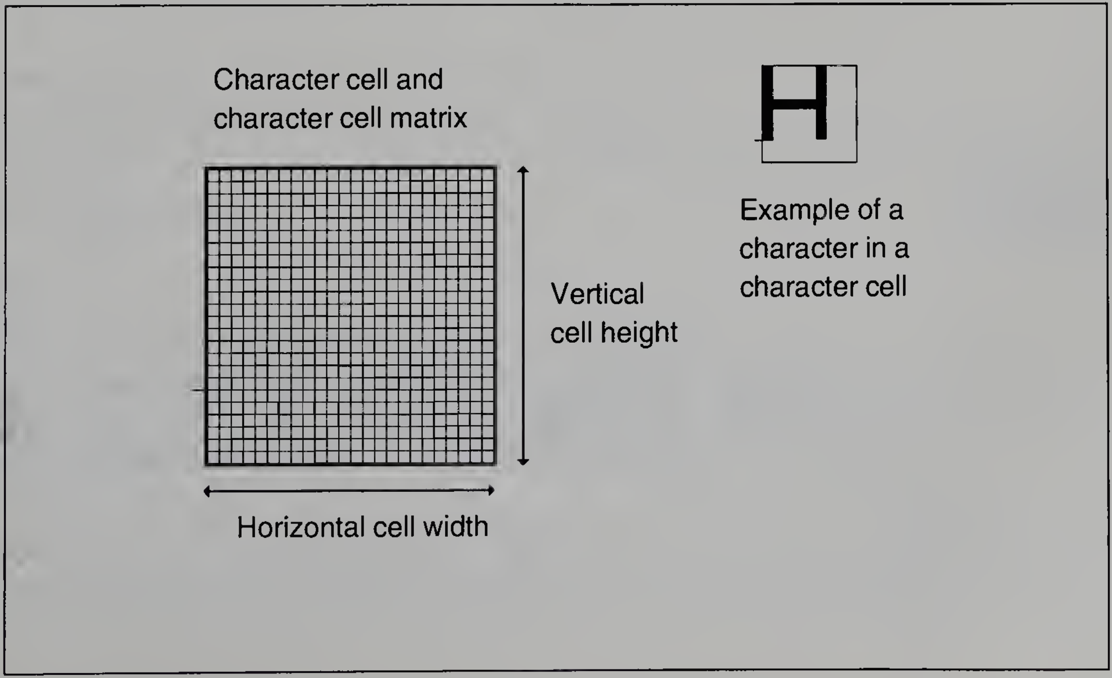
Stroke *Stroke* refers to the lines that make up a character. For example, the capital *T* can be said to consist of two strokes: one vertical stroke and one horizontal stroke, whereas the capital *H* consists of three strokes: two vertical strokes and one horizontal stroke.

Character *Character* denotes a particular image from a set of interrelated images. In the case of fonts, it is a single character from a font set. Each of the images *A, K, g, z, !, }*, and * constitutes a character.

Character Cell *Character cell* indicates the cell or box in which a character is created. Before a font set is made, the maximum character height and width are decided. These dimensions determine the size of the boxes or cells in which all characters of a font set will be created. A font set 24 x 24 in size specifies a set with a horizontal character cell size of 24 dots and a vertical character cell size of 24 dots. This means every character of the set fits within the 24 x 24 cell size. Figure 2-2 shows a diagram of a character cell and an example of a character inside a cell.

Horizontal Cell Width *Horizontal cell width* is the horizontal width of a character cell. This dimension is usually given in dots or pixels. Figure 2-2 shows an example of horizontal cell width.

FIGURE 2-2 Anatomy of a character cell



Vertical Cell Height *Vertical cell height* is the vertical height of a character cell. This dimension is usually given in dots or pixels. Figure 2-2 shows an example of vertical cell height.

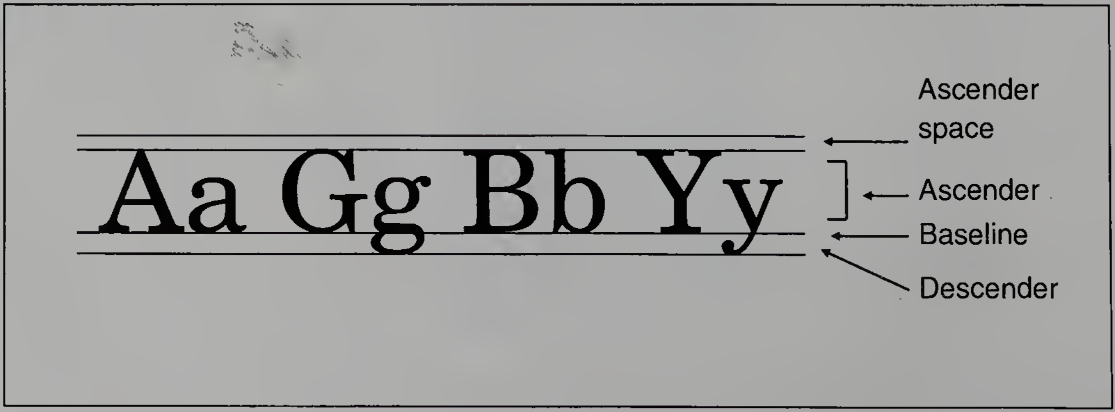
Character Cell Matrix *Character cell matrix* describes the data within a cell from which a character is created. A character cell matrix is composed of bit data. Turning bits on (a black dot) and bits off (a blank dot) creates a character. The previous example of a 24 x 24 bitmap font provides 24 horizontal rows of 24 dots each or 24 vertical rows of 24 dots. Both views calculate out to provide a total 24 x 24 matrix of 576 dots. From these dots individual characters are created. Figure 2-2 shows a diagram of the character cell matrix.

Baseline *Baseline* refers to that point in a character cell or line of printed text on which the base of an uppercase character rests. Figure 2-3 provides an illustration of this feature.

Ascender *Ascender* indicates the portion of a character that extends above the baseline. Figure 2-3 shows an illustration of this feature.

Ascender Space *Ascender space* denotes the portion of a character cell specifically designed to extend above the tallest uppercase character. This space (not always present in a font set) is usually reserved for diacritical marks and special punctuation required by foreign languages. Figure 2-3 gives an illustration of this feature.

FIGURE 2-3 Anatomy of a character



Note Ascender space is often confused with the term "ascender." It helps to add a quick definition when using these terms.

Descender *Descender* specifies that portion of a character (usually lowercase) that extends below the baseline. See Figure 2-3.

Uppercase *Uppercase* signifies the capital letters of an English alphanumeric or foreign language font set. These characters are shown here:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Lowercase *Lowercase* means noncapital equivalents of the capital letters of an English alphanumeric or foreign language font set. These characters are shown here:

a b c d e f g h i j k l m n o p q r s t u v w x y z

Note Not all foreign languages exhibit distinctively sized upper- or lowercase characters. Most European-based languages do; whereas most Asian languages use characters of one size only. In these instances there is no size distinction between upper- or lowercase.

Numerics *Numerics* has to do with the numerical characters in a font set. These characters are shown here:

0 1 2 3 4 5 6 7 8 9

Punctuation *Punctuation* refers to all the punctuation, accent, diacritical, and symbol marks in a font set. These marks will diverge across languages. The punctuation marks found on most computer keyboards are shown here:

! @ # $ % ^ & * ( ) _ – + = | \ { } [ ] : ; " ' ~ ` , . ? < > /

Basic Character Formatting Terms

The majority of typographic terms associated with formatting a set of font characters correspond with the definitions from traditional typesetting. The basic terms discussed here affect the formatting (primarily character spacing) of a line of font text.

Proportional *Proportional* indicates the relative placement of, and spacing between, the characters of an entire font set. While the space between characters remains the same, the positioning of characters in relation to each other is based on the relative width of the individual characters. This feature is controlled with software. The next illustration provides an example of this spacing.

Monospacing *Monospacing,* also known as *nonproportional spacing,* denotes the spacing between the characters of an entire font set. While the space between characters remains the same, the positioning of characters in relation to each other is based on the entire character cell width. Each character appears centered within its respective cell, with the entire character cell used as a character. This spacing is usually indicative of text fonts. This feature can be controlled with software or built into a font when it is created. The following illustration provides samples of proportional versus nonproportional character spacing.

This is a proportionally spaced sentence of text.

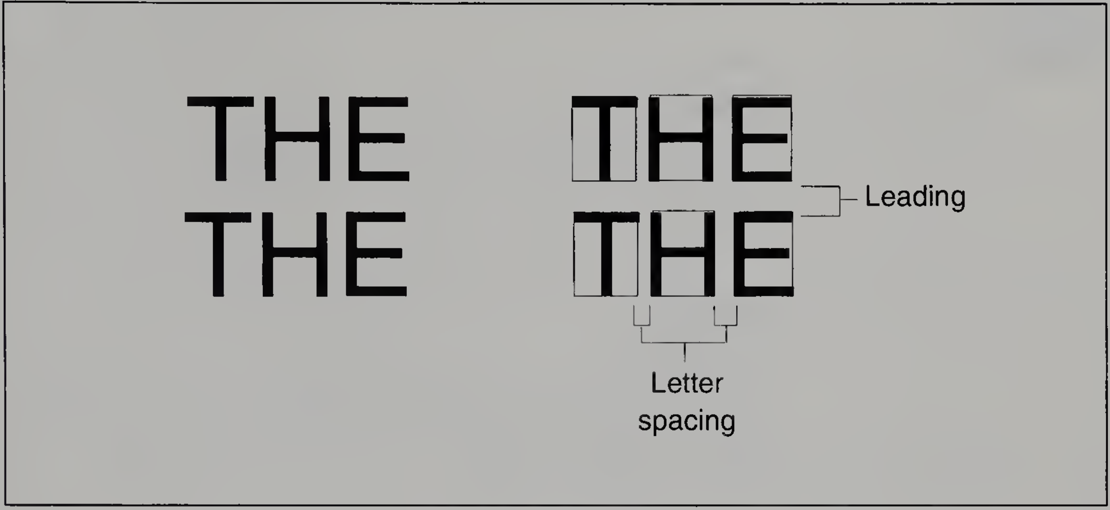
T h i s   i s   a   n o n p r o p o r t i o n a l l y
s p a c e d   s e n t e n c e   o f   t e x t .

Leading *Leading,* also known as *linefeed gap,* is the term used to define the distance between two lines of text, separated by only one carriage return (one ENTER keypress). This amount can be preprogrammed into the font header of a font set or controlled with software or a hardware device's firmware. See Figure 2-4 for an example.

Letter Spacing *Letter spacing,* also known as *character spacing gap,* is the preprogrammed distance between two adjacent characters. This amount can be preprogrammed into the font header of a font set or controlled with software or firmware. Figure 2-4 illustrates leading and letter spacing.

Kerning *Kerning* is used to describe the process of moving adjacent characters closer together or farther apart. This movement allows adjust-

FIGURE 2-4 Leading and letter spacing illustrated



ment of the character spacing gap to the point where some characters can be moved underneath an overhanging portion of another. For example, the character *a* can be moved underneath the cross bar of the character *T*. Figure 2-5 shows examples of kerning.

Tracking *Tracking* is the process of adjusting the spacing between all characters of a font set. This term, also known as *character compensation*, is, at times, referred to in the more general terms, *spacing control* and *horizontal spacing*. While tracking can be used to describe the process of adding or removing space, it is ordinarily used to describe the elimination of space. Whereas letter spacing is commonly used to describe the process of adding space.

Word Spacing *Word spacing* is, just as it sounds, the distance between words on a line, usually equivalent to the space allocated to one press of the SPACEBAR. This value can be preprogrammed into the font header of a font set or controlled with software or firmware. Alterations in letter spacing or tracking can affect word spacing. Word spacing is also known as *space bar width*.

Justification *Justification* specifies the positioning of text on an entire line. *Right justified*, also called *flush right* or *ragged left*, refers to lines of text that are flush against the right margin and ragged along the left margin of a page. *Left justified*, also called *flush left* or *ragged right*,

FIGURE 2-5 Comparison of kerned and unkerned characters

Unkerned

AWARE
HOW NOW BROWN COW.
RAT-A-TAT-TAT.

Kerned

AWARE
HOW NOW BROWN COW.
RAT-A-TAT-TAT.

Kerned too much

AWARE
HOW NOW BROWN COW.
RAT-A-TAT-TAT.

describes lines of text that are flush along the left margin and ragged along the right margin. *Center justified* denotes lines of text that are centered between the margins of a page. *Fill justified*, also called *full* or *flush*, signifies lines of text that are flush along both the right and left margins. Examples of right, left, center, and fill justification are shown in Figure 2-6.

Font Sizing Terms

Font sizing is one of the most talked about and one of the most easily confused terms. Explaining the difference between magnification and scaling can be aggravating, but getting people to agree on a method of determining the size of a character can be infuriating. Following are the basic sizing terms used throughout the computer font industry.

FIGURE 2-6 Examples of left, right, center, and fill justifications

Left justification

If you're reading this, stop. This is just text on a line. You're supposed to be
concerned with how it is justified on this line, not its content. It really has no
content you know, unless you read this of course. So if you are reading this,

Right justification

If you're reading this, stop. This is just text on a line. You're supposed to be con-
cerned with how it is justified on this line, not its content. It really has no con-
tent you know, unless you read this of course. So if you are reading this, stop.

Center justification

If you're reading this, stop. This is just text on a line. You're supposed to be
concerned with how it is justified on this line, not its content. It really has
no content you know, unless you read this of course. So if you are
reading this, stop.

Fill justification

If you're reading this, stop. This is just text on a line. You're supposed to be
concerned with how it is justified on this line, not its content. It really has no content
you know, unless you read this of course. So if you are reading this, stop.

Magnification *Magnification* describes the process of enlarging a given font or character. Most magnification routines use a ratio expansion algorithm to process the font character data in the following manner: When a character is magnified 2 x 2 (horizontal by vertical) each dot or pixel of the original is represented by a 2 x 2 block of dots or pixels. This differs from scaling in that the fonts manipulated are usually nonscalable bitmapped fonts and the final images are not smoothed. Samples of a magnified font are shown in Figure 2-7.

Scaling *Scaling* is used to describe the process of enlarging vector or outline fonts. Due to the nature of their format, when these fonts are enlarged they are already as good as the original, which is usually smooth and well formed. If there is smoothing to be done it is accomplished in an automatic fashion. Examples of a scaled font are shown in Figure 2-8.

Characters Per Inch *Characters per inch* (CPI) is the number of characters (including spaces) that can fit within one inch on a line of printed or displayed text. This term is usually used in conjunction with monospaced fonts.

FIGURE 2-7

Samples of horizontal by vertical magnifications

(0 x 0) HELVETICA helvetica
(2 x 2) HELVETICA helvetica
(3 x 3) HELVETICA helvetica
(4 x 4) HELVETICA helvetica

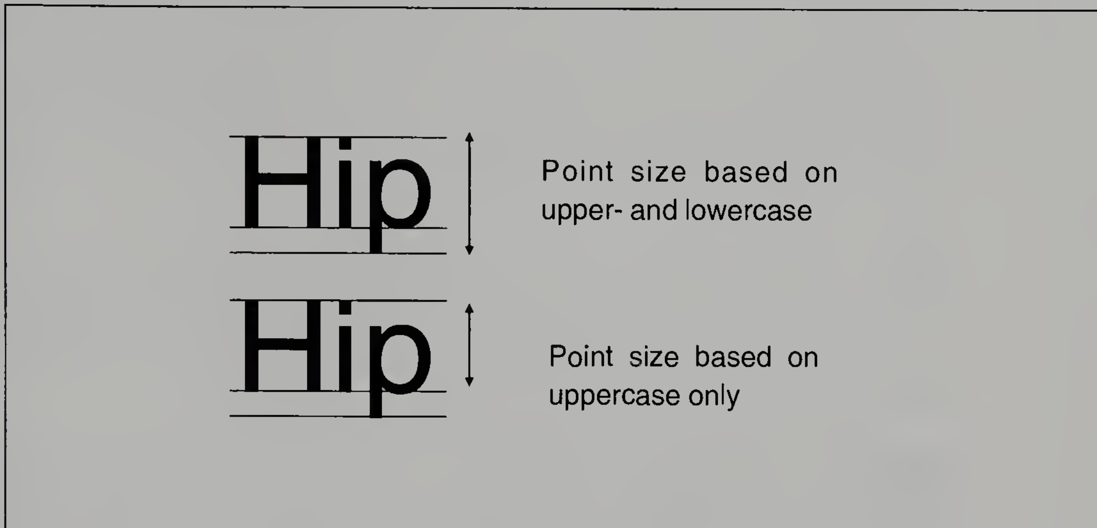
Point Size *Point size* is a typographic sizing term for the size of final hard copy output of a font. One point equals 1/72 inch, which equals 0.1388888 inch. There are two ways to measure point size. Most methods base point size on the vertical size of uppercase characters plus the descenders of lowercase characters (the vertical cell size of a font). Some methods, however, base point size of a font on the height of an uppercase letter only. Figure 2-9 illustrates both methods of measuring point size.

FIGURE 2-8

Samples of scaled sizes of a Helvetica typeface

HELVETICA helvetica
HELVETICA helvetica
HELVETICA helvetica
HELVETICA helvetica
HELVETICA helvetica
HELVETICA helvetica
HELVETICA helvetica

FIGURE 2-9 Samples of traditional typefaces



Inch Size *Inch size* is the measurement, in inches, of the vertical size of a font. This is the same as point size except the value is given in inches, not points.

Pixel Size *Pixel size* refers to the size of individual pixels on a computer graphic screen display. Pixel size is a function of monitor screen display size and display resolution. Assuming a fixed monitor screen size, the higher the resolution, the smaller the pixel size. While most monitor screens average around 11 x 8 1/2 inches (horizontal by vertical) the final display can be any size. (I once gave a demonstration of graphic software on a system that used a 10-x-8-foot projected screen display.)

The upshot of this "variability" in resolution and physical monitor size is that there can be no standard measure of pixel size for fonts displayed to a computer screen. The higher the screen resolution, the smaller the pixels that make up a character, hence a smaller character. The larger the physical size of a screen, the larger the pixels that make up a character, hence a larger character.

Basic Stylistic Terms

Choosing the correct type and style of type can often make or break a document. In the process of selection, it is important to know the terms associated with this font category. Often font libraries will have word descriptions of the typefaces available. By knowing the terminology you can quickly form a mind image of the type. Of course it's always nice to actually see a rendered image of the font. It is also useful knowledge when you ask font manufacturers if they carry a particular style. These stylistic terms are from traditional typography.

Type The term "type" shares the same generic usage trap as the term "font." Its meaning rests on the context in which it is used. *Type* can refer to a complete set of characters, or a stylistic design or attitude. (Some people use it to convey both meanings at once.)

Typeface *Typeface* designates a set of characters exhibiting a particular stylistic attitude. For example, a Helvetica typeface refers to a font set whose characters are of the accepted Helvetica stylistic appearance. For the purposes of this book, typeface is synonymous with font style. Figure 2-10 provides examples of five traditional type styles: Helvetica, Times Roman, Caslon, Script, and Old English.

Type Style *Type style* categorizes the design appearance of a font set. When used in combination with certain character font formatting terms, type style can categorize specific groups of fonts sharing like attributes. For example, all bolded fonts may be considered a bold type style. All fonts sporting serifs can be referred to as a serif type style. In Figure 2-10, Times Roman and Caslon would be considered serif styles, while Helvetica would be considered a sans serif style.

Serif *Serif* applies to the short lines stemming from, and at an angle to, the upper and lower terminating ends of a character. This term is also used to describe the class of fonts whose characters display this feature. Figure 2-11 shows an example of a serif type style.

Sans Serif *Sans serif* specifies the class of fonts whose characters do not display the serif feature. Figure 2-11 shows an example of a sans serif type style.

Block *Block*, also known as *Gothic*, describes a stylistic class of fonts whose character makeup exhibits a uniform, sans serif, square-shaped appearance. Here all lines are of even width, angles are of 30, 45, 60, or

FIGURE 2-10

Samples of five traditional type styles

Helvetica

A B C D E F G H I J K L M N O P
Q R S T U V W X Y Z a b c d e
f g h i j k l m n o p q r s t u v w x
y z

Times Roman

A B C D E F G H I J K L M N O P Q R
S T U V W X Y Z a b c d e f g h i j k l
m n o p q r s t u v w x y z

Caslon

A B C D E F G H I J K L M N O P Q R
S T U V W X Y Z a b c d e f g h i j k l
m n o p q r s t u v w x y z

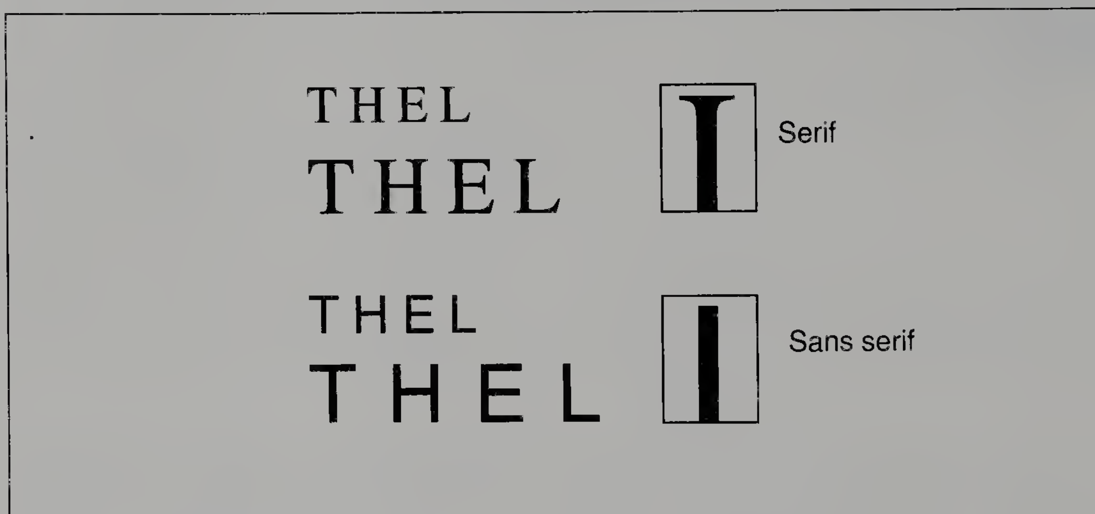
Script

A B C D E F G H I J K L M N O P Q
R S T U V W X Y Z a b c d e f g h i j k l
m n o p q r s t u v w x y z

Old English

A B C D E F G H I J K L M N O
P Q R S T U V W X Y Z a b c d e f g
h i j k l m n o p q r s t u v w x y z

FIGURE 2-11 Serif and sans serif features and examples of corresponding type styles



90 degrees, and all character widths are uniform. An example of a block style is the Helvetica typestyle shown in Figure 2-10.

Script *Script* depicts a stylistic class of fonts whose characters exhibit a cursive, often flowery, handwriting style. An example of a script typestyle is shown in Figure 2-10.

Uncondensed A great number of fonts are modifications of some original typeface. This typeface is used as the reference point for all succeeding modified fonts. *Uncondensed* refers only to the character width of an original typeface as compared against subsequent versions, which modify the character width only. See the following illustration.

Uncondensed characters	THEAOU
Condensed characters	THEAOU

Condensed *Condensed* denotes a font set whose characters display a narrower width than those of the original typeface on which it was based. See the preceding illustration.

Stroke Weight *Stroke weight* means the "level of thickness" in the lines of a font. The weight levels are determined by comparison to a standardized version of the font. This term is used as a general descriptor of the line thickness of a font character set. These weights are often given in the graded terms: light, medium, and bold. The following illustration shows a comparison of the stroke weights in a Gill Sans typestyle.

Light	A E I O U	Regular	A E I O U
Medium	A E I O U	Bold	**A E I O U**

- **Light** *Light* does not mean one-third less calories. It describes fonts whose character strokes, when compared to a standardized version of the font, exhibit the attribute of thinner lines.
- **Regular** *Regular* signifies the standard against which all stroke weights are determined. The standard is usually based on the originally created typeface and is valid only for that typeface. Be careful, this can be a tricky area. Asserting a stroke weight as the standard against which all others are judged can prove hazardous since occasionally it is difficult to determine just what the assumed standard regular typeface was.
- **Medium** *Medium* means a stroke weight intermediate between regular and bold. The expression *medium bold* is often used for this term. The 2 x 2 boldness in the next illustration can be considered a medium stroke weight.
- **Bold** *Bold,* also known as *boldface,* denotes fonts whose character strokes, when compared to a standardized version of the font, exhibit the attribute of thicker lines. This term is also used to describe the process of thickening the lines. The following illustration shows various stages of boldness.

Regular	Aa Bb Hh Ii	Bold 2 x 2	Aa Bb Hh Ii
Bold 3 x 3	**Aa Bb Hh Ii**	Bold 4 x 4	**Aa Bb Hh Ii**

Italic *Italic* specifies fonts whose characters exhibit the attribute of leaning to one side. Italic also describes the formatting capability of software to italicize a font set. The following illustration shows positive italic characters (leaning upward to the right) and negative italic characters (leaning upward to the left).

Oblique *Oblique* is similar to italic. Oblique can specify fonts whose characters were created with the attribute of leaning to one side.

Positive italic characters *A B C D E F G H I J*

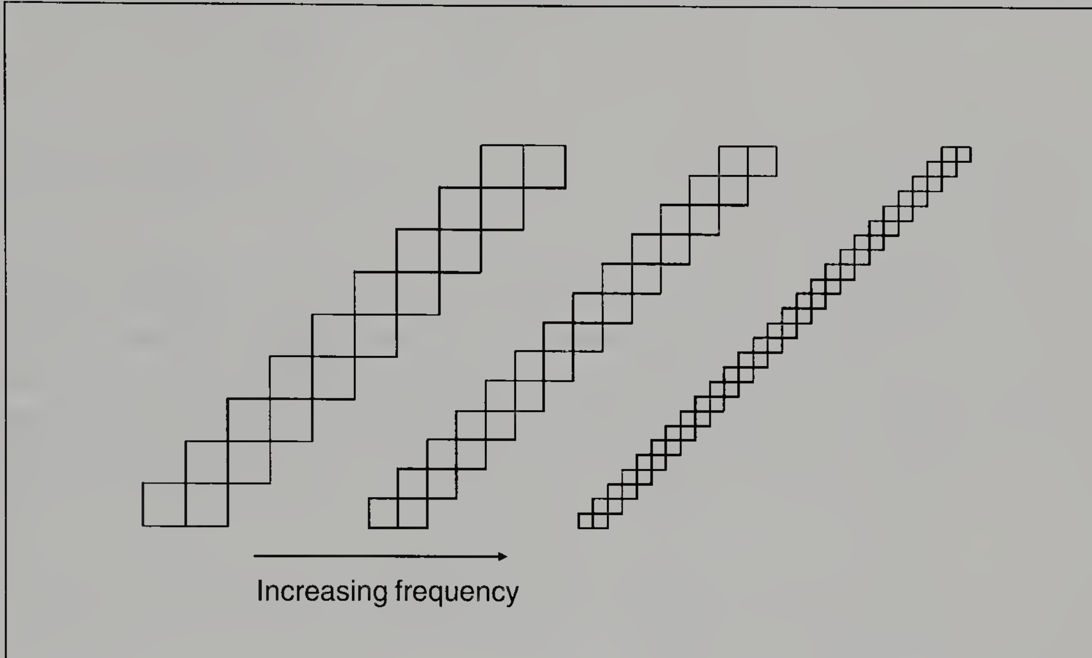
Negative italic characters A B C D E F G H I J

Character Enhancement Terms

Once a font has been scaled or magnified, its quality may not be as good as required. Character edges may be rough and the shape of the characters may appear "off." At this point, manufacturers and developers have two choices: to leave well enough alone or to attempt to smooth the visual appearance of the characters. This problem of quality is called "aliasing," and there are two methods commonly used to alleviate this situation: color aliasing and hinting. Collectively, these solutions are often referred to by their generic terms, anti-aliasing and smoothing.

Aliasing Aliasing is a problem of frequency and arrangement. In the specific context of font generation, *aliasing* refers to the arrangement of, and the frequency or number of dots used to represent a diagonal line or curve of a font character. The fewer the dots, the rougher the edge of a line or curve will appear. The more dots available for use, the "cleaner" the edge of a line or curve will appear. This quality is also dependent on the arrangement of these dots. It is not useful if a great number of dots are used, but not arranged in an optimal order for the character represented. Figure 2-12 shows three images that illustrate the problem of aliasing, using squares to represent individual dots. As the frequency of dots increases, so does the apparent smoothness of the line's edge.

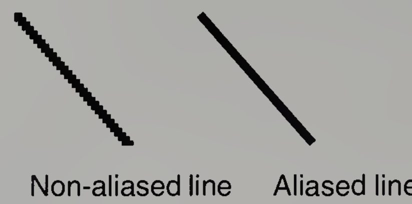
FIGURE 2-12 Examples of aliasing frequency



Anti-aliasing *Anti-aliasing* is a generic term often used when describing the solution or group of solutions to the problem of aliasing.

Color-aliasing *Color-aliasing* is a solution to the problem of aliasing often seen on a computer graphic screen display. This process fools the human eye by taking advantage of the ability to control the color or shade of every pixel on a screen display. Altering the colors along all the boundary edges of a character creates a contrast that "blurs" the edge of a character and fools the eye into interpreting this edge as a smooth line. The contrast allows the mind to "fill in" the spaces caused by the jaggedness produced by the corners of individual pixels protruding along the edge of a line.

This same solution can be used with printers that provide the ability to print halftones or shades of gray. Here, different shades are used to create the "blurring effect" of color-aliasing. This method works best with high-resolution printers such as laser printers. The following illustration shows two highly stylized lines, one aliased and one not.



Hinting *Hinting,* also referred to as *scaling intelligence,* is the process by which a font is slightly altered at print time, to produce better-looking characters. Hinting is primarily used with scalable fonts and is most effective when these fonts are printed on low-resolution printers. This fine-tuning is achieved through *hints* or *adjustments* programmed into a font file. For example, such adjustments may require the *stroke widths* of all the characters of a font set to be the same number of dots when printed. This may force some strokes to be narrowed while others are increased. The net effect is an improved regularity of the final character shape.

Smoothing *Smoothing,* a generic term, applies to the process by which the apparent definition of the edges of a character is increased. It is a byword for the application of an algorithm that automatically smooths out any roughness appearing along the edges of a character when a font is enlarged by scaling or magnification.

Page Description Language Terms

A *page description language* (PDL for short) is a programming language specifically designed to handle the placement of text and graphics on a page. Once constructed, the "description" of a page is saved as a file. This PDL file is interpreted by software or firmware and the entire page is rendered for display to a screen or printed on a printer. There are two page description languages prominent in today's market: PostScript and PCL.

PostScript *PostScript* is a page description programming language developed by Adobe Systems. A PostScript file can be printed on any printer with a PostScript interpreter built into its firmware or displayed and printed by any software using a similar interpreter. The term PostScript is often synonymous in the marketing, advertising, and sales worlds with *scalable fonts.*

PCL *PCL* is a page description programming language developed by Hewlett-Packard. There are two versions of this format: PCL4 and PCL5. The PCL format is used primarily for printing applications and can be printed on any printer with a PCL interpreter built into its firmware. Most of these printers are, of course, Hewlett-Packard (HP) laser printers. PCL is also used as a descriptor for the bitmapped format fonts that may be used with these printers. PCL5 is scalable technology and is used as a descriptor for the scalable format fonts that may be used with these printers.

CHAPTER 3

Type Style and Typeface Classification and Usage

The art of using computer fonts requires a grasp of the essentials of type style classification and type usage techniques. While this chapter provides a basic overview of common methods, there really is no substitute for hands-on experience. Use the information here as a guide only. For more information, refer to any of the books on typography listed in the Bibliography.

Classification of Type Styles

Deciding on a type style and typeface from the myriad of type styles in today's world of computer fonts can be, to put it kindly, difficult. To successfully sift through the bulk of type styles and their attendant typefaces requires some method of type style categorization. The following methods are commonly used to classify fonts and type styles.

- **Grouping fonts by name** This method is used because many fonts are based on traditional typefaces and so retain their original titles. However, it quickly becomes useless when addressing the growing number of computer fonts that are new designs. It also lacks effectiveness due to the rapid growth in the number of fonts available in the computer font industry. Current copyright law allows font names to be copyrighted. As a result, different font libraries may have identical or nearly identical typefaces with unique names, or they may use similar names to identify unique typefaces. This can create confusion when comparing and purchasing fonts from different sources. For example, the name Times Roman is copyrighted, but this same typeface may be found in different font libraries under the copyrighted names of Times, Time, Times25, and so on.

- **Grouping type styles by common physical attributes** Groupings based on serif and sans serif features are commonly used. However, the vast number of fonts that fall into these basic groupings and the numerous classification "features" that are possible limit the usefulness of this method. While fine for traditional styles, this method is only marginally useful for the bulk of artistic and symbolic font sets.

- **Matching type styles and typefaces to applications** Type styles can be grouped according to their intended usage application. There is a great deal of social bias involved with this method of classification. For example, styles acceptable for business or scientific documents are often considered too bland for wedding invitations. This is a practical method of type style classification, but does not define enough type style groupings to be really useful.

Each of these methods is useful but breaks down when trying to address the increasing volume of computer fonts in today's market. The best solution is to use the three methods of classification collectively: *traditional type style name* (when applicable), *common physical attributes*, and *probable attitude usage*. This way it is possible to provide a useful classification system for the broad range of type styles and typefaces currently available.

The following sections discuss specific style groupings. The traditional and classic decorative groupings include typefaces that are distinctive enough and have been around long enough to retain their names across marketing and product boundaries. The artistic, symbolic, and graphic groupings include fonts whose artistic design and naming were up to their creator.

Note Throughout this book terms such as Helvetica, Caslon, Times Roman, Old English, and so on, are used for stylistic references only. While they represent copyrighted font names, they are used here for reader clarification only. See the "Introduction" for further details.

Traditional Type Styles

Traditional styles are those that have been developed and commonly used over the last century or, as in the case of Helvetica and Caslon, over several centuries. The names used for identification are fairly consistent across font libraries. Traditional styles are classified by the presence or absence of serif features. *Serifs* are short lines stemming from and at an angle to the upper and lower terminating ends of a character. Two classification categories are referred to as serif and *sans serif* (without serifs).

Serif

Serif styles describe the class of fonts whose characters sport serif features. Serifs provide characters with a distinctive shape capable of improving readability. For long documents like books, newspapers, and large reports this style group is easy to read and provides a visually facile character appearance. Figure 3-1 shows the following sample serif typefaces, used to represent this grouping:

- *Times Roman* as a style has been championed by newspapers since the early 1900s.
- *Press*, similar to *Courier*, is representative of the style of type produced by typewriters.
- *Caslon* was developed in the 1800s as an elegant, visually appealing typeface.

FIGURE 3-1 Sample serif type styles

Times Roman

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z a b c d e f g h i j k l m n o p q r s t u v w x y z

Press

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z a b c d e f g h i j k l m n o p q r s t u v w x y z

Caslon

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z a b c d e f g h i j k l m n o p q r s t u v w x y z

Sans Serif

Sans serif is the class of fonts whose characters do not display the serif feature. In some areas this stylistic grouping is also known by the names Gothic and Block. Letters from these fonts are easy to read and often used in business and professional documents. It should be noted however, that the blocky appearance of the characters can provide for monotonous viewing, or *type boredom*. For this reason sans serif type fonts are better suited for short documents or brief entries in large documents. Figure 3-2 shows the following samples of typefaces used to represent this grouping:

- *ASCII* is a style whose dimensions and appearance were rigidly defined in the early days of the computer industry. The character

FIGURE 3-2

Sample sans serif type styles

ASCII

ABCDEFGHJIKLMNOPQRSTUVWXYZabcdefghjiklmnopqrstuvwxyz

Helvetica

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z a b c d e f g h i j k l m n o p q r s t u v w x y z

Gill Sans

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z a b c d e f g h i j k l m n o p q r s t u v w x y z

Universe Condensed

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z a b c d e f g h i j k l m n o p q r s t u v w x y z cell for this font is small, approximately nine dots high by seven dots wide.

- *Helvetica* is a type style developed several centuries ago. It is noted for its square, blocky, simple appearance.
- *Gill Sans* is an elegant, blocky typeface. It is easy to read and is the official type style of the British government.
- *Universe* is a popular blocky typeface similar to Helvetica and Gill Sans.

Classic Decorative Type Styles

For those who wish more decorative type styles without retreating from a traditional look or going to extremes, a group of classic typefaces is available. These styles range from thin-lined and easily readable to overtly ostentatious. They are often used for ceremonial purposes such as invitations, place cards, certificates, and diplomas. Fonts illustrative of this group are shown in Figure 3-3.

Note There is no special history for these typefaces except *Old English.* (I'm sure this statement will get me into trouble with students of type design.) When I see this typeface I envision a monastery full of monks working by candlelight late into the evenings, laboriously creating these characters with quill and ink. This is, in fact, part of the historical origin of this very old typeface.

Artistic

The artistic category includes font styles which have no historical counterparts. These styles are used for fun, shock value, and/or to make a distinct impression. The designs of typefaces in this group are the result of artistic endeavors of both professional and amateur type designers. The ease of computer font creation has allowed creativity to blossom in font-developing enthusiasts. Fonts representative of this group are shown in Figure 3-4.

FIGURE 3-3

Sample classic decorative type styles

Avant Garde

A B C D E F G H I J K L
M N O P Q R S T U V
W X Y Z a b c d e f g h
i j k l m n o p q r s t u v
w x y z

Broadway

A B C D E F G H I J K L M N O
P Q R S T U V W X Y Z a b c
d e f g h i j k l m n o p q r s t
u v w x y z

Peignot

A B C D E F G H I J K L M N O P Q R S T
U V W X Y Z a b c d e f g h i j k l m n o p
q r s t u v w x y z

Script

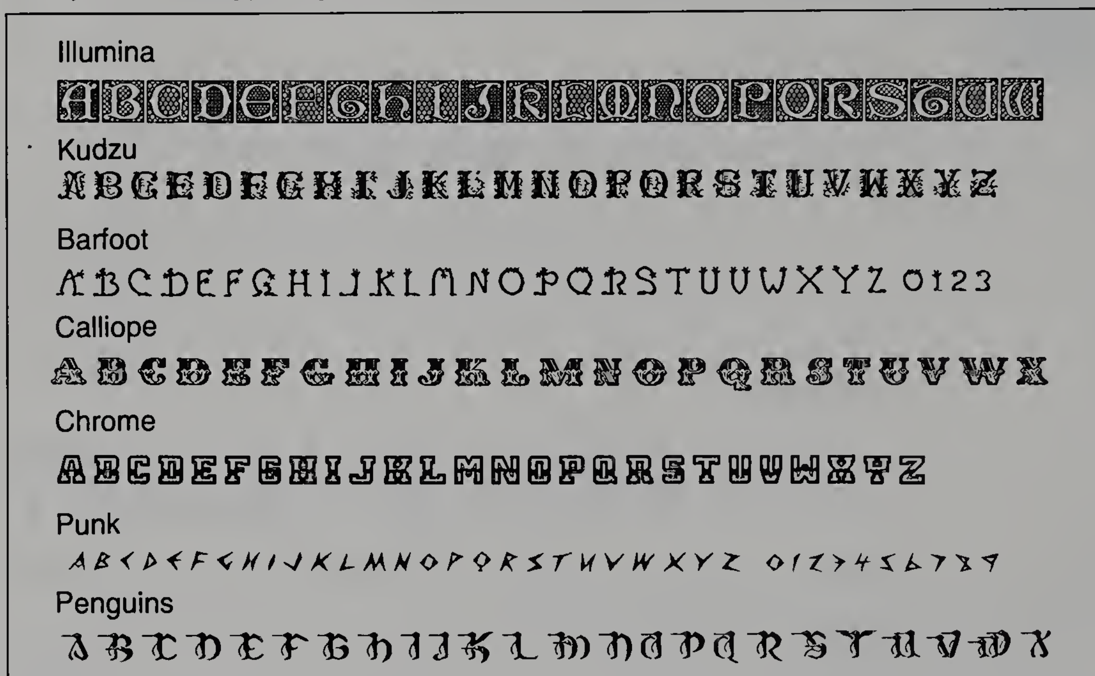
A B C D E F G H I J
K L M N O P Q R S T
U V W X Y Z a b c d
e f g h i j k l m n
o p q r s t u v w x
y z

Old English

A B C D E F G H I J K L M N O P
Q R S T U V W X Y Z a b c d e f g h i
j k l m n o p q r s t u v w x y z

FIGURE 3-4

Sample artistic type styles



Symbolic

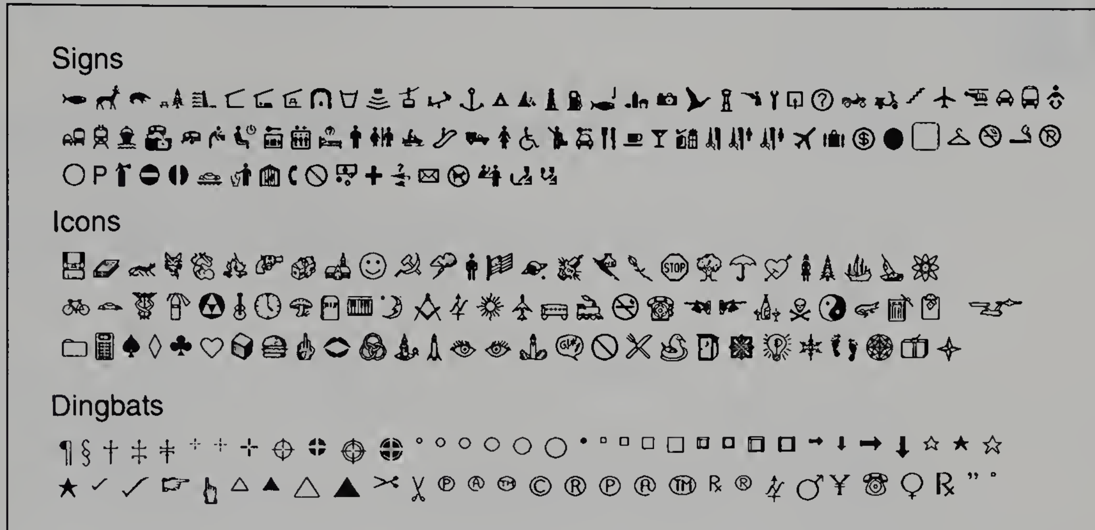
The symbolic group consists of those fonts whose characters are not alphanumerics. These fonts represent symbols and notation. This category can be divided into three subsets: symbol, design, and notation.

Symbol

The individual characters of symbol fonts are used exclusively to convey messages through pictures. Anyone who has seen the male/female figures adorning bathroom doors will recognize this grouping definition. Figure 3-5 shows the following sample fonts used to represent this grouping:

- *Signs* represent a group of internationally recognized pictographs used to convey common warnings, actions, and uses.
- *Icons* are used to convey general meanings and attitudes.
- *Dingbats* are markings for paragraphs, copyright, trademark, currency, and many more symbols.

FIGURE 3-5 Sample symbol type styles



Refer to Figure 3-5 and see how many symbolic designations you recognize.

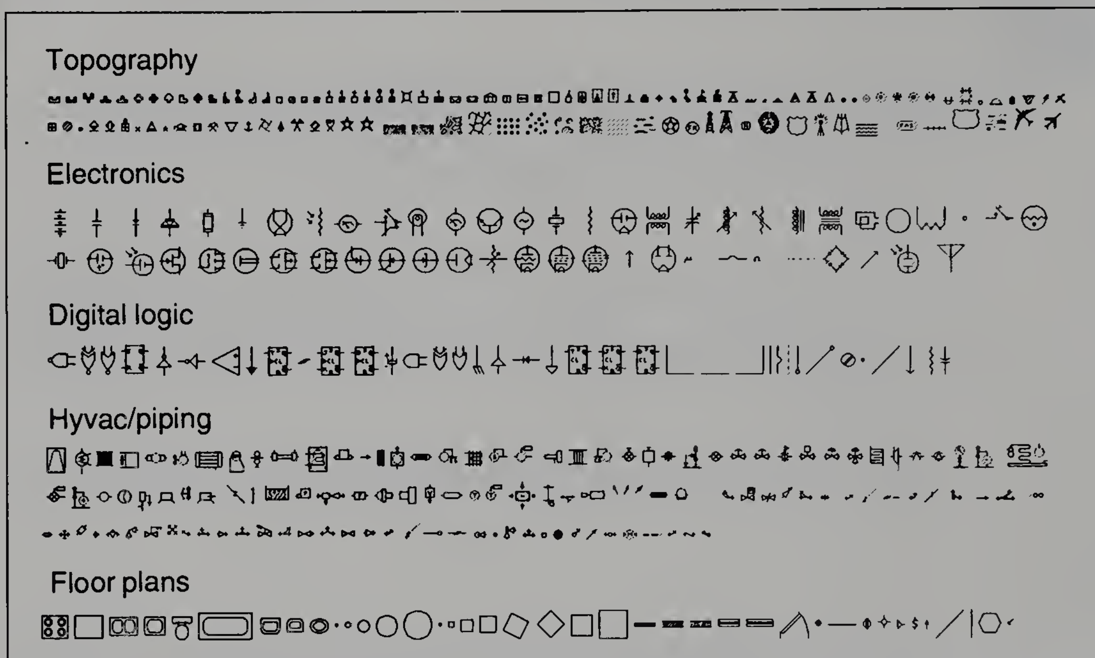
Design

Design fonts are used in developing schematics. These schematics may range from topographic maps to electronic circuitry to floor plans.

Who on earth would use this stuff? Since many "design" applications are becoming computerized, the answer is: lots of people. Figure 3-6 shows the following fonts used to represent this subgroup:

- *Topographic* symbols are used by mapping organizations.
- *Digital logic and electronic* symbols are used in the curriculum of basic circuit design in college physics.
- *Hyvac/piping and flow* symbols are used on fluid power diagrams employed by engineers at hydroelectric dams, for example.
- *Floor plan* symbols provide drafters with a tool for designing floor plans on a computer. This also allows two-dimensional computer modeling for anyone who might want to do a little remodeling or furniture rearranging in the home.

FIGURE 3-6 Sample design type styles

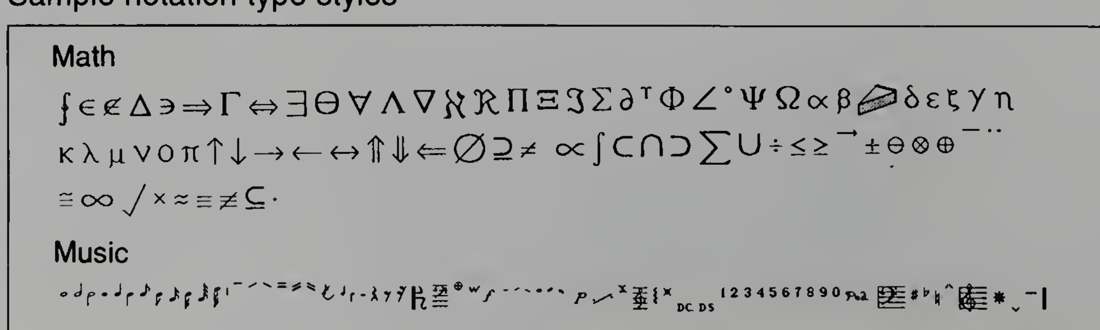


Notation

Notation fonts are used to represent logical progressions or designations. These symbols, while capable of individual meaning, are used in combination to express an interlinking progression of concepts. Figure 3-7 shows the following fonts used to represent this subgroup:

- *Mathematical symbol applications* range from college and high school test generators to home instruction software, with users ranging from scientists to bankers.
- *Computerized music notation* speeds and eases the process of composition, a useful tool for many composers and writers.

FIGURE 3-7 Sample notation type styles

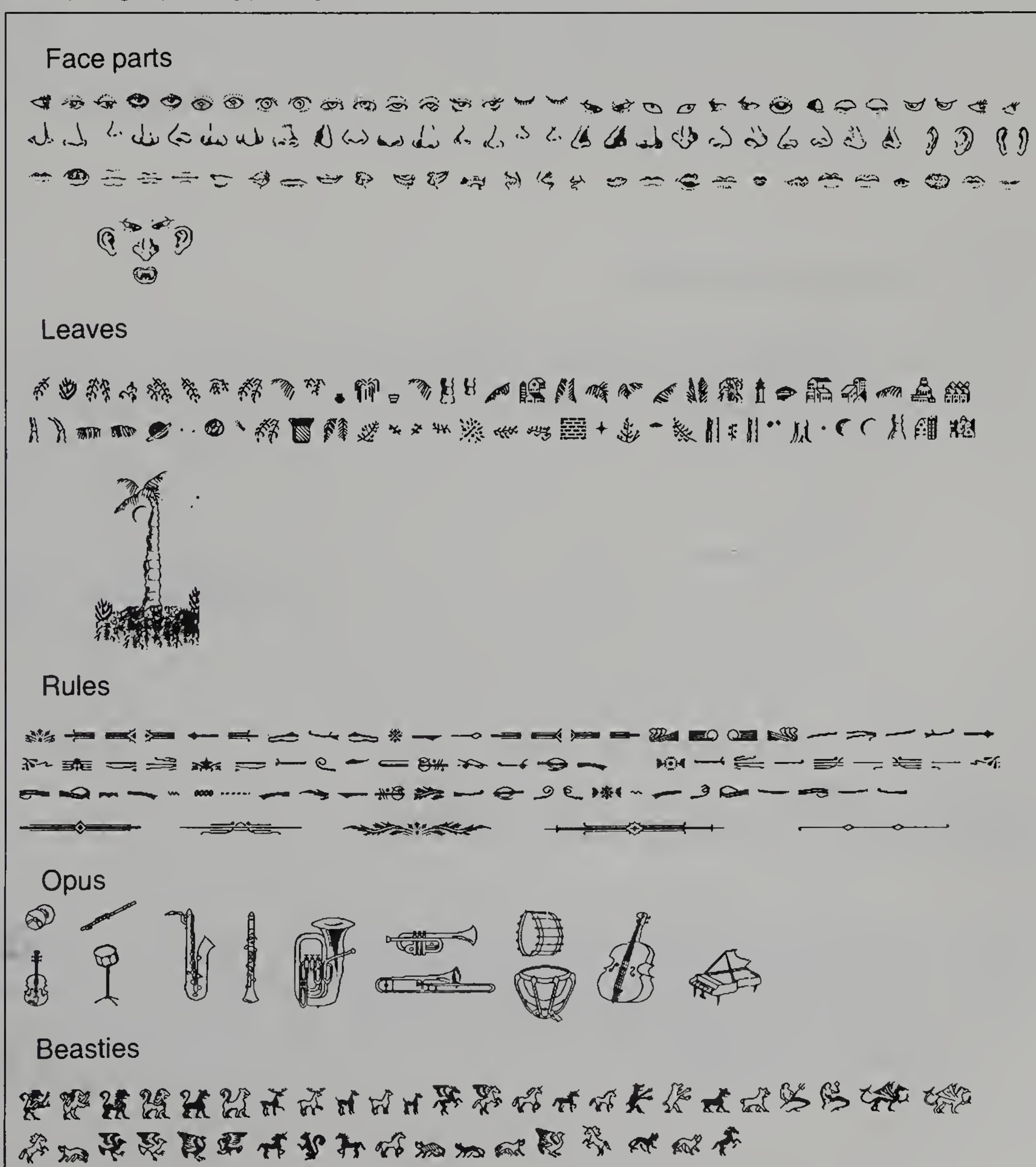


Graphic

Graphic fonts are used for pictures, but they differ from symbols in that they are not designed to convey specific messages. Rather, they are pictures usually used for adornment, or they are elements of a greater image. These elements can be combined at the user's discretion to form an image. Samples of this grouping are shown in Figure 3-8.

FIGURE 3-8

Sample graphic type styles



Type Style Selection

The style of type used in a document is often considered to be window dressing, pretty but not essential. However, as in music where the silence between notes is just as important as the notes themselves, so is the selection and usage of type styles to a written document. Typefaces are used to flavor intended ideas, highlight concepts, affect readability, and impart general attitudes.

The selection of a typeface is important for any written application. Though different styles may be better suited for specific jobs, the final choice always remains with the user. When selecting typefaces for purchase or choosing from the various typefaces at your command, keep the following basic concepts in mind.

Font Impressions

The written word conveys meaning and develops a "feeling" about the topic being addressed on a conscious level; a type style can impart similar impressions on an unconscious level. You can use type styles to convey an attitude—your own or one that is appropriate to the topic—and to evoke in a reader a specific mood and frame of mind. Depending upon the application, you can use type styles to exhibit businesslike, ceremonial, or artistic attitudes. For example, read the passages in Figure 3-9. Which is easier to read? Which is more comfortable; less straining? Which one is best suited to the passage content?

Application-Specific Fonts

Select typefaces and styles for specific applications. Contrasts in typefaces or a particular typeface (italics versus bold versus unbold) can be used to highlight or separate concepts. (For a good example compare the chapter headings and subheadings used in this book with the general body of its text.)

FIGURE 3-9 Using type styles to evoke and fit meaning

... that's the worst reason I can think of for killing. That it's the right thing to do. ....if you're only killing them because it's the 'right thing to do', it's only because you've done so many wrong things up until then to make that spot. It's not the right thing to do. It's the best of the last of your choices.

ARMOR - John Steakley

... that's the worst reason I can think of for killing. That it's the right thing to do. ....if you're only killing them because it's the 'right thing to do', it's only because you've done so many wrong things up until then to make that spot. It's not the right thing to do. It's the best of the last of your choices.

ARMOR - John Steakley

... that's the worst reason I can think of for killing. That it's the right thing to do. ....if you're only killing them because it's the 'right thing to do', it's only because you've done so many wrong things up until then to make that spot. It's not the right thing to do. It's the best of the last of your choices.

ARMOR - John Steakley

Depending on your application, one font may be better suited for a particular purpose than another. For example, the style you select for a business letter will probably not be the one you use for a wedding invitation.

Mixing Typefaces

There may be times when you wish to use several typefaces in one document. For example, you can contrast or blend complementary typefaces in a document to encourage concentration on the part of a reader. The use of this concept can be as sparing or lavish as desired. A mishmash of typefaces can be confusing, or it can be used intentionally as a goad to make readers concentrate.

Note The ability to convey information through the lavish mixing of typefaces is a very difficult skill to master and rarely is effective. This usage should not be attempted until you have become fairly proficient in selecting and using type.

Typeface Readability and Legibility

A typeface can be selected for its readability, legibility, or simply to cram as much information as possible into a limited space—as you know if you have ever tried to read the fine print on a contract. As an example of differences in legibility, squint your eyes at the text at the bottom of Figure 3-10.

Color

Color, in the typographic sense of shades of black, is an important element in page layout. Color is important when determining the readability of the final printed document. If a printed page is text-intensive it may be wise to use a lighter typeface for the body of the text. A dark typeface can make this page appear black and very difficult to read. If

FIGURE 3-10 A comparison of type styles—readability vs. volume of text

4.1 The term of this Agreement shall commence on the date hereof and shall continue in effect until terminated by either Party1 or Party2 upon at least thirty (30) days prior written notice via registered mail to the last known address of the other party.
4.2 This Agreement shall be construed and interpreted pursuant to the laws of the State of Washington.
4.3 This Agreement constitutes the entire agreement and supersedes any and all prior agreements between Party2 and Party1 and may not be changed except in writing and signed by both parties.
4.4 Neither party may sell, transfer, assign, delegate, or subcontract any rights or obligations under this Agreement without the prior written consent of the other party, which shall not be unreasonably withheld.

4.1 The term of this Agreement shall commence on the date hereof and shall continue in effect until terminated by either Party1 or Party2 upon at least thirty (30) days prior written notice via registered mail to the last known address of the other party.
4.2 This Agreement shall be construed and interpreted pursuant to the laws of the State of Washington.
4.3 This Agreement constitutes the entire agreement and supersedes any and all prior agreements between Party2 and Party1 and may not be changed except in writing and signed by both parties.
4.4 Neither party may sell, transfer, assign, delegate, or subcontract any rights or obligations under this Agreement without the prior written consent of the other party, which shall not be unreasonably withheld.

there is less text on a page, and you want it to stand out, a darker typeface may be in order. A lighter typeface can fade this text into the background and, again, make it difficult to read. It is ultimately a case of individual taste.

The following points are important when weighing use of color:

- A comparison of typefaces in their unbolded form will show how they differ in color.
- Sans serif typefaces will often appear darker than serif typefaces.
- A typeface will be darker when bolded or magnified.
- A typeface will appear lighter when italicized.

Printer Output Quality

When creating a document, it is important to consider the output device you will be using. This device will greatly affect your decision concerning font styles and color. The model and condition of the printing device will affect final output quality. High-resolution printers will often produce darker copy than low-resolution printers. Output from dot matrix printers is sometimes jaggy or blurred compared to the crisper output of a laser printer. As the condition of a printer deteriorates, the quality of its copy deteriorates.

Rate Your Own Readability

The comfort and readability of a font is tied to the cultural history of the reader. If you grew up reading text displayed in a particular type style, then often that style is what you'll find to be easily readable. For example, a European background may elicit a preference for sans serif typefaces, while an American background may evoke a preference for serif typefaces. It's all a matter of what you're used to. Because of this, it is exceedingly difficult to rate one font as more readable than another font.

Table 3-1 provides 76 samples of basic typefaces from the Micrografx Designer type collection. The columns to the right allow you to rate the typefaces according to your preference and application. A method you might use is a numerical rating system where 1 is easy, 2 is manageable, and 3 is difficult. The fonts have been loosely grouped according to relative appearance. Using what you have learned in this chapter, you could further categorize these fonts to your taste.

In Conclusion

Remember four basic things when choosing a type style and typeface: First, the type styles used in a document make a dramatic impression on the reader. Second, recognition and usage of type style categories are important in the selection of the typefaces used in a document's preparation. Third, cultural biases influence which typefaces are considered acceptable for specific applications. Fourth, in the final analysis, the choice of type style and typeface remains with the user. It really is up to you.

TABLE 3-1 Typeface Readability Table (Typefaces from the Micrografx® Designer™ Type Collection by Micrografx, Inc.)

Typeface	Rating
Courier Roman a b c d e f g h i j k l m n o p q r s t u v w x y z A B C D E F G H I J K L M N O P Q R S T U V W X Y Z 1 2 3 4 5 6 7 8 9 0 ! @ # $ % & * ? . , ( ) { }	1__2__3__
Goudy Old Style abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1__2__3__
Garamond abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*?.,(){}	1__2__3__

TABLE 3-1 CONT.

Typeface Readability Table (Typefaces from the Micrografx® Designer™ Type Collection by Micrografx, Inc.)

Typeface	Rating
Windsor abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1_2_3_
Baskerville Handcut abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1_2_3_
Bodoni-DTC **abcdefghijklmnopqrstuvwxyz** **ABCDEFGHIJKLMNOPQRSTUVWXYZ** **1234567890!@#$%&*?.,(){}**	1_2_3_
News Serif Roman abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*?.,(){}	1_2_3_
Palton Roman abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*?.,(){}	1_2_3_
Louisville abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1_2_3_
ITC Bookman® abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1_2_3_

TABLE 3-1 CONT.

Typeface Readability Table (Typefaces from the Micrografx® Designer™ Type Collection by Micrografx, Inc.)

Typeface	Rating
Caslon 540 abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*?.,(){}	1__2__3__
Century Schoolbook abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*?.,(){}	1__2__3__
Trajan ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$%&*.,(){}	1__2__3__
Charlemagne Regular ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$%&*.,(){}	1__2__3__
Heritage abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1__2__3__
Copperplate Light ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$%&*.,(){}	1__2__3__
ITC Korinna® abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*?.,(){}	1__2__3__

TABLE 3-1 CONT.

Typeface Readability Table (Typefaces from the Micrografx® Designer™ Type Collection by Micrografx, Inc.)

Typeface	Rating
ITC Friz Quadrata® abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*?.,(){}	1_2_3_
Liberty ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$%&*.,(){}	1_2_3_
Flare Gothic abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1_2_3_
Garrison Sans abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1_2_3_
Frugal Sans Light abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1_2_3_
Sans abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*?.,(){}	1_2_3_
Unique Roman abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1_2_3_

TABLE 3-1 CONT.

Typeface Readability Table (Typefaces from the Micrografx® Designer™ Type Collection by Micrografx, Inc.)

Typeface	Rating
ITC Avant Garde® Book abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*?.,(){}	1_2_3_
Eurostile Extended abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%& * .,(){}	1_2_3_
Cooper Black **abcdefghijklmnopqrstuvwxyz** **ABCDEFGHIJKLMNOPQRSTUVWXYZ** **1234567890!@#$%&*?.,(){}**	1_2_3_
Dynasty Black Extended **abcdefghijklmnopqrstuvwxyz** **ABCDEFGHIJKLMNOPQRSTUVWXYZ** **1234567890!@#$%&*.,(){}**	1_2_3_
Latin Wide **abcdefghijklmnopqrstuvwxyz** **ABCDEFGHIJKLMNOPQRSTUVWXYZ** **1234567890!@#$%&*.,(){}**	1_2_3_
Blackoak **abcdefghijklmnopqrstuvwxyz** **ABCDEFGHIJKLMNOPQRSTUVWXYZ** **1234567890!@#$%&*.,(){}**	1_2_3_
Franklin Gothic abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*?.,(){}	1_2_3_

TABLE 3-1 CONT.

Typeface Readability Table (Typefaces from the Micrografx® Designer™ Type Collection by Micrografx, Inc.)

Typeface	Rating
Sans Black abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*?.,(){}	1__2__3__
Poplar abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$%&*.,(){}	1__2__3__
Sans Inserat abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*?.,(){}	1__2__3__
Garrison Kayo abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1__2__3__
Arsis abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1__2__3__
Birch abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$%&*.,(){}	1__2__3__
Fette Engschrift abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*..(){}	1__2__3__

TABLE 3-1 CONT.

Typeface Readability Table (Typefaces from the Micrografx® Designer™ Type Collection by Micrografx, Inc.)

Typeface	Rating
Garrison Extra-Condensed Sans abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1_2_3_
Optimum abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*?.,(){}	1_2_3_
French Vogue Light abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1_2_3_
Britannic Medium abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1_2_3_
Broadway abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1_2_3_
Serpentine Bold abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1_2_3_
Madrone abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$%&*.,(){}	1_2_3_

TABLE 3-1 CONT.

Typeface Readability Table (Typefaces from the Micrografx® Designer™ Type Collection by Micrografx, Inc.)

Typeface	Rating
Stencil ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$%&*.,(){}	1__2__3__
Stop ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$%&*.,(){}	1__2__3__
Blippo Black abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*..(){}	1__2__3__
VAG Round abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1__2__3__
Balloon ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$%&*.,(){}	1__2__3__
Hobo abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$%&*..(){}	1__2__3__
Flamenco abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*..(){}	1__2__3__

TABLE 3-1 CONT. Typeface Readability Table (Typefaces from the Micrografx® Designer™ Type Collection by Micrografx, Inc.)

Typeface	Rating
Bernhard Antique abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1__2__3__
Juniper ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$%&*.,(){}	1__2__3__
Village Square abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1__2__3__
Algerian ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$%&*.,(){}	1__2__3__
Old Towne No. 536 abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1__2__3__
Mesquite ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$%&*.,(){}	1__2__3__
Ironwood ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$%&*.,(){}	1__2__3__

TABLE 3-1 CONT. Typeface Readability Table (Typefaces from the Micrografx® Designer™ Type Collection by Micrografx, Inc.)

Typeface	Rating
Arnold Böcklin abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$@#%&*?.,(){}	1_2_3_
Uncial abcdefghijklmnopqrstuvwxyz 1234567890!@#$%&*.,(){}	1_2_3_
Fette Fraktur abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$@#%&*?.,(){}	1_2_3_
Marriage abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1_2_3_
Lithos Light ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$%&*.,(){}	1_2_3_
Dom Casual abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$@#%&*?.,(){}	1_2_3_
Nora Casual abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1_2_3_

TABLE 3-1 CONT. Typeface Readability Table (Typefaces from the Micrografx® Designer™ Type Collection by Micrografx, Inc.)

Typeface	Rating
Mistral abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$@#%&*?.,(){}	1__2__3__
Brush Script abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$□□%&*?..()[]	1__2__3__
Kauflinn abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$@#%&*?.,(){}	1__2__3__
Jillian Gothic abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1__2__3__
ITC Zapf Chancery® abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$@#%&*?.,(){}	1__2__3__
Mural Script abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1__2__3__
Park Avenue abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!$@ #%&*?.,(){}	1__2__3__

TABLE 3-1 CONT.

Typeface Readability Table (Typefaces from the Micrografx® Designer™ Type Collection by Micrografx, Inc.)

Typeface	Rating
Vivante-DTC abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890!@#$%&*.,(){}	1_2_3_
Symbol αβχδεφγηιϕκλμνοπθρστυϖωξψζ ΑΒΧΔΕΦΓΗΙϑΚΛΜΝΟΠΘΡΣΤΥςΩΞΨΖ 1234567890!≅#∃%&∗.,(){}	1_2_3_
ITC Zapf Dingbats® 	1_2_3_

CHAPTER 4

Font Formats: The Basics

An important step in understanding computer font use is developing a feeling for the font formats involved. A *font format* is the method used to organize and represent font character data. This format will determine the method by which a font may be used, the flexibility inherent in its use, and its suitability for a particular application. The information in this chapter is of a technical nature, so prepare yourself for a bit of technicalese.

There are two broad classifications of font formats: graphic and text. *Graphic format* refers to fonts accessed and used by software. *Text format* refers to fonts accessed and used by hardware. While all formats will fit into one of these two basic groups, some formats are better suited to particular applications. As technology advances, expect to see the formats become more interchangeable.

Note The current trend among font taxonomists is to classify fonts according to their manipulation capabilities. These classifications are scalable and nonscalable. *Scalable* format fonts can be sized at the time of their use and *nonscalable* fonts cannot. These classifications will be used later in this chapter when specific manufacturers' font formats are discussed.

Whatever the classification system you use, these terms are nothing more than general categories. If you lay aside copyrightable features and usage classifications, all fonts fall into one of three format categories: vector, outline, and bitmap. (See Chapter 2 for specific definitions.)

Three Basic Format Types

The three basic font formats used in the computer industry are bitmap, vector, and outline. Each employs its own strategy of data arrangement and gives its own brand of uniqueness to the interpretation of this data. The strategies range from saving every dot within a character cell to saving equations that address every dot, line, and curve of a font character. The font format specifies and guides the process by which a font character is reconstituted from font data. Software or firmware interprets the data, uses whatever flexibility is inherent in a specific format, and finally renders that data as a character. The following sections give a brief definition and working description for each.

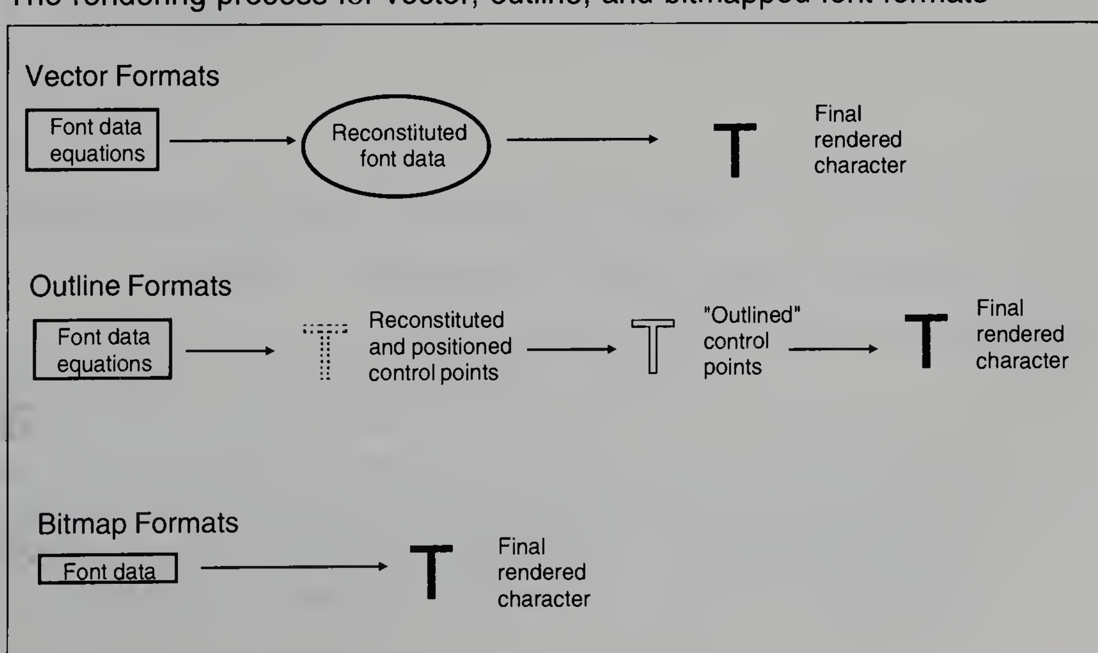
Vector Format

Vector format stores font character data as a series of mathematical equations. These equations describe the placement of every dot, line, and curve of a font character relative to a specific imaginary point. (This imaginary point is usually analogous to the upper-left corner of a box in which this character would fit.) When font data is reconstituted from the descriptive equations, a character is rendered in its entirety. Fonts in this format are scalable. Figure 4-1 illustrates the steps of vector format font rendering.

Outline Format

Outline format combines the scaling capability of vector format with a creation capability similar to bitmapped format.

FIGURE 4-1 The rendering process for vector, outline, and bitmapped font formats



An outline format stores specific portions of font character data as a series of mathematical equations. The stored data consists of selected points from along the edges of a font character. The equations describe the arrangement of the selected points relative to each other and to a specific imaginary point (the same as in vector formats). Fonts in this format are scalable.

In outline format a series of points, called *control points*, are used to define a path around the edge of a character. When this data is reconstituted from the descriptive equations, it is first plotted as a series of dots. At this point an elaborate game of connect-the-dots is played, resulting in an outline of the intended character. This outline is then "flooded" with visible dots (*bit-on data*) to complete the character rendering. Figure 4-1 illustrates the process of outline font regeneration.

Bitmap Format

Bitmap format stores all font cell and font character data as bit data. Every dot is individually represented. In this format the character image is rendered in its entirety, directly from the stored font data. No equations, just straight bits to dots. The dots that make up a bitmapped font are positioned relative to themselves only, unlike vector or outline fonts in which the dots are positioned relative to some point in the cell. Text format (see Chapter 2) is a special case of a bitmap format. Fonts in this format are not scalable. Figure 4-1 illustrates this process.

A Comparison of Formats—An Operational Description

The best way to compare font formats is from an operational point of view—what are the results of using a particular format for screen display or printing applications? As a user, you will be concerned mainly with individual aspects of an application, such as speed of use, character manipulation capabilities, and data storage requirements.

Usage Speed

Many people eonsider an application to be better when font character data is quickly displayed or printed, instead of slowly appearing on the sereen. For example, the faster the application displays font characters to the screen, the faster and more fluid the application will appear to the user. Applications which provide a rapid usage speed of font data are said to have *fast-access* or *on-the-fly* usage environments. The overall speed of a font format for display or printing purposes hinges upon two factors: calculation speed and transmission speed.

Calculation Speed Speed optimization occurs when there is minimal calculation and reconstruction of font data. Uncompressed bitmap format fonts are used as is, and are the fastest formats that can be used. Vector, outline, and compressed bitmap formats require calculation of character data either before or at usage time. This can restrict their usefulness in a fast-aceess environment such as screen display or rapid printing.

Transmission Speed Usage speed is also affected by the speed at which various format fonts are capable of being transmitted to an output device. Bitmap format font data can transmit faster than vector and outline format font data. This is because the process of reconstituting vector and outline font character data from equations and the subsequent transmission of this data can be very time-consuming. Since bitmapped data does not need to be reconstituted, it is obvious why bitmapped data can be faster to transmit. There is a point, however, at which the data transmission speeds become equal, and beyond which vector and outline fonts go faster. That point is when rendered character data reaches approximately 200 by 200 dots.

Manipulation of Character Size

The flexibility inherent in the different formats is clear when you manipulate font characters. The most obvious feature, whieh can be easily altered, is that of character size. In fact, this feature is how most people define a font format. Character size may be altered by two methods: magnification or scaling. (See Chapter 2 for definitions.)

Magnification

All fonts, regardless of their format, may be magnified. This is an easy way of getting larger characters, but it has drawbacks. The more an image is enlarged, the choppier it becomes. In other words, fonts drop in display or print quality each time they are magnified. This process produces the infamous choppy, stair-stepped effect on characters. (An example was shown in Figure 2-7 of Chapter 2.)

Of the three general formats, vector, outline, and bitmap, bitmap format fonts can be enlarged *only* by magnification. Bitmap format fonts are created in one size. If a particular character is to be used in larger sizes, it must be magnified or re-created in the required sizes. Fonts in this format cannot be scaled, but they can be magnified and *smoothed*, which takes out the jaggy edges.

This distinction is important because there are people who say they can "scale" a bitmapped font. There are several processes by which people claim to have developed scaling bitmap technology, but these may depend on your definition of scaling.

One method of scaling bitmapped fonts is the use of a magnification routine in conjunction with an automatic smoothing algorithm. A number of theoretical programming problems are involved with this process; they are usually prominently illustrated when rendering angled lines and curves. In many cases, the results are either good-looking angled lines but poor curves, or good-looking curves but poorly angled lines. Currently, smoothing a magnified bitmapped font does not achieve great results, but this should improve as smoothing algorithms become more sophisticated.

Another method is to convert a bitmapped font to an outline format font. This outline font is then scaled up (see the next section on scaling), and the final character images are saved as a bitmap format font. The same method can be used with vector format fonts.

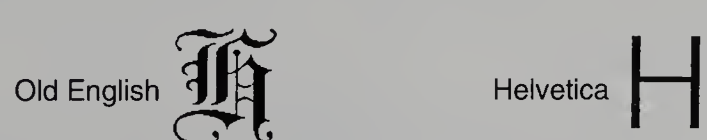
Scaling

Scaling is the realm reserved for vector and outline format fonts. Both vector and outline formats save font data as a series of mathematical equations. When a firmware or software program interprets the format equations, a user can input variables that alter the font character size. This approach allows font data to be scaled (up or down) to whatever size desired. This process also produces well-formed images for display or print. For quality, they beat magnified images hands-down. By using quality-enhancement techniques, such as "hinting" or color aliasing, characters may be made to appear better formed, crisper, and sharper. These same processes can be used on bitmap format fonts. (Scaled characters were shown in Figure 2-8 in Chapter 2.)

File Storage Requirements

All fonts require space for the storage of their font data. The amount of storage space required depends upon the font format used and the data compression method (if any) used. This amount can be quite substantial in some cases.

Vector and outline format fonts require only the amount of space needed for the mathematical description of their font data. These descriptions tend to remain fairly constant. They will grow with an increase in the complexity of the characters they describe. For example, of the characters in the following illustration, it is more equation-intensive to describe the character *H* from an Old English type style than the *H* from a Helvetica type style. The *H* from Helvetica is straightforward, whereas all of the convolutions and white space that make up an Old English character must be addressed:



Bitmapped fonts are different. As uncompressed bitmap format fonts increase in size, their data storage needs increase in direct proportion. This means data storage requirements can quickly reach mammoth proportions. A large library of bitmapped fonts stored on a computer would require a very large chunk of storage space. Realistically, some form of data compression is needed to keep the storage requirements from being prohibitive.

The data compression methods, as detailed in the following section, allow a greater number of fonts to be stored in the same area. Depending upon the compression method used, the ratio of stored compressed fonts to stored uncompressed fonts may reach five to one or higher.

Data Compression Methods

Efficient use of a finite amount of available data space is the goal of software and firmware developers who design programs to run in a fixed amount of computer memory. In order to maximize the available data space, file data must be consolidated. One of the methods used to achieve this is called data compression. *Data compression* is the process by which the information within a data file is encoded so that it takes up a smaller amount of space. For example, 1111 may be coded as 41 (four ones).

The major donors of data space are files whose current data arrangement technique is not as efficient as it could be. Some font files are prime candidates for this position. In these cases a compression algorithm can be used on the existing font file to compress the character data into a smaller amount of space.

Not all font formats are compressible. Due to their method of organizing font data as a series of equations, vector and outline format fonts are already near their minimum storage size. It is difficult to reduce them further. On the other hand, a bitmap format font saves every dot of a font character and its cell. Considerable space can be made by compressing this data. For this reason, data compression is used primarily on bitmapped fonts.

Two accepted methods of bitmap format font data compression are Run Length Bit Encoding (RLE) and Bounding Box compression. The most common data compression method used throughout the industry is Run Length Bit Encoding. This method is used with data files of all types. Bounding Box compression is an alternate method used almost exclusively with font data.

Run Length Bit Encoding

In a simple case of Run Length Bit Encoding, bitmapped data is compressed by reading each scanline of a character cell, grouping adjacent *bit-on* (visible dots) or *bit-off* (blank dots) data, and saving the information as four ASCII digits. (A *scanline* is one row of dots from a font character cell.)

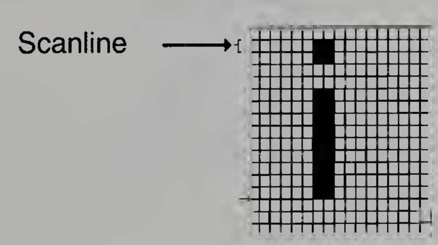
Figure 4-2 represents a 17-by-17-dot character cell of the bitmapped character *i*. The bit-on and bit-off data from the marked scanline is read in order from left to right. Using RLE, the data from the marked scanline could be compressed as follows:

0600 0201 0900

This line of RLE data can be read in the following manner: In each group of four ASCII digits the first two values specify the number of identical adjacent bits and the last two values signify whether these bits are bit-on (visible dots) or bit-off (blank dots). These groups are read in order from left to right. Bit-on data are always represented as (01) and bit-off data are always represented as (00).

FIGURE 4-2

Bitmapped character *i* in its 17-x-17-cell matrix



- 0600 means six identical bits in a row and those bits are bit-off data
- 0201 means two identical bits in a row and those bits are bit-on data
- 0900 means nine identical bits in a row and those bits are bit-off data

If this same scanline data were saved in an uncompressed form, each cell dot would be represented by two ASCII digits: 01 for bit-on and 00 for bit-off. The final data would look like this:

00 00 00 00 00 00 01 01 00 00 00 00 00 00 00 00 00

As an exercise, use both methods to compile the font character data from the preceding illustration. You will find that, even with a character this small, compressed data takes up less space than uncompressed data.

Bounding Box Compression

Bounding Box compression involves outlining a character cell's bit-on character data with the smallest box possible. Coordinates that position this box relative to the original character cell are saved in the font's header. When using Bounding Box compression, the character data is never compressed; rather, the empty space outside the bounding box is discarded. The analogy of a shrink-wrap bag can be used to illustrate this point.

Imagine a character cell placed within a shrink-wrap bag. The non-compressed cell is the unshrunk bag. Now shrink the bag until all the edges contact the outer limits of bit-on data, forming a rectangular bounding box. For some characters, as in a lowercase *i*, this correlates to a major amount of shrinkage and the shrinkage correlates to saved data space, hence compression. An uppercase *W* may fill the majority of a cell. In this instance minimal shrinkage will occur and little or no data space is saved. The overall net savings in data space for an entire font set will be great, however, since few characters fill an entire cell.

Figure 4-3 shows the before and after shots of characters that have undergone Bounding Box compression. Images *a.* (*i*) and *b.* (*W*) illustrate characters within the complete character cell matrix. Images *c.* (*i*) and *d.* (*W*) illustrate the amount of data actually saved from each character cell matrix when Bounding Box compression is used.

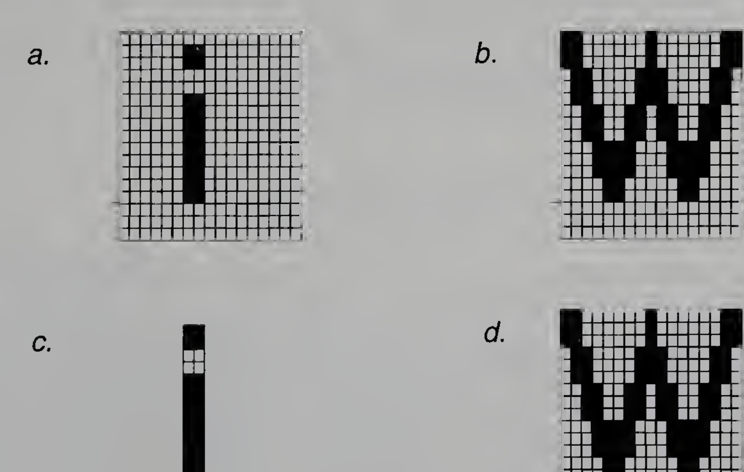
Compression Efficiency

The total data storage space liberated by the compression of an entire font set is the measuring stick for overall compression efficiency. The Bounding Box routine can run at up to 80 percent in overall compression efficiency. The Run Length Bit Encoding compression method can run at up to 98 percent in overall compression efficiency.

Speed of Compressed Data Access

Another detail is just as important as savings in data storage space. All data must be uncompressed or reconstituted before it is used. The greater the data compression, the longer it takes to uncompress and use the data. From an application viewpoint, it is essential to consider the

FIGURE 4-3 Bounding Box compression before and after shots of the characters *i* and *W*



amount of time required to use compressed font data (run-time use). For this reason, developers carefully weigh savings in storage space against the usage speed of compressed font data.

The Bounding Box compression method, while not as efficient at saving space as RLE, offers a better balance between data compression and usage speed of bitmapped font data. When a character that has been compressed with the Bounding Box method is used, there is little or no run-time usage penalty. A character cell is not reconstituted; rather the character data is used as is and positioned relative to the original cell size information. Since the actual font character data is never compressed, fonts sporting this compression method may be used as rapidly as uncompressed font data.

Fonts compressed with Run Length Bit Encoding pay a run-time use penalty. This run-time penalty is directly proportional to the amount of compression. The following sections discuss three possible ways in which RLE encoded font data may be used. There are more possible combinations, but these three cover the basics.

Full-Time Compression

The majority of the font character data always remains compressed. The only time data is uncompressed is when a character is used. This uncompression is limited to a specific character and is in force only for the duration of that character's use. This means each time a character is used for printing or display, the character cell data is uncompressed and the character reconstructed. While this process maximizes data storage space, it sacrifices a great deal of speed during use. In a case like this, you'll be watching the clock.

Part-Time Compression

A good portion of the run-time penalty can be circumvented by allowing all font character data to remain compressed until used. At the time of use, all font data is uncompressed and remains uncompressed until the application is concluded. This method optimizes usage speed and offers a font-use-as-needed solution, provided, of course, that only a few fonts are used at one time, say two or three. Since all fonts used remain uncompressed as long as the application is running, use of too many fonts can defeat the purpose of compressing the font data in the first place.

On-Demand Compression

Another possible combination is to uncompress only the font in use at the time. The data remains in the usage buffer until the next font is needed. At this point the uncompressed data is cleared from the buffer; then the next font is uncompressed into the usage buffer.

Specific Font Formats Currently in Use

Now you know the three major groupings of font formats used in the industry, but this information doesn't mean a thing unless you can apply it to the specific formats used in the font marketplace. The three grouping terms—vector, outline, and bitmap—are not often used as such in the computer industry. Instead, many people group fonts according to their manipulation capabilities: scalable or nonscalable. Vector and outline fall into the scalable group, while bitmap is in the nonscalable group. Using these classifications, a list follows of the most popular formats used in each of the two groupings. Undoubtedly, some of these will be new to you.

Each format employs its own unique method of arranging font data. It seems everybody wants to set a standard. Feel free to add any new types you may come across. It will help in the future when you need to deal with cross-software compatibility. Chapter 6 provides further details concerning the specifics of the various formats available.

Scalable Formats

Ten or eleven years ago you may have heard that scalable fonts (then primarily vector format fonts) would soon be obsolete. The reasons given were that vector format fonts required too much memory, took too long to calculate, were too difficult to create, and there wasn't enough type style variety. Since then outline formats have become prominent, PCs have gotten faster, and memory has gotten cheaper. Today, it's difficult to find a system that runs below 10MHz and doesn't have at least 1MB of RAM and a minimum 40MB hard drive in the standard package. All of this has revitalized and expanded the use of vector and outline format fonts. Today there are many flavors of these basic ideas. Of course there are also many more type styles available.

Scalable format is a common generic label used in the computer industry when referring to vector and outline format fonts. Ten of the more familiar scalable type formats available on today's market are described here.

Note PostScript and PCL are not font formats, although the terms are used in the same way as scalable, and describe the same grouping of formats. PostScript and PCL are two *page description languages*. Through their interpretation, data may be placed on a page or screen and manipulated in a wide variety of ways.

Type 1, 2, 3, and INF Formats Adobe Systems developed these formats. INF is the newest development. Of the four formats, Type 1 is a standard in the computer industry for describing PostScript fonts.

TrueType Format TrueType format was developed by Apple and is used by Microsoft Corporation for their Windows product. If you use Windows, you probably have fonts in this format since it was designed into the Windows environment.

Speedo and BCO Formats If you've been purchasing fonts for even a little while, BitStream will be a familiar name. They developed their font library early in the desktop publishing game. BitStreams' first fonts were released in their BCO format. Their new format is the Speedo format. Some say that through its use, your documents can receive a facelift in quality.

Nimbus/Q Format Nimbus/Q format (really just Nimbus) is a proprietary format of URW, a type foundry in Germany. Many font development organizations license URW fonts for conversion into a different format, then re-release them for sale in the marketplace.

FastFont FastFont was developed by Atech Software. It is one of the standard formats used for conversion between differing formats. Those of you who use AllType, the font conversion utility, will be familiar with this format.

PCL5 PCL5 is a scalable format codeveloped by Hewlett-Packard and AGFA Compugraphics. Most people who have HP Series III laser printers and later versions will be familiar with this format.

Intellifont Intellifont is an outline format produced by AGFA Compugraphics. It is the best known of outline formats and is still widely used. Those of you with LaserJet Series III printers are probably familiar with this format.

Nonscalable Formats

All nonscalable formats are bitmapped formats. (Almost everyone has produced a bitmapped format specific to their software or hardware.) Not all of these have achieved wide acceptance in the marketplace. This format is perhaps the oldest used in the computer industry. The following are several of the more frequently supported bitmap formats. Again, you may not recognize many of these.

Fontrix Font Format Fontrix Font format (SET) was developed by Data Transforms, Inc., and is indicative of the fonts produced by the Fontrix Font Editing software package.

UDF UDF (user defined format) is a proprietary format developed by Intermec Corporation; it is mainly used with Intermec's line of label printers.

ZPL A proprietary format developed by Zebra Technologies Corporation, ZPL is mainly used with Zebra's line of label printers.

BDF BDF is a public domain format. Any fonts you find in this format are free. They can usually be found on electronic bulletin boards and in public domain/shareware catalogs.

FNT Long before TrueType, Microsoft supported a specific bitmapped font format. Microsoft sells software for DOS programming and development and this font format is provided with that software. Because of this, many developers incorporated this format into the software package they developed. Fonts in this format are not often used.

PCL4 Most people will be familiar with PCL4. Developed by Hewlett-Packard, it is supported by a number of models of HP laser printers.

In Conclusion

Vector, outline, and bitmap formats provide good methods of font data arrangement. Because of their structure, each format can allow software or firmware applications to offer unique, flexible font usage capabilities. Before making a decision to purchase software or a software/hardware system that uses one or more of these font formats, first ask yourself four basic questions.

What Is My Application: Printing or Screen Display?

Know your application and what you want to accomplish. It is important to lay this groundwork before making any purchase. Your choice of application will be directly affected by the font format it uses, as the next questions attest.

How Fast Do I Need to Print to the Printer or Display to the Screen?

The choice of formats will determine your output speed. Uncompressed bitmap format fonts will print faster; this includes both soft (graphic) and hard (text) bitmaps. If speed is not essential, you would benefit by looking into vector and outline format use. (The capability of using vector and outline formats is becoming standard on many laser printers, and with faster PCs, they are becoming more common for screen display use.)

How Good Do I Need the End Product to Look?

Quality is an issue to consider very carefully. If you're always going to print small- to medium-sized fonts (under 1/2 inch, or 36 points) the format used is not as important because most formats have fonts in this size range. But if you plan to use fonts over 1/2 inch (say 1 inch, or 72 points, or taller), then the choice of format is very important, and you should look into vector and outline support. You would certainly rather scale and have smooth characters, than magnify and have choppy characters.

Is My Hardware/Software System Capable of Yielding My Output Requirements?

If you already have a system or plan to purchase one, know its capabilities. Not knowing can be a hotbed of frustration. A printer that can only print hard fonts may put a big crimp your printing needs. A monitor that can only display text fonts is useless for displaying soft (graphic) fonts. If your answer to this question is no, then you either must get new system components or compromise on your output requirements.

CHAPTER 5

Font Media and Access Methods

It's time to take stock of what has been presented so far. Chapters 1 through 4 have provided an overview concerning font usage, terminology, type styles, and format concepts. To complete this basic picture, two more pieces are needed for a fundamental background in computer font usage: the media on which fonts are supplied and the general methods by which fonts are accessed from this media.

Font Sources

Fonts may be accessed from many sources. *Sources,* as used here, are tangible forms of computer media, such as diskettes or cartridges, or electronic forms, such as an electronic bulletin board. This section discusses the general source media of fonts and the types of fonts you can usually expect to find on them.

Font Media

Fonts are supplied on many types of media. *Media* are tangible products from which font data may be accessed: diskettes, cartridges, RAM or ROM cards, and EPROMs.

Font Diskettes

Font diskettes are a popular media for many software applications. These applications use fonts supplied on either 3.5- or 5.25-inch diskettes. The fonts supplied on diskettes are called *soft fonts.* These soft fonts may be nonscalable or scalable type fonts. If they are scalable, they may be accompanied by an additional program which is used for scaling the fonts before they're used. The scaling programs are usually called *font generators.* (Generators are discussed in more detail later in this chapter.) Fonts on diskettes can be used for screen display or printing applications.

Font Cartridges

Font cartridges are plug-in media used to supply add-on fonts for printers. While "traditional" cartridges are limited to small amounts of

ROM (read-only memory) and small numbers of small fonts, newer versions, often containing between 0.5 and 4 megabytes (MB) of ROM, can provide larger numbers of larger fonts. These new *megacartridges* have become quite common. For those printers that support them, they are easy to use. Just plug them into the slot, install the proper driver for your software, and go. But beware—compatibility is dependent upon your printer. Dot matrix and inkjet printers usually accept only cartridges made especially for them (called *proprietary*), whereas laser printers enjoy greater flexibility in cartridge use. The fonts supplied on cartridges come in two forms: nonscalable (bitmap) and scalable (vector and outline).

Note With few exceptions cartridges cannot have fonts added or removed. (A noted exception is the customizable FontBank cartridge produced by Pacific Data.) Not all printers allow the use of cartridges; instead, they limit you to the fonts on their firmware.

Bitmapped Font Cartridges Bitmapped cartridge fonts are often used the same way as text fonts—they are accessed through a printer's firmware. But they do not reside on the printer's firmware. In most cases bitmapped cartridge fonts are faster to use than soft fonts. Even though they are restricted in size (and quite often limited in style variety) their ease of use and print speed make it easier to standardize printing applications.

Scalable Font Cartridges Scalable cartridge fonts offer the same advantages as scalable soft fonts provided on other media, with the added benefit of plug-in ease of use. Their main drawback is that they are often limited in the number and variety of type styles they provide.

Note The majority of scalable font cartridges are available for laser printers only.

RAM or ROM Cards

RAM (random-access memory) and ROM cards are similar to cartridges in that they plug into a printer. Like cartridges they may be used only on those printers which support their use. They are currently available with memory capacities of 32K, 64K, and 128K, but you can expect their memory capacity to increase in the near future. Primarily the repository of bitmapped soft fonts, they can also be programmed with scalable fonts. This is an area where soft font and hard font technologies cross. The fonts residing on RAM or ROM cards are soft fonts used the same way text fonts are used. They are accessed by a printer's firmware.

RAM and ROM cards are identical except that RAM cards are *reprogrammable*—meaning they allow fonts to be copied to them and removed from them—and ROM cards are not. Once a font is programmed on a ROM card, that's it; they do not allow additional fonts to be added or existing fonts to be removed from them.

Note RAM is an acronym for random-access memory. This memory allows information to be copied to, deleted from, and read from it. ROM is an acronym for read-only memory. This memory allows the information that is present within it to be read only. It does not allow information to be copied to or deleted from it.

Preprogrammed and Programmable EPROMs

Preprogrammed and programmable EPROMs are chips that reside in a printer as part of its firmware. The fonts on an EPROM are always available when a printer is powered up. Their memory capacity ranges from 32K, to 64K, to 128K. Expect these capacities to increase in the future. Either scalable or nonscalable fonts may be programmed onto an EPROM. In most cases, once a font is on an EPROM it may not be removed. This is because its essence has been "burned" or "hard-wired" into the matrix of the chip. However, if you have the technology—which is not inexpensive—it is possible to reprogram an EPROM. This is another area where soft font and hard font technologies intersect. The fonts residing on EPROMs are soft fonts, but are used in the same way as text fonts.

Electronic Media

Electronic media are sources of fonts and other information that exist outside of your own computer system. In order to access these sources you must hook up your computer to another system. This hookup may consist of a hard-wired system, such as a local area network (LAN), or it may consist of a modem and phone line used to access system-independent networks, such as CompuServe or Genie. (*Hard-wired* describes the process of physically connecting, through the use of cables or wires, two or more separate computer systems. A modem is a hardware device that allows you to transmit and receive computer information over a phone line.) These electronic sources are great places to find most every type and format of font used in the computer world. In these areas you can find everything from commercial fonts to public domain fonts to shareware fonts. These topics are defined and treated in greater detail in Chapter 6.

Networks

The term *network*, as the name implies, refers to a system of interconnection (hardwiring, telephone lines, microwaves, and so forth) of individual computers. Networked computers usually communicate through a central processing center called a server or node. This communication connection allows you to share and transfer information among several computers. This system is constructed so that, given the proper hookup capability, your PC can tie itself into (log on) and untie itself (log off) from the network.

Bulletin Boards

Electronic bulletin boards are frequently found on system-independent networks and infrequently on LANs. Like the bulletin boards you use at home or see in your office or supermarket, they provide information to whomever wants to read them. Often bulletin boards specialize in specific information provided by groups of computer users who share common systems or interests.

Font Media Access Methods

To use fonts, your computer accesses the media on which they are stored, identifies and interprets the data for particular font characters, and finally, reconstitutes the font data as a series of dots for the required output mode (screen display or printed hard copy). This basic method of font access remains consistent regardless of a font's format or its source.

Fonts are accessed and used through the two main "programmed elements" of a computer system: software and firmware. Because they are programmed, these elements may employ similar methods for accessing font data from some source. There are many sources of fonts, but really only a few basic methods by which font data is actually accessed from these sources. They are covered here briefly and will be addressed in greater depth in Chapters 7 through 10.

Font Uploading

When you transfer information from an outside source to your computer, it is called *uploading.* You usually employ this method when accessing font data through a network, from another host system, or from a bulletin board. Uploading also describes the process of copying information from a diskette to your PC's hard drive.

Font Downloading

When you transfer information from your computer to another computer or an output device, it is called *downloading.* For the purposes of this book, downloading refers to the application that sends font data to the printer when you print your document or to your screen when you display. Font data may be downloaded directly from your hard disk or from a diskette in a drive.

For most printing, font downloading means transferring character data for an entire font set. However, it can also mean transferring selected font characters. For screen display, downloading usually means transferring only those characters that are needed and only at the time they are needed. In both cases this process requires the font source to be within the memory of your PC.

Uploading and downloading are often used together. Uploading is usually the first half of a two-step process; the second half being downloading. Uploading accesses the fonts from their source and gets the font data onto your PC. Downloading transfers this information to the display or print device.

Note Depending upon your printer and its available print buffer, there can be severe restrictions in the size of fonts that can be downloaded. As a general rule, dot matrix printers are less flexible in accepting downloaded fonts than laser printers. This is usually not an issue for fonts displayed to a screen because they use memory on the host machine or display card for buffer space. Chapters 7 through 9 provide greater detail on these restrictions.

In Place Access

In this instance, fonts are accessed from their source by firmware as if they were a contingent part of the hardware. While not really an access method, it is distinguished from uploading and downloading as the process most often employed by the firmware of a hardware device, or when accessing internal fonts, bitmapped font cartridges, RAM or ROM cards, or EPROMs.

Font Management

Font management is a term you will hear a lot when it comes to scalable fonts. It is used to describe the manipulation of scalable fonts for printing and screen display applications. This term has also been coined as the tag name for software and firmware utilities specifically designed to perform these manipulations.

Font management is not font access. Rather, it is the formatting and usage options available to you once font data has been accessed. The extent of your options depends upon the programming of a given font management utility and whether that utility is software- or firmware-based. In general, software-based utilities provide more options than firmware-based utilities.

Font Management Utilities

Font management utilities can provide features such as scaling, text formatting, and fine print control over dot matrix and laser printers. If nothing else, they all offer one feature without which they would be all but useless: the ability to scale characters. The programs that provide this capability (sometimes *only* this capability) are often called font generators.

Font Generators These are programs used with scalable fonts. These programs are available as software or can be built into the firmware of a computer system (usually the printer). These generators allow you to scale the fonts to whatever size you desire. They usually require a large amount of buffer space for the storage of a font once it has been sized.

Font generators are often used in conjunction with the downloading process of font data accessed from a diskette or hard disk. These generators can also be used with the *in place* process of accessing a scalable font cartridge. For example, a scalable font may be downloaded to the printer buffer of a laser printer. In the process, a font generator (either firmware or software) is enabled, which sizes and renders this font in the buffer. This rendered font is then used for printing.

Note Do not confuse font generators with font creation and editing software. Font generators scale font data. Font editors are used to create fonts. The creation process will be discussed in Chapter 7.

Your Computer System and Font Media Access

There are two main elements to any computer system: software and hardware. The features provided by these elements will determine the type of font media which can be accessed. The limits placed by the presence or absence of basic features are obvious factors that many people overlook when dealing with font usage and media access. These topics will be treated in greater detail in subsequent chapters.

Software

The ability of software to access fonts from various types of media depends upon the software's programming. Font usage capabilities of a piece of software depend upon its intended application. Software can take a graphics direction or a text direction by using the graphics or text (also called character-based) mode of a printer or screen display. The presence or absence of support in either direction will determine the type of media that can be accessed. Listed here are three general approaches to font use by software applications. Remember, these are general only; there can be a great deal of crossover.

- If a software package takes a graphics approach to font use, then you can usually access soft fonts from diskettes, cartridges, networks, and bulletin boards.
- If a software package takes a text approach to font use, then it will usually allow fonts to be accessed from bitmapped cartridges, RAM or ROM cards, EPROMs, and the internal hard fonts of a hardware device or system.
- There are software packages that support both directions of font use. With these, you can access and use fonts from all of the font media sources mentioned above.

Hardware

The most easily recognized restrictions on font media access are those placed by the physical presence or absence of hardware features. The basic hardware components essential to font media access are disk drives (floppy and hard) and a printer's ability to support physical add-on media.

Disk Drives

You would have to go out of your way to purchase a computer system without a floppy or hard drive. Most computer systems come with at least one of each and allow the addition of more.

Floppy Drives You need a floppy drive for your PC to access fonts from diskette-type media. If you have a floppy drive, its type (high-density, low-density, 3.5-inch or 5.25-inch) will determine the type of disk media you can access.

The memory available for use on a diskette depends upon the size of the diskette and the type of drive it is formatted on. For low-density drives a 5.25-inch diskette will have 360K available and a 3.5-inch diskette will have 720K available. For high-density drives a 5.25-inch diskette can have either 1.2MB (high density) or 1.4MB (quad density), and a 3.5-inch diskette has 1.4MB available. A low-density drive cannot read a disk from a high-density drive, but a high-density drive can read a disk from a low-density drive.

Hard Drives Hard drives are bases for storing and using information, programs, and utilities. They are often sized according to their storage capacity, such as 20MB, 40MB, 60MB, 80MB, 100MB, and so on. Hard drives provide fast usage of applications and memory space for the reconstituting of font data. This is essential for font generators that need to scale fonts before downloading to a printer or display device.

If you have a stand-alone PC (no hookups to any other system) and no hard drive, more than likely, you will be unable to store information on your computer. Instead you will have to store information on and access software from floppy diskettes—a very slow process.

Tip All systems can use fonts. However, additional memory will make the use of fonts and font use programs more efficient. A basic system would have 2MB of RAM, a 60MB hard disk, and one or both, 5.25-inch high-density drive and 3.5-inch drive.

Printers

The ability of a printer to access font media depends upon the font add-on features built into it. If the physical access capability for a specific type of media is not there, it doesn't matter how much of that media you may have, you'll never be able to use it. For example, if you want to use cartridges or ROM and RAM cards, be sure your printer has slots to accept them.

Note Many inkjet and dot matrix printers accept only proprietary cartridges. Greater cartridge support and flexibility can be had with laser printers.

Fonts may be downloaded to or reconstituted in a printer's memory buffer. If your printer does not have a large enough buffer to handle fonts scaled and reconstituted to your required needs then it can prove to be a liability. As a general rule, dot matrix printers are less flexible in the buffer area for downloaded fonts than laser printers. Know your space requirements, because there can be severe restrictions in the size of fonts that can be downloaded into printer buffers. This point is particularly pertinent when dealing with scalable fonts from cartridges. Chapters 7 and 8 provide greater detail on these restrictions.

Modems

Modems are hardware that can reside on your PC and allow you, through a phone line, to hook up to a network system. This hardware is not standard on most PCs; you usually need to purchase and install it. A modem allows you to access and transfer font data from other PCs and electronic bulletin boards.

If you don't have the cash for a modem, you can always tie into the *tennis shoe* network. For this you need access to another PC, which has access to the information you want. The tennis shoe network works like this: At the "other" PC copy the information you need to a diskette. Hand carry this diskette to your PC (tennis shoe) and insert the diskette into your drive. Copy the information (upload) to some area on your PC's hard drive. If you do not have a hard drive, access the information directly from the diskette.

Caution If at all possible, maintain drive compatibility between the two PCs when you use the tennis show network. Don't put a high-density disk in a low-density drive or vice versa. If you do, the disk may be unreadable.

The Influence of Your Application

In general, your intended application will determine the source of the font data to be used. Before selecting a type of font media, it is important to first define your font usage application. In other words: "What do you want to do and how fast do you want to do it?"

Fonts are primarily used to display text to the screen and print text on a printer. Computer systems display or print fonts in the same way: the final rendered output of any font, regardless of format, is a series of dots displayed to a screen display or printed on a printer. When displayed on a screen, these dots are called *pixels*. When printed on a printer they are called—you guessed it—*dots*.

Software or firmware is programmed to support a particular type of font format. The specific type of font used will determine how it is accessed by the software or firmware. For example, most graphics-based software programs will allow you to use soft fonts for display and printing. Some will also allow you to use text fonts for display and printing. Because of this "choice" it is difficult to say exactly what media will be supported by an application. This is due to the increasing crossover in storage media for soft and hard fonts.

For the generic class of screen display and printing applications, one of two types of fonts is used: text or graphics. The following are some general ways that applications affect font usage.

- ❑ If your screen display application is character- (text) based, it will require you to use your computer's firmware-based text (hard) fonts or add-on character fonts, which work without switching your monitor to graphics mode. For example, Lotus and WordPerfect both use a system's internal hard fonts for display, and they allow the use of add-on character fonts for display. With either program you will be limited to only the internal or add-on fonts for display.
- ❑ If your computer system supports a graphics display mode and your application uses this mode, then a whole world of possibilities opens up—you can use graphics or soft fonts. For example, the Fontrix graphics and typesetting package uses only a system's graphics mode for printing and display. These fonts are primarily available from such media sources as diskettes, networks, and bulletin boards.
- ❑ If your printing application requires you to access hard fonts through your printer's firmware only, then you will be able to not only use your printer's internal text fonts, but fonts from additional

font media sources, such as bitmapped font cartridges, RAM or ROM cards, and EPROMs. Most word processors allow you to do this.

- If your printing application accesses fonts through your printer's firmware and your printer has a font generator built into its firmware, then, in addition to the printer's internal fonts, bitmapped font cartridges, RAM or ROM cards, and EPROMs, you will more than likely be able to access fonts from scalable font cartridges. Systems that use PostScript and PCL formatters and Page Description Languages will use these.

- If your printing application supports your printer's graphics printing mode, then a universe of font sources opens up. The limit of fonts and types of font media supported is determined by the software controlling the printer. In general, software packages will support only one of two general types of graphics font formats: scalable or nonscalable. If scalable, your sources will probably be diskette, scalable font cartridges, networks, and bulletin boards. If nonscalable, your sources are likely to be diskettes, bitmapped font cartridges, networks, and bulletin boards. Depending upon your printer, fonts on RAM or ROM cards and EPROMs may also be available. Any package that uses soft fonts for printing must support the printer's graphics mode.

Matching Screen Display Fonts and Printing Fonts

Matching the fonts used for display with those used for printing can be difficult. If your application does not allow you to print with the same fonts you used for display, perhaps it will allow you to access fonts from some other source. The more variety you have in supported font formats and font media the better your chances of an exact match. With the advent of font management utilities and downloading software, it is possible to have an exact match. That's the good news for those of you who have a flexible system. Now for the not-so-good news.

If this flexibility is not a part of your system and you cannot use any type of media with your printer (no cartridges, no soft fonts, nothing) then you're stuck with what's on your printer; make your best match and go with it. On the other hand, you might get lucky, and one of the fonts available on your printer might just happen to match or closely match the font style you used on your screen display.

In Conclusion

As you can see, font sources, your hardware system components, and software applications are all tied together. Understanding how they interact will help you understand how to get the results you want.

CHAPTER 6

Font Availability

Now that you have been deluged with terminology and technical information, most of you are probably saying: "Enough. All this information is fine, but who has fonts and where can I get them?" Your timing is perfect.

Chapters 4 and 5 provided the basics concerning font formats and standard types of media on which font data may be provided. This chapter provides a basic background on font availability or, generally speaking, who has what. Appendix A provides names, addresses, and telephone numbers of manufacturers and suppliers of fonts, font creation software, and font usage software. Appendix B provides printed samples of fonts from various suppliers and manufacturers.

Copyright Law

First it is important that you understand current copyright law as it pertains to computer fonts. This will clear up some confusion associated with relating font styles across font libraries. There are two aspects of a computer font that are "officially" copyrightable: a font name and a font format.

Font Names

Since a font name is copyrightable, there are many fonts on the market that appear identical, but are referred to by unique or slightly different names. Because of this, you should not purchase fonts by name alone. Compare type styles to make certain you are getting exactly what you want. To do this, get type catalogs or sample printouts of typefaces from the font suppliers from whom you consider making a purchase. There is little sense in purchasing duplicate fonts.

Font Formats

In copyright law, once the issue of font names was settled, the next issues to be dealt with concerned the artistic design and formats of fonts.

Several years ago a court decision was handed down that said a font format is copyrightable, but artwork is not copyrightable. The reasoning behind this goes something like this: All font images are displayed as pixels. In the computer industry pixels are not unique. Hence, the dot or pixel pattern which makes up a font is not unique and cannot be copyrighted. However, the format by which this information is stored, such as Type 1, TrueType, or Intellifont, can be unique, and is copyrightable. Lawsuits are pending concerning the copyrighting of font design artwork.

If you would like further information on copyright law, piracy, or other software related topics, contact the offices of the Software Publishers Association or the Association Typographique Int'l.

Software Publishers Association
1101 Connecticut Avenue, N.W.
Suite 901
Washington, DC 20036
Phone: (202) 452-1600
Fax: (202) 223-8756

Assoc. Typographique Int'l.
(ATypI) c/o Mark Batty
866 Second Avenue
New York, NY 10017
Phone: (212) 371-0699
Fax: (212) 752-4752

General Sources of Fonts

There are several different avenues of supply available to you when you are purchasing fonts. They range from expensive to free and can be legitimate or nonlegitimate.

Commercial

When you buy commercially you purchase fonts directly from the manufacturer or through a retail outlet. This means you will have to pay what may seem an excessive price. Remember, however, you are not just purchasing fonts. You are also buying the services and technical support of the manufacturer. If you have problems, this can be priceless.

Networks and Bulletin Boards

If your computer system is equipped with a modem, you have access to a veritable gold mine of fonts. These fonts can be commercial, public domain, shareware, freeware, or even pirated copies. Most networks are interconnected and often require you to have a password to access them. Network bulletin boards are often a valuable source for fonts, and usually provide an area for user feedback on how the fonts work. Check the following networks for bulletin boards:

- **CompuServe** This network provides access to a great number of bulletin boards nationally. In particular, investigate the DTPFORUM bulletin board on CompuServe.
- **Genie** This is another popular network that provides access to nationwide bulletin boards. It offers access to extensive software libraries that have a great number of fonts associated with them.
- **UUNET** This is an international network whose user groups and bulletin boards are called "news groups." Several news groups are dedicated solely to fonts. This network is perhaps the largest system in the world because it interconnects with just about every "official" network and bulletin board. Most colleges in the U.S. and many government agencies use this network.
- **Local user group network** This is usually just someone's computer, which you can access by telephone, that provides a bulletin board staffed by members of a group of like-minded individuals. If you live near a college campus, the computer science department could be a source of information about these, or check with your local newspaper for listings of user groups that you can contact.

Public Domain

Public domain fonts are free. They are usually produced by a group or an individual who generously makes them available at no charge to whomever wants them. Admittedly, some of these fonts lack quality, but this is not true of all of them—and they are *free*. Your best sources for them are bulletin boards and user groups.

Shareware

Shareware fonts are offered to the public by individuals or organizations and, though not free, are often very inexpensive. The payment for these fonts is based on the honor system. If you want them you can have them, but it's up to you and your conscience as to whether you pay for them. The most accessible sources for shareware fonts are bulletin boards, user groups, and shareware catalogs.

Pirating

Pirating is the bane of every software publisher, and most fonts are software. Pirated software is stolen software. It is purchased by someone, but then disseminated at no charge to a small group or the public in general without any compensation to the publisher. This is both illegal and one of the reasons for the high cost of software.

Two additional reasons for not using pirated software are

- When it comes to technical support from the manufacturer, forget it. (Would you help someone use something stolen from you?)
- Viruses are an ever-present danger in pirated software.

Font Suppliers

Fonts are available from many sources and supplied on many different types of media. This section lists several of the more prominent suppliers in today's font marketplace. The suppliers and their wares are grouped into two basic categories: scalable or nonscalable. For each supplier, the size of their font libraries is listed, the media type on which the fonts are supplied, and, when known, the specific font format type(s) they provide.

In font pricing, the old saying, "you get what you pay for" applies. You can expect fonts from scalable libraries to be more expensive than fonts from nonscalable libraries. You don't have to purchase an entire library to get what you want. In many cases, manufacturers sell packaged groups of selected fonts; sometimes you can even choose what fonts go in the package.

Most companies will provide, at no charge, catalogs or sample print-outs of fonts from their font libraries. Before purchasing fonts, request a print sampler of the manufacturer's library so you can see exactly what they have.

Note Appendix A provides addresses and phone numbers for many font manufacturers. If, in your shopping journeys, you should run across any suppliers not mentioned here or in Appendix A, list them in the margins of this chapter or in the appendix. It will help you in the future when you need to deal with cross-software compatibility.

Scalable Font Libraries

Currently, scalable fonts are all the rage. Not so many years ago, the list of scalable font suppliers would have contained only three or four companies. While the majority of scalable fonts are produced by foundries, such as URW in Germany, the list of suppliers has grown because a number of companies license fonts from these foundries for resale under their own name. Each of these suppliers sells individual fonts, groups of fonts, and entire libraries of fonts. Listed here are the more familiar manufacturers and suppliers of scalable font libraries.

Adobe Systems Adobe Systems designs its own fonts, and also licenses fonts from others for inclusion with their library, called the Adobe Type Library. Fonts are licensed from such companies as Linotype-Hell, Monotype Typography, and Agfa Compugraphics. Because of this licensing practice and their own efforts, Adobe maintains a wide selection of standard and decorative typefaces.

Adobe's library contains over 1,000 typefaces, which are divided into 200 separate packages. The fonts, supplied on diskettes and cartridges, are in Adobe's Type 1, 2, 3, and INF formats. Their cost varies according to the number of fonts contained on a disk and the library type (Types 1 and 2 are less expensive than Type 3).

Agfa CompuGraphics Agfa CompuGraphics, also known as The Company, offers its font library in the Intellifont format. These fonts are supported by Hewlett-Packard's LaserJet III and LaserJet III P. Agfa's library contains over 180 typefaces, which are divided onto 47 separate disks. The fonts can be provided in Intellifont and Type 1 formats. Support for TrueType format is scheduled for the future. Their cost depends upon the quantity purchased. You may purchase single disks with 4 related typefaces or selected packs of 12 typefaces.

BitStream If you've been purchasing fonts for even a little while, BitStream will be a familiar name. BitStream's first fonts were released in their .BCO format. Their new format is the Speedo format.

BitStream's library contains over 207 typefaces with an additional 800 typefaces soon scheduled for release. The fonts, supplied on diskettes, are in Speedo and .BCO formats. Type 1 and TrueType formats are scheduled for future support. The library is broken down into 52 packages of 4 typefaces or 6 packages of 12 typefaces.

Casady & Greene This company produces a library of unique and decorative fonts. Typefaces range from script to Russian Cyrillic faces. If you can't find a specific typeface anywhere else, you may well find it here.

Casady & Greene's font library, called Fluent Laser Fonts 1 and 2, contains 199 typefaces in Type 1 format. These fonts will be available in TrueType format soon. A group of decorative Latin typefaces is available, with four fonts on a disk. For those of you who need Russian or Eastern European languages, Casady & Green also offers what they call their Glasnost Collection of 17 Cyrillic typefaces and an Eastern European Collection of 26 typefaces. Single disks containing four "Latin" fonts each may be purchased separately or the entire Fluent Laser Fonts library may be purchased.

Digi-Fonts The majority of typefaces available from Digi-Fonts are based on known designs with names vaguely suggestive of the original. For example, Erie stands for Eras, Frisco for Futura, and Union for Universe. Foreign languages include Hebrew, Greek, Cyrillic, Gujarati, and Hindi. Digi-Fonts also has a special-effects pack for modifying their fonts.

Digi-Fonts' library contains 400 typefaces available in Intellifont and PCL 5 formats. The fonts may be purchased in groups of eight on an individual disk or in larger collections. These larger collections include Digi-Fonts' library, consisting of the first 264 fonts and a special-effects pack. A special package called Digi-Duit, which is the first 8 typefaces with the special-effects pack, is also available.

Digital Typeface Most of Digital's PostScript font library was licensed from the URW type foundry in Germany. This library, called the DTC MasterWorks Type Library, contains 100 typefaces. These fonts are mostly standard and well-recognized within the typesetting industry. DTC plans to release 500 more around the end of 1992. Currently the fonts are offered in Type 1 format; TrueType and Nimbus/Q formats will be supported soon. You may purchase the entire MasterWorks library. If you don't want the whole library, you can buy from 2 to 16 fonts on a diskette.

Image Club Graphics From standard contemporary designs to comic book lettering, Image Club's library offers an assortment of 613 type styles. Currently their fonts are available in Type 1 and Type 3 formats. The complete library is available on CD ROM and individual fonts are available on diskettes.

Linotype-Hell This company is a subsidiary of the one that produces Linotype machines—those expensive high-end typesetters that create super high-resolution output. Most of this company's digital typographic work is based in Germany. Their font library provides some of the finest classic, traditional, and decorative typefaces available on the market. For those of you who own Linotype typesetters, the company offers over 2,000 typefaces in its proprietary format. In the future, all of these typefaces will be made available in Type 1 format. Currently the same 1,000 fonts available from Adobe are also available in Type 1 format from Linotype-Hell. The fonts are sold in diskette packages of 1 to 12 typefaces. Also offered is a preselected assortment of typefaces ideal for business applications—appropriately called the Business Selection.

Microsoft Microsoft has entered into the realm of font library suppliers with the release of the TrueType Font Pack for Windows. This pack includes 44 scalable fonts for use with Windows 3.1 and above. Two type foundries—Monotype Typography and Bigelow & Holmes—have each supplied 22 of the typefaces. This group of fonts matches the standard set of typefaces included with most PostScript printers.

Monotype Typography Monotype has been designing typefaces since the 1920s. Many of these fonts are available in Monotype's library, Monotype Classic Fonts. This library contains over 200 typefaces, which are divided into 100 separate packages. The fonts, supplied on diskettes, are in Type 1 format and are offered in packages of 2 to 8 typefaces.

URW URW is a type foundry in Germany producing fonts in Nimbus/Q format. Many font development organizations license URW fonts for conversion into a different format, and then they rerelease them on the market. Companies that support Nimbus/Q include Zenographics and Digital Typeface. In the past this foundry has not sold direct to the public; it only licensed fonts to suppliers. As of Fall 1992 this will change and the URW type library will be made available to the public.

Hewlett-Packard Hewlett-Packard and Agfa Compugraphics worked together to produce the PCL 5 format used on HP LaserJet III and III P printers. HP sells cartridge-based Agfa Compugraphics scalable fonts. At last count, 76 scalable typefaces were available. These fonts are available on cartridges with 24 to 26 fonts per cartridge.

Nonscalable Fonts

Given the current copyright laws, many nonscalable formats have been developed. Not all of these have achieved wide acceptance. For those receiving at least limited acceptance, there are a number of bitmapped libraries in the marketplace, some more extensive than others. The following are several of the more well-known suppliers of nonscalable fonts.

BitStream That's right, BitStream also produces nonscalable bitmapped fonts in .BCO format. These fonts cover the basics of what you may see as standard on most systems. They offer 35 typefaces on a cartridge.

Data Transforms Data Transforms supplies bitmapped fonts to the marketplace. These fonts, contained on the Fontpak Library, include standard business, decorative, symbolic, and art typefaces. Over 300 typefaces are available. You can purchase 10 or 50 preselected fonts on diskette.

Hewlett-Packard Hewlett-Packard produces PCL 4-based fonts for use with their HP laser printers. These fonts cover the basics of what you may see as standard on most systems. Approximately 190 typefaces in PCL 4 format are offered on cartridges. These cartridges can contain groups of 6 to 65 preselected fonts.

Weaver Graphics Weaver Graphics produces LJ Fonts. Their fonts are primarily used on Hewlett-Packard printers and can require a separate extra-cost utility for their use. LJ Fonts offers 200 typefaces. Selected fonts may be ordered on diskette.

Public Domain Free fonts are always available. In particular, there are the .BDF fonts. Since .BDF is a public domain font format, any fonts you find here are free. These fonts, usually available on bulletin boards, have a catch-as-catch-can selection of type styles. There's really no telling what you'll find.

Font Format Conversion Utilities

Not all software and hardware systems can use the same font formats. With the growing number of libraries and formats available, you probably will, at some time, find yourself in one of the following predicaments:

- You have purchased a set of fonts whose format is not compatible with the application you wish to use.
- You have fonts in different formats from several different libraries and you wish to use them interchangeably with different applications.
- You see a font that is just perfect for a particular application, but it is in a format that your application can't handle.

Rather than running around looking for compatible fonts or purchasing duplicate fonts in different formats, you can save time by converting formats. There are a number of font format conversion utilities available. Listed here are some of the more common utilities, their manufacturers, and the formats they can convert. Appendix A provides addresses and phone numbers of these manufacturers.

AllType AllType is produced by Atech and converts between Intellifont, Speedo, Type 1, and other formats.

SoftType SoftType, from ZSoft, converts between its native Nimbus/Q and Type 1 formats.

MoreFonts MoreFonts is offered by MicroLogic. Through two add-on programs (MI and MT) Type 1 fonts may be imported into MoreFonts' proprietary format and exported to Intellifont, Nimbus/Q, and other formats.

ReFont ReFont, by Acute Systems, converts Macintosh Type 1 format fonts to PC Type 1 format fonts.

Font Foundry Font Foundry is available from Adobe Systems. While it does many other things, it also converts Type 1 fonts to PCL 4 bitmaps, which can be used on HP LaserJet printers.

Type Director Type Director is produced by Hewlett-Packard. While it does many other things, it also converts Intellifont format fonts to PCL 4 bitmaps, which can be used on HP LaserJet printers.

Font Management

Once you've acquired your fonts, you are then faced with the task of using them. If you're using soft fonts, this requires an extra piece of software or specially programmed firmware. For those of you who have purchased scalable font libraries, some type of font management utility is required. Now the hidden costs rear their ugly heads.

Programmed font management firmware is often automatic and used when scalable soft fonts are accessed. This programming is not available on all printers. Those that do have this type of firmware programming are often called PostScript printers. In many cases, these printers are unable to use nonscalable fonts. This is no great loss since the only reason for purchasing a PostScript printer is to print PostScript files exclusively.

Font management software utilities come in many shapes and sizes. Depending upon the utility, it may work with one or several scalable format types. This utility allows a user to scale fonts, add special effects like boldfacing, italics, and drop shadows, and download the final scaled versions into a printer's buffer or a PC's internal buffer. These scaled or *rasterized* fonts are then used for printing or graphic screen display.

How you choose among the software utilities is really a question of font format. The format of the fonts you have will decide what font management utility you must use. Listed here are four companies that produce the more popular font management utilities on the market today.

Adobe Systems Adobe Systems produces the Adobe Type Manager and Font Foundry utilities. Type Manager is primarily used for Windows 3.0 (and above) applications. Font Foundry is included with every package that generates bitmaps from Type 1 format fonts. Manufacturers whose libraries support and ship with these utilities include: Casady & Greene, Digital Typeface, Image Club Graphics, Linotype-Hell, and Monotype Typography.

Atech Software Atech is a company that produces software that works with a wide number of font formats. Their font management utility is called Publisher's Powerpak. This is an excellent utility for those of you who have fonts in different formats.

BitStream BitStream produces two font management utilities: Facelift for Windows and Fontware. Facelift manipulates fonts in the Speedo format, while Fontware works primarily with BitStream's older .BCO format fonts.

Agfa Compugraphics (The Company) Agfa Compugraphics produces the Intellifont for Windows and Type Director font management utilities. Intellifont works primarily with Windows 3.0 (and above) applications. Type Director, provided free with most Hewlett-Packard soft font collections, can create and install scalable fonts into Microsoft Word, Windows, WordPerfect, or Ventura Publisher. Both utilities let you download fonts to HP LaserJet III printers.

Creating Your Own Fonts

You have one other option when looking for fonts. You may purchase a package that will allow you to create your own. These packages are usually referred to as *font editors.* Do not confuse these with font management utilities that allow you to manipulate font data. Font editors are used to create font data from scratch. Chapter 7 provides basic information concerning font creation.

Because creating decent fonts can take time and—let's face it—a certain degree of artistic expertise, most people prefer to purchase them ready-made. There may be times, however, when you need specialized characters or character sets that are not available. In this case, your only options are creating your own fonts or finding someone who can custom create them for you. The following is a list of font editors currently on the market. Appendix A provides product and manufacturer listings.

Fontographer Fontographer, produced by Altsys, is designed to run on the Macintosh. It allows the creation of TrueType, Type 1, and Type 3 format fonts. Creation tools include curve drawing and hinting. When used with ReFont, this becomes a viable tool for creating fonts for use on IBM PCs.

Fontrix Fontrix is a WYSIWYG graphics creation and typesetting package published by Data Transforms. The Fontrix font editor is built into the software and allows the creation of bitmapped fonts. The editor allows you to edit fonts pixel by pixel, alter cell sizes and baselines, copy characters to different cells and assign them to different keypresses, and to set fonts to print or display in proportional or monospaced form. You can also load existing Data Transforms fonts into the font editor and alter them with Fontrix.

MSD Edit MSD Edit, from Mephistopheles Systems, combines two MSDware modules—MSDfnt and MSDedt—to create a bitmapped font editing system. MSDfnt allows global modification of every character of a font. These changes include boldfacing, repositioning of all characters within their cells, and altering character cell size. With MSDedt you can edit individual characters by pixel and cut and paste whole characters, or parts of characters, to create new ones.

PC Metafont PC Metafont, from Personal Tex, is a scalable font editing system that allows you to enter precise coordinates for the creation of font elements such as serifs, ascenders, and descenders.

Publishers Type Foundry Publishers Type Foundry, from ZSoft, comes equipped with PC Paintbrush+. Type Foundry is designed as a two-part font editing system. The bitmapped font editor portion allows fonts to be created and edited pixel by pixel. The second portion falls more in the range of font management, allowing native Nimbus/Q fonts to be scaled and manipulated.

SoftCraft Font Editor SoftCraft Font Editor, from SoftCraft, is a bitmapped editor that imports a wide number of graphic image formats and converts them into fonts. Many drawing tools are available for use during pixel editing.

SLEd and FontGen V SLEd (Signature Logo Editor) and FontGen V, from VS Software, work together to provide intelligent scaling (enlarging and smoothing of bitmaps). With them, you can also add special effects like boldfacing and italics, import and convert a wide range of graphic image formats into fonts, and edit pixel by pixel. SLEd offers 17 drawing tools for font editing. FontGen V allows you to view the entire character set and provides special effects.

In Conclusion

As you can see, just from these short lists, there are many manufacturers with many different font-related products. If you look closely, you will notice a trend toward compatibility in font formats. They aren't quite there yet, but they are getting close. In the meantime, font converters can be used.

For those of you looking for fonts, look carefully at your system (software and hardware) and at what you need in the way of fonts. Then contact font suppliers and manufacturers and ask for sample catalogs or output of fonts from their libraries. Compare them and consider your needs carefully before you make your choice—plan *before* you buy.

CHAPTER 7

Designing Your Own Fonts

While complete prefab font sets can be purchased, a time may come when your font needs are not met by the font libraries available in the marketplace. Whether you need to modify individual characters or to create entirely new font sets, your final recourse is to create your own. If you must create your own fonts, or you just want to play around with creating them, this chapter is for you.

Rather than telling you how to create fonts, or how to use the various font editors available to you, this chapter provides basic information on what to look for in the way of restrictions due to size, character complexity, and display device aspect ratio. The actual designing of font characters, artistic expression, and learning to use the capabilities of your chosen font editor are all up to you.

Determine Your Font Application

Before designing and constructing a font, first consider the application for which it will be used. The two basic applications for fonts are printing and screen display. Since it is most common for font editors to produce graphic fonts, these applications will center upon graphic printing and graphic screen display of font data. Later chapters address these and associated topics in greater detail. Chapters 8 and 9 provide background on printing and screen display systems. Chapters 10 and 11 provide practical applications for the selection, size layout, and determination of graphic fonts on a screen or printed page.

Screen Display

You can display fonts on your monitor in text or graphic mode. The output method is determined by the hardware or software application. Limits on font creation parameters, such as horizontal and vertical sizing, are dependent upon the output mode used.

Text Display Mode

When in text mode there are often severe limitations on the fonts that can be used. Most often, the fonts must conform to specific size dimensions and type style for fitting 40- or 80-column displays. In reality, text fonts are only bitmapped fonts used through a device's firmware. Some systems allow you to download fonts for use through their firmware; these fonts are considered special graphic fonts used in text mode. Graphic fonts can also be used in graphic mode to mimic text displays. If you need to create "text fonts" for text mode or graphic fonts to mimic text mode, you will need to consider the strict limitations required for these fonts.

Figure 7-1 shows a graphic screen display using a bitmapped font specifically designed to emulate the text screen's 80-column display. The physical aspects of the graphic font in Figure 7-1 are indicative of the restrictions due to size, character complexity, and display device aspect ratio.

FIGURE 7-1 An 80-column display in a monitor's graphic mode using a specifically created graphic font

```
Ski resort owners in Aspen are following the lead of Marie Antoinette, who, as
the story goes, when the snow was too light for her sleigh to ride smoothly,
ordered her palace grounds covered with sugar.  Similarly, the enterprising
Aspen businessmen have covered the slopes near this popular winter resort with
cotton candy, hoping to turn it into a year-round gathering place.

Skiers who have tried the new glide say that it requires a special wax on their
skis, but that summer skiing is worth it.  And no one minds taking a fall any
more.  Says Cathy Rogers, a long-time resident of Aspen, "It took a while to
get used to looking out the window and seeing a pink mountain, but it really
looks kind of pretty.  And my kids love it."

Colorado ecologists are applauding the innovation.  Colorado winters are
notoriously rough on deer, elk, bear, rabbits, and other wildlife.  A summer
spent consuming cotton candy allows them to fatten up for the winter.  So far
the populations of the various species seem to be growing steadily.

Of course, when it does snow, the natural ski surface merely covers the manmade
surface, and protects it from damage by the elements.  Cotton candy becomes
brittle in the cold, and could possibly injure someone if sharp cutting edges
were formed by breakage.
```

Graphic Display Mode

When a screen display is in graphic mode, graphic fonts, scalable or unscalable, are often used. Graphic fonts offer flexibility in sizing and type style selections. From a font editing standpoint, the only restrictions on these fonts are those of sizing based on the display resolution. For example, in order to maintain a specific font size across display resolutions, the size of a font must increase as the display resolution increases. This is discussed in greater detail later in this chapter. Figures 7-2 and 7-3 illustrate CGA (320 x 200) and VGA (640 x 480) screen displays, respectively. These figures show how two sizes of graphic fonts are required to maintain a relative size across display resolutions. Figure 7-2 displays a 20-pixel-high font, and Figure 7-3 displays a 40-pixel-high font.

Printing

Like display, printing is done in one of two modes: text or graphic. The software application often determines which method is eventually used.

FIGURE 7-2

A 20-pixel-high font on a CGA display

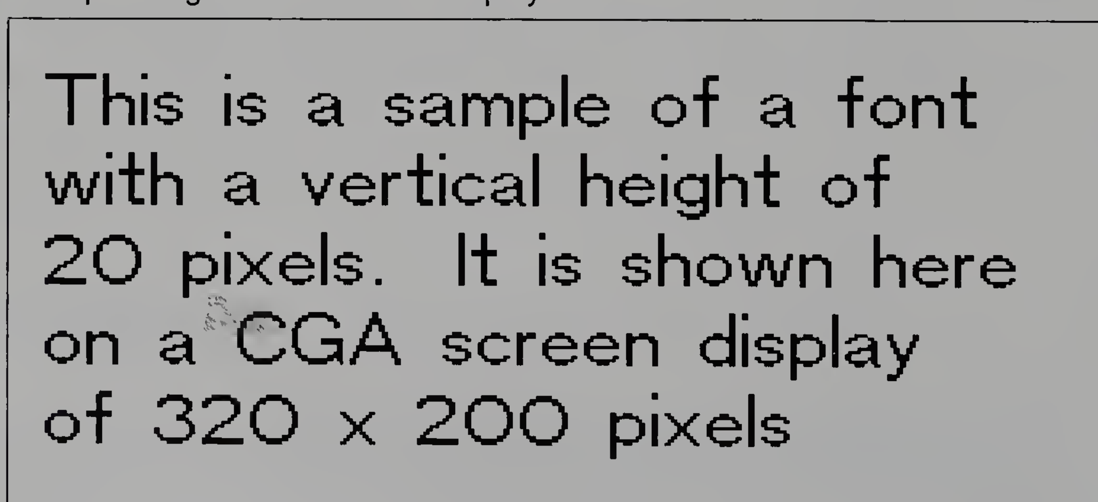


FIGURE 7-3 A 40-pixel-high font on a VGA display

This is a sample of a font with a vertical height of 40 pixels. It is shown here on a VGA display of 640 x 480 pixels.

Text Printing Mode

Unlike text screen display, text printing mode has a greater selection of font sources available. These sources are accessible through cartridges, RAM and ROM cards, EPROMs, and in some cases through font downloading software. Like its screen display counterpart, strict text printing mode often presumes specifically sized fonts. The following illustration shows how three sizes of graphic text fonts of 25, 35, and 70 vertical pixels are required to maintain a relative size across differing print resolutions of 100, 150, and 300 dots per inch (DPI).

300 DPI ABCDEFGHIJKLMabcdef ghijklm

150 DPI ABCDEFGHIJKLMabcdefg hijklm

100 DPI ABCDEFGHIJKLMabcde fghijklm

Graphic Printing Mode

When a printer is in graphic mode, graphic fonts, scalable or unscalable, may be used. This type of font offers greater flexibility in sizes and type style selections. From a font editing standpoint, the only restrictions placed on these fonts are sizing restrictions imposed by the printer's buffer limits and print resolution. If you are creating and using large fonts, the printer must have enough RAM printer buffer to accommodate them.

For example, POSID.SET is a bitmapped font developed for use in the label printer industry. Designed by an artist for hard copy printing applications, the function of this font is to provide a method where, if a portion of any individual character is rendered unreadable, what remains of the character will allow its positive identification—sort of a fail-safe system for labeling. The following illustration provides sample characters from POSID.SET shown at 150 DPI.

Printer Download of Fonts

When creating fonts for downloading to a printer, you must take several details into consideration. The most important are as follows:

- ☐ Does your printer have any font download restrictions, such as font size or character construction? This is often printer-dependent.
- ☐ Does your printer have limits on RAM buffer?
- ☐ Are there any restrictions built into your font download software?

In most cases, these items interact to create limiting conditions for font downloading. For example, limited buffer size will restrict the size of the font that can be downloaded.

Dot Matrix Printer Download Restrictions

All dot matrix printers are not created equal: Some do not allow downloading of fonts at all. Those that allow it may have particular quirks concerning the fonts they allow to be downloaded. Some allow downloading of only specifically sized fonts; usually small matrix sizes. For example, an NEC P5 XL allows fonts with a 24 x 24-pixel matrix to be downloaded. Occasionally restrictions can be bizarre. There have been instances where all downloaded font characters must be created with alternate horizontal bits (dots) off.

In many cases, dot matrix printers have limited buffer space. This limit, while adequate for a small font set, will prohibit downloading a full set of large fonts into printer RAM.

Laser Printer Download Restrictions

Often laser printers do not have the same restrictions as dot matrix printers. They usually have large buffers that allow downloading of larger fonts. In many cases, this memory may be increased by purchasing factory installed upgrade kits. In most cases, laser printers are far superior to dot matrix printers when it comes to downloading fonts. Because of this, there are usually few restrictions when it comes to creating fonts in a wide range of sizes for downloading into laser printers.

Determine the Font Format Type Required

There are only two basic format types to consider when looking into font creation: nonscalable and scalable font formats. The type of font format you need depends upon the hardware and software application you intend to use. Know in advance what formats are acceptable to these applications. It will guide your decision concerning the font editor and, should you need it, the conversion software you purchase.

There are both advantages and disadvantages associated with the creation of scalable and nonscalable fonts. What follows is a brief comparison of scalable and nonscalable format types along with the pluses and minuses concerning their creation.

Nonscalable Formats

Nonscalable really means bitmaps. In many cases a font editor that creates bitmaps is easier to use and faster to understand than a scalable editor. Since bitmapped fonts are created pixel by pixel, generation of greater detail is faster and easier than with scalable fonts. They do have drawbacks, however.

One drawback of nonscalable font creation is that, in order to maintain maximum character quality, each unique size of a particular typeface must be created separately. Unlike scalable fonts where, through programming, you plug in sizing values and get larger high-quality font images, each size of a specific nonscalable typeface must be created by hand.

This need to create every individual size gives rise to another drawback: pixel by pixel creation and editing of fonts can be very tedious. Creating a font set of small characters is not too bad since their creation is fairly rapid, even for a novice, but when you get to really large characters, it is different. Even with the power tools available in different editors, manipulating individual pixels for a font set of large characters, while easy at first, can quickly reach the stage where you will be wondering, "Why did I start this project?" and thinking, "This is endless!"

Scalable Formats

Scalable fonts have an advantage over nonscalable fonts in that, once created, they may be resized at usage time through a software- or hardware-based scaling process. This process allows you to obtain clean, smooth sizes of a particular font without having to personally re-create the font in the new sizes.

Another advantage depends upon the font editor you use. This is not a capability of all scalable editors, but it can be very useful if you have it. Depending upon the editor, you may be able to scale the completed font sets and save the final rendered output as bitmapped versions of the font sets. You should look into this if you need nonscalable as well as scalable fonts.

Scalable font editors can take longer to master than nonscalable editors. Since scalable font editors' creation tools are more complicated, it may take you a little more time to become comfortable with them.

Scalable editors often provide tools which, while they are fine for creating and mapping control points of large portions of characters, can prove more difficult to use when defining fine detail. For example, the detail involved with a character from Old English, while easy to create with a nonscalable editor, can be difficult to do with a scalable editor. Defining control points for every curlicue, small curve, and dot can be arduous.

Keep in mind that you must create scalable fonts in a sufficiently large size to supply enough control or reference points. *Control points* are used to define the outline of a character. In Figures 7-4 and 7-5, the images on the left are representations of control points for a character. The images on the right are highly stylized representations of the characters rendered from those control points.

FIGURE 7-4 Example of a character with a well-defined number of control points

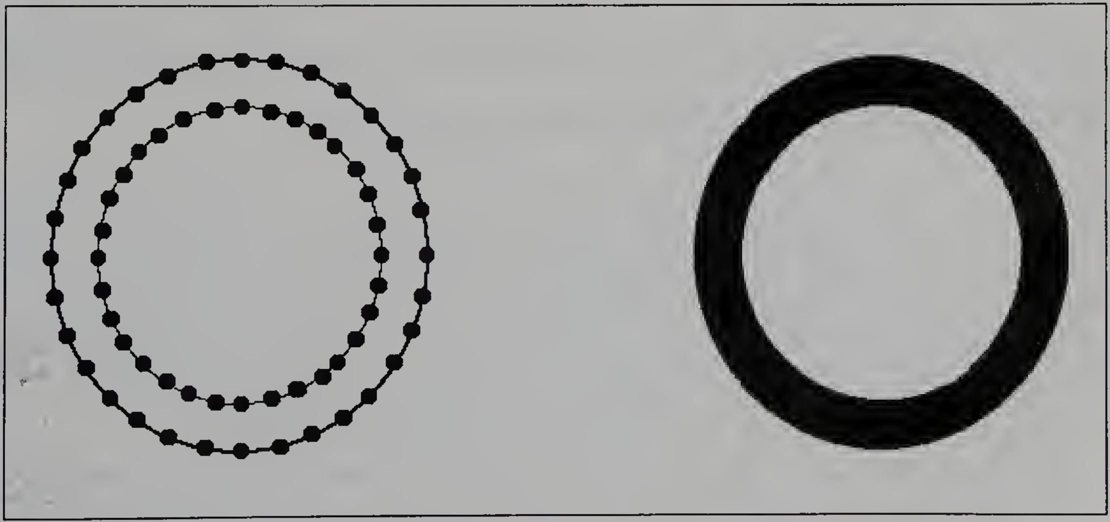
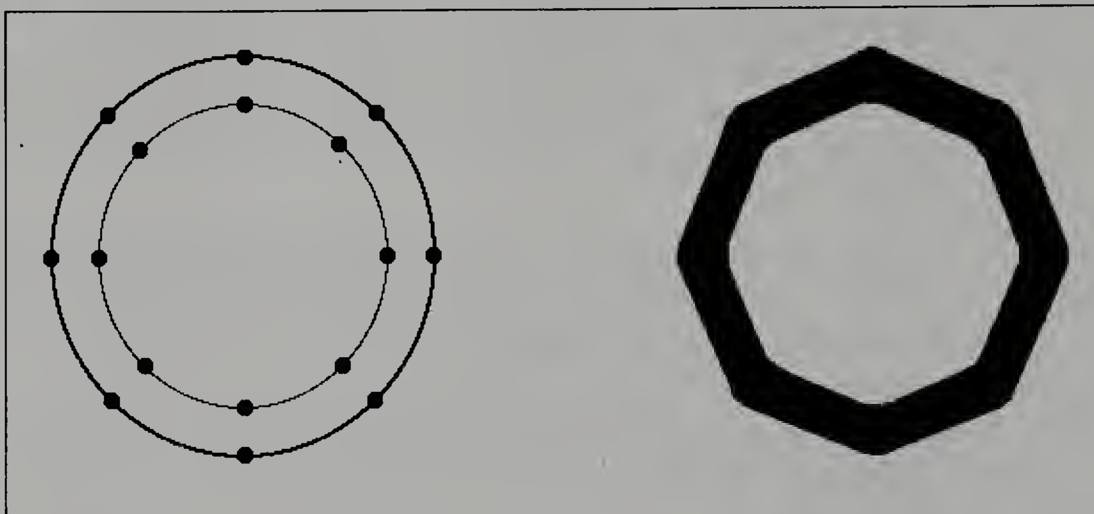


FIGURE 7-5 Example of a character with too few defined control points



As shown in Figure 7-4, the more control or reference points you have, the cleaner a curve or edge will be. If you create too small a character, there won't be enough points to maintain decent quality and smoothness when this character is scaled. If you do not specify enough control points on a larger character the same results will occur. Figure 7-5 shows what can happen if there are too few control points specified for a character. The choppy flat-edged appearance of the illustrated scaled character has been exaggerated to heighten this point. In most cases the programming would give its best effort at presenting a "smoother" circle.

Font Sizing Considerations

Fonts are created, rendered, and then displayed to a screen as pixels or on a printer as dots. When creating fonts for a particular output device, it is important to remember that their final rendered size is dependent upon two factors of the output device: device resolution and device aspect ratio. These two factors interact to affect the horizontal and vertical size of the font and its display or printed appearance.

Before creating a font, it is best to have an idea of what size you want the font to be on your output device. Most people do select a size, but don't consciously think about it. Then they are surprised to find that the font they created, or the finished font they selected, without thinking, isn't the height or width they wanted. It's important to have a good mental picture of what you want and a basic understanding of how to get it. Sizing is not as important to scalable fonts because they can be sized through software after they are created. But if you are creating bitmapped fonts, this is an essential piece of information.

Device Resolution

All device resolutions are given, or at least should be given, as horizontal by vertical values. For example, printer output resolution is a comparison of the number of horizontal dots versus vertical dots available per one square printed inch on a printer. Screen display output resolution is a comparison of the number of horizontal pixels versus vertical pixels available for use on a single graphic screen at a given graphic display resolution. For example, a VGA display has a resolution of 640 x 480. This means a single VGA screen will display 640 pixels horizontally and 480 pixels vertically. A laser printer may output 300 x 300 DPI. This means that for one printed square inch, there are 300 dots horizontally and 300 dots vertically.

Since all fonts are rendered and displayed as dots on a printer or pixels on a screen, the resolution of specific devices will determine the final size and physical appearance of a particular character. This is why before creating a font, you should know the output resolution of the device or devices you wish to use. Resolution is essential in determining the appropriate creation size and understanding the results of its final output.

All this boils down to a general rule of conformity, which concerns the ability to maintain a uniform display size across differing resolutions. In essence the rule is, the higher the output resolution, the larger the font size required; and the lower the output resolution, the smaller the font size required. For example, a font designed to display at a certain size on a 640 x 480 VGA display will appear approximately twice as large on a 320 x 200 CGA display. Using nonscalable bitmapped fonts will require that you physically create and use two different sized fonts (a large one for VGA and a smaller one for CGA) in order to maintain the same *relative* screen size appearance. By using scalable you can simply resize the font for use at the lower resolution.

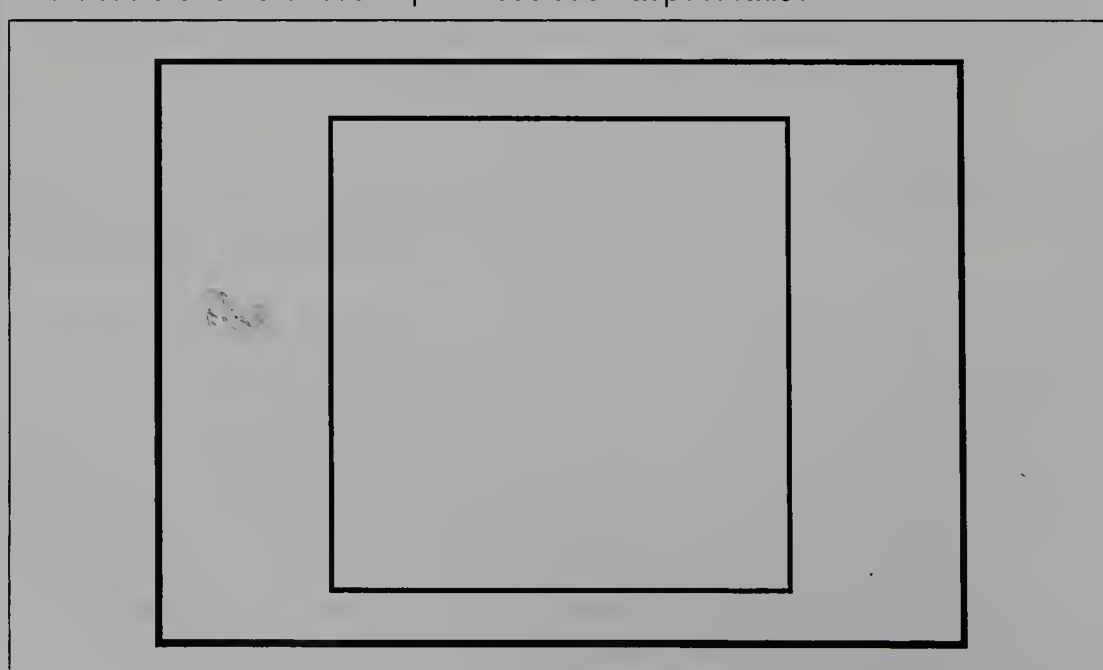
Aspect Ratio of Device Resolution

Aspect ratio can be a particular nuisance when creating fonts. Based on the device resolution, *aspect ratio* is the ratio of horizontal dots or pixels to vertical dots or pixels.

Except with 24-pin printers, laser printers, and some high-resolution screen displays, you rarely get a 1:1 aspect ratio in the computer industry. Most graphic screen displays will not have a 1:1 aspect ratio. For example, a VGA display sports a graphic resolution of 640 x 480. This resolution produces an aspect ratio of 1.3:1. A 9-pin dot matrix printer with a low print resolution of 120 x 75 will produce a print aspect ratio of approximately 1.6:1.

This feature will affect the displayed and printed appearance of a font character; it should be taken into consideration when creating fonts. For example, if you create a font character as wide as it is tall, the character will appear shorter and wider when printed at an aspect ratio of 1:1.3. The best way to illustrate this is by creating a square with sides of equal length. Figure 7-6 shows the results of different aspect ratios on a square. The outer box is the result of a 200 x 160 DPI (1:1.3 aspect ratio) output

FIGURE 7-6 The effects of differences in print resolution aspect ratios



on a square. The inner figure is the square as it should appear at a 1:1 print aspect ratio, such as a 300 x 300 print resolution.

If you know the aspect ratio of the system you intend to use, you can purposely design your font sets to compensate for the aspect ratio. This will allow you to custom design characters for specific appearances.

Caution Those of you who will use the same fonts for display as you will for printing, or who move between different print or display resolutions, expect the change in aspect ratio from screen display to printer to affect a comparison of output.

Font Sizing Concepts

Determining the size of fonts for use on a screen is very much like sizing fonts for use on a printer. They both have to do with discrete dots or pixels, but they differ in the terminology used and what that terminology describes. Many people use the term *point size* as a vertical measure of font size and *CPI* as a horizontal measure in both screen display and printing applications. These terms are correctly used only when you are talking about the final printed hard copy of fonts. When it comes to screen displays, you can really only talk about pixels and column display.

Sizing Terms

The dimensions of a font character are limited by the number of dots available for its rendering on an output device. Before you determine the size and shape requirements for your soon-to-be-created font, it is important to clarify a few sizing terms.

Point Size *Point size* is based on the size of final physical hard copy output of a font. One point equals 1/72 inch, which equals 0.1388888 inches. This method of sizing is difficult to apply to screen displays. It can only be relied on when the physical size of a monitor screen and the display resolution are kept constant.

Dot Size *Dot size*, as used here, refers to the size of a single dot formed by a printer.

CPI (Characters Per Inch) *CPI* is the measure of the number of characters from the same font that will fit within one inch on a horizontal line of printed text. On your printer, you may see by pushing the font selection switch, the numbers 10, 12, 15, 17, or 20. These numbers refer to the CPI of the text font you have selected.

Column Display *Column display* is a screen display term. It is similar to CPI, and refers to the number of text characters that can be displayed on one horizontal line of a computer screen. The column display is usually set by software or by DOS to 80 columns or 80 characters per line. While in many cases you can select alternate column displays like 40 or 60, the standard is most often 80.

Pixel Size *Pixel size* refers to the size of individual pixels on a computer graphic screen display. This size is the function of monitor screen display size and display resolution. There are two aspects of a computer screen display that will affect font sizing:

- ☐ The higher the screen resolution, the smaller the pixels making up a character, hence smaller characters.
- ☐ The larger the physical size of a screen, the larger the pixels that make up a character, hence a larger character. Of the two, this is the less important consideration and the one about which most people know the least.

If you are confused, don't worry. Leave it in the back of your mind for a while. Soon it will make sense. These terms will be used and explained in greater detail in later chapters; specifically Chapter 10.

Font Sizing Equations

There are a few simple equations that are very useful for determining font parameter sizes. Since some form of constant is needed, assume one dot of a character cell matrix is equivalent to one dot on a screen display or one dot on a printer. Pull out your calculators or sharpen your pencils, you will now be introduced to a few simple mathematical equations. (All values are rounded to the nearest whole number.)

Vertical Sizing

The most frequent and stringent sizing determination with which you will be faced when creating fonts is the vertical size. Most people want to know how to determine a font's point size and pixel size for printing and display applications. Chapters 2 and 10 provide more on these terms.

Note Point size, as used here, describes the vertical height of an entire font set. Its determination is based upon the vertical measure of the height of the tallest uppercase character plus the total descent below the baseline of any lowercase descender. Should you wish to, you can also use the equations to determine the specific height of any character, such as a lowercase *e*.

Determining Point Size To determine a font's printed point size, use the following equation:

$$A/0.0139 = P$$

where:

P is the font size in points
A is the font size in inches
Constant is 1 point = 1/72 inch = 0.0139 inches

For example, say you have a font that prints or displays as one inch tall, and you need to know what this means in point size. The equation would be as follows:

$$1/0.0139 = P = 72 \text{ points}$$

Determining Vertical Pixel Size for Displays and Printers To determine the vertical pixel size of a font for a particular display resolution from a specific size in points, use the following equation:

$$P\,(0.0139) \times (X/Z) = V$$

where:

V is the font's vertical pixel size
P is the font size in points
X is the vertical display resolution in pixels
Z is the measured vertical screen size in inches
Constant is 1 point = 1/72 inch = 0.0139 inches per point

For example, say you're using a VGA display with a 640 x 480 display resolution on a monitor with an 11 x 8-inch screen and you need to create and display a 10-point font. To do this, you will need to know the necessary vertical pixel size for this font. The equation is used in the following manner:

10 (0.0139) x (480/8) = V = 8.4 pixels (round to 8 pixels)

To determine the vertical pixel size of a font for a particular print resolution from a specific size in points, use the following equation:

P (0.139) x Y = V

where:

V is the font's vertical pixel size
P is the font size in points
Y is the vertical print resolution in dots
Constant is 1 point = 1/72 inch = 0.0139 inches per point

For example, say you're using a 300 x 300 DPI laser printer and you need to create and print a 10-point font. To do this, you will need to know the necessary vertical pixel size for this font. The equation is used in the following manner:

10 (0.139) x 300 = V = 41.7 pixels (round to 42 pixels)

Horizontal Sizing

In most cases, the horizontal sizing of a font is up to you. There may be times, however, when you want to determine the exact cell width you need to achieve a specific number of characters per inch (CPI). In these instances, there are two things you must keep in mind concerning the intended spacing of your "created" font.

- If a font is created with nonproportional spacing (monospaced), the maximum number of characters for each printed or displayed line can easily be determined. The width of each character, including any intercharacter spacing, is equal.
- If a font is created with proportional spacing (spacing related to the width of individual characters), it will be difficult to determine the exact number of characters per line. In this case, approximate the number of characters that fit on one printed or displayed line. Do this by using the width of the widest character on the line as a width constant. Be certain to add the character spacing gap to the total cell width.

To determine the necessary character cell width for a specific CPI for a single line on a screen or on a printer, use the following equation:

$X/P = C$

where:

C is the maximum character cell width in pixels
P is the desired character(s) per inch (CPI) for printers or the desired column display for screens
X is the horizontal display or print resolution in dots

For example, to determine the necessary maximum character width in pixels for an 80-column display on a 640 x 480 VGA display, use the equation in the following manner:

$640/80 = C = 8$ pixels

As another example, to determine the necessary maximum character width for 10 CPI output on a 300 x 300 DPI laser printer, the equation would be used in the following manner:

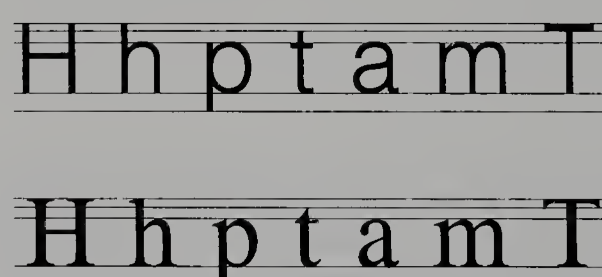
$300/10 = C = 30$ pixels

Font Design Considerations

When you design a font character, there are several important topics to consider: the character cell matrix size, character complexity, and the interactive limits of character detail due to cell matrix size. As you can see, these factors interact.

Font Character Size Ratios

You will be faced with creating upper- and lowercase characters when you design most font sets. How you size these characters in relation to each other is up to you. A rule of thumb, however, is to make the x-height, or lowercase characters such as *a* and *m*, approximately one-half to two-thirds the vertical size of the uppercase letters, and to make other lowercase characters such as *j*, *t*, and *h*, three-quarters or equal to the height of the capital letters. This sizing rule is illustrated here:



The rule of thumb for width is, lowercase letters run about one-half the width of uppercase letters. Again, do this to your taste.

Character Dimensions

Before creating a character font set, you should review all the characters you intend to create. Whatever the character cell size dimensions you use, they must accommodate all your intended characters, so you need to determine your tallest and widest characters.

- Determine the height of your tallest uppercase letter and add to it any descender space that may be needed by any other character, such as a lowercase *y* or *g*. This is the upper limit for your vertical cell size.

- Determine the widest character of your font set. This will be the minimum limit for your horizontal cell size. Since font characters can have any limit, this will depend upon the font set you are creating. In English alphanumerics, the widest character is usually uppercase *W*.

Character Cell Matrix Size

When you consider cell matrix sizes, a good rule of thumb is to use as much space as you can. It's easier to create something in a large space than in a small space.

- A large matrix means you will have more pixels to work with. More pixels means you can create smoother lines and curves, as well as add more detail to your characters. Figure 7-7 illustrates this point by showing a sample of a font editing cell for an 80 x 80-pixel character. Notice that the *Q* is not the full width of the cell.

FIGURE 7-7 Example font editor editing cell of an 80 x 80 font

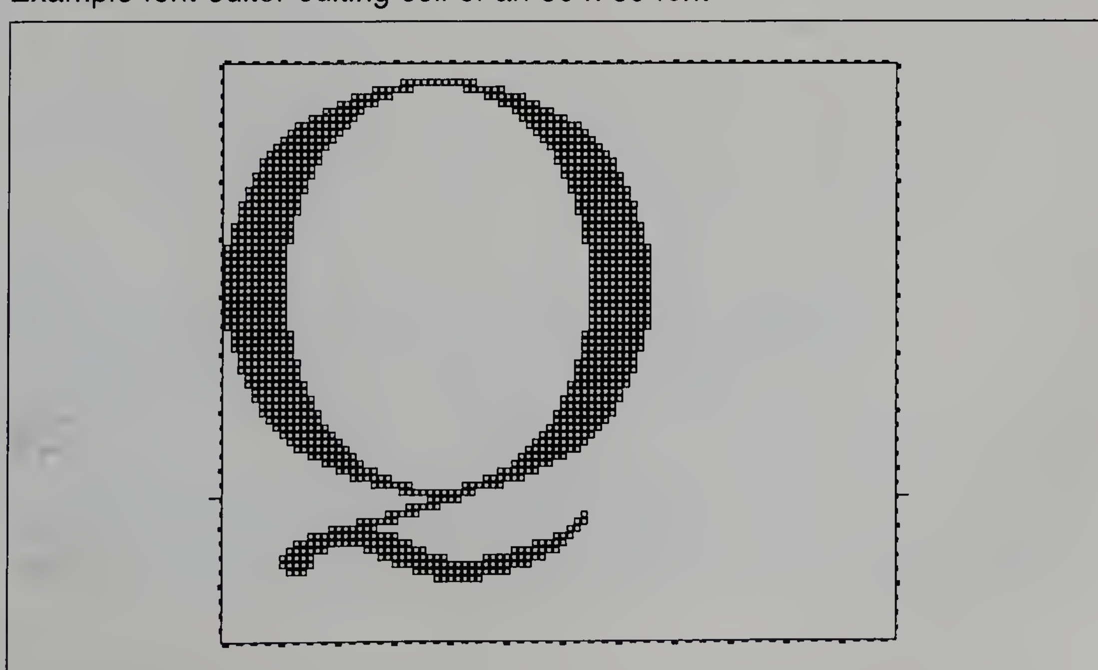
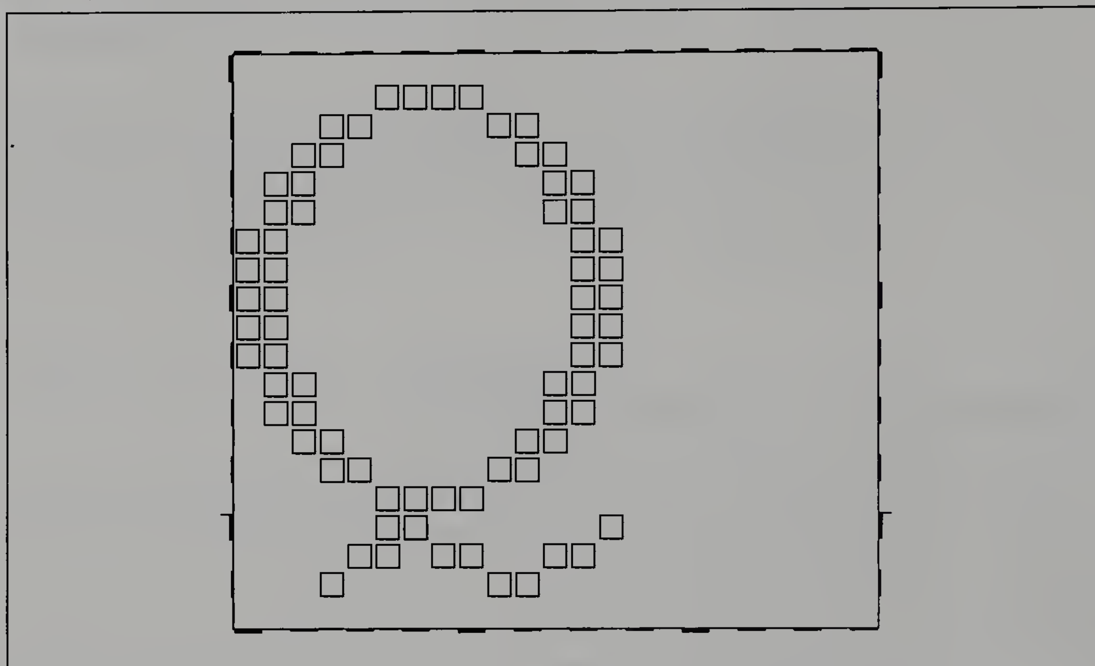


FIGURE 7-8 Example font editor editing cell of a 20 x 20 font



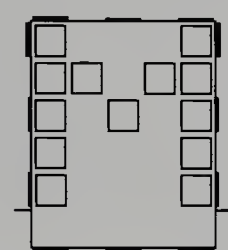
- A small matrix means you will have fewer pixels to work with. Fewer pixels means rougher lines and curves, as well as less character detail. Figure 7-8 illustrates this point by showing a sample of a font editing cell for a 20 x 20-pixel character.

There are times, however, when you may want to create small character font sets. If you do, it is important to know how low you can go. First, you must decide if you want both upper- and lowercase. Lowercase will require room below the baseline for any descenders.

- For uppercase only, the minimum cell matrix for the generation of a readable font is 5 x 5 pixels. This allows only the creation of a very basic font that is not distinctive in any stylistic sense, other than it is the fewest number of dots you can use to create a readable character.

  At high-resolution display and printing, a font this size is virtually unreadable unless you have a magnifying glass.

- For a font with both upper- and lowercase, the minimum cell matrix you can use for generation of a readable font is 5 x 6 pixels. As shown in the following illustration, this leaves 5 vertical pixels for the uppercase and 1 pixel for the lowercase descenders.



Note In my custom font design services, I have been asked by a number of people for very small fonts—as small as 5 x 6—in distinctive type styles. I feel distinctive type styles cannot be produced within character cells below 10 x 10 dots, and flexibility for stylistic design is not really reached until you get over cell sizes of 25 x 25 dots. There are just not enough dots available to work with.

Character Complexity

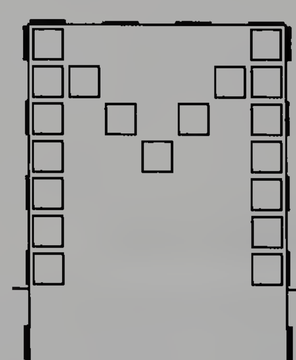
There is a direct correlation between character cell size, character detail, and character complexity (how intricate the font characters are). Character complexity is really a question of the number of pixels you have to work with and how much space is available in which to arrange these pixels. As in character sizing, the larger the cell size the more dots you have to work with and the greater the space to arrange the dots; the smaller the cell, the more limited the character complexity.

With insufficient space, fonts whose characters rely on complexity and minor nuances in image form will be unreadable. Asian font characters like Kanji (Japanese language ideograms) are particularly difficult when you try to create them in a cell matrix that is too small to allow for the detail they need. This problem will also arise when dealing with decorative and artistic font styles, like Old English, Illumina, or icons. Figures 7-9 and 7-10 illustrate this point by showing samples of font editing cells for a 20 x 20-pixel Old English character (Figure 7-9) and an 80 x 80-pixel Old English character (Figure 7-10).

Note Remember that font characters are composed of blank space as well as visible dots. Blank space is important for character complexity, because without it you would only have solid blobs.

The effects of cell matrix size on character complexity are similar to that of sizing. You can get a sense for what has been presented here by playing around with various combinations within a font editor.

- A small character matrix provides few pixels and little space to work with. Within a small character cell, minimal detail is possible; blocky styles and basic characters are the norm. The following illustration shows the limitations imposed by a 9 x 7 font editing cell.



- A large character matrix not only provides a greater number of pixels, but also more space in which to work. Within a large character cell, smoother, better formed characters are possible. Figure 7-11 illustrates this by showing the limitations imposed by an 80 x 80 font editing cell.

FIGURE 7-9

Example font editor editing cell of a 20 x 20 Old English font character

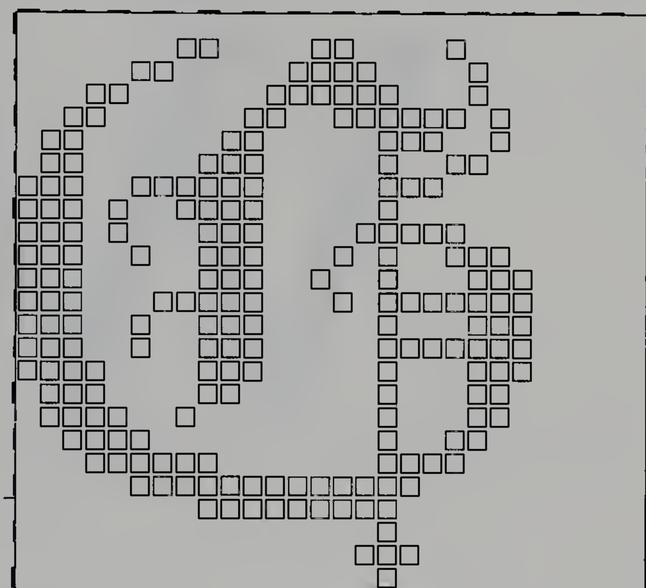


FIGURE 7-10

Example font editor editing cell of an 80 x 80 Old English font character

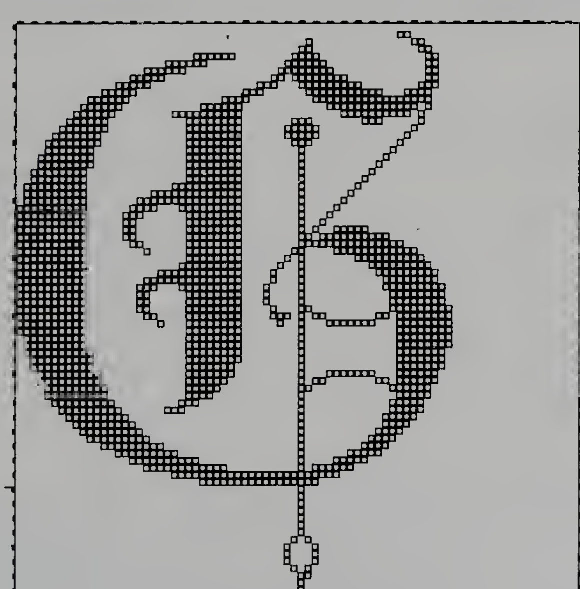


FIGURE 7-11 Sample editing cell for an 80 x 80 font character

Common Font Editor Power Tools

There is a big difference between creating scalable and nonscalable fonts. The processes, while somewhat similar, often require different tools. Listed here are some of the most common "power" creation tools that you will find on different font editors. You may notice that many of these are common tools found on screen graphic creation programs.

Cell Copying

The ability to copy the contents from one character cell to another is fairly common among font editors, and very useful, too. Since many characters can be composed from other characters, like the *P* and the *R* from the *B*, copying the contents of one cell to another can greatly speed up character creation. For those of you who wish to reassign characters to different keypresses, this copying ability affords an easy method.

Character Repositioning

The ability to reposition characters within a cell is of immense use for perfecting characters before using them. This final "tweaking" is often available for use on single characters or for moving, at the same time, every character within a font set.

Pixel Editing

Single pixel editing is the basic utility for every font editor. This is the nitty-gritty tool for manipulating individual characters. You can turn pixels on and off, one by one.

Elastic Line Draw

Elastic line draw allows you to select a point as an anchor for one end of a line and then, using the free end, stretch that line in a vertical, horizontal, or diagonal direction. Once you have achieved the position you want for the line, you anchor the free end.

Elastic Box Draw

Elastic box draw, like line draw, allows you to select a point as an anchor for one corner of a box and then, using the free opposite corner, stretch that box out in a vertical or horizontal direction. Once you reach the dimensions you want for the box, you anchor the free corner.

Elastic Circle Draw

This feature, also called ellipse draw, allows you to select a point as a center reference for a circle and then stretch that circle out in a vertical and horizontal direction. Once you have achieved the dimensions you want for the circle, you anchor the final image.

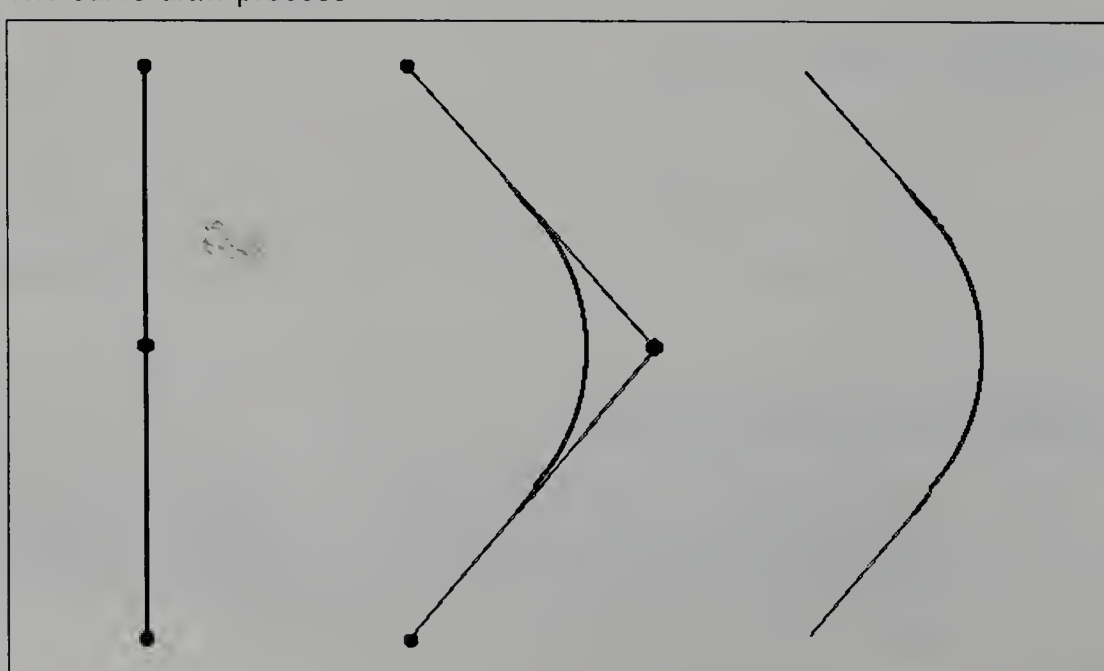
Polygon Fill

Polygon fill, also called *flood*, is used when you wish to fill an empty area with visible pixels. This tool is often used in conjunction with the box and circle draw routines. Once the outlines of a character are sketched, the area within the line is flooded with visible pixels.

Curve Draw

Curve draw, also called *bezier curve draw*, allows two points of a line to be anchored while points on the line between the two dots stretch the line away from the two anchored points. When this happens, a curving line of pixels is drawn. A very simplified version of this process is shown in Figure 7-12. While this type of tool is used by a few nonscalable font editors, it is usually exclusive to scalable font editors, such as Fontographers.

FIGURE 7-12 The curve draw process



In Conclusion

You are the final arbiter of quality and ease-of-use of your fonts. There are creation tricks and artistic perspectives in font editing that do not depend upon the editor used; they depend on you. For example: What is "good enough" in the shape of a circle? Are those angles exactly right? Are the lowercase characters the correct height and width when compared to the uppercase characters? Is the line weight consistent and correct for horizontal, vertical, and curved lines? These are topics that take the experience of doing, making mistakes, and fixing the mistakes. Font editing is personal because what is "good enough" differs for everyone.

When it comes to font editors, what you are used to using is what is important. For whatever font editor, like most software you use, the longer you use it, the easier it is to use. Each editor has its quirks and built-in capabilities. The more familiar you become with using font editors and creating fonts in general, the more tricks and shortcuts you learn. The only way to learn it is to do it.

CHAPTER 8

Printers and Output Quality

This chapter is devoted to providing you with basic information concerning common printer technologies and their effect on computer font output quality. Although specific printers may be mentioned by name, this is not a product listing. The information presented here will not only help you understand the output quality that results from different printer technologies, it will also help you decide which technology is best suited to your needs.

The function of printers is simple: to print the information transmitted to them. The final quality and legibility of fonts used in printing a document (printer hard copy) is often dependent on the printer you are using. Different printers generate various levels of output quality. To help you grasp the significance of printers and how they affect computer font usage, several aspects of printers are discussed:

- Common print technologies used in the computer industry
- Common printer components
- Print resolutions and aspect ratios
- Hard copy graphic and text output modes
- How these technologies are commonly addressed through software and firmware
- How components and technologies affect output quality

Comparison of Printer Technologies

When you get right down to it, all printers, regardless of their technology, perform in essentially the same fashion. They all accept data from a computer, they all use internal fonts or add-on fonts when printing, and they all print information onto a page as a series of dots. What makes them different from each other is the technology they use to render information on a printed page.

All printers create images as a series of dots. The differences are just a matter of how the dots are affixed to paper to create a printed page. The method employed by a printer is based on the technology on which the printer was designed. Each different technology will impart its own brand of output quality to the printing of fonts. Four common printer technologies are employed: dot matrix, inkjet, thermal transfer, and laser.

Dot Matrix

Dot matrix, or impact printer technology, uses a shifting ribbon and pin to print information on a page. Incoming dot information is sent along wires that address individual pins arranged in a specific order on a printhead. As the printhead moves across a page, individual pins are fired for each dot of a rendered font character. The number of pins available for use depends on the printer model type. Two basic classifications of dot matrix printers exist: 9-pin and 24-pin.

A certain degree of illegibility is inherent in dot matrix technology. Pins can only be made so small before they become useless. Because of this, printed character quality is a function of the size and number of pin strikes used to print the character. When a pin is fired, it strikes the paper. The ribbon interposed between the printhead and paper deposits an ink impression on the paper. As the pin strikes, the ribbon shifts. This causes the ribbon to drag slightly. The drag produces a minor smearing at the point of pin impact that can impart a fuzzy appearance to a printed dot.

This fuzziness, when compounded over all the dots required to generate a font character, can "blend" dots together and provide a certain amount of "smoothing" to a printed character's appearance. The fuzziness can also cause areas of a character that should remain blank, such as the center of a lowercase *o*, to fill in (often more pronounced with smaller fonts).

Inkjet

Inkjet printers use a printhead especially designed to spray ink when rendering printed information to a page. The ink is kept in a reservoir attached in some fashion to the printhead. (For example, the Hewlett-Packard DeskJet uses a disposable unit that is both a printhead and an ink reservoir.) Incoming dot information is sent along wires that address individual spray nozzles arranged in a specific order on the printhead.

As the printhead moves across a page individual nozzles squirt a shot of ink for each dot of a rendered font character. The quality of the printed characters depends strongly upon the resolution capability (number of dots per inch) engineered into a printer's hardware and firmware. For example, the HP DeskJet produces excellent copy at 300 DPI. An earlier sibling, however—the HP ThinkJet—produced rather rough copy at 90 DPI.

Inkjet printing allows for a certain amount of spreading as the ink is sucked into the fibers of the paper, which causes fuzziness. As with dot matrix printing, this fuzziness can blend dots together and provide a certain amount of smoothing to a printed character. It can also cause areas of a character that should remain blank to fill in. As with dot matrix printers, this is often more pronounced with smaller fonts.

Thermal Transfer

Thermal transfer printers use what might be called a "melting crayon" technology to render printed information to a page. Incoming dot information is sent along wires that address individual contacts arranged in a specific order. In many cases, these contacts are part of a movable printhead. In special cases, however, such as industrial label printers, these contacts remain in a fixed position while the paper passes underneath. To print information, individual contacts are heated for each dot of a rendered font character. The heat melts a waxy ink-like substance from a specially designed and coated ribbon. This melted substance adheres to the paper to produce the dots that eventually make up a character.

The character quality generated by the thermal transfer method is dependent upon the temperature of the contact point, something like the three bears' porridge: "This one's too hot, this one's too cold, but this one's just right."

Too Hot

If the temperature is too high the wax will melt, run too much, and possibly smear as the printhead or paper moves. This will produce irregularly sized dots with skewed shapes. The characters resulting from these dots can appear stretched and smeared. If the wax runs too freely, it can cause areas of a character that should remain blank, such as the center of a lowercase *o*, to fill in.

Too Cold

If the temperature is too low, the wax won't melt evenly, producing a chunky, uneven, spotty dot. Characters resulting from these dots can appear irregularly sized, jagged, incomplete, or badly formed.

Just Right

If the temperature is just right, birds sing and tropical breezes blow. This will produce regularly sized, crisp-edged dots. Characters resulting from these dots will be well-formed. Since the wax runs just a little, it can blend dots together and provide a certain amount of smoothing.

Laser

Laser printer technology uses a moving laser beam and toner to render printed information to a page. Most laser printers use a disposable and refillable toner cartridge. Laser printers process incoming information and create an entire printed page as a memory map within their printer buffer. In essence, this map is a grid composed of, in most cases, 300 small squares or dots per inch. As the page moves through the printer, it passes over a transfer wire. Each dot on the page corresponding to a dot within the memory map is addressed, and those dots with visible data receive an electrical charge from the transfer wire. This charge attracts toner to that spot. The toner is then affixed to that spot by a brief burst from the laser beam. Because the toner powder is so fine and the laser beam so precise, this method almost always produces crisp clean-edged characters.

There are two advantages to pre-producing the page as a memory map:

- A large RAM buffer accommodates and provides the capability of using large fonts, most notably scalable fonts.

- Print speed is greatly increased. Text mode printing can be two times faster than the same mode for any of the other technologies. Graphic mode printing of a single page takes nearly the same time as the same mode for any of the other technologies. Producing multiple copies of a printed graphic page, however, is by far faster. This is because, once the memory map is in place, copies of that page map can be printed at the maximum speed of the printer. This rate is printer-dependent and often averages between 4 and 12 pages per minute.

Comparison of Common Printer Components and Operations

Regardless of the different technologies used for printers today, they all share several components. These include printer buffers, printheads, and external font access features.

Printer Buffers

The most significant comparison you can make among printers, after their method of printing information to the page, is RAM buffer size. Actually, the amount of available RAM is tied to the printer type. Generally:

- Most standard dot matrix, inkjet, and thermal transfer printers have limited RAM built into the printer. In many cases, RAM is below 50K and cannot be expanded.
- Laser printers have more RAM, often 512K or more, and in many cases this RAM may be expanded.

The question, "Can RAM be added to the existing RAM of a printer?" is very important to font usage and output quality. The more RAM available for font download into the printer's buffer, the larger the font that can be accommodated. As discussed in Chapter 7, larger fonts provide greater versatility in style, as well as more dots to form an image. More dots often equate to cleaner, better-formed characters.

In many cases laser printer manufacturers offer factory installed add-on memory packages that can boost the printer's RAM by two to eight times. The rest of the printer world doesn't fair so well. Many dot matrix, inkjet, and thermal transfer printers are limited to a strict amount of internal RAM. In most cases, more RAM cannot be added to the printer's internal manufactured RAM. Attempts have been made to get around this limit through the use of programmable RAM cards.

Printheads

The type of printhead affects the final output quality of a printed font. Two printhead styles commonly used are 9-pin and 24-pin. Whether pins, spray nozzles, or heat elements (from here on, each of these will be referred to as "pins"), these general printhead styles are usually consistent across dot matrix, inkjet, and thermal transfer printers.

Due to the differences in technology, laser printers cannot really be said to use a printhead. Instead, they use a different system that uses a laser beam pulse to act in a fashion similar to a pin.

9-Pin As the name suggests, these are limited to 9 usable pins per printhead. They are found on low-resolution, low-cost printers that are for light duty; generally fine for use in the home.

24-Pin These printheads, limited to 24 usable pins, are used on medium to high-cost printers. They are heavy duty printers that are fine for business and home use. Printers that use this type of printhead are medium to high-resolution printers.

Note To quickly determine whether a printer is using a 9-pin or 24-pin printhead, count the wires leading to the printhead. There will either be 9 or 24.

Paper Feed Methods

An often overlooked factor in font output quality is the method by which paper is fed through a printer. Precise movement of paper through a printer is essential for the exact placement of dots on a page. There are two common methods used in the industry: friction feed and tractor feed.

Friction Feed

Friction feed is a standard feature on nearly all printers. This method uses only the rubber rollers on your printer to move paper. The rollers press against the paper and as you print, the rollers turn in precise increments carrying the paper with them. Because uniform pressure can be difficult to maintain across the entire width of a piece of paper (especially as a printer gets older), some slippage can occur, which may show up as a line or several lines of seemingly crushed characters.

The quality of the friction feed is often in direct proportion to the price of the printer. For example, laser printers use a highly efficient friction-feed mechanism for moving paper. Slippage and other problems only occur when the mechanism begins to wear out, usually after many years of service. Low-cost, low-quality printers are those "bargains" with no other method of feeding paper than friction feed.

Tractor Feed

Tractor feed, also known as *pin feed,* is usually available as an add-on for nearly all printers except laser printers. This method requires the use of continuous-feed paper, the kind with the holes along both sides. With a tractor feed attachment, pins stick up, catching the paper along the holes. These pins are on individual tracks or wheels. As you print, the rollers turn in precise increments carrying the paper with them. Because the alignment of the holes on the paper and the pins on the track are precise, slippage is almost unheard of. Slippage can occur at the very beginning of a new page, however, because the holes drilled at the beginning of a page are purposely made bigger. This is to ensure easier catching of the initial page on the tractor pins.

Printers that use a tractor feed are often capable of producing better-quality output than friction-feed printers, because they offer a higher degree of precision in paper movement. This generalization is true with dot matrix, inkjet, and thermal transfer printers only.

External Font Access Features

External font access features will greatly enhance a printer's capabilities in font character output. Without them, you are limited to the printer's internal text fonts and, if the printer has a graphic mode, to using graphic fonts only through software. With them, you can use the internal fonts and graphic fonts through software, and also a whole world of add-on fonts through firmware. The common features considered here—plug-in slots and sockets—allow font cartridge or RAM/ROM card usage capabilities and EPROM use. Look for these external font access features; they are worth the money for the flexibility they offer.

Slots for Cartridges and RAM Cards

Slots designed into a printer, which allow cartridges or RAM/ROM cards to be plugged in, are wonderful font access features. These allow more fonts to be accessed by a printer and, in the case of RAM cards, allow extra RAM to be added to a printer's accessible internal RAM.

EPROMs

Not quite as common in the computer industry, are printers manufactured with empty spots for add-on EPROMs on their internal mother board. The *mother board* is the basic hardware controlling the printer. Since these chips must be installed on the printer's mother board, use of EPROMs usually requires a technician or at least a person with some technical expertise.

Print Resolution and Aspect Ratio

Your printer's print resolution determines the final output quality of the fonts you use for your document. Resolution determines how many example, the Epson LQ 2550 24-pin dot matrix printer is capable of 180 x 180 DPI, as well as 360 x 360 DPI, and it works in a similar way to the NEC P5XL—but its firmware for doing this is different.

Printer Types and Print Resolutions

As a basic guideline, dot matrix, thermal transfer, and inkjet printers are supported by applications at low and medium resolutions, while laser printers are supported at high resolution. Depending on the software you use, you may see several or all of the resolutions supported. Table 8-1 provides low, medium, and high-resolution printing values common to the four different printer technologies.

Note With the advent of font management software like Adobe Type Manager, printers that are commonly considered low resolution can be made to produce very high-quality output. The output, however, does take awhile to print.

Printer Aspect Ratio

Aspect ratio is the ratio of printed horizontal dots to printed vertical dots. Most commercial fonts were designed to be printed at a 1:1 print ratio, so they look their best at even resolutions, like 300 x 300 or 180 x

TABLE 8-1 Common Print Density Resolutions in Dots per Inch

Printer Type	Low Resolution	Medium Resolution	High Resolution
Dot matrix (9-pin)	120 x 75	240 x 75	240 x 210
Dot matrix (24-pin)	240 x 75	180 x 180	360 x 360
Inkjet	100 x 100	150 x 150	300 x 300
Thermal Transfer	100 x 100	200 x 200	300 x 300
Laser	100 x 100	150 x 150	300 x 300

180. As this ratio diverges from the 1:1 ideal, the characters will appear skewed. For example, if the ratio is 2:1 (horizontal to vertical), the printed character will appear tall and narrow. If the ratio is 1:2 (horizontal to vertical), the printed character will appear short and wide.

You can compensate for this effect during font creation by purposely creating a font character with an aspect ratio directly opposite that of the print resolution. If the print ratio is 2:1 (horizontal to vertical), create a font with a cell matrix aspect ratio 1:2 (horizontal to vertical). You can achieve this same thing if you are using scalable fonts with a font manager that allows you independent control over the horizontal and vertical font sizing parameters.

Printer Type	Common Print Aspect Ratios (based on common resolutions)		
Dot matrix (9-pin)	1.7:1	3.2:1	1.1:1
Dot matrix (24-pin)	3.2:1	1:1	
Inkjet	1:1		
Thermal Transfer	1:1		
Laser	1:1		

Printer Output Modes

The two output modes available to most printers, text and graphic, affect the speed and quality of your hard copy. If you are using fonts, you will probably use your printer's text mode for draft printing and its graphic mode for final copy (camera ready print).

Print Speed

An important difference between text and graphic modes is the speed at which they print. Graphic mode prints at approximately one-fourth the speed of text mode. Since text fonts are already in place in the printer's firmware, they are readily available, whereas graphic fonts must be dots can be printed per inch. In general, higher print resolutions provide a high-quality appearance in smoothness and form to fonts; lower resolutions provide a rougher appearance.

Print resolutions are given as horizontal by vertical values, for example, 300 x 300 DPI. The following print resolution rating is based on the broad range of printer types available. As with all manner of manufactured goods, early printer models coexist with the latest production models. Even with such a large grouping from different manufacturers, there are really only a few common resolutions used. In the following table, these have been grouped as low, medium, and high resolutions.

Resolutions	**Dots per Inch**		
Low	60 x 60	75 x 75	100 x 100
Medium	120 x 120	150 x 150	180 x 180
High	200 x 200	240 x 240	300 x 300 and up

Tip Many times, salespeople give you only the higher of the horizontal or vertical values. This can mislead you into believing you're getting a higher resolution printer than you are. Don't let them get away with it; ask for both values! A laser printer was presented to me as a 600 DPI printer. While the printer was capable of a horizontal print resolution of 600 DPI, the vertical component was still limited to 300 DPI. This means it is more than likely this printer would never be supported by any application in any resolution other than 300 x 300 DPI.

Print Resolution Support

Most printers provide a range of print resolutions. The resolution you use will depend upon how your software and hardware application supports the printer. Unfortunately, the best print resolution capabilities of a printer are not necessarily the ones supported.

The Least Common Denominator Because it is easier, and they can "support" more printers this way, many manufacturers use the "least common denominator" method of support: A printer, judged to be a "standard" in the computer industry, is targeted for support. Manufacturers and developers then write firmware that emulates, or software that addresses, the lowest print resolution of that printer. This method allows many printers to run as a specific printer, commonly supported by most software packages, and the printer manufacturer can say, "Our printer runs just like (a well-known brand)." Or a software developer can say, "Since we support the (well-known) printer and your printer runs just like it, we support your printer."

For example, when laser printer manufacturers build their printers, they commonly support the high-resolution printing (300 x 300) of Hewlett-Packard's LaserJet series printers. When HP built the HP DeskJet printer, it was designed to emulate the HP LaserJet printers and produce 300 x 300 DPI output. When dot matrix printer manufacturers build their 9-pin and 24-pin printers, they commonly support the low-resolution printing (120 x 75) of Epson 9-pin and medium-resolution (180 x 180) of Epson 24-pin series printers.

Support for Higher Print Resolutions Many printers are capable of higher print resolutions than are commonly supported by applications. Support for these resolutions usually requires special coding in the software package. Many software developers choose to go with the broader support offered by low-resolution drivers, rather than invest the time in developing a printer-specific high-resolution driver.

For example, an NEC P5XL 24-pin dot matrix printer is capable of 180 x 180 DPI and 360 x 360 DPI. The 180 x 180 DPI output of the NEC is based on the Epson LQ 1500, a popular and commonly used 24-pin printer. This allows the P5XL to be run as an Epson in many applications. Addressing the P5XL's 360 x 360 mode, however, requires that the software developer control the stepper motor of the printer. The *stepper motor* is what moves the paper through the printer. This motor has a little plastic gear that allows the paper to move in increments of 1/360 of an inch. Obviously, a printer driver written for the specific peculiarities of this printer will not work very well on any other printer.

Why don't other printer manufacturers emulate the entire print resolution range of a "targeted printer"? They do not develop firmware that exactly replicates all the print resolution capabilities of "targeted printers" because it is viewed as illegal. Development of a printer that exactly emulates a specific "targeted printer" can make the printer's internal control firmware look too much like the firmware of the "targeted printer," and "too much like" is a phrase that perks up the ears of corporate lawyers who are worried about infringement of copyright lawsuits. As long as the firmware is different enough, it is okay. For accessed from some source, and possibly downloaded, before they can be used.

The speed of graphic printing can be inhibited by several other variables, three of which are

- If scalable fonts are used, the time required to scale the fonts must be included.
- The greater the character size, the longer printing takes.
- The higher the print resolution, the more data can fit on a page, and the longer printing will take.

Character Size and Quality

Since all font characters are printed as dots, regardless of the printer type or printer mode, their print size and quality are directly related to the resolution and mode in which they are printed.

Printing in Text Mode

Because text fonts are usually limited in size to even multiples of the height of a printhead, the printed quality of the character is dependent on the total number of pin strikes used in its rendering. Usually, an individual text font character is printed by firing all the pins in the printhead at the same time. In general, text fonts printed in this way look fine because they were specifically designed to be printed this way.

Note Text fonts are often limited in size to the number of pins on the printhead. This size limit will affect the quality and complexity of the font used.

Printing in Graphic Mode

Graphic mode allows scalable fonts and larger sizes of nonscalable fonts to be used for printing. In this mode, software can control the order and pattern in which the pins of a printer are fired by sending signals through a printer's firmware. Since this allows precision control over the placement of every dot on a printed page, greater flexibility in print quality is possible. In most cases, the higher the print resolution, the better the image quality.

Common Printing Problems

There are three printing problems that affect the quality of your printout. The first two problems are common to all printers, and you will see them when the printer does not seem to deposit the appropriate amount of ink to the paper evenly. The last problem is common to dot matrix, inkjet, and thermal transfer printers.

- A character or a page of characters may be inconsistent in their color or shading. Instead of well-defined, visible characters of a uniform color and shade, you may see bands of darker color alternating with lighter bands.
- A character or group of characters on a page may be faded or missing.
- Lines of white space may alternate with lines of printed data, a kind of *venetian blind* effect.

If you see any of these problems, don't panic. Some of the possible causes and cures follow.

Alternating Bands

Alternating bands of darker and lighter color are common to graphic printing modes of dot matrix, inkjet, and thermal transfer printers, but not laser printers. When this occurs, the printhead is usually positioned too far away from the paper. An adjustment located on most printers allows you to alter this distance.

Caution If you position the printhead too close to the paper you could push the ribbon against the paper, causing streaks to appear on the page.

Faded or Missing Characters

When a printed page has faded or missing characters, it usually means the printer is running out of ink or inefficiently using what ink it has. Each of the four technologies can generate this problem in its own way.

Dot Matrix

A dot matrix prints faded or missing characters when the ribbon is old and needs to be replaced, or some of the pins in the printhead are jammed. Replacing the ribbon is easy; just buy a new one. If the pins are jammed, you have to buy a new printhead.

Tip You can tell if pins on a printhead are jammed by looking at your printout. If you see thin, unevenly spaced white lines, one dot thick, passing through the characters all the way across the page, at least one pin is probably not firing.

Inkjet

Faded or disappearing print can occur on inkjet printers for one of two reasons: either the ink reservoir is empty and needs to be filled or replaced, or some of the inkjets are clogged. Filling or replacing the ink reservoir is easy; just buy ink refills or a new prefilled reservoir. If the inkjets are clogged, you must clean them out or buy a new printhead.

Note Cleaning is usually a maintenance process described in the printer's manual. In some cases, like the HP DeskJet, the printhead is part of a new, prefilled ink reservoir.

Thermal Transfer

Thermal transfer printers will produce faded or missing print for one of two reasons: either the ribbon has been used up and needs to be replaced, or the temperature of the contact points isn't hot enough. Replacing the ribbon is easy; just buy a new one. If the contact points are not hot enough, see if the printer has a method for turning up the heat. If it doesn't, contact the printer's manufacturer for suggestions.

Laser

When a laser printer produces faded or missing print, the toner cartridge is usually empty or the transfer wire is broken. Check your cartridge and replace it if necessary. A new transfer wire is usually included with a new toner cartridge, but it can be bought separately. You may want to keep any unbroken used transfer wires for emergencies.

The Venetian Blind Effect

The venetian blind effect is most evident when printing in graphic mode. It looks like a vertical bar of printed information followed by a vertical bar of white space. Both bars are of equal thickness. It occurs when a printer's automatic line-feed switch is turned on. This switch forces a printer to automatically move the paper one full vertical line space for every pass of the printhead. It is a simple matter to correct. Go to your printer's manual and look under switch settings. The manual will tell you which switch you are looking for and what the off position is. This problem is usually limited to dot matrix, inkjets, and thermal transfer printers.

To illustrate, imagine a solid black box. When this box is printed, a solid horizontal row of dots is printed the full width of the box. When each line is through printing, the software application uses the printer's paper advance to move the page a certain amount (a portion of a line feed), and then print another row of dots. Now imagine the same box, but this time the automatic line feed is enabled. When this happens, after a line of dots is printed, the printer's firmware automatically moves the paper *one full line feed* down the page before it allows another row of dots to be printed. This line feed leaves a horizontal gap of white space across the box.

In Conclusion

The final quality of print produced by any printer is an interaction of a number of factors. When producing applications for printers, software and hardware developers must balance the technology on which the printer is based, its method of moving paper, its method for putting dots on a page, buffer limits, external font access features, and its available print resolutions. Most of these factors will be invisible to you, but must be kept in mind when considering the entire process of computer font printing.

For many people print quality is the most important factor in printing. This may bé better stated by saying that affordable print quality is an important factor to many people. If you're considering the purchase of a printer, think about the information in this chapter carefully and read every consumer report and product comparison you can before you decide on a printer. The following questions may help you narrow your search.

What Do You Need? If your primary concern is print speed, then you should lean toward 24-pin printers and laser printers. If you need to print on continuous or multipart form paper, you are limited to dot matrix, inkjet, or thermal printers. If you need maximum font flexibility, look at printers that can access fonts from cartridges, have a graphic mode, and have large or expandable RAM print buffers. If you need to print a lot of text often, look at heavy-duty 24-pin and laser printers. If your printing needs are minimal, you may be able to use a 9-pin printer.

What Print Quality Is Acceptable? Do you need to produce camera-ready copy or is a lesser quality acceptable? If you want camera-ready quality, with crisp, sharp characters, look at laser printers. For lesser quality, 24-pin dot matrix, inkjet, or thermal printers are acceptable.

What Print Resolution Is Acceptable? Currently, most laser printers are supported at 300 x 300 DPI, most 24-pin printers at 180 x 180 or 200 x 200 DPI, and most 9-pin printers at 120 x 75 DPI. Although the human eye is capable of discerning dots above 300 DPI, realistically most people will not detect dots at this resolution.

What Can You Afford? Price differences both among and within the different technologies are dramatic. You can find laser printers, 24-pin printers, and thermal transfer printers ranging from a few hundred dollars to a few thousand dollars. Generally, however, laser printers are the most expensive.

Product reviews in computer publications are your best source for up-to-date pricing and capabilities associated with different printers.

CHAPTER

9

Display Systems and Image Legibility

Computer font usage involves not only fonts, but the physical processes by which fonts are presented. This chapter provides basic information about common computer display systems and the display quality they produce. The final quality and legibility of font data information displayed to a screen is dependent upon the components that make up the system. While different display systems generate different levels of visual quality, all perform in essentially the same manner: all work on a personal computer, use internal fonts or add-on fonts when displaying text to a screen, and display information to a screen as a series of pixels or dots. To grasp the effects of display systems on font quality, it is important that you understand the following concepts:

- Programmed software and firmware components that make up a screen display system
- Common display modes
- Factors that affect display, including resolution, pixel size, and aspect ratio, which are determined by the system display components
- How display systems affect computer font display quality

Display System Components

Computer display systems have at least three basic components: a monitor, a display card, and programmed components (software or firmware). These components work together as one system, each bringing its own capabilities and limitations into the working environment.

Monitors

The monitor, often referred to as a *CRT screen*, houses the visual screen. This is the place where the final display rendering of text and graphic font data takes place. There are two general types of monitors: text and graphic.

Text Monitors

Text monitors, or character display monitors, are designed to perform one function only: display text fonts to the screen. Text monitors are incapable of displaying graphics to the screen. If you shop for a monitor you will almost never be shown a text monitor unless you specifically request it.

Graphic Monitors

Graphic monitors are often designed to be capable of two display modes: graphic and text. In general, the monitor will be placed in one of the two display modes, and it will display only text when in text mode or only graphics when in graphics mode. However, the separate use of the two modes is not always so rigid. Through programming, a graphic monitor can be made to display text fonts on one portion of the screen while displaying graphics on another. For example, pop-down or pop-up menus are often displayed to screens simultaneously with graphic images. This is common in those screens generated by graphical user interfaces such as Windows. Here the screen layout and icons are graphic images, while the menus and command line input portions are in text mode.

Graphic monitors come in three types: monochrome, composite, and color.

Monochrome and Composite Graphic Monitors These monitors can use only two colors for display—a solid background color and a solid foreground color. Two color schemes often used are amber and black and green and black. Amber screens display amber colors on a black background, and are usually associated with composite monitors. Green screens display green colors on a black background and are usually associated with monochrome monitors.

Color Graphic Monitors This type of monitor can display many different colors. The number of colors available for use will often depend upon the resolution being displayed. Medium and high-resolution displays usually offer more colors. In many cases primary color schemes are based on the combination and blending of three colors: red, green, and blue. If you shop for a monitor you will most likely be offered a selection of color graphic monitors.

Note There is often an inverse ratio between color capabilities and very high resolutions (over 1500 pixels, horizontal and vertical). At these higher resolutions display card memory restraints can start to kick in, which results in fewer colors being offered.

Display Cards

Display controller cards either fit into a slot on your PC or, in cases like Atari and some Packard Bell computers, the controller may be built into the PC's hardware. These cards govern the process by which information is displayed to the screen. Display cards often have their own built-in memory—usually 256K or more—for the processing and subsequent rendering of information onto a monitor's screen. Depending on the information, this rendering can be accomplished in one of two modes: text or graphic.

- Text mode is common to all display cards; it allows the display of text fonts to the monitor's screen.
- A card with graphic display mode capability allows graphic information to be displayed to a monitor's screen.

The use of text or graphic mode, or a combination of the two for display, depends on your specific hardware or software application. In many cases, the card's graphic mode is used in conjunction with its text mode. For example, in a GUI (graphical user interface) display environment, the graphic mode is used to display and manipulate the icons, screen colors, and movable, resizable boxes outlining a program's workspace. Text mode is used to display the text information in the pull-down menus and the text typed onto a command line of a program such as a word processor.

Programmed Components

Software and firmware are two possible sources for programmed components within a computer display system. Regardless of the source, programming will determine the display resolution(s) an application can use. For example, a software graphic package may be programmed to allow graphics to be displayed in only CGA, EGA, or VGA mode, or in all three.

Common Display Modes

Though they use the same basic methods, computer systems provide different screen display modes and resolutions for their display systems. Most text displays appear identical; it is in graphic display capabilities that real differences arise.

Text Display Modes

All text displays are nearly equal in how they work and the quality of their display. Text display allows text characters of a specific size to be displayed to a monitor screen. The size of the text font characters is determined by the *column setting*. For example, an 80-column display means that 80 characters, including spaces, will fit on one line across the screen. In many cases, a PC system will allow the column display to be arbitrarily changed.

Graphic Display Modes

Graphic display will be of most interest because many of you will be using graphic scalable or nonscalable fonts. Since this display allows an entire monitor screen to be mapped as a series of dots, theoretically the graphic font character size can be unlimited. In practice, you will find the practical, maximum usable limit for a single character to be one full screen. Since characters are displayed as dots, the higher the display resolution the better the image quality.

There are a number of display modes available, but only a few industry standards. For PC graphic displays, IBM sets the standard. The Macintosh has the highest standard for Apple-style computers. However, these are not the only ones out there. Common computer systems include IBM PC, XT, AT, and compatibles, Amiga, Atari, Commodore, the Apple II family, and Apple Macintosh.

In many cases the different systems have unique display resolutions. Table 9-1 lists common graphic display resolutions and aspect ratios associated with several of the systems mentioned. The notation (h x v) represents horizontal by vertical dimensions.

TABLE 9-1 Common Computer System Graphic Displays, Resolutions, and Aspect Ratios

Type	Display Resolution in Pixels (h × v)	Aspect Ratio (h × v)
IBM	320 × 200 (CGA)	1.6:1
	640 × 200 (CGA)	3.2:1
	640 × 350 (EGA)	1.8:1
	640 × 480 (VGA)	1.3:1
	800 × 600 (Super VGA)	1.3:1
	1024 × 768 (Super VGA)	1.3:1
	720 × 348 (Hercules)	2.1:1
Amiga	640 × 480	1.3:1
	1280 × 400	3.2:1
Apple II		
Family	280 × 192 (Single Hi)	1.5:1
	560 × 192 (Double Hi)	2.9:1
	640 × 200 (Ultra Hi)	3.2:1
Macintosh	512 × 342	1.5:1
	512 × 384	1.3:1
	640 × 400	1.6:1
	640 × 480	1.3:1
	640 × 870	1:1.4
	1152 × 384	3:1

Display Factors That Affect Output Quality

The quality of a graphic display is determined by the interaction of four factors: graphic display resolution, display aspect ratio, pixel display size, and display speed. Understanding the interrelationships among these factors will provide insight into the quality of an image display.

Resolution is often the deciding factor in quality of graphic display. You will find that the higher the display resolution the better the image quality. As Table 9-1 shows, there are many display resolutions available. Because of this it is helpful at times to have generic classifications for them. In the following table, IBM standards have been used as general reference points for the classifications.

Resolution Class	Display Type	Pixel Resolution Range (h × v)
Low	CGA - EGA	320 × 200 – 640 × 350
Medium	VGA	640 × 480 – 800 × 600
High	Super VGA	1024 × 768 – and up

In all cases the quality of the display resolution used will depend upon the capabilities of your display system components; that is, your monitor, display card or cards, software, and firmware.

Monitor Display Capabilities

Capabilities for displaying information are usually built right into the monitor. Two important factors to consider when addressing monitors are its resolution capabilities and whether or not the monitor uses interlacing for its display.

Resolution

Most of the monitors sold today have medium to high-resolution displays. However, some limits are imposed by the physical components of the monitor itself. Check the owner's manual for display resolutions the monitor is capable of producing. For example, a Multisync monitor may be capable of producing CGA, EGA, VGA, and Super VGA displays. Whereas a Taxon RGB monitor may be limited to producing CGA displays only. These two monitors are very different and have their own built-in limits.

Interlacing

When dealing with monitors and screen displays, you may run across the term *interlacing*. This term can have two completely different meanings depending upon the context of its usage. There are two types of interlacing used for monitors: time interlacing and positional interlacing.

Most monitors use time interlacing to reduce the flicker of a screen display, but do not use positional interlacing. A monitor that supports a particular resolution, but only in interlace mode (positional interlacing), doesn't really support that resolution, as you'll see in the following discussion.

Note Interlacing is not an issue many of you will be concerned with. In "real-world" display applications interlacing is invisible to the user.

Time Interlacing This term refers to the method of image scanning used in video. This process is used to reduce the flicker associated with a computer screen, and it helps the human eye to perceive the display in a more favorable light. For example, a monitor displays an image to the screen at a certain rate over a fixed time. If the rate is 60 cycles, this means that the image blinks on and off 60 times per second. This pulsing produces a flickering image which can result in headaches and eye strain. To reduce this "flickering," time interlacing is used.

To comprehend time interlacing imagine two identical screens of information displayed simultaneously to the same screen, but halfway out of step in their display time. This means that when the first screen is halfway through its display time and before it blinks off, the display of the second screen begins. (This process of redrawing or redisplaying the screen is called *refreshing*.) When the second screen is halfway through its display and before it blinks off, the first screen starts again. The result is a drop in the flickering of the screen because there is always a screen to view due to the overlap in the timing.

Positional Interlacing This term is used when describing the scanning method used in video where the individual scan lines that make up a screen picture are offset by a portion of a pixel, say one-half. These overlapped lines are simultaneously displayed to a monitor screen. This process gives the appearance of a higher display resolution, but is not the real McCoy.

Imagine a box displayed on a screen at 320 × 200 pixels. Now overlap each horizontal pixel by one-half. Effectively, you have jammed three pixels into the same space which had been occupied by two. This has increased the horizontal resolution by one-third, and it is now approximately 426. Do the same to the vertical element, and the resolution is effectively raised from 200 to 266 pixels. With this offset, the screen which was displaying 320 × 200 now appears to be displaying 426 × 266 pixels—an apparent increase in resolution, but not really useful. This process can also slow down the cycles and increase the flicker of the screen.

Display Card Capabilities

A display card determines the resolution at which processed information will be displayed onto a monitor screen. Like monitors, not all display cards are capable of displaying the same graphic resolutions. For example, the Genoa Super VGA 6000 series display card also allows CGA, EGA, standard VGA, and Hercules Graphics resolutions to be displayed.

If a display card is capable of producing a high resolution, it will, in many cases, be able to produce most of the common lower display resolutions. Display cards use hard or soft switching to change resolutions.

- *Hard switching* This type of switching means that you can physically remove the card from your PC and flip a switch or a series of switches on the card to move from one resolution display to another.
- *Soft switching* This type of switching means that the movement from one resolution display to another is achieved by software. The software application automatically "switches" the card to the necessary display resolution. This is the method most often used by application software.

Programming Capabilities

Programming of the application being used will affect display resolution. Whether software or hardware, an application will specify and use a display resolution when it displays information to a monitor screen. The choice of which resolutions to display are made by the software developers and marketing people. It is difficult to find applications which will *not* support and use at least medium to high-resolution displays such as VGA or Super VGA.

Aspect Ratio

Aspect ratio is the ratio of horizontal pixels to vertical pixels in a graphic screen display. The ideal aspect ratio for a screen display would be 1:1 (an equal number of pixels horizontally and vertically). You may find that this mostly occurs in high-end, high-resolution systems. Table 9-1 shows the aspect ratios associated with commonly supported display resolutions. From this you can see that a majority of systems' aspect ratios hover around 1.3:1.

Aspect ratio is important when images are transferred between different display resolutions. When the aspect ratio differs between graphic displays, image display proportions will vary. For example, a box designed to be square when displayed with a 1:1 aspect ratio will be a vertically stretched rectangle when displayed at a 2.1:1 aspect ratio. If you port a graphic image (a drawing or screen of graphic font text, for example) between display types, try to maintain the same aspect ratio to avoid image distortion.

Pixel Display Size

The size of a displayed pixel is directly related to two factors: the physical size of the monitor screen and the graphic resolution being displayed. Since variance in either factor will affect pixel size, these relationships can best be described as follows:

- Given a consistent graphic display resolution, pixels must vary in size when displayed on monitor screens of physically different sizes.

  For example, a 320 × 200 CGA display, which fills an entire 10-×-8-foot screen, would have single pixels measuring 0.38 × 0.48 inch—considerably larger than on a standard monitor. The same resolution on an 11-×-8.5-inch CGA screen will display single pixels measuring .034 × 0.04 inch.

- Given a consistent monitor screen size, pixels must vary in size when displayed with differing graphic display resolutions.

  For example, a monitor with an 11-×-8.5-inch screen and a display resolution of 320 × 200 (CGA) pixels will display single pixels measuring .034 × 0.04 inch. The same screen with a 640-×-480-pixel resolution will display single pixels measuring .017 × 0.018 inch.

Display Speed

Another important aspect of text and graphic display modes is the speed at which they display information. Graphic mode display is substantially slower than text mode display. Since text fonts are already in place in the PC's firmware, they are readily available and used without any further processing. Graphic fonts, however, must be accessed from some source and downloaded before they can be used. This processing inhibits their usage speed. In addition, other variables can affect the speed of a graphic display. Three of the most basic variables are display resolution, font character size, and machine speed.

How Display Resolution Affects Display Speed

The higher the display resolution the more data that can fit on a single screen. The more information you display, the longer it will take to process and put it on the screen. It stands to reason that the more space you have, the more information you will try to fit in that space. When information is displayed in medium to high resolutions, people tend to use larger fonts.

How Font Character Size Affects Display Speed

The greater the font character size, the longer it will take to display. Larger characters mean there is more information per character to process before the information can be displayed to a monitor screen.

How Machine Speed Affects Display Speed

The faster the PC, the faster the graphic display. For example, an 8 MHz PC will display graphics at a certain speed. A 16 MHz machine will display graphic information at a much faster speed, and a 33 MHz machine is capable of displaying graphic information even faster.

Determining the Display Quality of Your System

For most people, image acceptability is decided by the final quality of a display. While quality means different things to different people, it usually relates to the crispness, shape, and size of an image. These elements of quality often prove to be associated with display resolution and the use of any display enhancement techniques.

System Display Resolution

The graphic display of a PC-based system is a dynamic relationship between monitor, graphic display card, and software. The upper display limit is determined by the greatest common display resolution among these factors.

For example, if the monitor is capable of EGA, VGA, and Super VGA display resolutions, the graphic display card is capable of EGA and VGA display resolutions, and the software is capable of EGA resolution only, then the maximum display resolution of this system will be EGA. To find the greatest common display resolution of your system, compare the specifications in the manuals of your display system components.

Display Enhancement Techniques

In addition to resolution, display quality is affected by any display enhancement techniques you employ. In most cases, the means to use these techniques are included as part of the programmed hardware or software components of a display system. Such techniques include color-aliasing, hinting, smoothing, and the physical alteration of font characters. (See Chapter 2 for definitions.)

Color-aliasing

The technique most commonly used to enhance display quality, color aliasing is a process which uses programming techniques to control the color or shade of every pixel on a screen display. The colors are altered along the boundaries of displayed characters. This "alteration" creates a contrast between the standard font pixel data and the "colored" edge information. The resulting interference imparts "blurred" edges to the displayed characters. The blurring fools the human eye and brain into interpreting this edge as a smooth line. This color contrast allows the mind to "fill in" the spaces caused by the jaggedness produced by the corners of individual pixels protruding along the edge of a line.

Hinting

While primarily used for printed output, hinting can also be used on fonts at display time. Through slight alterations in character widths and character line or stroke widths, displayed characters can be made to exhibit an improved regularity in shape.

Smoothing

An algorithmic process is used to smooth the edges of scaled or magnified font characters. For display and print purposes the smoother the character, the crisper the image and the better the perceived quality.

Physical Alteration of Font Characters

The characters of a font set may be physically altered to produce a more acceptable screen display image. This is not properly considered an "enhancement technique," but it is mentioned here because it can alter the displayed image of font data. Three methods are commonly used to physically alter displayed font data: scaling, magnification, and font creation. These methods are addressed in Chapters 7 and 10.

In Conclusion

Since the screen display is often the very first thing you will see when you use an application, understanding that a display system is more than just a monitor is vitally important. Realizing the limiting effects of the components that make up a display system will let you know what to expect visually of a computer system. In other words, seeing is believing, but only when you know what is being edited out.

The choice of display systems is up to you. When putting one together, try to optimize the display resolution capability of the overall system and compatibility among the components.

CHAPTER

10

Font Sizing

A major aspect of computer font use involves the sizing of fonts. Two issues commonly define the font sizing process:

- Determining the size of existing fonts
- Determining the desired or required sizes of a font

This chapter describes common sizing techniques, how they are implemented and applied, and how font sizes translate between screen display and printing applications. Even if you do not actively use the information presented in this chapter, the background it provides will be invaluable when using any type of publishing software or hardware.

Determining font size in an intended application may be the biggest challenge you face in working with computer fonts. Don't be alarmed at the seeming complexity of this process. Whether it concerns final output on your printer or screen display, sizing fonts is actually a straightforward process. It is a significant aspect of displayed or printed presentations of all kinds, including desktop publishing, desktop video, letter or book writing, product manual creation, or any other documentation.

While IBM-style system displays are used as a reference point, the sizing and page layout methods presented in this chapter will work equally well with the displays of other systems such as Apple and Atari. These same methods can be used on all printers. The only tools you need are a pocket calculator or pencil and paper. All dimensions are horizontal by vertical unless specified otherwise.

Basic Sizing Methods

The method used for sizing a font depends upon whether the font is scalable or nonscalable. Scalable fonts refer to outline and vector format fonts. Nonscalable fonts refer to text fonts and regular bitmap graphic fonts. The three basic methods of font sizing are scaling, magnification, and the physical creation of a new font.

Scaling This describes the software or firmware process of enlarging and automatically smoothing vector and outline format fonts for use on a screen display or printer.

Magnification This is the process of enlarging a given font or character through the use of a ratio expansion algorithm. This method of sizing is used primarily with bitmap format fonts. It differs from scaling in that the final font images are not smooth.

Font Creation Your last resort—or first, if you wish—for getting a specific-sized font for your application is to make it yourself. If you have the time and the expertise, this is a viable option. Once you've learned how and have had some experience creating a font, this becomes a valuable skill and one you can fall back on in a pinch.

Basic Sizing Factors

Regardless of the application, the methods used for sizing fonts for printing and screen displays are the same and require that the following factors be taken into consideration:

- Dots and pixels
- Vertical resolution of the screen display or printing device
- Vertical font size desired
- Horizontal resolution of the screen display or printing device
- Horizontal font size desired

Dots and Pixels

The terms *dot* and *pixel* are often used generically to refer to individual points from a matrix of points. In reality, these terms refer to separate entities of very different sizes. The dots or pixels that form a font character impose limits on its size. Whether a font character is composed of dots or pixels depends upon whether it is being output to a printer or monitor.

- *A printer prints dots.* The physical dimensions of a dot are determined by the print resolution and the size of the pins on a printhead or focus of a laser beam.
- *A screen displays pixels.* The physical dimensions of a pixel are determined by the display resolution and the physical size of the display screen.

As a general rule, pixels are larger than dots. To illustrate this, consider an 11-x-8.5-inch screen displaying a VGA resolution of 640 x 480 pixels. If you draw a box around the edge of the full screen, this box will measure 640 pixels wide by 480 pixels high, and it will display as 11 inches wide by 8.5 inches high. Now print this graphic screen on a laser printer at 300 x 300 dots per inch. During printing, a single pixel on the screen will equate to one dot on the printer. Given this, the graphic image of the box will be printed with dimensions 2.13 inches wide by 1.6 inches high. You can see how the size of displayed pixels can differ greatly from the size of printed dots.

Resolution

Print or display resolution directly affects the size of a font character. In both cases, resolution determines the output density of the dots or pixels which make up a font character. As with resolutions, characters are sized according to horizontal by vertical dimensions. A rule of thumb is, the higher the print or display resolution the smaller a given font character will appear.

Vertical Character Size

When people talk about font sizing, they are usually referring to the vertical size of a font set or font character. This size is usually based on the distance measured between the top of the tallest uppercase character, such as the *T*, and the bottom of the lowest descender, such as the *y*, of characters in a font set. However, since the parameters of measurement are really up to the individual, sizing can be limited to the height of the character being addressed, such as the height of the characters *H* or *e*. For the sake of continuity, remember which sizing parameter you're using. Two vertical sizing terms are used throughout this chapter: inch and point.

- *Inch* A measurement that many of us grew up with, inches can be provided as fractions or in the more common method of decimals in hundredths of an inch.
- *Point* This is a measurement based on inches. One point is equal to 1/72 inch or 0.0139 inch.

Both inch and point describe the measured vertical size of a character.

While their definition and application always remain the same, the dot or pixel size of the font they describe will differ depending upon the output device: printer (based on dot sizes) or screen (based on pixel sizes). Table 10-1 is a quick reference table of conversions between points and inches.

For those of you who prefer a visual approach, Figure 10-1 offers a bar sizing chart for commonly used point sizes.

Horizontal Character Size

When determining the horizontal size of fonts for a print or display application, consider the following factors about a font: character spacing (proportional or monospaced) and horizontal cell size. Chapter 2 provides definitions and details concerning these terms.

Proportional Spacing

This spacing tends to draw all characters of a font set together and allow each character to take up a unique and specific amount of space based on an individual character's width. Proportional spacing makes it difficult to determine the exact number of characters you can fit on a line.

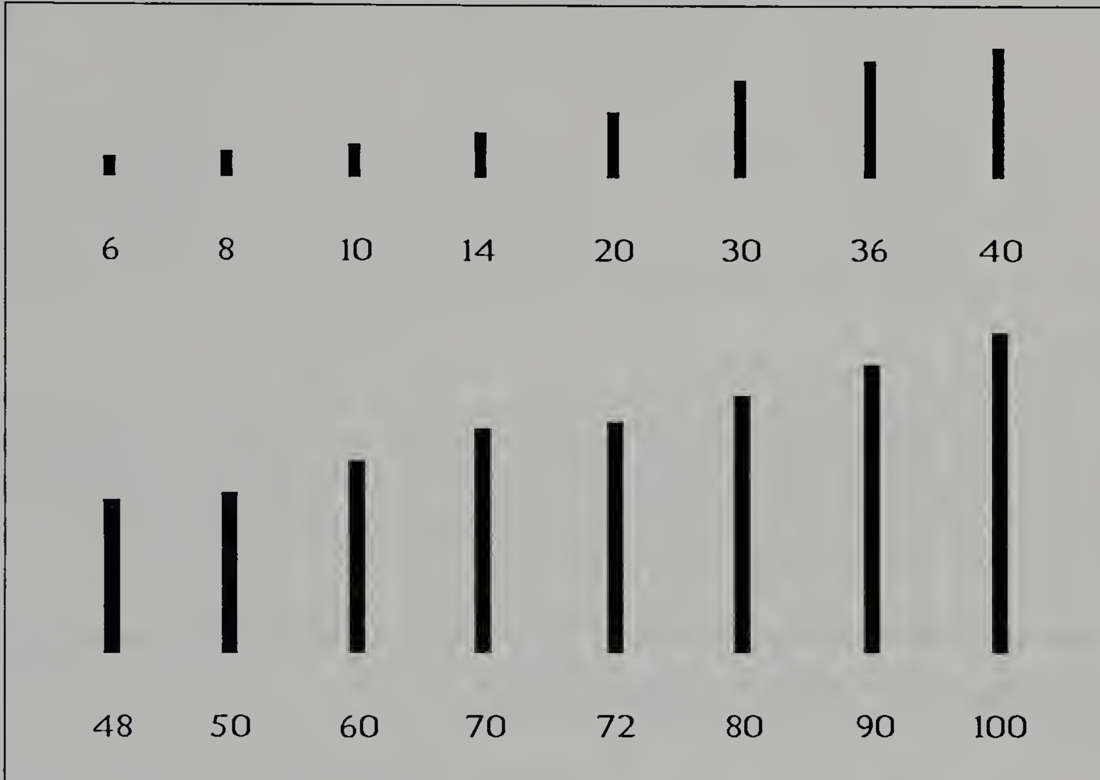
TABLE 10-1 Quick Reference for Conversion Between Points and Inches

Points	Inches	Points	Inches
2	0.03	52	0.72
4	0.06	54	0.75
6	0.08	56	0.78
8	0.11	58	0.81
10	0.14	60	0.83
12	0.17	62	0.86
14	0.19	64	0.89
16	0.22	66	0.92
18	0.25	68	0.95
20	0.28	70	0.97
22	0.31	72	1.00
24	0.33	74	1.03
26	0.36	76	1.06
28	0.39	78	1.08
30	0.42	80	1.11
32	0.44	82	1.14
34	0.47	84	1.17
36	0.50	86	1.20
38	0.53	88	1.22
40	0.56	90	1.25
42	0.58	92	1.28
44	0.61	94	1.31
46	0.64	96	1.33
48	0.67	98	1.36
50	0.70	100	1.39

Nonproportional (Monospaced) Spacing

In this mode all characters of a font set, when typed on a line, are separated by an equal amount of space. The spacing is usually based on

FIGURE 10-1 Bar scale of commonly used point sizes



the horizontal size of the character cell or the widest character in a set. Since all characters are spaced evenly apart, it is easy to determine the exact number of characters you can fit on a line.

Horizontal Character Cell Size and Widest Character

These dimensions are important because they provide you with the maximum character width that can be expected from a font character set.

Horizontal sizing terms used throughout this chapter are characters per inch (CPI), column display, and characters per screen line. All terms refer to the number of characters which can be expected on a single line of output. Their definition and application differ because each term is dependent upon the output situation being considered: printing on a printer or display to a monitor screen.

Characters Per Inch (CPI) This term is usually reserved for printed documents. It refers to the number of characters, without spaces, that fit within one inch of a single line of printed text.

Column Display This term is usually reserved for text mode screen displays. It refers to the maximum number of characters that fit on a single line of text displayed to a screen. For example, an 80-column display will allow 80 characters, including spaces, to be displayed on one line of a screen display.

Characters Per Screen Line While this term can be used interchangeably with column display, it is more often used when speaking of graphic screen displays. It refers to the number of graphic characters that fit on a single line of "text" displayed to a screen.

Determining Font Size

Regardless of the font sizing method chosen, one more basic piece of information is needed before it can be accomplished: you need to know what size you want the font to be. You may already have a value in mind, but if you don't, you may wish to calculate the size. To do this requires a few additional pieces of information.

Note If math is not your forte and you do not wish to do any calculating, you can use the precalculated values from the tables in the section, "Quick Lookup Tables," later in the chapter.

Required Sizing Information

The information presented in this chapter can be used not only for determining the size of fonts in applications, but also for layouts for screen display and printing. Layouts often include graphic art or clip art as well as fonts. (Chapter 11 covers page layouts in more detail). Since fonts are really nothing more than specialized graphic images, the information in the following sections contains generic sizing information for graphic images and specific sizing information for fonts. To size fonts and graphic images to a specific display or print resolution you must have the following information:

X = The monitor's exact vertical screen size in inches

W = The monitor's exact horizontal screen size in inches

Y = The vertical graphic resolution being displayed (pixels) or printed (dots per inch)

Z = The horizontal graphic resolution being displayed (pixels) or printed (dots per inch)

V = The measured or calculated vertical size of the image in pixels

H = The measured or calculated horizontal size of the image in pixels

A = The measured or calculated vertical size of the image in inches

B = The measured or calculated horizontal size of the image in inches

P = The character's vertical display or printed size in points

D = The column display value, such as 40, 60, or 80 characters

C = The constant of 1 point = 1/72 inch = 0.0139 inch

S = The number of characters per screen line

I = The number of characters per inch

Note These variables comprise all of the information required for the sizing equations which follow. This information should be available in your system's manuals or from the technical support liaison for the product you're using.

Sizing Equations

There are two equations that can be used to determine the size of any graphic image. Permutations of these simple equations will allow the calculation of all the variables given in the preceding table.

- To determine the vertical or horizontal display or print size of an image in inches, use the following equations:

  Vertical: $(XV)/Y = A$
  Horizontal: $(WH)/Z = B$

- To determine the vertical or horizontal display or print size of an image in pixels, use the following equations:

  Vertical: $(YA)/X = V$
  Horizontal: $(ZB)/W = H$

From these basic measurements (given in pixels and inches) the values of other, more common measurements such as point size, characters per inch, and characters per screen line may be calculated.

Points, Dots, and Pixels

Point size is commonly used to describe the height (vertical size) of a font character and is rarely used to describe other graphic images. When determining point size it is important to comprehend the distinction between points, dots, and pixels. A common misconception lies in equating the vertical pixel or dot size of a font with its point size.

- Pixel size refers to the vertical number of pixels required to display an image on a screen.
- Dot size refers to the vertical number of dots required to print an image on a printer.
- Point size is derived from the physically measured vertical size of a font character (size includes uppercase and lowercase descenders of a font set) when printed or displayed.

Point Size Equations

The following equations can be used to determine a font's point size from several different types of measurements.

- To determine a character's display or printed size in points from a measured size in inches, use the following equation:

  $A/C = P$

- To determine a character's display size in points from a given size in pixels, use the following equation:

$(XV)/(YC) = P$

- To determine a character's print size in points from a given size in pixels, use the following equation:

  $V/YC = P$

Horizontal Number of Characters

For printing applications, characters per inch (CPI) refers to the number of characters that fit within one inch on a horizontal line; for display applications, the terms are column display and characters per screen line (CPSL). To determine the maximum number of characters that fit on one line of a screen display or print within one inch on a line from a printer, you must know the width of the widest character to be used on that line. Usually this value is equal to the width of the widest character in a font set.

Determining Characters Per Inch To determine the CPI for the printed output of a specific font use the following equations and round down to the nearest whole number.

- If the width of the widest character is measured in inches, use the equation:

  $1/B = I$

- If the width of the widest character is measured in pixels, use the equation:

  $Z/H = I$

Determining Characters Per Screen Line When using a monitor's monospaced text display mode, CPSL is referred to as the *column display*. However, when displaying information in a monitor's graphic mode the terminology reverts to simply *CPSL*. This is because the character limits of column displays do not apply, and a graphic display mode allows greater flexibility in font sizes.

To determine the width of characters necessary for a specific column display, use the following equation and round down to the nearest whole number.

- If a specific column display value is given, use the equation:

  Z/D=H

To determine the CPSL for the screen display of a specific font, use the following equations and round down to the nearest whole number.

- If the width of the widest character is measured in inches, use the equation:

  W/B = S

- If the width of the widest character is measured in pixels, use the equation:

  Z/H = S

Remember two things when using the equations for determining CPI or CPSL:

- If the fonts used are nonproportional (monospaced) the maximum number of characters for each line (column display) will be determined.
- If the fonts used are proportional (spacing related to the width of individual characters) it will be difficult to determine the exact number of characters per line. In this case the number of characters of a specific width that fit on one line (CPSL) will be determined.

Quick Lookup Tables

If you decide that doing calculations is for the birds, you can use the lookup tables in Figures 10-2 through 10-5. These tables provide a quick reference of general font sizes (horizontal and vertical) for screen display and printing applications. Each table assumes a constant monitor size of 11-x-8.5 inches.

Depending on the information you want, you can use the tables two ways:

1. Choose a value from the vertical axis and one from the horizontal axis of a table. Read straight across from the vertical value and straight up from the horizontal value. Where they intersect is your final value. For example (using Figure 10-2), a font with a vertical size of 80 pixels, displayed at a vertical resolution of 600 pixels, on an 8.5-inch screen will produce an image 81 points or 1.13 inches high.

2. The process mentioned above may be reversed and a final value from within a chart may be selected first. By reading straight across and straight down, the values from the horizontal and vertical axis can be determined. To determine the pixel size or display resolution necessary to produce a font of a specific point or inch size, select the desired point/inch size, such as 81/1.13, and read across to the left to find pixel size (80 pixels) or down the column for vertical display requirements (600 pixels).

Vertical Font Sizes for Screen Displays

Figure 10-2 shows vertical character sizes for screen displays. All height values are given in points and inches (for example, 17/0.23 means 17 points or 0.23 inch). Common vertical display resolutions are used and given in pixels. Commonly used vertical font sizes are given in pixels. A constant monitor size of 11 x 8.5 inches is assumed.

Conversion Equation

If your monitor screen is not 8.5 inches, a quick conversion equation is necessary to allow you to use Figure 10-2. The following variables are needed to use the quick scaling equation:

X = Your monitor's vertical screen size in inches

Z = A specific point size or inch size from Figure 10-2

V = A font's displayed point or inch size on your monitor's screen

V = XZ/8.5

For example, if the point size of a 100-pixel-high font at a vertical display resolution of 480 pixels is 127 points on an 8.5-inch monitor screen, then

FIGURE 10-2 Quick lookup table of vertical character sizes (in points and inches) for screen displays

Vertical Font Size	200	350	480	600	725	1000
20	61/0.85	35/0.49	25/0.35	20/0.28	17/0.23	12/0.17
40	122/1.70	70/0.97	51/0.71	41/0.57	34/0.47	24/0.34
60	183/2.55	105/1.46	76/1.06	61/0.85	50/0.7	36/0.51
80	244/3.40	140/1.94	102/1.42	81/1.13	67/0.94	49/0.68
100	306/4.25	175/2.43	127/1.77	102/1.42	84/1.17	61/0.85
120	367/5.10	209/2.91	153/2.12	122/1.7	101/1.41	73/1.02
140	428/6.00	244/3.40	178/2.48	142/1.98	118/1.64	85/1.19
160	489/6.80	279/3.89	204/2.83	163/2.67	135/1.88	98/1.36
180	550/7.65	314/4.37	229/3.19	183/2.55	152/2.11	110/1.53
200	611/8.50	349/4.86	255/3.54	204/2.83	168/2.34	122/1.70

Common Vertical Display Resolutions

this same font displayed at the same vertical resolution on a 10-inch-high monitor screen would be

V = (10 x 127)/8.5
V = 149.41 or 149 points

Horizontal Character Width Sizes for Screen Displays

Figure 10-3 shows horizontal character width sizes for screen displays. All width values are given in pixels and are based on the widest character to be used. Common horizontal display resolutions are used and given in pixels. Commonly used column displays and possible characters per screen line (CPSL) are given.

FIGURE 10-3 Quick lookup table of horizontal character width sizes (in pixels) for screen displays

Common Horizontal Display Resolutions	Characters Per Screen Line: 10	20	40	60	80
320	32	16	8	5	4
640	64	32	16	10	8
800	80	40	20	13	10
1024	102	51	25	17	13

Vertical Character Sizes for Printer Output

Figure 10-4 shows vertical character sizes for printer output. All height values are given in points and inches. Common vertical print resolutions are used and given in dots. Graded vertical font sizes are given in pixels.

Note In Figure 10-4, it is assumed that one pixel of a character equates with one dot on a printer. While this is not constant in all cases of font printing, some basic standard for measurement must be assumed.

Horizontal Character Width Sizes for Printer Output

Figure 10-5 shows horizontal character width sizes for printer output. All width values are given in pixels and are based on the widest character to be used. Common horizontal print resolutions are used and given in dots. Commonly used column displays and possible characters per inch are given.

Note In Figure 10-5, it is assumed that one pixel of a character equates with one dot on a printer.

FIGURE 10-4

Quick lookup table of vertical character sizes (in points and inches) for printer output

Vertical Font Size	75	100	150	180	200	300	600
20	19/0.27	14/0.20	9/0.13	8/0.11	7/0.10	5/0.07	2/0.03
40	38/0.53	29/0.40	19/0.27	16/0.22	14/0.20	9/0.13	5/0.07
60	77/0.80	43/0.60	29/0.40	24/0.33	21/0.30	14/0.20	7/0.10
80	77/1.07	57/0.80	38/0.53	31/0.44	29/0.40	19/0.27	9/0.13
100	96/1.33	72/1.00	48/0.67	40/0.56	36/0.50	24/0.33	12/0.17
120	115/1.60	86/1.20	57/0.80	48/0.67	43/0.60	29/0.40	14/0.20
140	134/1.87	101/1.4	67/0.93	56/0.78	50/0.70	34/0.47	16/0.23
160	153/2.13	115/1.6	77/1.07	64/0.89	57/0.80	38/0.53	19/0.27
180	172/2.4	129/1.80	86/1.20	72/1.00	65/0.90	43/0.60	21/0.30
200	192/2.67	144/2.0	95/1.33	80/1.11	72/1.00	48/0.67	24/0.33

Common Vertical Print Resolutions

FIGURE 10-5

Quick lookup table of horizontal character width sizes (in pixels) for printer output

Common Horizontal Print Resolutions	10	12	15	17	20
100	10	8	7	6	5
120	12	10	8	7	6
150	15	12	10	9	7
180	18	15	12	10	9
200	20	17	13	12	10
300	30	25	20	18	15
600	60	50	40	35	30

Characters Per Inch

Resizing Images to Fit

When porting or re-creating images between systems with different display resolutions or monitor sizes, you may want to resize an image. For those of you who have a system or image format that allows scaling of images, this is a relatively simple process; for those who don't, this can be tedious unless your system has access to pre-created, graded sizes of images. For simplicity, only scalable (vector and outline) and nonscalable (bitmapped) image formats will be discussed.

Note The information in this section applies to both fonts and graphics. To simplify the writing, the term "image" has been used and refers to both.

Resizing Scalable Images

If the target system can scale images and the image is in a scalable format recognized by this system, then you only need to determine the image size desired. You can compensate for visual problems due to different print or display aspect ratios by proportionally resizing the dimensions of the image. For systems that feature the ability to stretch images using a mouse or arrow keys, the resizing may be done by eye. While this method is not as precise as calculating the size, it is faster.

Resizing Nonscalable Images

Before an image can be resized, you need to know its starting size and the final size desired. To accomplish this, follow the procedures outlined in this chapter for determining size. When images are in a nonscalable format, several sizing options must be considered because of problems that can arise.

Living With What You've Got

If the creation aspect ratio of the image matches the aspect ratio of the target system, the image will visually maintain the same proportions. The image may fluctuate to be larger or smaller than the original. This variance can depend upon two factors:

- *The "new" display or print resolution.* Higher resolutions produce smaller versions of an image and lower resolutions produce larger versions of an image.
- *The "new" screen size used.* Larger screens can produce larger versions of an image and smaller screens produce smaller versions of an image.

Cropping the Image

When moving from a higher to lower display resolution, an image may be too large to fit on a single screen. In this instance it may be desirable to do with less of the image. If the application you are using allows it, you may crop an image. One way to *crop* an image is to draw a box (window) around the portion of the image you want to use. If this method of setting a cropping window is supported by your application, then the rest of the image is then discarded or ignored. Use the sizing equations provided earlier in this chapter to determine the dimensions of the cropping window.

Creating the Image

To create an image the target system must have graphics creation capabilities. While this option provides precise control over image size, it can be a lengthy process, depending upon your artistic ability. If a system has features for scanning and manipulating images, the major portion of creation can be avoided.

Selecting Presized Images

There may be graded sizes of images available from accessory libraries. This is particularly true of fonts—less so with screen graphic images. If this option is available, the simple expedient may be to select the image closest to the desired size.

In Conclusion

The techniques for sizing fonts and graphic images described here are simplifications of methods often used by software and hardware applications packages for determining similar information. By illustrating basic sizing principals, this chapter provides workable guidelines for you to determine sizes on your own, taking into consideration your system and individual needs.

CHAPTER

11

Screen and Printed Page Layout Considerations

How to arrange information on a page is the next step in font usage. Planning the layout of a printed page or screen display is the key to professional quality in a document. Attention to layout elements such as the "right" typefaces and sizes, use of graphics, font character and graphic placement, and use of white space is very important. These factors, combined with your system's display or print resolution and intended application, make the difference between an adequate or a great presentation. Employing the methods from this chapter to determine the sizes and proportions of your screen or page layout can save hours of valuable creation time—and postpone headaches for those situations when they can't be avoided.

Note The Bibliography lists a number of sources for detailed information on page layout, including font usage and typeface selection. This chapter is intended to provide an outline of basic, general page layout concepts only. The references provide detailed, professional instruction and are well worth your consideration.

Determine Your Application

You must first determine what it is you wish to accomplish before you can address the components which make it up. What you do is up to you. Just have it clear in your mind before you start. Two quick examples can be outlined and used to illustrate why having a good grasp of your application is important.

Note There are literally hundreds of screen display and printing applications and it would be impossible to mention them all here. There are sources listed in the Bibliography which provide detailed instructions on how to approach and perform many of these applications. Don't forget, you can always make up your own.

An Easily Readable Screen Presentation

If your application requires information to be read from a distance off a normal monitor screen, you will have to consider your screen display and its components. Deciding on the display resolution will be necessary, as will your choice of fonts. For this application to fulfill its basic goal you will have to evaluate typefaces, select easily readable ones, and determine their appropriate size for the application.

A Printed Mailing

The production of a document which will be mailed to thousands of people requires that you consider your printer and its components. Mailings must be eye-catching; for these documents to be effective they must be laid out so as to draw the reader's attention to the topics presented. To do this will require the careful selection of a typeface or faces, their placement on the page, and their usage within the document.

Okay, the documents are done. Now what about the outside of the mailing (or envelope for short)? Its appearance is just as important, maybe more so, since it is the first thing people will see. This requires formatting and printing labels and envelopes. For a mass mailing you can use basic (Helvetica-like) or elegant (Caslon-like) fonts. Whichever you choose, the printing on the envelope should be legible. This is necessary for most people and the post office. People tend to throw mail away if it's unreadable on the outside, and the post office will send it back.

Your Presentation Medium

Page layout, as used here, can be loosely defined as the organization and arrangement of images into a single unified image for the purpose of presentation. The specific definition of page layout will be decided by the medium of your intended application. This is why, before you start a page layout, you should have a clear notion of what your intended medium of presentation will be.

Screen Display

A screen page layout requires images to be arranged on a monitor screen. The limits of your workspace are decided by the physical size of your monitor screen.

Printed Page

A printed page layout uses the medium of hard copy printing by a printer for the final presentation of information. It requires images to be arranged on a single printed page. The limits of your workspace are decided by the physical size of your printer paper.

- If you are using a single sheetfed printer, such as most laser printers (in the U.S.), your upper limit is 8.5-x-11-inch paper.
- If you use a continuous feed printer, such as any dot matrix printer, your upper limit is the width of the printer's carriage—8.5 or 14 inches plus the length of the paper. With continuous feed fanfold paper this length can be anything, as long as the paper doesn't rip.

Differences Between Screen Page and Printed Page

While both mediums are flexible to a degree, screen pages and printed pages differ greatly in the ultimate size of their prospective workspaces. For the purpose of understanding page layouts, it is very important that you understand what the size difference between the workspaces means. Many people equate a screen with a printed page; this is not so. Due to the differences in displayed pixels and printed dots, a single screen is capable of showing only a part of a "printed" page. The best way to illustrate this concept is through the use of a chart. The chart in Figure 11-1 contrasts printing output resolutions against common screen display resolutions by using a dot for dot comparison; one pixel on a screen equals one dot on a printer. Locate your print resolution on the vertical axis and your screen resolution on the horizontal axis to find the actual size, in inches, of a single screen when printed. All values are given as horizontal by vertical.

Note If you are trying to maintain a specific font size between screen display and printing, the actual font you choose for a screen display will not be the one you select for printing. Due to the size difference between printed dots and displayed pixels, the font used for the screen display

FIGURE 11-1 Printed sizes, in inches, of single screens at different display resolutions

Print Resolution		320 x 200	640 x 350	640 x 480	800 x 600	1024 x 750
	75 x 75	4.27 x 2.67	8.53 x 4.67	8.53 x 6.40	10.67 x 8.00	13.65 x 10.00
	100 x 100	3.20 x 2.00	6.40 x 3.50	6.40 x 4.80	8.00 x 6.00	10.24 x 7.50
	150 x 150	2.13 x 1.33	4.27 x 2.33	4.27 x 3.20	5.33 x 4.00	6.83 x 5.00
	180 x 180	1.78 x 1.11	3.56 x 1.94	3.56 x 2.67	4.44 x 3.33	5.69 x 4.17
	200 x 200	1.60 x 1.00	3.20 x 1.75	3.20 x 2.40	4.00 x 3.00	5.12 x 3.75
	250 x 250	1.28 x 0.80	2.56 x 1.40	2.56 x 1.92	3.20 x 2.40	4.10 x 3.00
	300 x 300	1.07 x 0.67	2.13 x 1.17	2.13 x 1.60	2.67 x 2.00	3.41 x 2.50
	600 x 600	0.53 x 0.33	1.07 x 0.58	1.07 x 0.80	1.33 x 1.00	1.71 x 1.25

Single Screen Sizes in Pixels

will actually be smaller than the one used for printing. This method of font usage is standard procedure for many publishing packages which use scalable fonts.

Basic Components of Page Layout

The page layout process, regardless of the medium used, requires several factors to be taken into account, including the workspace, typefaces, font size, use of graphic images, and use of white space.

Your Workspace

Both display and printing processes are limited to the utilization of a finite amount of workspace. Knowing the limits of your workspace will allow you to plan the type of fonts, graphic images, and the sizes that can be used within that space.

It is essential that you determine the "correct" dimensions of the workspace. Once the relative size of the workspace has been defined, the process of selecting and sizing the components which will be used, such as fonts and graphics, can commence. For example, while a laser printer may use an 8.5-x-11-inch piece of paper, the actual amount of printable area on the page is less than that. This is because a laser printer's firmware is engineered to maintain a certain amount of unprintable area around the edge of a page. While this area can be up to .5 inch, the actual amount will depend upon the make and model of the laser printer.

Note The unprintable area is to protect the workings of the printer. If a laser beam goes off the edge of the paper it will cause toner to be sprayed and affixed all over the inside of the printer. A stray laser beam can also cause havoc to the machinery itself.

Type Style Selection

Selection of type styles is often affected by your application and the medium you use. While any type style can be used for anything, different type styles tend to perform better on different mediums. The following information provides general rules of type style usage for screen display and printing. These are concepts only; the real choice is up to you. Your taste and preference are important.

Screen Display

If your application uses a screen display, your amount of workspace is limited to a single screen. To accommodate this limit, choose sans serif typefaces, like Helvetica, which are easily readable at a distance. Serif typefaces are often best used for headings or titles on the screen. When minor graphic images, icons, or symbols are required, graphic type styles can be used to good effect, as long as they are used in moderation. Unless your direct intention is artistic, curtail the use of artistic and decorative typefaces.

Printing

If your application uses a printer, your amount of workspace is limited to a single printed page. This area is much larger than a single screen so you have much more flexibility in type style selection, and usage. In the main body of a document, your font selections should be serif typefaces, like Caslon, which are easily readable when presented in large bodies of text; when bolded they also make excellent titles and headings. Sans serif typefaces, such as Universe, are often best used for small bodies of text, a word or a paragraph, where specific information needs to stand out from the main body of text. As with screen display, graphic type styles can be used to good effect as long as they are used in moderation.

Your application may require italic, boldface, or special characters. If this is the case, you need to review all of the characters to make sure you have all you need. For instance, certain math symbols may be unavailable. You may also find that certain characters (like *j*'s) are hard to distinguish in certain fonts. Before you choose your font, make sure it will work for you.

If your application is artistic, ceremonial, or personal, the use of artistic and decorative typefaces can provide a profound and elegant appearance to a document. Just be careful not to overdo it.

Determining the Best Font Size

Determining the optimal font size for your application is important to the goal of the application. For example, if your application is preparing printed documents or screens for visually impaired persons, using a small font like ASCII is out of the question. Instead a simple, easy-to-read typeface should be used and the font sized to around 30 points (approximately .5 inch tall).

Like all aspects of a page layout, font sizing is really a personal preference. However, this preference must be tempered with the knowledge that a balance must be achieved between the size of your workspace and the size of the fonts you use. There are two generalizations that apply to printed page and screen page layouts.

- In a printed document, the height of the font for the main body of text on an 8.5-x-11-inch page is usually around 0.1 to 0.15 inch (approximately 9 points). On a screen in text mode, the height is usually around 0.2 inch (15 points). On a screen in graphic mode there are no generalizations—font sizing is just too flexible.

- While document headlines and titles can be any size, they are often half again to two times larger than the font used for the body of the document. If you produce large-format documents, headline fonts can be as much as ten times the size of text—check any tabloid for examples.

There are no exact rules governing this aspect of font usage and page layout. Many people visualize the font sizes, type styles, and page layout. Use font sizes that work for your eye. When you've finished the document, get feedback from someone else and incorporate their constructive criticism. Learn by doing.

Graphic Images

Not all documents are composed strictly of text; some use pictures or graphic images. The decision to include graphic images, such as clip art, is up to you. If you include graphics, be aware that they take up a portion of your workspace and leave less space for text. On a printed 8.5-x-11-inch page, the size of a graphic has little effect on the fonts you use. However, on a single screen, use of different sized graphics will require an adjustment in the size of the fonts you use.

You must also decide if you want to wrap text around a graphic, to center a graphic on the page, to make it flush left or right, to put it in the margin (if it is small), or to allow it to break a margin. Some software will break a graphic out and automatically fit it on the top of the next page. Consistency is a big issue here. Capabilities of your software may prohibit some of your graphic placement options. You may be forced to use paste-up or consider another software product to get the desired result.

White Space

How much blank or empty space should there be in a document? This is a concept that is difficult to grasp. When you hear it said that a page is too "busy," it indicates an inefficient use of blank space. There are three common causes of a "busy" page:

- ☐ Too much graphic and text information has been jammed onto a page, making it difficult to read
- ☐ Too much variety in font styles or sizes has been used on a page
- ☐ Poor arrangement of the information on the page, resulting in a cluttered appearance
- ☐ The use of difficult to read typefaces for a large body of text, for example, single or multiple pages.

White space includes the space between font characters and within a character itself, the space between lines of text, between text and graphics, text and headings, and the space for margins. You may need to experiment to optimize your use of white space. The more you do, the more your eye will become trained

Here are a few tips on the use of white space:

- ☐ Margin width is in large part dependent on the size of the page. If you want an open look on a book page, you might try margins in the 5-pica (0.32 inch) range. If you run headings or other material in the margins, your margin area may be significantly larger on the side used for the in-margin material. (Note: Pica is a horizontal unit of measure with a single pica equal to approximately 1/16 of an inch.)
- ☐ If you have a heading such as those that appear in this book, your space above the heading should be roughly twice the space below the heading.
- ☐ Be very consistent in your use of spacing throughout; deviations will be easily spotted.
- ☐ You may use white space between graphics and text, text and headings, or in leading, to bottom out pages if necessary for your design. Again, deviations in consistency may be apparent, particularly in a two-page spread.
- ☐ Most software packages allow you to address kerning problems. You may, however, find lines with severe letterspacing problems. One word might spread across an entire line.

- ☐ You may wish to do some kerning to make a line fit or to take care of problems such as a dash touching a following character. If you have such needs, make sure your software has this capability.
- ☐ If your design calls for multiple columns, you might wish to use a smaller font size to avoid breaking lines. Typically, a document with multiple columns will have less margin space than one with only single-column text.
- ☐ Depending on your application, you may wish to use a condensed font with little white space between characters (such as those found in a dictionary) or you may wish to use an eye chart effect (with extra letterspacing) for a logo, a heading, or an advertisement, to give extra white space between characters.
- ☐ If you are using a severely bolded font, you may want to increase letterspacing to improve readability.
- ☐ Be sparing in the use of boldface typefaces. Too much bolding will make text dark and difficult to read; non-bolded text is easier to read.
- ☐ Unless you are writing a ransom note, stay away from using all capital letters. In a document, or even a long heading, they can be difficult to read.
- ☐ With italicized fonts, you may wish to decrease letterspacing because of the slope of the characters. It may be necessary to kern between individual letter pairs.
- ☐ Typefaces with long ascenders and descenders may require more leading than others.
- ☐ A serif typeface is, in general, easier to read than a sans serif typeface because the serifs break up the outline of characters.
- ☐ Tab settings will affect white space. You may want to set your tabs such that they are evenly spaced across a page.
- ☐ You may want to adjust the leading on a page for effect—make sure you are consistent.
- ☐ Some applications may require a certain number of characters on a line. If this is the case, you may need to pick a smaller or more condensed typeface, but you may also need to reduce your margin

to accommodate the character count. If character count is essential, you may have to switch from a proportional font to a nonproportional font to achieve exact spacing between characters.

- In general, the longer the line length, the more difficult a page is to read.
- The type of output device in use should be considered when laying out a page. Lower resolution printers will produce choppier letters and output than higher resolution printers. High resolution displays will often produce cleaner output and crisper looking images than bw resolution displays.
- If you are using a low opacity paper, you may want to consider a light typeface so that the show-through on the back of the page is minimized. The lighter typeface may make your page look less crowded.

Note If you are concerned about the learning curve, don't worry. Most fonts have standard spacing built in. If nothing else, font management utilities will set this up for you. As printed page layouts go, most word processing programs and desktop publishing packages provide default settings for font spacing and page layout specifications. These defaults will, of course, be set according to the developers' concepts of what is correct. Most desktop publishing and word processing programs have predesigned templates that you simply fill in, but that do allow for modifications.

Specific Applications

Many of you can just plug in and go without how-to examples. For those of you who like them or just want to get a feel for what has been presented so far, the following samples have been prepared to give an overview of the page layout process.

A Screen Layout

A basic scenario can be used to illustrate various sizing and layout techniques for screen displays. By dividing this example into its component parts, applications involving titling, screen graphic sizing, and white space usage will be illustrated. The scenarios are based on an IBM system with a 10.5-x-8-inch monitor screen displaying a 640 x 480 graphic resolution.

The first example application is designed for easy reading at a distance. It is a graphic screen comprised of graphic font text and a graphic screen image, shown in Figure 11-2. The image, centered at the bottom of the screen, takes up about one-third of the screen vertically and three-quarters of the screen horizontally. Above the image are three lines of text. The last two lines use equal-sized characters, and the first line uses characters twice the size of those in the last two lines. The space between the graphic and text is one-fifth of the screen. Each line is no wider than the screen and spaced 0.3 inch apart, with the first line starting 0.3 inch down from the top of the screen. The lines of text vary in length, with the widest character in the last two lines displaying at a width of approximately 0.8 inch.

Sizing Your Graphic

Because it will occupy a large amount of the workspace and limit the final amount of space for text, it is important to determine the actual size

FIGURE 11-2 Page layout for a screen display

of the graphic. Using the image sizing equations presented in Chapter 10, the maximum dimensions of the graphic image can be calculated in inches or pixels.

Graphic Size in Inches The graphic is one-third (0.333) of the screen's vertical dimension, or

8 inches x .333 = 2.7 inches

It is three-quarters of the screen's horizontal dimension, or

10.5 inches x .75 = 7.9 inches

Graphic Size in Pixels The graphic's vertical pixel size can be calculated using the equation (YA)/X = V:

(480 x 2.7)/8 = 162 pixels

The horizontal pixel size can be determined by using the equation (ZB)/W = H:

(640 x 7.9)/10.5 = 482 pixels

Determining White Space

Since a graphic is used in this layout, it is important to calculate not only how much space it will take up, but also how much space is required to separate the last line of text and the graphic.

Space Between Text and Graphics The space between the text and the graphic is one-fifth (0.2) of the screen, or

8 x 0.2 = 1.6 inches

Or, you can use the equation (YA)/X = V:

(480 x 1.6)/8 = 96 pixels

Line Space The space above and between each of the three text lines is 0.3 inch. The number of pixels per space can be calculated using the equation (YA)/X = V:

(480 x 0.3)/8 = 18 pixels

This means that the total number of pixels between lines is

18 x 3 spaces = 54 pixels

Titling Application

Titling is a very common application for computer screen page layouts. It usually refers to an onscreen presentation of one to several lines of large text. Before you can proceed, you must determine the exact amount of space you have to work with. This knowledge will let you calculate the number of lines and the maximum number of characters per screen line.

Subtracting the graphic size and white space from the vertical screen display resolution leaves,

$480 - (162 + 96) = 222$ pixels

for the total vertical text area. The amount of horizontal text space remains 10.5 inches or 640 pixels.

Character Height A total vertical text area of 222 pixels and total line spacing of 54 pixels leaves 168 pixels per four text lines. The number of pixels per text line can then be calculated:

$168/4 = 42$ pixels

Since the characters in the first line are twice the size of those in the last two, their height is 84 pixels and the height of characters in the last two lines is 42 pixels. From this, the maximum vertical size in inches and points of the font characters can be calculated. Using the equation $(XV)/Y = A$:

$(8 \times 42)/480 = 0.7$ inch for the smaller lines of text and $0.7 \times 2 = 1.4$ inches for the larger line

Using the equation $A/C = P$:

$0.7/C = 50$ points for the smaller lines of text and $1.4/C = 100$ points for the larger line

Determining Characters Per Screen Line With the maximum width of the characters in the last two lines at 0.8 inch, the maximum width of a character in pixels can be calculated by using the equation $(ZB)/W = H$:

$(640 \times 0.8)/10.5 = 49$ pixels per character width

This allows two methods of calculating the maximum number of characters with a specific width per line. Using the equation W/B = C:

10.5/0.8 = 13 characters per smallest line

Using equation Z/H = C:

640/49 = 13 characters per smallest line

Since the first line contains characters twice the size of the second line, its maximum character width would be 98 pixels or 7 characters per line.

A Printed Page Layout

Most printed page layouts use 8.5-x-11-inch pages. To ease the problems in layout, many software programs allow you to generically set up your page layout before you print. These packages create a document layout file, often referred to as a *style sheet*. This style sheet allows you to specify margins, tabs, headers, footers, and fonts to be used. Because of the preprinting arrangements done by the style sheet, there is little need to perform the major calculations required for the screen layout.

Instead of giving equations, a software package is assumed to have programmed capabilities for setting up and producing a printed page layout through a style sheet. The example application presented here is a business letter—a simple type of printed page layout. Figure 11-3 illustrates the printed page based on the layout components described in the following sections. (The letter in Figure 11-3 has been reduced in size to fit on one page in this book.)

The Workspace

Letters are normally printed on 8.5-x-11-inch paper. For this example the workspace is limited to 5.5 inches horizontally by 6.5 inches vertically.

FIGURE 11-3

Page layout for a printed business letter

CUBIC CORPORATION

Convention Services, Ltd.
193 Lincoln Street
Canaveral, Ohio

Attn: Richard McKenzie, Director

Cubic Corporation
1234 Four Corners Road
Four Corners, Arizona

October 20, 1993

Dear Mr. McKenzie:

As Coordinator of Cubic Corporation's annual research conference on **Large Rectangular Structure Design**, I am currently investigating possible sites for our spring conference.

Please send all information on facilities available at the Canaveral Convention Center, including shuttle services, accommodations and entertainment, conference support systems, and special rates.

Thank you for your assistance.

Sincerely,

Dr. Wilford Pythagoris
Conference Coordinator
Cubic Corporation

The Printer

A laser printer is used for printing the final document. The page is printed at a resolution of 300 x 300 DPI.

White Space

Except for the graphic letterhead, the positioning of the remaining information on the page deals with text. Because of this, the main considerations in white space usage for this example are margins, character spacing, line spacing, and line justification.

Margins All margins are 0.5 inch. The inside address and greeting are followed by the body of the letter, which is indented an additional 0.25 inch. The margins move back to their original 0.5 inch for the closing.

Character Spacing For easier reading, all characters of the font sets should be proportionally spaced. A proportional font has an effect on white space by reducing the space between characters; it produces greater delineation of and between words.

Line Spacing Standard line spacing (leading) is built into the fonts. This imparts an even regularity between lines of text, producing an easier to read document.

Line Justification To maximize use of overall white space, the text in the body of the letter is fill justified. This gives you an evenly balanced page.

Graphic Use

The only graphic used for this document is in the letterhead. It is right justified at the top of the page. The distance between the letterhead and the beginning of the letter—the company names and addresses—is 0.75 inch. The letterhead is not more than 0.7 inch high and 3 inches wide.

Fonts

Three fonts are used in the letter, two serif typefaces and one sans serif. The fonts used for the company names, addresses, and most of the body of the text are an easily readable serif typeface such as Caslon. A sans serif font like Helvetica is used to highlight an important topic in the body of the letter.

Font Size A standard size of approximately 0.15 inch (9 points) is used for the fonts in the body of the text. This means font height is approximately 35 pixels. The font used for the company names, addresses, and conclusion is approximately one-quarter larger than the fonts used for the letter body. In this case the font is 0.22 inch (11 points), or approximately 45 pixels high. Widths are not addressed because the software application automatically wraps whole words to the next line.

Label Layout

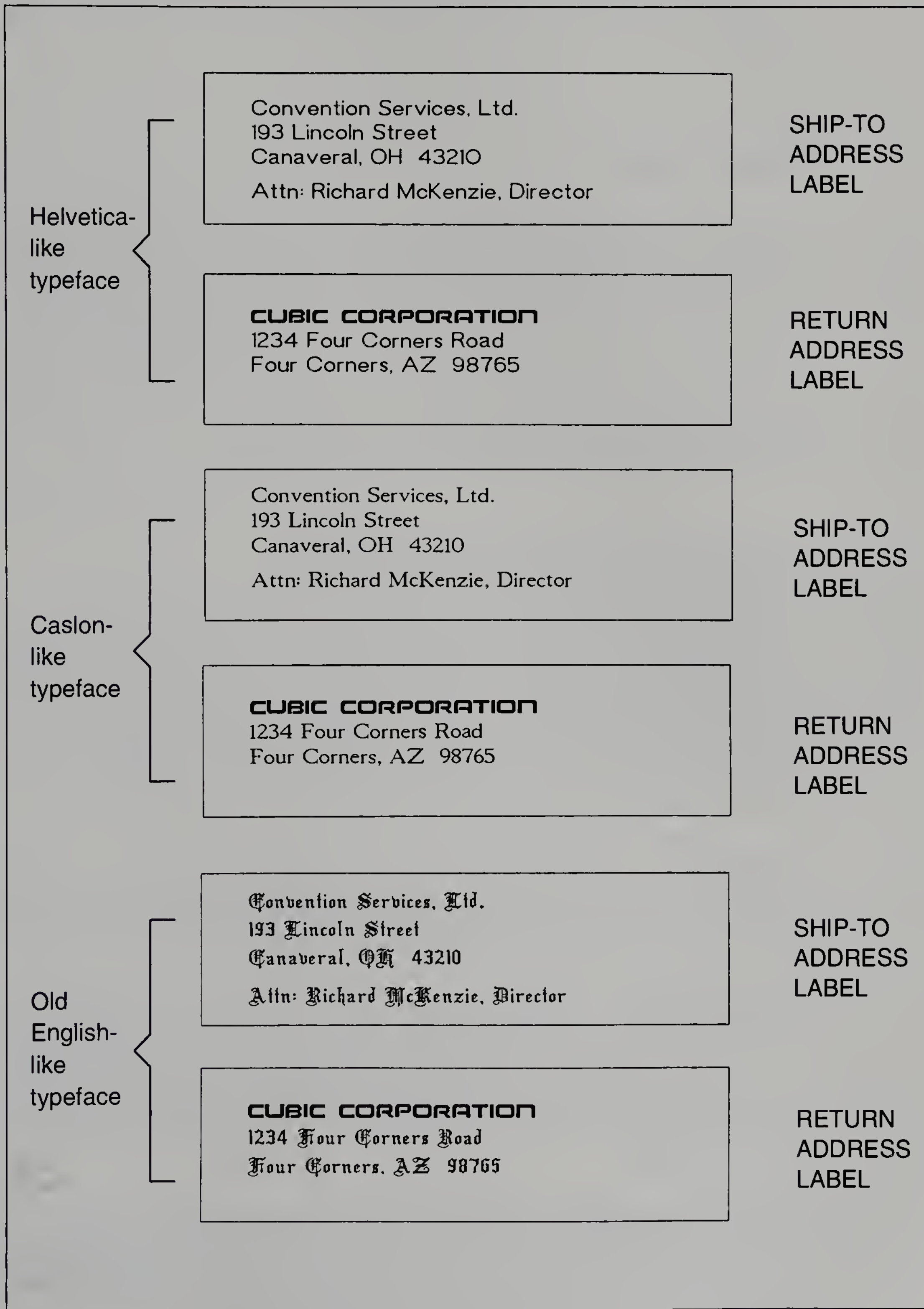
Layout and printing of labels are a special case of printed page layout, but in this case the workspace is much smaller. This scenario uses ship-to and return addresses provided by the preceding business letter. Figure 11-4 shows sample address labels based on the layout component examples described in the following sections. (The labels in Figure 11-4 have been reduced in size to fit on one page in this book.)

The Workspace

For the purposes of this example a standard label size of 3.5 x 1 inch is used. Like an 8.5-x-11-inch page, this label size provides the maximum workspace limit for printing. Margins will further limit the workspace.

Margins Printed information should never run right up to the edge of a label; leaving some white space is always desirable. To achieve this, left and right margins of 0.3 inch are set on all labels. Top and bottom margins of approximately 0.1 inch are set for the ship-to labels, and top and bottom margins of 0.2 inch are set for the return labels.

FIGURE 11-4 Contrasting type styles used for address labels for a business letter



With the margins in place the final workspace for the ship-to labels is 2.9 x 0.8 inches and the workspace for the return labels is 2.9 x 0.6 inches.

Font Style

Since this is a business letter, selection of the fonts to be used on the labels is very important. Traditional type styles are often used because their tone and form are generally accepted as best suited for business applications. Figure 11-4 presents three examples of type styles on ship-to and return address labels. The first two samples use Helvetica-like and Caslon-like type styles respectively. The last example contrasts these styles by using an Old English style of type. Which set of labels would you prefer for this business application?

Character Formatting

A label needs to be easy to read. This requires that font characters be presented in a format requiring little visual effort to understand. To optimize this, select the font's character spacing and justification carefully. Also consider the character font size and its effect on the number of characters per line. If it's too large, the entire address won't fit on the label; too small and the information will be difficult to read.

Spacing Fonts with proportional character spacing are used because, when lines of written information are presented to a reader, words formed with proportionally spaced characters provide easier reading.

Justification Because this is a label, all line entries are left justified. Left justification provides easier reading for the recipient and the postal worker who would process this letter. This has the added benefit of maximizing the amount of workspace that may be needed for each line of an address.

Vertical Font Size Given the limited size of the workspace, font size is a very important issue. A vertical character size of approximately 0.1 inch and 0.05 inch for spacing between lines, gives a limit of 6 lines for the ship-to label and 4 lines for the return label.

Characters Per Line If you have a vertical character size of 0.1 inch, an estimated maximum horizontal character width of 0.13 inch (the letter *M*) and a minimum character width of 0.03 inch (the letter *i*) can be assumed. This means that the average character width would be approximately 0.08 inch. With a workspace width of 2.9 inches, this means the number of characters which can fit on each label line is approximately 36 characters.

A character count of the individual label lines shows that the longest line, including spaces, is 32 characters. Given this, it can be safely assumed that there is sufficient horizontal label space to fit each individual line of text.

In Conclusion

The means by which font and graphic images are laid out on a screen or printed page depend upon the system used. The examples of generic layout applications in this chapter are intended to provide workable guidelines to help you grasp the techniques of page layout. In deciding how information is arranged for presentation, use your eye, trust your intuition and judgment, and remember the goal of your application.

CHAPTER

12

Applications Overview

This chapter provides an overview of font information; it gives a brief review of the book, and discusses software applications that use fonts. Refer to Appendix A for information on font products.

Software is an integral part of any application. It tells the hardware (and you) what to do. This chapter lists some of the software currently on the market. The software packages are categorized according to specific applications, such as desktop video and word processing.

Before you refer to the listings of specific software products, you may want to review the basic font applications and factors common to each, which are summarized in this chapter. For each factor, a chapter reference and/or subheading reference is given. Reading the summary is fairly quick and painless, but you may want to skip through it.

Should you run into a term you do not understand, refer to Chapter 2 or the Glossary for definitions.

Note The review sections in this chapter do not provide in-depth information. For detailed information, read the specific chapters and referenced sections.

Basic Applications

There are two basic types of applications for which you can use fonts: printing and screen display. The hardware and software systems you use for either type of application determine what fonts you can use and how you can use them.

- *Printing applications* Most printers are capable of two modes of printing: graphic mode and text mode. The types of fonts you can use depend on the printer you are using, as well as the print mode you are in. Chapter 8 provides information on printers and hard copy legibility.

- *Screen display applications* Most monitors today are capable of two modes of display: graphic mode and text mode. The types of fonts you can use depend on the display mode you are in. Chapter 9 provides information on screen display systems and image legibility.

Common Application Factors

Regardless of the application, factors affecting the complexity, quality, and style of font usage must be taken into account.

Layouts

Many computer applications involve some form of layout. Layout refers to the process of arranging and the final arrangement of information on some form of display media. Two types of layout are screen and print.

- A screen layout requires images to be arranged on a monitor screen.
- A printed layout requires images to be arranged on a page printed on a printer.

Chapter 11 provides considerations for the layout of screens and printed pages.

Determining Your Workspace Size

To perform a layout you must first determine the size of your workspace. The size depends on the type of output you want to produce. The size of the workspace for a screen display application is limited to the size of the monitor screen. The size of the workspace for a page printing application is limited to the size of the printed "page"; for example, a label or an 11-x-8.5-inch page. For detailed information, read the section, "Basic Components" in Chapter 11.

Output Resolution

The biggest factor that affects image quality is the resolution an output device produces. Output devices are capable of rendering copy in many different resolutions. There are two common output devices: printers for printing applications and monitor screens for display applications.

Printer Output Resolution

The resolution and subsequent quality of printed output differs greatly among printer types because different printer types are capable of producing various print resolutions. Final output quality depends on the printer and printing mode (graphic or text) you are using, as well as the printing resolution the software supports. Chapter 8 provides detailed information on printers.

Screen Display Resolution

The resolution and subsequent quality of a screen display depends on the interaction of the different components that make up a screen display system. These components include the monitor, the display card, and the software. Chapter 9 provides detailed information on screen display systems. Pay particular attention to the section, "Font Display Quality."

Font Access

An application uses either the text or graphic mode of an output device for its layout and final presentation of information. The methods you use to access fonts and the sources from which you can access them depend on the mode you use.

- Text mode requires an application to use nonscalable text fonts.
- Graphic mode allows an application to use scalable or nonscalable fonts.

For more information on font access methods for printers and screen displays, refer to the section, "Font Access Methods," in Chapter 5.

Font Access Methods for Printers

The font access methods available to any one printer differ. In most cases, there are several sources from which a printer may access fonts when printing.

- When printing in text mode, you can access text fonts (specific-sized bitmapped fonts) from printer firmware, bitmapped cartridges, RAM or ROM cards, or EPROMs. You can also use RAM downloaded fonts, but they usually come in a limited number of sizes and usually are restricted to a nonscalable format.
- When printing in graphic mode, you can access scalable and nonscalable fonts from diskettes, cartridges, RAM or ROM cards, EPROMs, or by downloading graphic fonts into printer RAM.

Font Access Methods for Screen Display

When you display fonts on a monitor, you are often limited to accessing fonts from a computer system's internal firmware or from graphic software.

- When you display text in text mode, you can access text fonts (specific-sized bitmapped fonts) from the computer system's firmware or, in special cases, you can download them into RAM. These fonts are usually restricted to a nonscalable format.
- When you display text in graphic mode, you can access scalable and nonscalable fonts from diskettes, or by downloading graphic fonts into the computer's RAM.

Font Selection

Before selecting the fonts you use, you should carefully consider the application for which you intend to use them. Depending on what you need to do and the tone you wish to convey, the different type style and the type style character formatting you select are important. For detailed background information, read Chapters 4 and 11.

Type Styles

The many different styles of fonts available fall within the font classifications serif, sans serif, traditional, classical, artistic, and graphic. How carefully you select a single style or combination of styles will determine how effective your printing or screen display application will be. To understand the basic workings of type styles, refer to Chapter 3.

Font Manipulation

The type of font you use (scalable or nonscalable) determines what software you need to manipulate a font's characteristics. If you are using scalable fonts, more than likely you will need to use a font management utility. If you are using nonscalable fonts, manipulation will probably be built right into your application software. For detailed information, see the section, "The Influence of Your Application," in Chapter 5 and the section, "Font Management," in Chapter 6.

Size

For many people, the biggest concern regarding font manipulation is font sizing. When you refer to font usage, the term *sizing* usually means font scaling. However, sizing can also refer to magnification. *Scaling* is the term applied to the sizing of scalable (vector and outline) fonts, while *magnification* usually refers to the enlarging of nonscalable fonts. Either way you choose, knowing how to determine the exact font size you need in points and inches is essential. Chapter 10 provides hands-on methods for determining the size of existing fonts. Chapter 7 presents information on creating fonts in specific sizes.

Font Sources

Before determining the particulars concerning the fonts you want to use, you must first know where to get them. There are many font sources available to you. Different software and hardware support different sources. It is very important to know what font formats your application supports and who has them. Chapter 4 provides basic information on font formats commonly used in the computer industry. Chapter 6 lists popular sources of font libraries, such as manufacturers, shareware, and online networks. Appendix A provides listings of font and font use products, company names, addresses, and telephone numbers.

Character Formatting

Once you select a font, the format characteristics, including character spacing, boldness, italics, and line justification, as well as the arrangement of the font's characters on a screen or printed page greatly influence the readability of a document. Your ability to perform any of these formatting functions depends on the capabilities of your software. Chapter 2 provides definitions of these terms, and Chapter 11 provides examples of usage during page layout.

Specific Software Applications

If hardware components of a computer system are the body behind computer font usage, then software programs are the nervous system that makes an application work. There are many software packages that use fonts. They direct the functioning of a computer system's hardware to produce a desired print or screen display effect (application). These packages can be categorized according to the applications they serve. The following sections address several of the more prominent categories of computer font applications. Within these categories there are lists of sample software products that fit these categories of font usage. These listings by no means cover all of the font usage applications and software available in the world of computer fonts. They merely present a brief view of what's available.

If you don't find your application in the lists, don't worry. There are bound to be lots more than are listed here. Just add your application and software to these lists. (That's what book margins are for.)

Clarification of Terms

Before addressing various software applications, a bit of clarification is important for several common computer industry terms. The terms *WYSIWYG* and *desktop* often come up in communications concerning font usage.

WYSIWYG

This term, an acronym for What You See Is What You Get, is a clever marketing term used to describe the functioning of a number of graphic font display and desktop publishing programs. Software that supports this "WYSIWYG" function produces a document on the screen as a graphic image and prints the entire image to the printer as a single graphic image.

Desktop

You can apply the term *desktop* to any application that uses a personal computer and peripherals to generate screen display or printer hard copy, such as a printer or monitor. However, the term often refers to cases where the graphic modes of the hardware system are manipulated by graphic-based software to generate display or printed copy. Common references you will encounter are *desktop publishing* and *desktop video.*

Graphic and Font Use Software

Software in this category uses a computer system's graphic display and a printer's graphic printing mode to produce documents. These packages are usually capable of creating graphic images and using soft fonts for typing on the graphic computer screen. These packages are considered WYSIWYG programs.

Product	**Manufacturer**
Arts & Letters	Computer Support Corp.
CorelDraw!	Corel Systems Corp.
ColoRIX	RIX Softworks, Inc.
DrawPerfect	WordPerfect Corp.
Fontrix	Data Transforms, Inc.
PC PaintBrush	ZSoft Corp.
PrintMaster	Unison World Software
Tempra Pro	Mathematica

Desktop Publishing

Most computer novices have heard this term but don't understand what it really means. Desktop publishing software allows you to use multiple graphic screens to lay out and print a document page or pages. One document page usually equates with a single printed page of your printer.

By incorporating graphic displays with word processing capabilities, this software can provide the best of both worlds. It allows you to see what you are creating on the screen in the font styles and sizes you use, and it allows you to print this document.

However, be aware of the possible misuse of the term WYSIWYG. This term is only correctly applied when the software you use saves the work you did on the screen as a graphic file, such as *TIF* (Tagged Image Format), or a Page Description Language file, such as PostScript, and prints that file. In such cases, what you print is exactly what you create onscreen. The "What You See" comes from the different type styles typed on the screen. The "What You Get" comes from the printing of this exact image on a printer.

When this does not occur you see the font styles you are using on the screen, but you don't print with the same fonts. In many cases the software's printing default uses whatever fonts happen to be in the printer's memory. Unless fonts that match those you used on the screen are downloaded, you get the closest the software can match from what's available in the printer.

Product	**Manufacturer**
Aldus PageMaker	Aldus Corp.
Express Publisher	Power Up! Software Corp.
Finesse	Logitech, Inc.
GEM Desktop Publisher	Digital Research, Inc.
Impress Desktop	PC Publishing
PFS-First Publisher	Software Publishing Corp.
Picture Publisher	Astral Development Corp.
Publish-It!	Timeworks, Inc.
QuarkXPress	Quark, Inc.

Product	Manufacturer
Spellbinder	Lexisoft, Inc.
TotalWord	LifeTree Software
Type-Set-It	Good Ideas
Ventura Publisher	Ventura Software, Inc.

Desktop Video

Desktop video applications revolve around the use of graphic information displayed on a single monitor screen. This application is really twofold. It utilizes the display output from a software or firmware program and a piece of hardware called a Genlock video adapter. This adapter, usually associated with and attached to a graphic display card, allows the graphic information produced on the computer screen to be sent directly to video tape. Given this, it is apparent that any software which displays graphic information to a graphic computer screen can be used. While this is true, not all software can be used effectively for this application.

Most software used for this application is specifically designed for screen displays. They often extensively employ techniques for image enhancement, such as color aliasing, and image manipulation, such as animation. Font use in this area is primarily for screen titling purposes. Where would the six o'clock news be without titling to tell you what burning building you're seeing or the name associated with the large face on the screen? Imagine a TV weather forecast without titles to show you which day of the week the weather prediction is assigned to.

Product	Manufacturer
Animax	VisionBase, Inc.
BCG-2, Video Charlie	Progressive Image Technology
Media Maker	MacroMind
Panorama for AT Vista	AT&T Graphics Software Labs
Pro Video Post	Shereff Systems
Quill	Data Translation
Studio/1	Electronic Arts

Product	Manufacturer
TV Text	Zuma Group
Video Titler Release #4	Entropy Engineering

Screen Presentations and Demos

A very popular font use application is for onscreen presentations and demos. If you've ever sent away for a demonstration diskette for any product, you've probably seen this type of application. Software for these applications is often an easy-to-use screen page layout programming language. This language allows a person to program an interactive, automatic presentation sequence of graphic and font information onto a graphic computer screen. This type of software application is used to produce everything from product tutorials and demos to computerized job training lessons. Since this application is primarily graphic, soft fonts are used.

Product	Manufacturer
Applause	Ashton-Tate
Dashboard	Bridgeway Publishing
Grasp	Paul Mace Software
Harvard Graphics	Software Publishing
Multimedia Toolbook	Asymetrix
Sam V	Technology Applications Group
Show Partner	BrightBill-Roberts & Co.
V_Graph	V_Graph, Inc.

Font Special Effects

Software for special effects is used in addition to your printing or display software. Font special effects, or enhancement, software utilities come in many shapes and sizes. Depending on the utility, it may work with one or several scalable or nonscalable font format types. This utility allows you to add special effects like bold, italic, and drop shadows to fonts that are downloaded into a printer's buffer or a PC's internal buffer.

Product	Manufacturer
Adobe TypeAlign	Adobe Systems, Inc.
Effects Specialist	Postcraft Int'l, Inc.
Font Special Effects Pack	Softcraft
ParaFont	Design Science, Inc.
PreScript	Poc Pan OverSeas Computer
TypeStyler	Borderbund Software, Inc.

Label Generation and Printing

Whether creating mailing labels, product tags, bar codes, or just information labels, font use looms large in this application. Generic software associated with label generation are of two types: WYSIWYG and text.

In label generation software, a label is formatted on a graphic screen and printed in a printer's graphic mode. The fonts utilized in this application are soft fonts.

In text label generation software, label information is entered as text in a word processor, text editor, or database. The labeling software formats this information and prints the labels in a printer's text mode. The fonts utilized in this application are text fonts.

If your label generation application is geared towards business or manufacturing, this application is often associated with a specific type of printer. These printers are designed to perform only one function—that of printing labels. You'll know it if you have one. These types of printers are something you buy for only this purpose. Software used for this application ranges from onscreen label design and printing software to programming languages for layout, formatting, and printing of labels on a specific model of printer. For example, the Zebra Programming Language (ZPL) is designed to be used with Zebra Technologies' label printers only.

Product	Manufacturer
Easylabel	Tharo Systems
Label Designer	ComputaLabel, Inc.
Labels and Envelopes	Eastgate Systems, Inc.
Loftware Labeling System	Loftware, Inc.
MacLabel Pak	Vertical Solutions
Zebra Programming Language (ZPL)	Zebra Technologies, Inc.

Word Processing

For many people word processing is an essential application and a primary reason for owning a computer. Word processing software refers to the spectrum of software designed to allow you to produce documents with a personal computer. These software packages primarily use text-based fonts for printing and screen display. For the majority of word processing software, font flexibility comes in during the printing portion of the software, when scalable or nonscalable soft fonts may be downloaded to the printer buffer and used, or fonts may be accessed from cartridges.

Note There are some word processing packages that allow alternative fonts (downloaded text and soft fonts) to be used in screen display. With the advent of Microsoft Windows, expect this to become more prevalent.

Product	Manufacturer
GEM Write	Digital Research, Inc.
Multi-Lingual Scholar	Gamma Productions
PC-Outline	Brown Bag Software
PFS-Write	Software Publishing Corp.
Sprint	Borland International, Inc.
Word	Microsoft Corp.
Wordbench	Addison-Wesley Publishing Co.

Product	Manufacturer
WordPerfect	WordPerfect Corp.
WordStar	WordStar International, Inc.
XyWrite	Xyquest, Inc.

Company Names and Addresses

Following is a list of the names and addresses of the companies mentioned in this chapter. When known, telephone numbers are also provided. Be aware that addresses and phone numbers can change without notice. In some instances you may need to call directory assistance to find a forwarding phone number and address.

Addison-Wesley Publishing Co.
Jacob Way
Reading, MA 01867
(617) 944-3700

Adobe Systems, Inc.
1585 Charleston Rd.
P.O. Box 7900
Mountain View, CA 94039-7900
(415) 961-4400

Agfa Compugraphic
90 Industrial Way
Wilmington, MA 01887
(800) 424-8973

Aldus Corp.
411 First Avenue South
Suite 200
Seattle, WA 98104
(206) 628-6595

Ashton-Tate
20101 Hamilton Ave.
Torrance, CA 90502-1319
(213) 329-8000

Astral Development Corp.
Londonderry Square
Suite 112
Londonderry, NH 03053
(603) 432-6800

Asymetrix
110 110th Ave. N.E.
Suite 717
Bellevue, WA 98004
(206) 462-0501

Atech Software
5964 La Place Court
Suite 125
Carlsbad, CA 92008
(619) 438-6883

AT&T Graphics Software Labs
3520 Commerce Crossing
Suite 300
Indianapolis, IN 46240
(317) 844-4364

Borland International, Inc.
P.O. Box 660001
1800 Green Hills Road
Scotts Valley, CA 95067
(408) 439-1064

Bridgeway Publishing
2165 East Francisco Blvd.
San Rafael, CA 94912
(415) 485-0948

BrightBill-Roberts & Co.
120 East Washington St.
#421
Syracuse, NY 13202
(315) 474-3400

Broderbund Software, Inc.
500 Redwood Blvd.
Novato, CA 94947
(800) 521-6263

Brown Bag Software
2155 South Bascom Ave.
Campbell, CA 95008
(408) 559-4545

ComputaLabel, Inc.
28 Green St.
Newbury, MA 01951
(508) 462-0993

Computer Support Corp.
15926 Midway Road
Dallas, TX 75244
(214) 661-8960

Corel Systems Corp.
1600 Carling Ave.
Ottawa, Ontario
CANADA K1Z 8R7
(613) 728-8200

Data Transforms, Inc
616 Washington St.
P.O. Box 300458
Denver, CO 80203
(303) 832-1501

Data Translation
100 Locke Drive
Marlboro, MA 01752
(508) 481-3700

Design Science, Inc.
4028 Broadway
Long Beach, CA 90803
(310) 433-0685

Digital Research, Inc.
P.O. Box 579
Pacific Grove, CA 93950
(408) 649-3896

Eastgate Systems, Inc.
P.O. Box 1307
Cambridge, MA 02238
(617) 924-9044

Electronic Arts
P.O. Box 7578
San Mateo, CA 94403
(415) 223-6246

Entropy Engineering
12317 Village Square Terrace
Suite 202
Rockville, MD 20852

Gamma Productions, Inc.
710 Wilshire Blvd.
Suite 609
Santa Monica, CA 90401
(213) 394-8622

Good Ideas
175 Lowell St.
Andover, MA 01810
(508) 475-7328

Lexisoft, Inc.
P.O. Box 1950
Davis, CA 95617
(916) 758-3630

LifeTree Software
33 New Montgomery
Suite 1250
San Francisco, CA 94105
(415) 541-7864

Loftware, Inc.
Box 1090
20 Bay Haven Road
York Beach, ME 03910
(207) 363-3195

Logitech, Inc.
6505 Kaiser Drive
Fremont, CA 94555
(800) 231-7717

MacroMind Paracomp
600 Townsend Ave.
Suite 310
San Francisco, CA 94103
(415) 442-0200

Mathematica, Inc.
402 So. Kentucky Ave.
Suite 210
Lakeland, FL 33801
(813) 682-1128

Microsoft Corp.
One Microsoft Way
Redmond, WA 98052
(206) 882-8080

Paul Mace Software
400 Williamson Way
Ashland, OR 97520
(503) 488-0224

PC Publishing
1801 Avenue of the Stars
#815
Los Angeles, CA 90067
(213) 556-3630

Poc Pan OverSeas Computer
11444 N. Olympic Blvd.
Los Angeles, CA 90064
(213) 312-9562

Postcraft Int'l, Inc.
27811 Avenue Hopkins
Suite 6
Valencia, CA 91355
(805) 257-1797

Power Up Software Corp.
2929 Campus Drive
San Mateo, CA 94430
(415) 345-5900

Progressive Image Technology
120 Blue Ravine Rd., #2
Folsom, CA 95630
(916) 985-7501

Quark, Inc.
300 South Jackson St.
Denver, CO 80209
(303) 934-2211

RIX Softworks, Inc.
18552 MacArthur Blvd.
#200 Suite G
Irvine, CA 92715
(800) 233-5983

Shereff Systems
15075 S.W. Koll Pkwy
Beaverton, OR 97006
(503) 626-2022

Software Publishing Corp.
1901 Landings Drive
Mountain View, CA 94039
(415) 962-8910

Technology Applications Group
1700 W. Big Beaver Rd.
Suite 265
Troy, MI 48084
(800) 659-5214

Tharo Systems, Inc.
P.O. Box 798
Brunswick, OH 44212
(216) 273-4408

Timeworks, Inc.
625 Academy Dr.
Northbrook, IL 60062
(708) 559-1300

Unison World Software
1321 Harbor Bay Parkway
Alameda, CA 94501
(415) 748-6943

Ventura Software, Inc.
15175 Innovation Drive
San Diego, CA 92128
(800) 822-8221

Vertical Solutions
P.O. Box 1150
Beaverton, OR 97075
(503) 671-0511

V_Graph, Inc.
1275 Westtown Thornton Rd.
Box 105
Westtown, PA 19395
(215) 399-1521

VisionBase, Inc.
351 Hiatt Dr.
Palm Beach, FL 33418-7106
(407) 694-2211

WordPerfect Corp.
1555 N. Technology Way
Orem, UT 84057
(800) 451-5151

WordStar International, Inc.
201 Alameda del Prado
Novato, CA 94948
(800) 227-5609

Xyquest, Inc.
44 Manning Road
Billerica, MA 01821
(617) 671-0888

Zebra Technologies, Inc.
333 Corporate Woods Pkwy
Vernon Hills, IL 60061-3109
(708) 913-2276

ZSoft Corp.
450 Franklin Road
Suite 100
Marietta, GA 30067
(404) 428-0008

Zuma Group
6733 North Black Canyon Hwy
Phoenix, AZ 80515
(602) 246-4238

APPENDIX

A

Product Listings and Manufacturer Addresses

This appendix provides listings of font-related products and the names, addresses, and phone numbers of companies that supply these products. You can contact the companies directly to obtain product information. A brief explanation introduces each product listing table.

Since software and hardware products come and go, as do software and hardware companies, this list is as complete as possible at the time of publication of this book. Keep an eye out for software and hardware directories. These will often provide you with the most current status of companies and products. Also, manufacturers may have additional products available, which are not listed in this appendix.

With a request by phone or mail, most companies will provide catalogs and literature on their products with information on font formats, computer system support, prices, supporting software, and printed font samplers. Before purchasing fonts or any font usage software or hardware technology, it is a good idea to request information of this nature. For a quick preview of available type styles, Appendix B provides samples of fonts that are available from several of the font suppliers.

Following is a review of a few important points that have been emphasized in this book. Where font usage is concerned, it is very important that you are aware of these issues, so that you will not run into any compatibility problems.

- ☐ Take the time to learn about and make sure you have a basic understanding of the interaction between your hardware and software systems' components.
- ☐ Think about your application and the types of hardware and software it will require.
- ☐ When you choose fonts from the various font sources available to you, be certain you select fonts in a format and media supported by your application. It can be very frustrating when there are compatibility problems between your software and hardware.
- ☐ Remember, it's okay to experiment with your application software and hardware.

Fonts and font applications are available for different computer systems. In many cases, a product may be available in versions for different systems. Because of this, the computer systems that support each font library or software product will be indicated with an abbreviation. Since products bound to a particular hardware device, such as cartridges and font cards, are usually not bound to a specific computer system, no system abbreviation will be given. The products listed in this appendix are for IBM-compatible and/or Macintosh computer systems. If you have an alternative system, such as an Atari or Commodore, contact the company or computer manufacturer directly to verify support. The following abbreviations are used:

Abbreviation	Type of System
I	IBM or IBM-compatible PC
A	Apple Macintosh
I/A	Both IBM and Macintosh

Font Suppliers

Fonts are available from manufacturers as libraries and in the form of cartridges, RAM/ROM cards, or as part of PostScript emulators. It is up to you to determine the best source for your font needs.

Font Libraries

Font libraries are often available on diskette, and they are the prime source of fonts for most individuals, companies, and font manufacturers who license fonts. These libraries are grouped into two categories, scalable and nonscalable.

Scalable

Currently, scalable fonts are all the rage. Listed here are several manufacturers and suppliers of scalable font libraries.

Library	Manufacturer	System Support
Adobe Type Library, Multiple Master Typefaces	Adobe Systems, Inc.	I/A
Intellifont Type Library	AGFA Compugraphics	I/A
Fontographer Fonts	Altsys Corp.	I/A
Omnifont Type Library	Architext	I/A
FastFonts Library	Atech Software	I
Multi Font Library, Adobe Multi Font Library, BitStream Font Library	Autologic, Inc.	I/A
BAF Type Library	BAF Font Foundry	I
Beyond Words Typefaces	Beyond Words	I
Fontware Type Library	BitStream	I/A
Computer Modern PostScript Fonts	Blue Sky Research	I/A
Fluent Laser Fonts 1 & 2, Glasnost Cyrillic Library, Eastern European Fonts	Casady & Greene Inc.	I/A
Optifont Type Library	Castcraft Software, Inc.	I/A
Foreign Language Typefaces	Davka Corp.	I
Digi Fonts Library, Digi-Duit	Digi-Fonts, Inc.	I
DTC MasterWorks Type Library	Digital Typeface Corp.	I/A
Elfring Font Library	Elfring Soft Fonts	I/A
FontSet, FractionSet	EmDash	I/A
Emigre Fonts	Emigre Graphics	I/A
Font Bank Type Companion	Font Bank	I/A
The Font Company Fonts	The Font Company	I/A
Foreign Language Typefaces	Font World	I
Giampa Textware Fonts	Giampa Textware Corp.	I/A
Intellifont Compatible Type Library	Good Software	I
ZipFonts, Serial Type Collection	Graphitec	A
Premier Collection Scalable Typefaces	Hewlett-Packard	I/A

Library	Manufacturer	System Support
Adobe Type1 Bar Code Fonts	Innovage Int'l. Corp.	I
Image Club Type Library	Image Club Graphics	I/A
Hebrew Fonts	Kabbalah Software	I/A
GoFonts	LaserGo	I
Linotype-Hell Type Library	Linotype-Hell	I/A
LTI Masterpiece Library	LTI Softfonts Int'l., Inc.	I
MacTograpy PostScript Type, PostScript Type Sampler	MacTography	A
Designer Type Collection	MicroGraphix	I
MoreFonts	MicroLogic	I
TrueType Font Pack for Windows	Microsoft Corp.	I
Monotype Classic Fonts	Monotype Typography	I/A
Type Gallery	NEC Technologies, Inc.	I/A
Art Fonts	Olduvai Corp.	I
PIX Symbol Fonts, Ideograf	Page Studio Graphics	I/A
Ultra Script Type Collection	QMS Corp.	I/A
QualiType Type Library	QualiType	I
Alphabet Soup, Fancy Fonts	Silver Graphics	I/A
SoftCraft Type Foundry, Font Solution Pack, WYSIfonts	SoftCraft, Inc.	I
Studio 231 Font Collection	Studio 231	A
Glyphics	SWFTE Int'l., Ltd.	I
Treacyfaces	Treacyfaces, Inc.	I/A
TypeWorks Type Library	TypeWorks, Inc.	I
TypeXpress Type Library	TypeXpress	I
URW Type Library	URW	I/A
Varityper Font Library Varityper PS Font Library, Tegra Font Library,	Varityper	I
SuperFonts	Zenographics	I
SoftType Font Library	ZSoft Corporation	I/A

Nonscalable

There are many applications for which scalable fonts are inappropriate. In such cases, or perhaps simply if scalable fonts are not your preference, nonscalable font libraries are available. Listed here are several manufacturers and suppliers of nonscalable font libraries.

Library	Manufacturer	System Support
Omnifont Type Library	Architext	I
Computer Modern Bitmap Fonts	Blue Sky Research	A
Fontpak Font Library, Laser Fontpak Font Library	Data Transforms, Inc.	I
Elfring Font Library	Elfring Soft Fonts	I/A
LTI Master Library	LTI Softfonts Int'l., Inc.	A
Super Fonts 25/1 & 25/9	Metro Software	I
PC TeX AM, PC TeX CM, SliTeX Fonts	Personal TeX, Inc.	I
Storch Premium Series Fonts	SoftCraft	I
Diplomat Series	VN Labs	I
VS Fonts	VS Software	I
LJ Fonts	Weaver Graphics	I

Cartridges

Cartridges are strictly limited for use on printers. They are almost always available and easily obtainable from a printer's manufacturer (for example, Epson America supplies cartridges for Epson printers and Mannesman-Tally supplies cartridges for Mannesman-Tally printers). Look in your user's manual for addresses and phone numbers. Lists of products from third-party sources is a bit more difficult to come by. Many third-party suppliers produce cartridges that are compatible with Hewlett-Packard laser printers, for example. Contact the companies to find out what other printer makes and models they support.

Cartridges are a popular source of fonts. While they often provide a more limited and less flexible selection of fonts than font libraries, they are often easier to use. Just plug one in and go. You can purchase scalable or nonscalable font cartridges.

Nonscalable Cartridges

Nonscalable cartridge fonts include text fonts and bitmapped soft fonts. Nonscalable font cartridges are the most plentiful.

Cartridges	Manufacturer
ArcArtist, ArcMail, BarCode Set (and many more)	Architext
Type City	BitStream
Action Set, A-Z	Computer Peripherals
Elefont Cartridges	Elesys, Inc.
25 Plus/Charisma	Elite Business App., Inc.
All-in-1, Hardfont A-Z	Everex Systems
25 in 1 SoftCartridge	Good Software
A to Z, ProCollection, International Collection (and many more)	Hewlett-Packard
Super Cartridge 1 & 2	IQ Engineering
Super Cartridge	Lotus Selects
25 in One, Headlines Cartridge	Pacific Data Products
Image Font All-in-One, Collection, Presentation, Ventura (and many more)	Personal Computers Products, Inc. (PCPI)
Desktop Publishing Cartridge (DTP)	UDP

Scalable Cartridges

Fonts included on scalable font cartridges are soft fonts. They are not as numerous as nonscalable cartridges, but their availability is growing. You can expect to see many more of these in the near future.

Cartridges	Manufacturer
JetWare SuperSet+	Computer Peripherals
PCL5, Brilliant Presentations, WordPerfect Scalable, (and many more)	Hewlett-Packard
Super Cartridge 3	IQ Engineering
Complete Font Library, Fontbank	Pacific Data Products

RAM/ROM Cards

RAM and ROM cards are those handy little credit-card-sized gizmos that, like cartridges, are often restricted to a particular model of printer. You'll know if your printer can use this media source. While the fonts provided on these cards are usually nonscalable, they can be scalable. Contact the company for a definitive determination. Check your user's manual for supply contacts and phone numbers.

In many cases these cards, like cartridges, are available from a printer's manufacturer (for example, IBM will supply font cards for IBM printers; Okidata will supply font cards for Okidata printers). In addition, there are third-party suppliers of fonts on this type of media. Listed here are a few sources for font cards.

Printer Support	Manufacturer
IBM, HP laser printers, and others	Architext
HP laser printers	Hewlett-Packard
IBM laser printers	IBM
QMS laser printers, Texas Instruments laser printers, and Apple LaserWriter	Sonnet Technologies, Inc.
Zebra label printers	Zebra Technologies, Inc.

Page Description Language Emulators

Page description language emulators are available as hardware or software products and usually come with a sampling of scalable fonts.

They allow you to print PostScript and PCL5 files on printers that may not otherwise include that feature. Contact the manufacturer for computer system support information.

Since page description language emulation is available through hardware, including cartridges and boards, as well as software, the following abbreviations are used to designate a specific type of product:

Abbreviation	Type of Product
CT	Cartridge
BD	Board
SW	Software

Product	Manufacturer	Type of Product
PostScript cartridge	Adobe Systems	CT
JetPage III	Computer Peripherals	CT
Freedom of Press	Custom Applications, Inc.	SW
EiconScript	Eicon Technology Corp.	BD
PowerScript	Elite	CT
GoScript	LaserGo	SW
Laser Twin for PCL5	Metro Software	CT
PacificPage PE	Pacific Data Products	CT
ImageScript	PCPI	CT
Ultra Script PC	QMS Corp.	SW
Jetscript	QMS Corp.	BD

Font Format Conversion Utilities

Not all software and hardware systems can utilize the same font formats. Those of you who have fonts from several libraries may find that the fonts are in different formats. If so, you may want to have the power of converting fonts into formats compatible with the software you're using. Listed here are some of the font format conversion utilities available on today's market.

Software	Manufacturer	System Support
ReFont	Acute Systems	I/A
Font Foundry	Adobe Systems	I
Type Director	AGFA Compugraphics	I
Metamorphosis	Altsys Corp.	I/A
FontMonger	Ares Software Corp.	I/A
AllType	Atech Software	I
BitStream Fontware for HP Laserjet III & IIID, Type Director	Hewlett-Packard	I
MoreFonts	MicroLogic	I
SoftType	ZSoft Corp.	I

Font Editing Software

For those of you who wish to delve into the world of font creation, there are a number of font editors at your disposal. Font editors are used to create font data from scratch. The following is a list of font editors currently on the market.

Software	Manufacturer	System Support
TypeStudio	Adisys Data Information System	I
Fontographer, FONTastic Plus	Altsys Corp.	I/A
FontMonger	Ares Software Corp.	I/A
AllType	Atech Software	I
The EXP Font Development Kit	Brooks/Cole Publishing Co.	I
Fontrix	Data Transforms, Inc.	I
Digi-edit!	Digi-Fonts, Inc.	I
ElixiFont	Elixir Technologies Corp.	I
ATF Type Designer	Kingsley/ATF Type Corp.	A
FontStudio, LetraStudio	Letraset G.D.S.	A

Software	Manufacturer	System Support
MSD Edit	Mephistopheles Systems	I
PC Metafont	Personal TeX, Inc.	I
SoftCraft Font Editor	SoftCraft, Inc.	I
FontEdit	Specific Solutions	I
Ikarus M, Linus M	URW	I/A
SLEd and FontGen V	VS Software	I
Alphabets	Xerox Corp.	I
Publishers Type Foundry	ZSoft Corp.	I

Font Management Software Utilities

Font management software utilities come in many shapes and sizes. Depending on which one you choose, a utility may work with one or several scalable format types. These utilities allow you to manipulate font data—including scaling, boldfacing, italicizing, and more—as well as perform font downloads. Since different utilities support different font formats, select your font management utility carefully. Listed here are several font management utilities on today's market.

Software	Manufacturer	System Support
Adobe Type Manager, Font Foundry, MultiMaster	Adobe Systems, Inc.	I/A
Intellefont	AGFA Compugraphics (The Company)	I
Type Director	AGFA Compugraphics and Hewlett-Packard	I
Publisher's Power Pak	Atech Software	I
Facelift, Fontware	BitStream, Inc.	I/A
TSR Download	Elfring Soft Fonts	I
ERMAsoft Easyfonts	ERM Associates	I
Typographer	Glyph Systems, Inc.	I

Software	Manufacturer	System Support
BackLoader, Fonts-On-The-Fly	LaserTools Corp.	I
MSDmanager	Mephistopheles Systems	I
QualiType Preview & Management Utility	QualiType	I
WYSIFonts, Font Solution Pack	SoftCraft	I
Super Print	Zenographics	I

Company Names, Addresses, and Telephone Numbers

Companies are listed in alphabetical order. Be aware that addresses and phone numbers can change without notice. When available, direct as well as 800 numbers have been provided.

Acute Systems
Box 37
Algonquin, IL 60102

Adisys Data Info. Systems
#200-25 Alexander St.
Vancouver, BC
CANADA V6A 1B2

Adobe Systems, Inc.
1585 Charleston Rd.
P.O. Box 7900
Mountain View, CA 94039-7900
(800) 833-6687
(415) 961-4400

AGFA Compugraphic
90 Industrial Way
Wilmington, MA 01887
(800) 424-8973
(508) 658-5600

Altsys Corp.
269 W. Renner Rd.
Richardson, TX 75080
(214) 680-2060

Architext, Inc.
121 Interpark Blvd., #208
San Antonio, TX 78216-1808
(512) 490-2240

Ares Software Corp.
561 Pilgrim Dr.
Suite D
Foster City, CA 94404
(415) 578-9090

Atech Software
5964 La Place Ct., #125
Carlsbad, CA 92008
(619) 438-6883

Autologic, Inc.
1050 Rancho Conejo Blvd.
Thousand Oaks, CA 91320
(805) 498-9611

BAF Font Foundry
P.O. Box 700
Monsey, NY 10952
(800) 626-2344

Beyond Words
11 Belle Ave.
San Anselmo, CA 94960
(415) 721-2000

BitStream, Inc.
201 1st St.
Cambridge, MA 02142
(800) 522-3668
(617) 497-6222

Blue Sky Research
534 S.W. Third Ave.
Portland, OR 97204
(503) 222-9571

Brooks/Cole Publishing Co.
511 Forest Lodge Rd.
Pacific Grove, CA 93950-5098
(408) 373-0728

Casady & Greene
22734 Portola Dr.
Salinas, CA 93908
(800) 359-4920
(408) 484-9228

Castcraft Software, Inc.
3649 W. Chase Ave.
Skokie, IL 60076
(708) 675-6530

Computer Peripherals, Inc.
667 Rancho Conejo Blvd.
Newbury Park, CA 91320
(800) 854-7600
(805) 499-5751

Custom Applications, Inc.
900 Technology Park Dr.
Billerica, MA 01821
(800) 873-4367

Data Transforms, Inc.
P.O. Box 300458
616 Washington St.
Denver, CO 80203
(303) 832-1501

Davka Corporation
845 N. Michigan
Suite 843
Chicago, IL 60611
(312) 944-4070

Digi-Fonts, Inc.
528 Commons Dr.
Golden, CO 80401
(800) 242-5665
(303) 526-9435

Digital Typeface Corp.
9965 W. 69th St.
Eden Prairie, MN 55344
(612) 943-8920

Eicon Technology Corp.
2196 32nd Ave.
Lachine, Quebec
CANADA H8T 3H7
(514) 631-2592

Elesys, Inc.
528 Weddell Dr.
Sunnyvale, CA 94089
(408) 747-0233

Elfring Soft Fonts
P.O. Box 61
Wasco, IL 60183
(708) 377-3520

Elite Business Applications, Inc.
412-3 Headquaters Dr.
P.O. Box 300
Millersville, MD 21108
(800) 942-0018
(301) 987-7200

Elixir Technologies Corp.
P.O. Box 1559
Ojai, CA 93024
(805) 640-8054

EmDash
P.O. Box 8256
Northfield, IL 60093
(708) 441-6699

Emigre Graphics
4475 D St.
Sacramento, CA 98519
(916) 415-4344

ERM Associates
29015 Garden Oaks Ct.
Agoura Hills, CA 91301
(800) 288-3762

Everex Systems, Inc.
48431 Milmont Rd.
Fremont, CA 94538
(800) 821-0806

Font Bank
2620 Central St.
Evanston, IL 60201
(708) 328-7370

The Font Company, Inc.
7850 East Evans
Suite 111
Scottsdale, AZ 85260
(602) 998-9711

Font World
2021 Scottsville Rd.
Rochester, NY 14623-2021
(716) 235-6861

Giampa Textware Corp.
1340 East Pender St.
Vancouver, BC
CANADA V5L 1V8
(604) 253-0815

Glyph Systems, Inc.
P.O. Box 134
Andover, MA 01810
(508) 470-1317

Good Software Corp.
13601 Preston Rd., #500W
Dallas, TX 75240
(800) 925-5700

Graphitec
9101 W. 123rd St.
Palos Park, IL 60464
(708) 448-6660

Hewlett-Packard Co.
19310 Pruneridge Ave.
Cupertino, CA 95014
(800) 752-0900

IBM Corp.
6300 Diagonal Hwy.
Boulder, CO 80302
(303) 924-7838

Image Club Graphics
1902 11th St.
Suite 5
Calgary, Alberta
CANADA T2G 362
(800) 661-9410

Innovage Int'l. Corp.
21436 N.E. Union Hill Rd.
Redmond, WA 98053
(206) 462-5787

IQ Engineering
685 N. Pastoria Ave.
Sunnyvale, CA 94086
(800) 765-3668
(408) 733-1161

Kabbalah Software
8 Price Dr.
Edison, NJ 08817
(908) 572-0891

Kingsley/ATF Type Corp.
2559-2 E. Broadway
Tucson, AZ 85716
(602) 325-5884

K-Talk Communications, Inc.
30 West First Ave., 100
Columbus, OH 43201
(614) 294-3535
(614) 294-3704

LaserGo, Inc.
9369 Carroll Park Dr.
Suite A
San Diego, CA 92121
(619) 450-4600

LaserTools Corp.
1250 45th St., #100
Emeryville, CA 94608
(800) 767-8004
(510) 420-8777

Letraset G.D.S.
40 Eisenhower Dr.
Paramus, NJ 07653
(201) 845-6100

Linotype-Hell
425 Oser Ave.
Hauppauge, NY 11767
(800) 633-1900
(516) 434-2000

Lotus Selects
P.O. Box 9172
Cambridge, MA 02139
(800) 635-6887

LTI Softfonts Int'l, Inc.
14742 Beach Blvd.
Suite 440
La Mirada, CA 90638
(714) 739-1453

MacTography
326D N. Stonestreet Ave.
Rockville, MD 20850
(301) 424-1357

Mephistopheles Systems
Design
3629 Lankershim Blvd.
Hollywood, CA 90068-1217
(818) 762-8150

Metro Software
1870 W. Prince Rd.
Tucson, AZ 85705
(800) 621-1137

MicroGraphix
1303 Arapahoe
Richardson, TX 75081
(800) 733-3729
(214) 234-2694

MicroLogic Software, Inc.
1351 Ocean Ave.
Emeryville, CA 94608
(800) 888-9078
(510) 652-5464

Microsoft, Corp.
One Microsoft Way
Redmond, WA 98052-6399
(206) 882-8080

MonoType Typography
53 W. Jackson Blvd., #504
Chicago, IL 60604
(800) 666-6897
(312) 855-1440

NEC Technologies, Inc.
1414 Massachusetts Ave.
Boxborough, MA 01719
(508) 264-8000

Olduvai Corp.
7520 Red Road, Suite A
South Miami, FL 33143
(305) 665-4665

Pacific Data Products
9125 Rehco Rd.
San Diego, CA 92121
(619) 552-0880

Page Studio Graphics
3175 N. Price Rd.
Suite 1050
Chandler, AZ 85224
(602) 839-2763

Personal Computer Products, Inc.
(PCPI)
10865 Rancho Bernardo Rd.
San Diego, CA 92127
(800) 262-0522 (CA)
(800) 225-4098 (outside CA)

Personal TeX, Inc.
12 Madrona Ave.
Mill Valley, CA 94941
(415) 388-8853

PMWare, Inc.
346 State Pl.
Escondido, CA 92029
(800) 845-4843
(619) 738-6633

Power Up Software
2929 Campus Dr., #400
San Mateo, CA 94403
(800) 851-2917
(415) 345-0551

QMS, Inc.
One Magnum Pass
Mobile, AL 36618
(205) 633-4300

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#611
Southfield, MI 48034
(313) 822-2921

Silver Graphics
P.O. Box 485
Pennington Gap, VA 24277
(703) 546-3800

SoftCraft, Inc.
16 N. Carroll St., #500
Madison, WI 53703
(800) 351-0500

Sonnet Technologies, Inc.
18004 Sky Park Circle
Suite 260
Irvine, CA 92714
(714) 261-2800

Studio 231
231 Bedford Ave.
Bellmore, NY 11710
(516) 785-4422

SWFTE Int'l, Ltd.
P.O. Box 219
Rocklind, DE 19732
(302) 234-1740

Treacyfaces, Inc.
P.O. Box 26036
West Haven, CT 06516
(203) 389-7037

TypeWorks, Inc.
820 Cummings St.
Abingdon, VA 24210
(800) 221-9920

TypeXpress
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Hillside, IL 60102
(800) 343-4424

UDP
1309 Laurel Ave.
Manhattan Beach, CA 90266
(213) 545-5767

URW
#4 Manchester St.
Nashua, NH 03060
(603) 882-7445

Varityper
11 Mt. Pleasant Ave.
East Hanover, NJ 07936
(800) 631-8134
(201) 887-8000

VN Labs
4320 Campus Dr.
Suite 114
Newport Beach, CA 92660
(714) 474-6968

VS Software
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Little Rock, AR 72216
(501) 376-2083

Weaver Graphics
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Melbourne Beach, FL 32951
(407) 728-4000

Xerox Corp.
Xerox Square 05B
Rochester, NY 14644
(716) 423-5078

Zebra Technologies, Inc.
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Vernon Hills, IL 60061-3109
(708) 634-6700

Zenographics
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Irvine, CA 92714
(714) 851-6352

ZSoft Corp.
450 Franklin Rd.
Suite 100
Marietta, GA 30067
(404) 428-0008

APPENDIX

B

Font Samplers

About This Appendix

This appendix provides visual samples of type styles available from various font sources. These samplers allow you to familiarize yourself with the variety of font styles that you can find on the market today.

The manufacturers participating in this appendix range from suppliers of font libraries to hardware and software manufacturers whose font selections are available only with their hardware or software products. The style of each presentation was left to the individual manufacturers. From straight listings to collages, your eyes and mind won't get bored as you view these font samplers.

Participating Manufacturers

Font sampler artwork and materials were contributed by manufacturers that expressed interest in this presentation. The type styles often represent partial listings of fonts available from these companies.

The name of the supplier usually is listed at the bottom of each sample. Also, for credit and copyright purposes, the full company name of the supplier is present on the cover page of the respective samplers. For more information, contact the companies directly. Refer to the last section of Appendix A, "Company Names, Addresses, and Phone Numbers" for appropriate contact information. The following table lists the names of companies whose font samplers are included in this appendix.

Adobe Systems	Image Club Graphics
AGFA Compugraphic	IQ Engineering
Architext, Inc.	Kabbalah Software
BitStream, Inc	LaserTools Corporation
Blue Sky Research	Linotype-Hell
Casady & Greene	Microsoft Corporation
Custom Applications, Inc.	MonoType Typography

Data Transforms, Inc.
Digi-Fonts, Inc.
Digital Typeface Corporation (LaserMaster)
Elfring Soft Fonts
EmDash
Emigre Graphics
FontBank, Inc.
The Font Company, Inc.
Font World
Hewlett-Packard Company
Pacific Data Products
Silver Graphics
Sonnet Technology
Swfte International, Ltd.
Treacyfaces, Inc.
URW
Varityper
Weaver Graphics
ZSoft Corporation

Identifying Font Name Abbreviations

In this appendix, there are instances where the name of a licensed font is abbreviated with a company name or an acronym for that name, which is designed to identify the company that created the font. The following table lists several abbreviations you will encounter in this appendix and in the computer font industry.

Font Name	Font Manufacturer
Adobe	Adobe Systems, Inc.
AG, CG	AGFA Corporation
Bitstream	Bitstream, Inc.
FC	The Font Company
ITC	International Typeface Corporation
IQE	IQ Engineering
Letraset	Letraset
URW	URW

Fonts and Their Original Manufacturers

Some companies license fonts from other font manufacturers for resale. There are times when a licensed font name does not carry an obvious abbreviation of the company name. The following table lists the name of the font, along with the font's original manufacturer (when known), which holds the legal copyright and trademark for it.

Font Name	Font Manufacturer
Cottonwood, Juniper, Lithos	Tekton, Trajan
Type Director, Shannon	AGFA Corporation (AGFA Compugraphic Division)
Revue, University Roman	Esselte Pendaflex Corporation
Antique Olive, Choc	Fonderie OLIVE (Monsieur Marcel)
Futura, Lucian	Fundicion Tipografica Neufville
Ad Lib, Della Robbia	Kingsley-ATF Type Corporation
Freestyle Script	Letraset
Helvetica, Linotext, Peignot	Present, Univers

Note PostScript is a registered trademark of Adobe Systems. Compugraphic and Intellifont are trademarks of AGFA Corporation. Fonts-on-the-Fly is a trademark of LaserTools Corporation. Other brand or product names are trademarks or registered trademarks of their respective holders.

Adobe Systems, Inc.

Adobe Garamond™ Regular

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890., :;„“»«&ß!?

Hâmbûrgefönstiv. If the only reliable basis for the designing of an alpha

Adobe Garamond Italic

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890., :;„“»«&ß!?

Hâmbûrgefönstiv. If the only reliable basis for the designing of an alphabet

Adobe Garamond Bold

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890., :;„“»«&ß!?

Hâmbûrgefönstiv. If the only reliable basis for the designing of an a

Adobe Garamond Bold Italic

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890., :;„“»«&ß!?

Hâmbûrgefönstiv. If the only reliable basis for the designing of an alp

Lithos™ Light

ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890., :;„"»«&SS!?

HÅMBÛRGEFÖNSTIV. IF THE ONLY RELIABLE BASIS FO
R THE DESIGNING OF AN ALPHABET IS A FEELING FOR

Lithos Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890., :;„"»«&SS!?

HÅMBÛRGEFÖNSTIV. IF THE ONLY RELIABLE BASIS FO
R THE DESIGNING OF AN ALPHABET IS A FEELING FOR

Lithos Regular

ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890., :;„"»«&SS!?

HÅMBÛRGEFÖNSTIV. IF THE ONLY RELIABLE BASIS FO
R THE DESIGNING OF AN ALPHABET IS A FEELING FOR

Lithos Black

ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890., :;„"»«&SS!?

HÅMBÛRGEFÖNSTIV. IF THE ONLY RELIABLE BASIS FO
R THE DESIGNING OF AN ALPHABET IS A FEELING FOR F

Tekton™ Regular

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890., :;„"»«&ß!?

Hâmbûrgefönstiv. If the only reliable basis for the designing of an alp

Tekton Oblique

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890., :;„"»«&ß!?

Hâmbûrgefönstiv. If the only reliable basis for the designing of an alp

Tekton Bold

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ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890., :;„"»«&ß!?

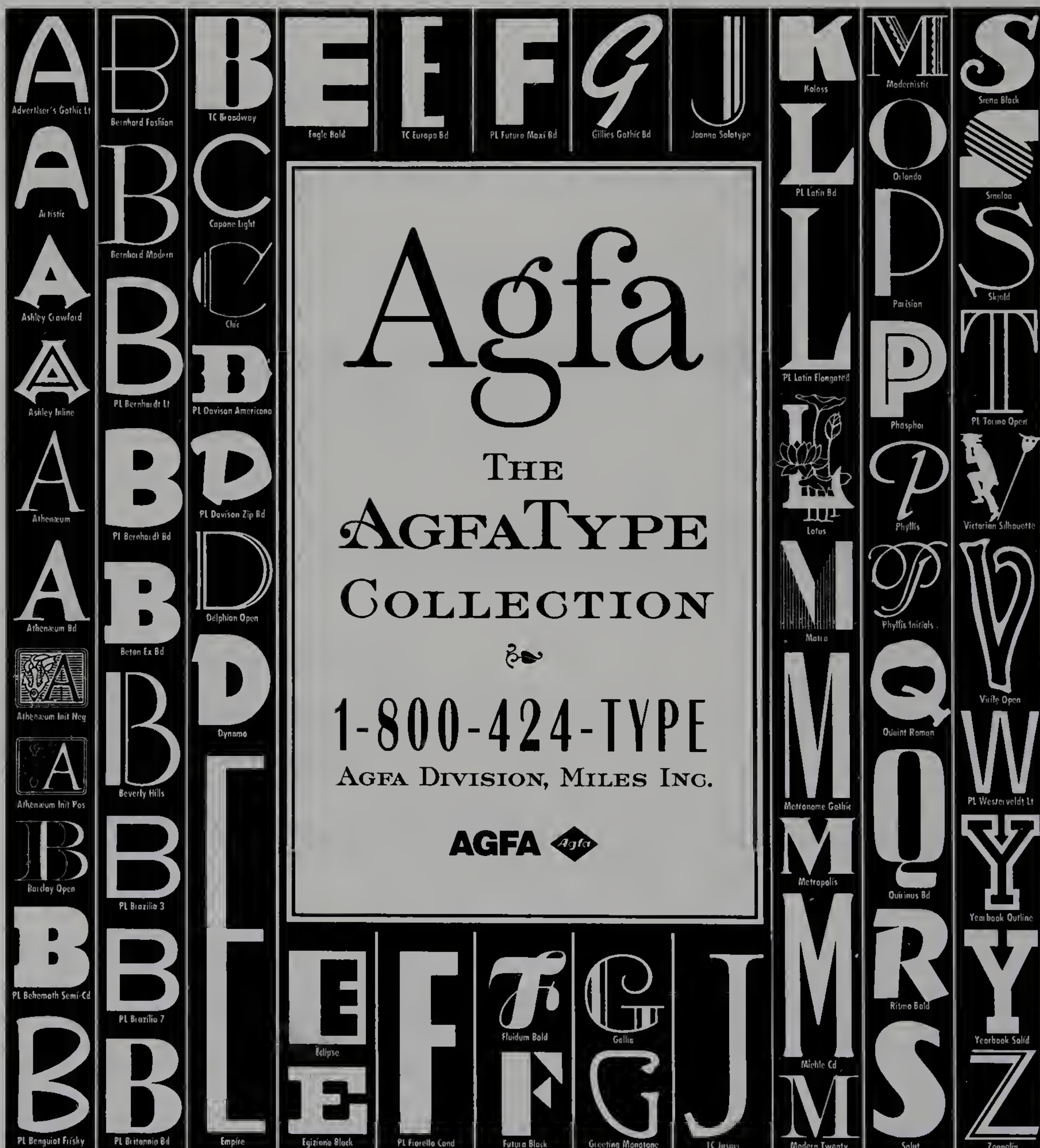
Hâmbûrgefönstiv. If the only reliable basis for the designing of an al

Tekton Bold Oblique

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890., :;„"»«&ß!?

Hâmbûrgefönstiv. If the only reliable basis for the designing of an al

AGFA Corporation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AGFA

Agfa Nadianne Book
Agfa Nadianne Medium **Agfa Nadianne Bold**
CG Poster Bodoni

Garamond Antiqua
Garamond Kursiv Halbfett
Garamond Kursiv Garamond Halbfett

ECCENTRIC
Dom Casual
Garth Graphic
Garth Graphic Italic
Garth Graphic Bold
Garth Graphic Bold Italic
McCollough
CG Bodoni Book
CG Bodoni Book Italic
CG Bodoni Bold
CG Bodoni Bold Italic
Cooper Black
Murray Bold
THUNDERBIRD EXTRA CONDENSED
CG Times Book
CG Times Book Italic
CG Times Bold
CG Times Bold Italic
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Agfa

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DELPHIAN
Hiroshige Book
Hiroshige Book Italic
Hiroshige Bold
Hiroshige Bold Italic
Hobo Medium
Typo Roman
Uncial
Shannon Book
Shannon Book Oblique
Shannon Bold
Shannon Extrabold
Old English
Univers Medium
Univers Medium Italic
Univers Bold
Univers Bold Italic
Marigold

CG Goudy Old Style
CG Goudy Old Style Italic
CG Goudy Bold **CG Goudy Extrabold**
Goudy Handtooled

Signet Roundhand
Microstyle **Microstyle Bold**
Microstyle Extended
Microstyle Bold Extended

GarthGraphicGarthGraphicItalicGarthGraphicBoldGarthGraphicBoldItalicGarthGraphicExtraboldGarthGraphicBlackGarthGraphicCondensedGarthGraphicBoldCondensedAgfaNadianneBookAgfaNadianneMediumAgfaNadianneBoldAgfaRotisSerif55AgfaRotisSerifItalic56AgfaRotisSerifBold65AgfaRotisSemiserif55AgfaRotisSemiserifBold65AgfaRotisSemisansLight45AgfaRotisSemisansLightItalic46AgfaRotisSemisans55AgfaRotisSemisansItalic56AgfaRotisSemisansBold65AgfaRotisSemisansExtraBold75AgfaRotisSansSerifLight45AgfaRotisSansSerifLightItalic46AgfaRotisSansSerif55AgfaRotisSansSerifItalic56AgfaRotisSansSerifBold65AgfaRotisSansSerifExtraBold75ShannonBookShannonBookObliqueShannonBoldShannonExtraboldCGTriumvirateLightCGTriumvirateLightItalicCGTriumvirateCGTriumvirateItalicCGTriumvirateBoldCGTriumvirateBoldItalicCGTriumvirateHeavyCGTriumvirateHeavyItalicCGTriumvirateLightCondensedCGTriumvirateLightCondensedItalicCGTriumvirateCondensedCGTriumvirateCondensedItalicCGTriumvirateBoldCondensedCGTriumvirateBoldCondensedItalicCGTriumvirateBlackCondensedCGTriumvirateBlackCondensedItalicAgfaWileRomanAgfaWileItalicAgfaWileMediumAgfaWileMediumItalicAgfaWileBoldAgfaWileBoldItalicAgfaWileBlackAgfaWileBlackItalic

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Katakana

アイウエオカキクケタチツテトナ

Plains™

Let's Type About It!

MICR

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Postal Bar Code–Zip+4

BigSpring™

We Mind Your P's and Q's.

Pts

SanMarcos™ Condensed

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Building type solutions for business.

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Benavides ™

SanMarcos ™ Condensed (similiar to Helvetica™)

Following Your Needs To The Letter.

Code 3 of 9

Minton ™

♠ ✓ ⁂ ● @ ☎ ℞ © ™ ∅ % ‖ ♥

Old English

Let's Type About It!

Tuxedo™

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PROFESSIONAL INSURANCE AGENT

REALTOR

2

DeLeon ™

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ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890 &$£.,:;!? ÇŒflàéñòßûå

Allegro
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890 &$£.,:;!? ÇŒflàéñòßûå

Bitstream Arrus™ (6-weight family)
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890 &$£.,:;!? ÇŒflàéñòßûå

Della Robbia™ (2-weight family)
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890 &$£.,:;!? ÇŒflàéñòßûå

ITC Garamond® Narrow (6-weight family)
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890 &$£.,:;!? ÇŒflàéñòßûå

HUXLEY VERTICAL™
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890 &$£.,:;!? ÇŒFLÄÉÑÒSSÛÅ

Bitstream Iowan Old Style™ (6-weight family)
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890 &$£.,:;!? ÇŒflàéñòßûå

Lucian™ (2-weight family)
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890 &$£.,:;!? ÇŒfläéñòßûå

Bitstream Oz Handicraft™
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890 &$£.,:;!? ÇŒfläéñòßûå

Staccato 555 (Bitstream version of Choc™)
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890 &$£.,:;!? ÇŒfläéñòßûå

Blue Sky Research

A b C d E f G h I j K l M n O p Q r S t U v W x Y z

COMPUTER MODERN BOLD EXTENDED **After being cleaned and oiled, and regulated, my watch slowed down to that degree that it ticked like a tolling bell. I began to be left by trains, I failed all appointments, I got to missing my dinner; my watch strung out three days' grace to four and let me go to protest; I gradually drifted back into yesterday, then day before, then into**

COMPUTER MODERN TEXT ITALIC *My beautiful new watch had run eighteen months without losing or gaining, and without breaking any part of its machinery or stopping. I had come to believe it infallible in its judgments about the time of day, and to consider its constitution and its anatomy imperishable. But at last, one night, I let it run down. I grieved about it as if it were a recognized messenger and*

COMPUTER MODERN SANS SERIF She would reel off the next twenty-four hours in six or seven minutes, and then stop with a bang. I went with a heavy heart to one more watchmaker, and looked on while he took her to pieces. Then I prepared to cross-question him rigidly, for this thing was getting serious. The watch had cost two hundred dollars originally, and I seemed to have paid out two or three thousand for repairs. While I waited and looked on I presently recognized in this watchmaker an old acquaintance—a steamboat engineer of other days, and not a good engineer, either. He examined all the parts carefully, just as the other watchmakers had done, and then delivered his verdict with the same confidence of manner.

COMPUTER MODERN ROMAN Next day I stepped into the chief jeweler's to set it by the exact time, and the head of the establishment took it out of my hand and proceeded to set it for me. Then he said, "She is four minutes slow—regulator wants pushing up." I tried to stop him—tried to

COMPUTER MODERN BOLD EXTENDED TEXT ITALIC ***I went to a watchmaker again. He took the watch all to pieces while I waited, and then said the barrel was "swelled." He said he could reduce it in three days. After this the watch averaged well, but nothing more. For half a day it would go like the very mischief, and keep up such a barking and wheezing and whooping and sneezing and snorting, that I could not hear myself think for the disturbance; and as long as it held out there was not a watch in the land that stood any chance against it. But the rest of the day it would keep on slowing down and fooling along until all the clocks it had left behind***

COMPUTER MODERN TYPEWRITER `It hurried up house rent, bills payable, and such things, in such a ruinous way that I could not abide it. I took it to the watchmaker to be regulated. He asked me if I had ever had it repaired. I said no, it had never needed any repairing. He looked a look of vicious happiness and eagerly`

A b C d E f G h I j K l M n O p Q r S t U v W x Y z

A b C d E f G h I j K l M n O p Q r S t U v W x Y z

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MODERN
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$$\left(\int_{-\infty}^{\infty} e^{-x^2}\,dx\right)^2 = \int_{-\infty}^{\infty}\int_{-\infty}^{\infty} e^{-(x^2+y^2)}\,dx\,dy$$
$$= \int_0^{2\pi}\int_0^{\infty} e^{-r^2} r\,dr\,d\theta$$
$$= \int_0^{2\pi}\left(-\frac{e^{-r^2}}{2}\bigg|_{r=0}^{r=\infty}\right)d\theta$$
$$= \pi.$$

$$\det\begin{vmatrix} c_0 & c_1 & c_2 & \dots & c_n \\ c_1 & c_2 & c_3 & \dots & c_{n+1} \\ c_2 & c_3 & c_4 & \dots & c_{n+2} \\ \vdots & \vdots & \vdots & & \vdots \\ c_n & c_{n+1} & c_{n+2} & \dots & c_{2n} \end{vmatrix} > 0$$

$$\sum_{j=1}^{n}(\delta\theta_j)^2 \le \frac{\beta_i^2}{\delta_i^2+\rho_i^2}\left[2\rho_i^2 + \frac{\delta_i^2\beta_i^2}{\delta_i^2+\rho_i^2}\right] \equiv \omega_i^2$$

$$X' = X_0 \sin\Phi',$$
$$L' = L_0 \sin\Phi'.$$

B L U E S K Y R E S E A R C H

Casady & Greene

ABILENE

Alexandria Bold

Black Knight

Bodoni Roman

Bonnard

Calligraphy

Campanile

COLLEGIATE

Coventry Script

Cutouts

DESPERADO

Dorovar Carolus

DRY GULCH

Epoque

FATTI PATTI

Fletcher Gothic

Gatsby Bold

Gazelle

Gregorian

Galileo Roman

Giotto Regular

Harlequin

Highland Gothic

Jott Casual

Kasse

Kells

La Peruta

Meath

Micro

MICHELLE

CASADY & GREENE

Monterey

Moulin Rouge

Nouveau

Paladin

Pendragon

Phoenix Script

Prelude

Regency Script

Right Bank

Ritz Regular

Rocko Regular

Sans Serif Regular

Sedona Script

slender gold

Vertigo

Zephyr Script

Check Box

Button

Open Revert

Eject OK Apply

Chicago

Key Caps

CASADY & GREENE

Custom Applications, Inc.

Equivalents of the following 35 fonts are sold in Freedom of Press, CAI's award-winning software PostScript language interpreter. They are not sold separately.

Helvetica, **Helvetica Bold**, *Helvetica Oblique*, ***Helvetica Bold Oblique***

Helvetica Narrow, **Helvetica Narrow Bold**, *Helvetica Narrow Oblique*, ***Helvetica Narrow Bold Oblique***

Times Roman, **Times Bold**, *Times Italic*, ***Times Bold Italic***

Courier, **Courier Bold**, *Courier Oblique*, ***Courier Bold Oblique***

Σψμβολ (Symbol)

ITC Avant Garde Gothic, **ITC Avant Garde Gothic Bold**,
ITC Avant Garde Gothic Oblique, ***ITC Avant Garde Gothic Bold Oblique***

ITC Bookman Light, **ITC Bookman Bold**, *ITC Bookman Oblique*,
ITC Bookman Bold Oblique

Palatino, **Palatino Bold**, *Palatino Oblique*, ***Palatino Bold Oblique***

New Century Schoolbook, **New Century Schoolbook Bold**,
New Century Schoolbook Oblique, ***New Century Schoolbook Bold Oblique***

ITC Zapf Chancery

☆✳✣ ✺❁❐❄ ✤✽■✲❂❁▼▲ (ITC Zapf Dingbats)

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Fonts a Calligrapher Would Write Home About
FUTURISTIC FONTS NOSTALGIA
Textual fonts for letters and correspondence THREEINONEFONTS
FONTS THAT THE SHADOW KNOWS
REVERBERATORY FONTS
TALL THIN TYPEFACES ΑΒΔΕΖΓΗΙΘΚΛΜΝΟΠΞΡΣΤΥΦΧΨΩ αβδεξγηιθκλμνοπξρστυφχψω
FONTS FOR ROBOTS
small block letters for charts and graphs.....
ASTOUNDING FONTS
FONTS FOR FORMAL OCCASIONS
DREAMY FONTS
OPTIMUM TYPESTYLES
Respected Typefaces
COSMOPOLITAN TYPESTYLES
EXPORTED FONTS
Fonts with good inclinations
FONT FIX
FONTS WITH VISUAL QUALITY
Fonts fit to frame
SHINING FONTS
LIQUID CRYSTAL DISPLAYS
Fonts for Clarity
STANDARD TYPESTYLES FOR VERY, VERY SMALL MESSAGES
HIGH TECH TYPEFACES
Sidewinders

FANTASY FONTS
Fonts that mean Business
LARGE BOLD TYPEFACES
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3-D FONTS
ULTRA-LIGHTS
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GRAND FONTS
HAND-LETTERED FONTS FOR THE DRAFTED LOOK
WANTED FONTS
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STORY-BOOK FONTS
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delicately formed typefaces
Très Elegant Typestyles
FONTS IN SILHOUETTE
Fonts that Jump with the Quick Brown Fox
Curvaceous Fonts
STATELY FONTS
High Fashion Typestyles
Recognized Fonts

$$\sum_{m=n}^{\infty} \frac{(-1)^m t^{-n+2m}}{2^{-n+2m}\, m!\,\Gamma(-n+m+1)}$$

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Sterling
Victor
Capulin
Durango
Mack
Berthoud
Florence
Ouray
Pagoda
Brush
Lakewood
Paradox
Bailey
Cortez
Open
Conifer
Jarryall
Mosca Fraktur
IBM Keyboard
Arvada
Briggsdale
Copper Mountain
Mesita
Center
Fort Lyon
POWDERHORN
Golden Medieval
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Vail
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Telluride
Apex
Aspen
Climax
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Granite
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AαBβΓγΔδEεΦφ
AαBβΓγΔδEεΦφ
AαBβΓγΔδEεΦφ
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Silverton
Vernon
Cortez Antique
Monte Vista
ENGLEWOOD
Bijou
Frisco
Rico
Columbine
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Cuchara
Shawnee
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Univers Light
Univers Light Oblique
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Univers Roman Oblique
Univers Bold
Univers Bold Oblique
Univers Black
Univers Black Oblique
Univers Ultra Bold
Univers Light Condensed
Univers Light Condensed Oblique
Univers Roman Condensed
Univers Roman Condensed Oblique
Univers Bold Condensed
Univers Bold Condensed Oblique
Univers Roman Extended
Univers Bold Extended
Univers Black Extended
Univers Ultra Bold Extended
Univers Light Ultra Condensed
Univers Ultra Condensed
VAG Round Black
Weiss Round Gothic

Elfring Soft Fonts

Top Fonts™

The *Top Fonts* package contains 80 of the most **popular** scalable typefaces around today! Finally, a collection of your favorite fonts is available at popular prices in either TrueType or PostScript formats. *Top Fonts* contains 19 Text , 37 Display, 15 Script, 3 Dingbats, and 6 fixed width typefaces and is available in IBM or Mac formats. This includes the following fonts:

Aapex

Aristocrat

Antique Olive, **bold,** *italic,* ***bold-italic,*** **heavy**

Baha, **bold,** *italic*

Black Chance

Blippo, outline

Broad Street

Brush

Cas Open Face

Circled Numbers ❶ - 99

Commercial Script

Computer

Cooper Black, *italic*

COPPER PLATE

Coronet

COPPER PLATE CONDENSED

Cursive Elegant

Dom Casual

Dot Matrix

Dingbats ♻⊛❑●⊘✂✆⇩▶

Flourish

Hobo

Friz Kat, **bold,** *italic,* ***bold-italic***

Isotype, *italic*

Kaufman

Liquid Crystal Logan

Letter, **bold**, *italic*, ***bold-italic***

Microstile, **bold,** *italic,* ***bold-italic***

Nova, **bold,** *italic,* ***bold-italic***

Old English Park Street

PENOIR, **bold,** *italic,* ***bold-italic***

Revenue **STENSIL**

Rockford, **bold,** *italic,* ***bold-italic,*** condensed, *condensed-italic*

Rounded, **bold,** *italic,* ***bold-italic***

Symbol Pi ΔΩαπ≤∞≈∑∫ Tech, **bold**, *italic*

UMPA University

Zap Chance

The TrueType font set is designed for Windows 3.1. Only a few quick steps and these fonts are up and running in Windows. Once installed, TrueType fonts will appear in any Windows application program and work on any kind of printer. The PostScript version works with any PC application that understands PostScript fonts. ATM *(Adobe Type Manager)* is required for matching Windows screen fonts. All PostScript fonts include PFB, PFM, AFM, & INF files. These fonts require either a PostScript printer or ATM and an HP LaserJet or compatible printer. Mac versions of these fonts are also available. For more information contact:

Elfring Soft Fonts, PO Box 61, Wasco, IL 60183
Phone: 708-377-3520, Fax: 708-377-6402

EmDash

ARCHITEXT® REGULAR

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890

BRIAR HEAVY

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890

CASPIAN REGULAR

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890

GENDARME HEAVY

ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890

KONWAY BOLD

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890

PALOMAR BOLD

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890

UPSTART EXTENDED

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890

ARROWDYNAMIC BOLD

Also: *ArchiText Bold*, Briar Book, Bold, *Caspian Bold, Condensed, Condensed Bold*, BulletsNstuff, *Konway Regular, Heavy, Condensed, Condensed Bold, Condensed Heavy*, Upstart Regular, Condensed, *ArrowDynamic Medium, Heavy*

EmDash

Emigre Graphics

Arbitrary Regular & **Arbitrary Bold** Citizen Light & **Citizen Bold** Elektrix Light & **Elektrix Bold** Journal Text, *Journal Italic* & Journal Ultra JOURNAL SMALL CAPS & FRACTIONS; TEXT ❁ *ITALIC* ❁ ULTRA **Keedy Sans Regular & Keedy Sans Bold** Lunatix Light & **Lunatix Bold** Matrix Book, Matrix Regular & **Matrix Bold** MATRIX SMALL CAPS & FRACTIONS; BOOK ❁ REGULAR ❁ **BOLD** **Matrix Extra Bold,** Matrix Narrow & Matrix Wide *Matrix Script Book, Matrix Script Regular & **Matrix Script Bold*** **Matrix Inline Extra Bold & *Matrix Inline Script*** Modula Regular, **Modula Bold & Modula Black** Modula Serif Regular, **Modula Serif Bold & Modula Serif Black** Oblong Regular & **Oblong Bold** Senator Thin, **Senator Demi &**

Emigre Fonts 4475 D Street Sacramento, CA 95819

Senator Ultra TALL MATRIX Tall Modula Tall Senator Template Gothic & Template Gothic Bold totally gothic & TOTALLY GLYPHIC Triplex Light, **Triplex Bold & Triplex Extra Bold** Triplex Serif Light, **Triplex Serif Bold & Triplex Serif Extra Bold** *Triplex Italic Light, **Triplex Italic Bold & Triplex Italic Extra Bold*** Triplex Condensed Regular **& Triplex Condensed Black** Triplex Condensed Serif Regular & **Triplex Condensed Serif Black** variex Light, **variex regular & variex bold** Emperor Eight, Emperor Ten, Emperor Fifteen & Emperor Nineteen Universal Eight & Universal Nineteen **OAKLAND SIX, Oakland Eight, Oakland Ten** & Oakland Fifteen **Emigre Eight, Emigre Ten,** Emigre Fourteen & Emigre Fifteen

Emigre Fonts (916)451-4344

The Font Company, Inc.

FC-American Gothic
abcdABCD&!12

FC-Antique Olive
abcdABCD&!12345

FC-Avalon
abcdABCD&!12345

FC-Balloon
ABCDABCD&!1234567890

FC-Bulmer
abcdABCD&!12345

FC-Caslon No.78
abcdABCD&!123

FC-Catull
abcdABCD&!1234

FC-Centaur
abcdABCD&!12345

FC-Coliseum
ABCDEFABCDEFG!123456789

FC-Danmark
abcdABCD&!123

FC-Deepdene
abcdABCD&!12345

FC-Delphin No.2
abcdABCD&!1234

FC-Diotima
abcdABCD&!1234

FC-Fat Face
abcdABCD&!12345

FC-Firmin Didot
abcdABCD&!123456

FC-Gordon
ABCDABCD&!1234567

FC-Helserif
abcdABCD&!1234

FC-Introspect
abcdABCD&!1234

FC-Martin Gothic
abcdABCD&!12345

FC-Newport Land
abcdeABCDE&!1234567890

FC-Placard
abcdeABCDE&!12345678

FC-Quay Roman
abcdABCD&!1234

FC-Roman Solid
abcdABCD&!12345678

FC-Sans Serif Light
abcdABCD&!123456

FC-Stanza
abcdABCD&!12

FC-Venus
abcdABCD&!12345

FC-Weiss Initials
ABCDABCD&!12345

FC-Wordsworth
abcdABCD&!123

The Font Company

FontBank, Inc.

Display faces are used to attract attention.

Use display faces for headlines, titles, anywhere you want to direct the eye and attention .

Just remember that display type should be BIG!

You can convey any feeling with a display typeface.

Celebrate the Fourth with a patri-otic font.

Evoke the Classic Age with an inline.

FontBank specializes in producing display typefaces.

You can use them for quick notes.

Or anything else you choose.

Display faces give you the power to motivate and attract.

BEST OF ALL, DISPLAY FACES ARE FUN TO WORK WITH!

And isn't having fun what type is all about?

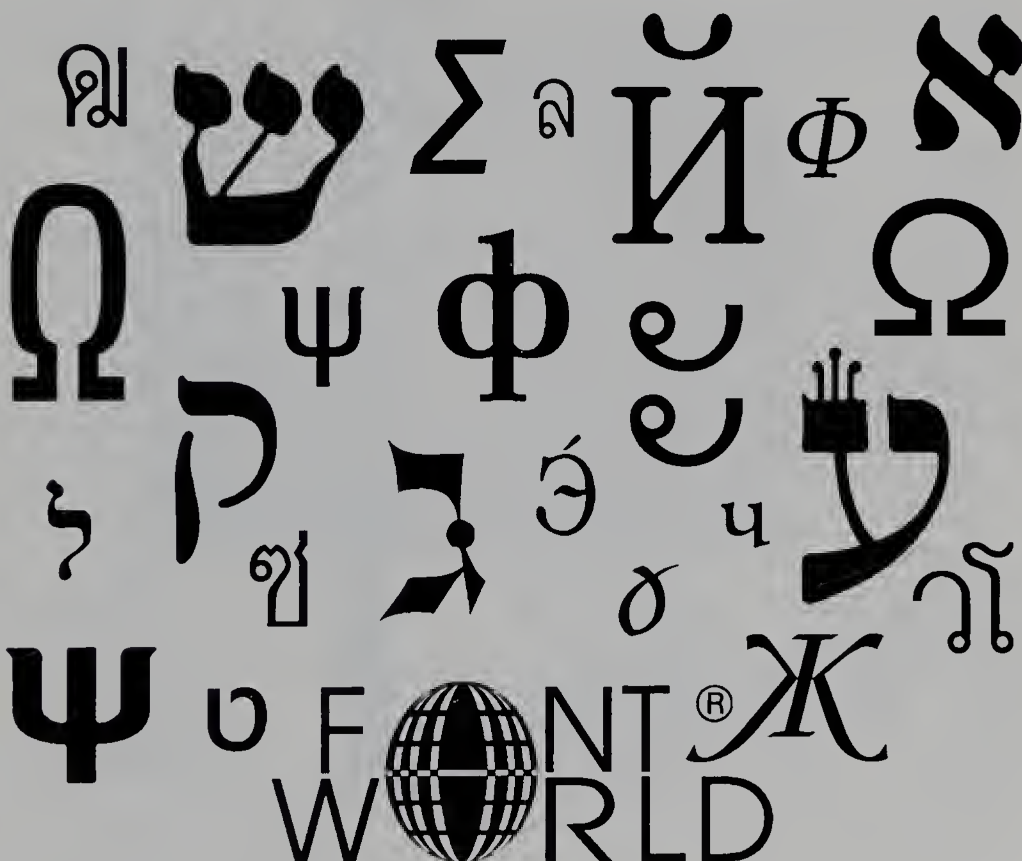
FontBank™

Over 300 display typefaces available.

Font World

Multiple Language Publishing

Quality–Crafted Typefaces
In PostScript™ Type–One (fully–hinted) Format
For Superior Quality Output



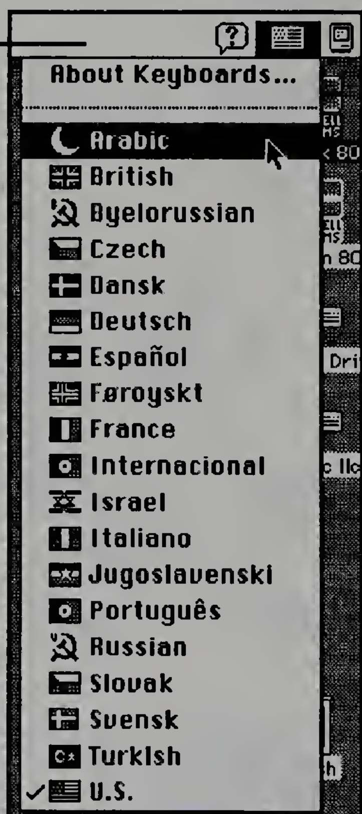
Multiple Language Publishing

It Is HIGHLY Recommended To Maintain
STANDARD ENCODING
This Ensures Worry–Free Document Use
While Providing Professional Hyphenation
And Spell Checking Support

Font World's Keyboard Menu

When typesetting multi–lingual documents, use the same typeface design that are height, weight and width metric compatible, thus eliminating line spacing problems.

Культура, Culture, Бизнес, Business, Спорт, Sports, Наука, Science, Образоване, Education



Three Easy Steps for Multi–Lingual Use

#1
Select Keyboard Language Layout

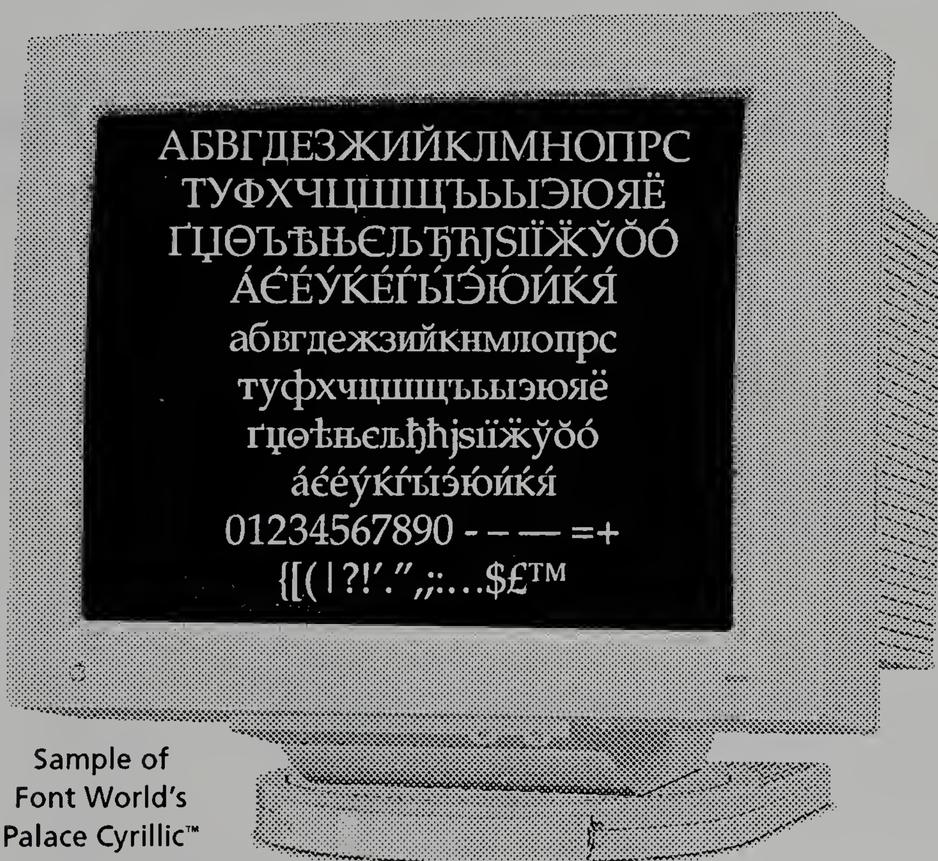
#2
Choose Typeface

#3
And Then Type

Sample Shown for Apple Macintosh

Multiple Language Publishing

FONT WORLD has the world's largest library of multiple language typeface software



Sample of Font World's Palace Cyrillic™

Includes Cyrillic, Cyrillic Extended & US English Character Sets for use with Russian, Belarussian, Ukrainian, Macedonian, Serbocroatian & English languages

Hewlett-Packard Company

CG Triumvirate™
ITC Zapf Dingbats® ☞✎✑✘❐
CG Century Schoolbook
ITC Lubalin Graph®
ITC Avant Garde Gothic®
Futura® II
ITC Souvenir®
Microstyle
Univers® Condensed
ITC Benguiat®
Garamond Antiqua
ITC Bookman®
CG Triumvirate™ Condensed
CG Palacio
CG Omega

Cooper Black
Revue Light
Revue Shadow
University Roman

Antique Olive
Stymie
CG Bodoni
Shannon™

Brush
Dom Casual
Park Avenue
Uncial

CG Times
Univers®

HEWLETT PACKARD

Image Club Graphics

Berkeley OLDSTYLE
Berkeley OLDSTYLE ITALIC
Berkeley OLDSTYLE BOLD
Berkeley OLDSTYLE BOLD ITALIC
Garamond LIGHT
Garamond LIGHT ITALIC
Garamond BOOK
Garamond BOOK ITALIC
Garamond BOLD
Garamond BOLD ITALIC
Garamond COND LIGHT
Garamond COND LIGHT ITALIC
Garamond COND BOOK
Garamond COND BOOK ITALIC
Garamond COND BOLD
Garamond COND BOLD ITALIC
Lubalin EXTRA LIGHT
Lubalin EXTRA LIGHT OBLIQUE
Lubalin BOOK
Lubalin BOOK OBLIQUE
Lubalin MEDIUM
Lubalin MEDIUM OBLIQUE
Lubalin DEMI
Lubalin DEMI OBLIQUE
Lubalin BOLD
Lubalin BOLD OBLIQUE

Futura LIGHT
Futura LIGHT OBLIQUE
Futura BOOK
Futura BOOK OBLIQUE
Futura MEDIUM
Futura MEDIUM OBLIQUE
Futura DEMI BOLD
Futura DEMI BOLD OBLIQUE
Futura BOLD
Futura BOLD OBLIQUE
Futura EXTRA BOLD
Futura EXTRA BOLD OBLIQUE
Futura CONDENSED MEDIUM
Futura CONDENSED MEDIUM OBLIQUE
Futura CONDENSED DEMI BOLD
Futura CONDENSED DEMI BOLD OBLIQUE
Futura CONDENSED BOLD
Futura CONDENSED BOLD OBLIQUE
Futura CONDENSED EXTRA BOLD
Futura CONDENSED EXTRA BOLD OBLIQUE

KABEL BOOK
KABEL MEDIUM
KABEL DEMI
KABEL BOLD
KABEL ULTRA
KABEL OUTLINE
KABEL CONTOUR
T H ALPHABET SOUP
Uniform 45
Uniform 46
Uniform 55
Uniform 56
Uniform 65
Uniform 66
Uniform 75
Uniform 76
Uniform 47
Uniform 48
Uniform 57
Uniform 58
Uniform 67
Uniform 68
Uniform 39
Uniform 49

Allegro
Bernhard Tango
Champagne
BALLOON
BALLOON BOLD
Mistral
Salto
PAINTBRUSH
Reporter
Castle
DAVIDA
Gillies Gothic
Gillies Gothic Bold
Murray Hill
Murray Hill Bold
American UNCIAL
American UNCIAL BOLD
American UNCIAL OUT
P T BARNUM
PIONEER

BADLOC
BADLOC COMPRESSION
Estro
ARQUITECTURA
Compact Light
Compact Book
Compact Bold
Eurostil EXTENDED
Eurostil EXT BOLD
Eurostil EXT OUTLINE
Eurostil EXT BOLD OUT
GRAPHIK
GRAPHIK SHADOW
ULTRA CONDENSED SANS
CORVINUS SKYLINE
ULTRA CONDENSED SERIF
LSC CONDENSED
LSC CONDENSED ITALIC
Mistral
Neuland Casual
Reporter
Savage
Salto

Book Jacket
Commercial Script
Vivaldi
Brody
Brush Script
Dom Casual
Dom Diagonal
Neuland Casual
Savage
Fraktur
GALLIA
Park Avenue
Kaufman Script
Kaufman Script Bold
SCOTFORD
CAROLUS ROMAN
THOR
PLAYBILL
GOLDRUSH
IVY LEAGUE
IVY LEAGUE OPEN
STENCIL
BROADWAY
BROADWAY ENGRAVED

Cooper Black
Cooper Black Italic
Peigno Light
Peigno Bold
Nevison Casual Script
STEELPLATE GOTHIC
NEULAND
News Gothic
News Gothic Bold
THUNDERBIRD

Kaufman Script
Kaufman Script Bold
PLAYBILL
Hobo
Castle
T H ALPHABET SOUP
STENCIL
GALLIA
AUGUSTEA
AUGUSTEA INLINE

Image Club Graphics Inc.

IQ Engineering

IQE Super Cartridge 3 / *Creative Collection's 66* Scalable Typefaces

IQE TUSCAN ANTIQUE ▪ *IQE BrushStroke* ▪ **IQE Stencil Gothic** ▪ IQE Champs Élysées ▪ IQE Circus Classic ▪ **IQE Harlequin** ▪ IQE Drafting Script & *Italic* ▪ IQE ATHOS **IQE ATHOS BOLD** ▪ IQE Uncial MS Demi ▪ IQE JEU DE PAUME DEMI **IQE JEU DE PAUME BOLD** ▪ **IQE Antebellum Roman** ▪ **IQE Roman Wood** ▪ IQE DisplaySquare ▪ IQE Don Casual ▪ **IQE Bodoni Poster** ▪ **IQE Cooper Black** ▪ **IQE Archon** ▪ **IQE BLOCKED GOTHIC** ▪ **IQE Edwardian Poster** ▪ IQE Galliant **IQE Galliant Bold** *IQE Galliant Italic* ***IQE Galliant Bold Italic*** ▪ **IQE Franklin Gothic Bold** ***IQE Franklin Gothic Bold Oblique*** **IQE Franklin Gothic Bold Condensed** ▪ IQE Goudy OS **IQE Goudy OS Bold** *IQE Goudy OS Italic* ***IQE Goudy OS Bold Italic*** ▪ IQE Souverin Light **IQE Souverin Demi** *IQE Souverin Light Italic* ***IQE Souverin Demi Italic*** ▪ IQE Granite **IQE Granite Bold** *IQE Granite Italic* ***IQE Granite Bold Italic*** ▪ IQE Trump Monumental **IQE Trump Monumental Bold** *IQE Trump Monumental Italic* ***IQE Trump Monumental Bold Italic*** ▪ IQE NeuStyle **IQE NeuStyle Bold** *IQE NeuStyle Italic* ***IQE NeuStyle Bold Italic*** **IQE NeuStyle Bold Expanded** ▪ IQE COPPERPLATE IQE COPPERPLATE DEMI **IQE COPPERPLATE BOLD** ▪ OCR-B ▪ IQE Gilcens **IQE Gilcens Bold** *IQE Gilcens Italic* ***IQE Gilcens Bold Italic*** ▪ Letter Gothic **Letter Gothic Bold** *Letter Gothic Italic* ***Letter Gothic Bold Italic*** ▪ IQE Bodoni **IQE Bodoni Bold** *IQE Bodoni Italic* ***IQE Bodoni Bold Italic***

Super Cartridge 3 / *Professional Edition*⁺'s 72 Scalable Typefaces

IQE STENCIL ROMAN ▪ Prestige Elite **Prestige Elite Bold** *Prestige Elite Italic* ***Prestige Elite Bold Italic*** ▪ IQE Garamond OS ***IQE Garamond OS Bold*** *IQE Garamond OS Italic* ***IQE Garamond OS Bold Italic*** ▪ *IQE* GARAMOND SMALL CAPS & OS FIGURES 0123456789 ▪ IQE Garamond Bold OS Figures 0123456789 ▪ *IQE Garamond Italic OS Figures 0123456789* ▪ *IQE Garamond Bold Italic OS Figures 0123456789* ▪ ▪ Courier **Courier Bold** *Courier Italic* ***Courier Bold Italic*** ▪ IQE Univ Cond **IQE Univ Cond Bold** *IQE Univ Cond Italic* ***IQE Univ Cond Bold Italic*** ▪ IQE MICR 1 2 3 4 5 6 7 8 9 ▪ IQE Beardsley **IQE Beardsley Bold** ▪ IQE Palangraphic **IQE Palangraphic Bold** *IQE Palangraphic Italic* ***IQE Palangraphic Bold Italic*** ▪ IQE PALANGRAPHIC SMALL CAPS & OS FIGURES 0123456789 ▪ **IQE Palangraphic Bold OS Figures 0123456789** ▪ *IQE Palangraphic Italic OS Figures 0123456789* ▪ ***IQE Palangraphic Bold Italic OS Figures 0123456789*** ▪ *IQE Chancellery Italic* ▪ IQE English Blackletter ▪ IQE Avgard Gothic **IQE Avgard Gothic Bold** *IQE Avgard Gothic Italic* ***IQE Avgard Gothic Bold Italic*** ▪ IQE Schoolbook **IQE Schoolbook Bold** *IQE Schoolbook Italic* ***IQE Schoolbook Bold Italic*** ▪ ▪ IQE Helv Cond **IQE Helv Cond Bold** *IQE Helv Cond Italic* ***IQE Helv Cond Bold Italic*** ▪ IQE Optimus **IQE Optimus Bold** *IQE Optimus Italic* ***IQE Optimus Bold Italic*** ▪ ▪ IQE Mellorn **IQE Mellorn Bold** *IQE Mellorn Italic* ***IQE Mellorn Bold Italic*** ▪ IQE Book One **IQE Book One Bold** *IQE Book One Italic* ***IQE Book One Bold Italic*** ▪ ▪ IQE Korhuna **IQE Korhuna Bold** *IQE Korhuna Italic* ***IQE Korhuna Bold Italic*** ▪ IQE Baskerville **IQE Baskerville Bold** *IQE Baskerville Italic* ***IQE Baskerville Bold Italic*** ▪ IQE BASKERVILLE SMALL CAPS & OS FIGURES 0123456789 ▪ **IQE BASKERVILLE BOLD SMALL CAPS & OS FIGURES 0123456789** ▪ *IQE Baskerville Italic OS Figures 0123456789* ▪ ***IQE Baskerville Bold Italic OS Figures 0123456789*** ▪ **IQE Modern Gothic**

Kabbalah Software

Kabbalah Software

Penina-KF w/nikudot

קדשינו במצותיך
ותן חלקינו בתורתיך

Rashi-KF

קדשינו במצותיך
ותן חלקינו בתורתיך

Redis-KF

קדשינו במצותיך
ותן חלקינו בתורתיך

Rolit-KF

קדשינו במצותיך
ותן חלקינו בתורתיך

Shlomo-KF w/nikudot

קדשינו במצותיך
ותן חלקינו בתורתיך

Siddur-KF w/nikudot

קדשינו במצותיך
ותן חלקינו בתורתיך

Temima-KF

קדשינו במצותיך
ותן חלקינו בתורתיך

Torah-KF

קדשינו במצותיך
ותן חלקינו בתורתיך

Yerushalmi-KF

קדשינו במצותיך
ותן חלקינו בתורתיך

Aharon-KF

קדשינו במצותיך
ותן חלקינו בתורתיך

Baluk-KF

קדשינו במצותיך
ותן חלקינו בתורתיך

Budko-KF

קדשינו במצותיך
ותן חלקינו בתורתיך

Cursiva-KF

קדשינו במצותיך
ותן חלקינו בתורתיך

Essex_St.-KF

ESSEX ST IS A HEBRAIC
STYLE ENGLISH FONT

Grau-KF

קדשינו במצותיך
ותן חלקינו בתורתיך

Hadar-KF w/nikudot

קדשינו במצותיך
ותן חלקינו בתורתיך

Miri-KF

קדשינו במצותיך
ותן חלקינו בתורתיך

Ora-KF

קדשינו במצותיך
ותן חלקינו בתורתיך

Kabbalah-Fonts/Professional

Hebrew Fonts for MS-DOS and Mac applications!

Kabbalah-Fonts/Professional adds Hebrew capabilities to many MS-DOS and Macintosh applications. Here are some of their features:

Microsoft Windows:

- TrueType and ATM fonts available for all Microsoft Windows applications
- CorelDraw fonts available
- Font families come in Normal, Italic, Condensed and Condensed Italic
- Windows macros included to ease right-to-left text entry
- Hebrew fonts are mapped both phonetically and compatible with Hebrew ASCII
- Hebrew vowels placed properly in PageMaker (fonts with nikudot)
- Hebrew 386 windowed DOS fonts available for copy-and-paste between DOS and Windows apps
- Other Hebrew right-to-left utilities available

Macintosh:

- TrueType and ATM fonts available
- Font families come in Normal, Italic, Condensed and Condensed Italic
- Hebrew right-to-left utilities available

WordPerfect Hebrew Language Module:

- Postscript, HP LaserJet II, HP LaserJet III and HP DeskJet fonts available (call for availability)
- HPLJ2 and DeskJet families come in Normal, Bold, Italic and Bold-Italic
- HPLJ3 and Postscript families come in Normal, Condensed, Italic and Condensed-Italic
- WordPerfect drivers included

Other Applications:

- Fonts may be converted to Publisher's PowerPak and MoreFonts formats
- Utilities available to convert fonts to GeoWorks, Express Publisher and other scalable-font formats

Kabbalah Software
8 Price Drive
Edison, NJ 08817
(908) 572-0891 Fax (908) 572-0869
Internet: kabbalah@israel.nysernet.org

LaserTools Corporation

Linotype-Hell

The Didot family of typefaces
New and Available from Linotype-Hell
in PostScript.

Didot Roman
Didot Cursive
Didot Bold
Didot Headline

abcdefghijklmnopqrstuvwxyz
1234567890
ABCDEFGHIJKLMNOPQRSTUVWXYZ&
abcdefghijklmnopqrstuvwxyz
[($¢£,.:;'–'?!*†‡§)]
1234567890

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ&
1234567890
[($¢£,.:;'–'?!†‡§)]*

abcdefghijklmnopqrstuvwxyz
1234567890
ABCDEFGHIJKLMNOPQRSTUVWXYZ&
[($¢£,.:;'–'?!*†‡§)]
abcdefghijklmnopqrstuvwxyz
1234567890

D D D

The Didot typeface family is immediately available in two roman weights with italic, roman small caps with old style figures, headline, initials and ornaments. For a free printed sample call Linotype-Hell Type Sales at 1-800-633-1900.

Linotype
LIBRARY

Didot is a registered trademark of Linotype-Hell AG and/or its subsidiaries.
PostScript is a registered trademark of Adobe Systems.

The Electra family of typefaces
New and Available from Linotype-Hell
in PostScript.

Electra Roman
Electra Cursive
Electra Bold
Electra Display

abcdefghijklmnopqrstuvwxyz
1234567890
ABCDEFGHIJKLMNOPQRSTUVWXYZ&
ABCDEFGHIJKLMNOPQRSTUVWXYZ
[($¢£,.:;‘–’?!*†‡§)]
1234567890

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ&
1234567890–1234567890
[($¢£,.:;‘–’?!†‡§)]*

abcdefghijklmnopqrstuvwxyz
1234567890
ABCDEFGHIJKLMNOPQRSTUVWXYZ&
ABCDEFGHIJKLMNOPQRSTUVWXYZ
[($¢£,.:;‘–’?!*†‡§)]
1234567890

E E E

The Electra typeface family is immediately available in two roman weights with italics, roman small caps with old style figures and a display version.
For a free printed sample call Linotype-Hell Type Sales at 1-800-633-1900.

Linotype
LIBRARY

Electra is a registered trademark of Linotype–Hell AG and/or its subsidiaries.
PostScript is a registered trademark of Adobe Systems.

The Fairfield family of typefaces
New and Available from Linotype-Hell
in PostScript.

Fairfield Medium

Fairfield Medium Italic

Fairfield Bold

abcdefghijklmnopqrstuvwxyz
1234567890
ABCDEFGHIJKLMNOPQRSTUVWXYZ&
ABCDEFGHIJKLMNOPQRSTUVWXYZ
[($¢£,.:;'–'?!*†‡§)]
1234567890

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ&
1234567890
[($¢£,.:;'–'?!†‡§)]*

abcdefghijklmnopqrstuvwxyz
1234567890
ABCDEFGHIJKLMNOPQRSTUVWXYZ&
[($¢£,.:;'–'?!*†‡§)]
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890

ABCDEFGHIJKLMNOPQRSTUVWXYZ

The Fairfield typeface family is immediately available in four roman weights with italics, roman small caps with old style figures and swash capitals.
For a free printed sample call Linotype-Hell Type Sales at 1-800-633-1900.

Linotype
LIBRARY

Fairfield is a registered trademark of Linotype–Hell AG and/or its subsidiaries.
PostScript is a registered trademark of Adobe Systems.

Microsoft Corporation

Microsoft® TrueType Font Pack for Windows™

The Lucida® set

Lucida Blackletter
Lucida Bright
  Demibold, *Italic*, ***Demibold Italic***
Lucida Calligraphy
Lucida Fax
  Demibold, *Italic*, ***Demibold Italic***
Lucida Handwriting
Lucida Sans
  Demibold, *Italic*, ***Demibold Italic***
Lucida Sans Typewriter
  Bold, *Oblique*, ***Bold Oblique***
Lucida Bright Math Extension
  ∏∑⋁⨄⋂⨀\{{∩⟩}]∮{∄∮≠‴[¢
Lucida Bright Math Italic
  $\phi\Gamma\Delta\Pi\Omega\alpha\beta0123$⪆>ƒ⋋(]⊣♯♭♮≫⊦
Lucida Bright Math Symbol
  𝒜ℬ𝒞§∬↔∀⊆∴∃∞⊥ℵ≳∘≍∇∋≈⊃∅

The Monotype® set

Arial Narrow
  Bold, *Italic*, ***Bold Italic***
Book Antiqua
  Bold, *Italic*, ***Bold Italic***
Bookman Old Style
  Bold, *Italic*, ***Bold Italic***
Century Gothic
  Bold, *Italic*, ***Bold Italic***
Century Schoolbook
  Bold, *Italic*, ***Bold Italic***
Monotype Corsiva
Monotype Sorts
  ✁✂☎✆✇✈✉☛☞✌✍✎✓✖✗✘✚
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Normal, **Bold**, *Italic*, ***Bold Italic***

Zapf Calligraphic 801 (Palatino)

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Normal, **Bold**, *Italic*, ***Bold Italic***

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Century Schoolbook

Normal, **Bold**, *Italic*, ***Bold Italic***

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Medium Italic

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Symbol

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CG Palacio

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Universe Medium Condensed

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ARCHER	METRO
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Avant Guard
Avant Guard Bold
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Baskerton Bold
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Bongo Black
Brush Script
Buckingham
Capelli
Capelli Bold
Capelli Italic
Capelli Bold Italic
Carnegie
Carnegie Bold
Carnegie Italic
Carnegie Bold Italic
Century
Century Bold
Century Italic
Century Bold Italic
Circus
Classic Typewriter
Typewriter Bold
Typewriter Italic
Typewriter Bold Italic
Copperfield
Coronation Script
Corporate Condensed
Corporate Cond. Bold
Corporate Cond. Oblique
Corporate Cond. Black

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Dateline Condensed
Dateline Condensed Bold
Diner Script
Don Casual
Eterna
Eterna Bold
Eterna Oblique
Eterna Bold Oblique
Exchequer Script
Futuri Light
Futuri Light Oblique
Futuri Heavy
Futuri Heavy Oblique
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Futuri Bold
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Garamand Bold
Garamand Italic
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Gazette Bold
Gazette Italic
Gazette Bold Italic
Gettysburg
Gettysburg Bold

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Gibraltar Bold
Gibraltar Italic
Gibraltar Bold Italic
Guthrie
Harem
Jewel
Jewel Bold
Jewel Italic
Jewel Bold Italic
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Joulliard Bold
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Joulliard Bold Italic
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Katrina Bold
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Roctus Regular T

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CLOF	ABCDEFGHIJKLMNOPQRSTUVWabcdefgh
CPK	**ABCDEFGHIJKLMNOPQRSTUVWa**
CU	ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGH
CUE	ABCDEFGHIJKLMNOPQRSTUVABC
EE	ABCDEFGHIJKLMNOPQRabcd
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OE	ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefg
PAR	ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmn
PGD	ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnop
PK	*ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnop*
PRS	ABCDEFGHIJKLMNOPQRSTUVWXYZab
PYB	**ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz0123456789**

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ZSoft Corporation

Glossary

Aliasing In the specific context of font generation, aliasing refers to the arrangement of and the frequency or number of dots used to represent a diagonal line or curve of a font character. This frequency is manifested as a jagged or stairstepped appearance of lines.

American National Standards Institute (ANSI) A U.S.-based organization dedicated to the development of industrial and communications standards. The adoption of these standards by persons, groups, and organizations is voluntary.

American Standard Code for Information Interchange (ASCII) A computer communications code established by the American National Standards Institute (ANSI) to facilitate compatibility among data services.

Anti-aliasing A term used to describe the solution or group of solutions to the problem of aliasing. *See* Aliasing.

Ascender This term can be defined in two ways. As it was used in this book, ascender refers to that portion of a character which extends above the baseline. However, it can also be defined as that portion of a lowercase character which extends above the x-height. *See* X-height.

Ascender space The portion of a character cell specifically designed to extend above the tallest uppercase character. This space (not always present in a font set) is usually reserved for diacritical marks and special punctuation required by foreign languages.

ASCII *See* American Standard Code for Information Interchange.

Baseline An imaginary line on which the letters in a line of type sit. In the case of a character cell matrix, this term refers to the line on which the uppercase letters of a font sit.

BBS *See* Bulletin Board Service.

Bezier curve This term describes the curve draw function used in graphic illustration programs and scalable (outline and vector) font editing programs that provides control point nodes for manipulating the shape of an arc or curve.

Bit A contraction of binary digit, bit is the smallest unit of information in a binary system; a one or a zero.

Bitmap An organized group or matrix of dots that forms an image. These dots are all of the same size and density. This term is associated with graphic images and nonscalable graphic font formats.

Bitmap format A graphic font format where all font character data is stored as bit data and rendered as dots or pixels.

Block A stylistic class of fonts with characters that are uniform, sans serif, and square-shaped in appearance. All lines are of even width, angles are of 30, 45, 60, or 90 degrees, and all character widths are uniform. This term is also referred to as *Gothic.*

Bold or boldface A term used to describe a typeface with characters of a heavier or denser stroke weight when compared with a stylized ideal of that typeface.

Bold stroke weight A term used to describe fonts with character strokes which, when compared to a standardized version of the font, exhibit the attribute of thicker lines. This term is also used to describe the process of thickening the lines.

Buffer A temporary storage area or device used to compensate for the differences in data flow between two devices (typically a computer and a printer).

Bulletin board An area within a Bulletin Board Service (BBS) usually named for the topic or area of interest of a number of users. Information may be placed on or retrieved from these areas from an outside computer system.

Bulletin Board Service (BBS) A computer system that has been set up to facilitate the exchange of information among other computer systems. A BBS is accessed by a modem.

Byte A string of binary elements (zeros and ones) which function as a single unit, consisting of 8 bits.

Cartridge A term specifying the plug-in hardware media used to supply add-on fonts for printers. These cartridges often have the dimensions of a deck of cards.

Cartridge font Any font supplied on a cartridge. These cartridges are add-on devices for printers. The fonts supplied on this media are usually bitmap/text format fonts.

Cathode Ray Tube (CRT) This term describes a computer monitor that uses an electron gun, or cathode, to emit an electron beam that moves back and forth then up and down across the screen. As the ray sweeps across the screen the phosphors on the back of the front of the tube are irradiated, which lights up discrete dots on the visual computer screen.

Center justified This term refers to lines of text which are centered between the margins of a page or a display screen.

Central Processing Unit (CPU) This unit interprets the instructions sent to a computer. The entire unit is comprised of the computer's internal storage, data processing, and control circuitry.

CGA *See* Color Graphics Adapter.

Character A particular image from a set of interrelated images. In the case of fonts it is a single character from a font set. Each of the images (A, K, g, z, !, }, or *) constitutes a character.

Character cell An imaginary box which surrounds a font character. This box contains the dots or point references for every dot of a font character.

Character cell matrix The term used to describe the data within an idealized cell from which a character is created. The data can be considered the total number of possible dots that fill a character cell. A character is created from these dots. A 10-x-10-character cell matrix contains 100 dots.

Character compensation *See* Tracking.

Characters Per Inch (CPI) The number of printed font characters that fit within one inch on a line of text. This term is usually used in conjunction with monospaced fonts.

Character spacing gap The horizontal space between adjacent printed or displayed characters from the same font set. *See* Letter spacing.

Color-aliasing A process used when displaying fonts on a color screen display. Different shades of color are used along the edges of a font character with the intent of fooling the human eye and brain into perceiving the edges as smooth.

Color Graphics Adapter (CGA) A bitmapped graphics display adapter for IBM personal computers and compatibles. This adapter simultaneously displays four colors at a resolution of 320 x 200 pixels, but it is also capable of a 640-x-200-pixel monochrome display. Either display is capable of 40- or 80-character display text modes. (All dimensions are given as horizontal by vertical.)

Condensed A font set whose characters display a narrower width than those of the original typeface on which it was based.

CPI *See* Characters Per Inch.

CPU *See* Central Processing Unit.

Cropping An editing process where edges are trimmed from a graphic image to make it fit into a specific space or to remove unnecessary parts of the image so as to display or print only a portion of that image.

CRT *See* Cathode Ray Tube.

Descender The portion of a letter which extends below the baseline of a font set. Usually this term refers to lowercase characters such as g, j, p, and q.

Desktop publishing A term for the use of personal computers and software to produce publication-quality documents.

Digitize The process of converting an image into a series of dots that can be interpreted, stored, and manipulated by a computer.

Diskette A form of media used by manufacturers to supply fonts and software. Diskettes come in sizes of 3.5 or 5.25 inches.

Dot The term used when describing the image rendered from one strike of a pin from a printer's printhead or an individual dot on printer hard copy.

Dots Per Inch (DPI) The number of dots printed on a printer or displayed on a specific computer screen which fits within one linear inch. The term is also used to determine and designate the print resolution of a printer.

Download The act or process by which information is transferred from a host computer to another device, such as a printer.

DPI *See* Dots Per Inch.

EGA *See* Enhanced Graphics Adapter.

Element A graphic image (font or screen graphic) used in a graphic screen layout.

Emulation The imitation of a computer system or device.

Enhanced Graphics Adapter (EGA) A bitmapped graphics display adapter for IBM personal computers and compatibles. This adapter, displaying a resolution of 640 x 350 pixels, allows 16 colors to be selected from a palette of 64 colors. It also supports CGA and MDA displays. (All dimensions are given as horizontal by vertical.)

Erasable Programmable Read Only Memory (EPROM) This term describes a computer chip with nonvolatile, erasable, and reprogrammable memory. However, copying and erasing this memory requires the correct, not-inexpensive equipment.

Fill justified This term refers to lines of text that are flush along both the right and left margins. Also known as full or flush justified.

Firmware A computer program stored permanently in a computer or computer peripheral's read only memory (ROM).

Flush justified *See* Fill justified.

Flush left *See* Left justified.

Flush right *See* Right justified.

Font A set of graphic images of a specific type. These images often correspond to a collection of letters, punctuation marks, numbers, and special characters. However, the term font can also be used for a wide variety of terms, including font character, font set, font style, font file, font format, or font data.

Font character A particular image within a font set, such as A, K, g, z, !, }, or *.

Font data The actual bit and byte data which make up an individual font character or set of font characters.

Font file A term used to indicate the complete data concerning a font set. From a programming viewpoint, a font file specifies a file consisting of font header and font data information. From a general view, it indicates a font set and all font characters within that set.

Font format The system by which font data is arranged and reconstituted for use.

Font header The information located at the beginning of a font file. This header specifies formatting and organizational information concerning the font.

Font set A series of interrelated font characters which have been saved as one file. This set consists of characters in a particular typeface, size, and style.

Font style The overall stylistic design of a typeface as indicated by the appearance of the characters of a font. This term is often considered synonymous with type style.

Freeware Copyrighted programs available at no charge to the public. These programs may be given away, but not resold for profit.

Full justified *See* Fill justified.

Gothic *See* Block.

Graphic display resolution The number of pixels displayed horizontally by vertically on a graphic screen display.

Graphic display system An integrated system comprised of a monitor, graphics display card, and software.

Graphic font The category of fonts designed to be stored on soft media, such as a floppy diskette, hard disk, and cartridge. These fonts are later accessed by software for printing or screen display applications. *See* Font.

Graphic image Any graphically defined shape, such as a font character, a piece of clip art, and so on.

Halftone Reproduction of a graphic image using evenly spaced, variable-sized dots. When printed, the visual effect is that of the dots blurring together and appearing as shades of gray.

Hard font Another name used to describe text font. This refers to the fonts found on and accessed by the firmware associated with a computer or computer's peripheral device.

Hinting The process by which a font is slightly altered at print time. The alterations improve the regularity of the final character shape and produce better-looking characters. Hinting is also referred to as *scaling intelligence.*

Horizontal cell width The horizontal width of a character cell, usually given in dots or pixels.

Horizontal spacing *See* Tracking.

Icon A small graphic image that visually represents an idea, concept, message, function, or object.

Image cropping *See* Cropping.

Inch size The measurement, in inches, of the vertical size of a font. This is the same as point size except the value is given in inches, not points.

Interlacing A method used in some display systems where the electron beam alternately updates all odd-numbered scan lines; then all even-numbered scan lines. *See* Time interlacing.

Italic A term used to describe fonts with characters that lean to one side. There are two types: positive or negative. Italic also describes the formatting capability of software to italicize a font set.

Justification This term refers to the positioning of text on an entire line.

Kerning The act of adjusting the amount of space between two adjacent characters by moving them closer together or farther apart.

Kilobyte A unit of measure of computer and computer-related memory frequently abbreviated to K. A single kilobyte (1K) is 1024 bytes.

LAN *See* Local Area Network

Leading The vertical spacing between two lines of text separated by only one carriage return (one ENTER keypress). It is measured on the distance between the baselines of the characters on two adjacent lines of text. This term is also called *line feed gap.*

Left justified This term refers to lines of text which are flush along the left margin and ragged along the right margin. Also known as flush left or ragged right.

Letter spacing The preprogrammed distance between two adjacent characters. Letter spacing is commonly used to describe the process of adding space. Also known as character spacing gap.

Light stroke weight A term used to describe fonts with character strokes which, when compared to a standardized version of the font, exhibit the attribute of thinner lines.

Line feed gap *See* Leading.

Line weight The thickness of a single line of a font character. This term is also called *stroke weight.*

Local Area Network (LAN) A data communications system confined to a limited area, such as a suite of offices, a single building, a cluster of buildings, or college campus. While a LAN is often isolated, it may contain connections to other public or private networks.

Lowercase The non-capital equivalents of the capital (uppercase) letters of an English or foreign language alphanumeric font set.

Magnification The process of algorithmically enlarging a given font or character. This process is usually used with bitmap format fonts and the final images are not smoothed.

Matrix A grid-like arrangement of rows and columns used for organizing related items such as dots or pixels.

MDA *See* Monochrome display adapter.

Medium stroke weight A stroke weight intermediate between regular and bold. The expression *medium bold* is often used for this term.

Megabyte A unit of measure of computer and computer-related memory frequently abbreviated to MB or Mb. A single megabyte (1MB) is 1,048,576 bytes. Also called *meg.*

Modem A hardware device that allows you to transmit and receive computer information over a telephone line.

Monochrome display adapter A text or character display adapter for IBM personal computers and compatibles. This adapter allows the display of only one color, such as white, green, or blue, contrasted against a black background. It is capable of only an 80-column character text display mode.

Monospacing This term (also known as *nonproportional*) refers to the spacing between characters of an entire font set. While the space between characters remains the same, the positioning of characters in relation to each other is based on the entire character cell width. It is as if each character is centered within its respective cell and the entire character cell is used as a character.

Negative italic The displayed attribute of leaning upward to the left.

Nonproportional *See* Monospacing.

Numerics The numerical characters in a font set.

Oblique A term often used synonymously with italic. It describes the italic appearance of a character; usually referring to characters with a positive italic slope. *See* Italic and Positive italic.

Original Equipment Manufacturer (OEM) The company that actually manufactures a given piece of hardware. Don't confuse this term with *value added reseller (VAR)*.

Outline A font format in which character data is stored as a mapping of control points from along a character's edges only. This format is scalable.

Page Description Language (PDL) A programming language specifically designed to handle the placement of text and graphics on a page. *See* PCL and PostScript.

Page layout The final positioning of all elements, such as fonts and graphics, on a printed page.

Parallel transmission A data transmission mode that sends a number of bits simultaneously over separate lines. A common parallel transmission used for communication between computers and printers is 8-bit transmission, which sends 8 data bits over 8 lines.

PCL A page description programming language developed by Hewlett-Packard. There are two versions of this format: PCL4, a nonscalable type, and PCL5, a scalable type.

Peripheral Any input or output device, such as a printer, modem, or monitor, that is not a part of the main computer.

Pica A horizontal unit of measure equal to approximately 1⁄16 inches.

Pixel An individual dot on a computer monitor screen. This term is usually associated with a graphic screen display.

Pixel size The size of individual pixels on a computer graphic screen display. Pixel size is a function of monitor screen display size and display resolution. The higher the screen resolution the smaller the pixels which make up a character; hence a smaller character. The larger the screen, the larger the pixels which make up a character; hence a larger character.

Point A standard unit of typographic measurement. Traditionally, it is based on the distance measured from the top of the tallest uppercase character to the bottom of the descender of the characters in a font set. In a nontraditional sense it is simply the height of a character. There are 72 points to an inch.

Positional interlacing A technique used in some display systems where overlapping scan lines are used. These overlapped lines are simultaneously displayed to a monitor screen, which gives the appearance of a higher display resolution. *See* Interlacing and Time interlacing.

Positive italic The displayed attribute of leaning upward to the right.

PostScript A page description programming language developed by Adobe Systems. A PostScript file can be printed on any printer that has a PostScript interpreter built into its firmware, or displayed and printed by any software that utilizes a similar interpreter. The term *PostScript* is often synonymous in the marketing, advertising, and sales worlds with scalable fonts.

Proportional The relative placement of and spacing between the characters of an entire font set. While the space between characters remains the same, the positioning of characters in relation to each other is based on the relative width of individual characters.

Public domain The term used to describe products or information that have been made available for use to the public at no charge. Public domain products are free, not copyrighted, and may be distributed without obtaining permission from or paying any fees to the programmer or developer. *See* Freeware and Shareware.

Ragged left *See* Right justified.

Ragged right *See* Left justified.

RAM or ROM card A form of font media, much like cartridges, which are about .25-inch thick and have the dimensions of a credit card. ROM cards are not programmable; RAM cards are.

Random Access Memory (RAM) This is internal computer or computer peripheral memory which allows information to be copied to, deleted from, and read from it. Information stored in this memory is lost if the computer system or device is turned off.

Rasterization The conversion of scalable (vector and outline) graphic images into images composed of patterns of pixels (bitmaps).

Read Only Memory (ROM) The internal portion of computer or computer peripheral memory that is permanent. The information in this memory may be read, but not altered in any way.

Refreshing The process of consistantly repeating data that is displayed to a screen, in order that it might not fade.

Regular stroke weight This describes the standard stroke weight against which all other stroke weights are compared and determined.

Render The process of producing the final display of an image on a screen or printing it on a printer.

Right justified This term refers to lines of text that are flush against the right margin and ragged along the left margin of a page. Also known as *flush right* or *ragged left*.

ROM *See* Read Only Memory.

Sans serif The term applied to the class of fonts whose characters do not display the serif feature. *See* Serif.

Scalable A graphic image, usually vector or outline, capable of being scaled up or down to different sizes.

Scalable font A term used to describe vector or outline format fonts. These fonts are capable of being enlarged and automatically smoothed, via software, on a screen or printer.

Scaling The process of mathematically enlarging vector or outline fonts. Due to the nature of their format, when these fonts are enlarged they are already as good as the original. Usually the original was smooth and well-formed.

Scaling intelligence *See* Hinting.

Scan line This term can be used in two senses: mechanical or programming. A mechanical definition is a horizontal line on the inner surface of a computer screen that is traced by an electron beam. A programming definition is a single row, usually horizontal, of bit data from a larger matrix of data which forms a graphic image.

Screen graphic A specific type of graphic image (clip art, picture, and so on) comprising all or part of a graphic screen.

Screen layout The final positioning of all elements, such as fonts and graphics, on a computer screen.

Script A stylistic class of fonts with characters that exhibit a cursive, often flowery, handwriting-like style.

Serif The term applied to the short lines stemming from and at an angle to the upper and lower terminating ends of a character. This term is also used to describe the class of fonts whose characters display this feature.

Shareware Software that is freely distributed for evaluation, but requires a small fee from those who wish to keep it.

Smooth and smoothing The process by which the apparent definition of the edges of a character is increased. These are bywords for the application of an algorithm which automatically smooths out any roughness that may appear along a character's edges when a font is enlarged by scaling or magnification.

Smooth font Often used as another name for *scalable font*, this, however, is not its only definition. It also describes a font which has undergone the treatment of a smoothing algorithm. *See* Smooth and smoothing.

Soft font This term is used to describe the category of fonts stored on soft media—such as a diskette—and accessed by software. *See* Graphic font.

Spacebar width *See* Word spacing.

Spacing control *See* Tracking.

Stroke The individual lines used to make up a character. For example, the character *T* can be said to consist of two strokes: one vertical and one horizontal. Whereas *H* can be said to consist of three strokes: two vertical and one horizontal.

Stroke weight The level of thickness in the lines of a font. This term is used as a general descriptor of the line thickness of a font character set. Stroke weights are often given in the graded terms: light, medium, and bold. The weight levels are determined by comparison to a standardized version of the font called regular.

Style sheet Specifications used for formatting text on a printed page or screen display. These specifications include typeface, type size, margins, tabs, character and line spacing, and paragraph indentations.

Text font The category of fonts designed to be stored in and accessed by the firmware of a hardware device. These fonts, found in the firmware of printers, computers, and on cartridges, are primarily used for text (alphanumeric) printing and display.

Text format A special case of a bitmap format.

Time interlacing This term refers to the method of image scanning used in video. This process alternates and slightly overlaps in display time, screens of identical information. The slight overlap reduces the flicker associated with a computer screen.

Tracking The process of adjusting the spacing between all characters of a font set. While the term can be used to describe the process of adding or removing space, it is ordinarily used to describe the elimination of space. Also known as *character compensation, spacing control,* and *horizontal spacing.*

Type This term shares the same generic usage trap as the term *font.* Its meaning rests on the context in which it is used. It can refer to a complete set of characters or a stylistic attitude.

Typeface The term used to describe a set of characters which exhibit a particular stylistic attitude. For the purposes of this book, this is synonymous with *font style.*

Type style The term used when categorizing the design appearance of a font set. When used in combination with certain character font formatting terms it can categorize specific groups of fonts that share attributes. For example, all bolded fonts may be considered a bold type style. All fonts sporting serifs can be referred to as a serif type style. *See* Font style.

Typography The arrangement, appearance, and style of typeset matter.

Uncondensed This term refers only to the character width of an original typeface as compared against subsequent versions which modify the character width.

Uploading The process by which information is transferred from some source to a host computer.

Uppercase The capital letters of an alphanumeric font set.

User group An organization in which computer users exchange tips and information. These groups usually revolve around a specific computer system, product, or application; for example, Macintosh Users Group, Ventura Users Group, or Computer Graphic Design Group.

Value Added Reseller (VAR) Organizations that have licensed a product or products from an original manufacturer for resale under a new name by a different company.

Vector A term used to describe a graphic image format where the image data is saved as a series of mathematical descriptions only. This format is scalable.

Vertical cell height The vertical height of a character cell, usually given in dots or pixels.

Video Graphics Array Adapter (VGA) A bitmapped graphics display adapter for IBM personal computers and compatibles. This adapter duplicates all of the graphic modes of EGA and CGA displays. When displaying a resolution of 640 x 480 pixels, 2 or 16 colors may be selected from a palette of 262,144 colors. When displaying a resolution of 320 x 200 pixels, 256 colors are available from the same palette.

Word spacing The distance between words on a line, usually equivalent to the space allocated to one press of the spacebar. This term is also referred to as *spacebar width.*

WYSIWYG This stands for What You See Is What You Get and refers to an accurate screen representation of final printed output. Realistically, all it can do is give you an idea of how things should look.

X-height This term refers to the height of the body of a lowercase letter minus its descender and ascender portions. For example, The x-height of the letter *o* is equal to the full height of the character. The x-height of the letter *b* is the height of the *bole,* or rounded portion only, and does not include the vertical portion of the character which extends above it. The x-height of the letter *y* is the height of that portion which extends above the baseline only, and does not include the descender.

BIBLIOGRAPHY

The books and other references in this bibliography are listed under the following topics:

- **Articles** This section provides a short list of articles from the last couple of years that are useful and informative.
- **Computer terminology** This section provides a list of dictionaries for the computer marketplace. They are excellent sources of definitions for confusing computer terms you come across in publications or hear in conversations.
- **Font design** Books referenced in this section address issues of font design, structure, and creation. If you plan on getting into font creation you may want to look up several of these.
- **Font usage** Books referenced in this section provide practical instruction on using fonts to produce computer-generated copy—good background in case you get confused.
- **Magazines** The magazines mentioned in this section are especially good sources of information on fonts, font use products, and font-related subjects.
- **Manufacturer publications** This section is a list of special ongoing publications produced by various font manufacturers ranging from font catalogs to instruction in typography.
- **Page layout and design** Books in this section provide guidelines and instructions for page layout and design using a desktop computer system.
- **Type styles and typefaces** If you are interested in accumulating information and knowledge of traditional and commonly used type styles, the books referenced in this section are for you.
- **Typography** The books referenced in this section provide practical commonsense instruction in the art of typography.

Articles

"BBS-ing Today." *Online Access.* (Summer 1992).

Bishop, Philip. "Crimes of the Art." *Personal Publishing.* (May 1990).

Dean, David. "Battle of the Font Technologies." *PC Publishing.* (April 1990).

"The Font Fray: Who Will Set the Standard." *PC Publishing.* (May 1990).

"Design & Graphics Directory." *Publish.* (January 1992).

McClelland, Deke. "No-Sweat Desktop Publishing." *PC World.* (January 1992).

Mendelson, Edward. "Beyond Times and Helvetica: Scalable Fonts for the PC." *PC Magazine.* (September 1991).

Roth, Steve. "Font Wars." *Personal Publishing.* (October 1989).

Smith, Catherine. "Buyer's Guide: Fonts." *PC World.* (January 1992).

"Fonts A to Z." *PC World.* (January 1992).

Smith, Ross. "Scaling to New Heights: PostScript, PCLs and Beyond." *PC Publishing.* (October 1990).

Taub, Eric, Schuyler W. Lininiger, Jr., and Daniel Brogan. "Full Tilt Publishing." *Personal Publishing.* (July 1989).

Tinkel, Kathleen. "When in Doubt, Use Caslon." *Personal Publishing.* (April 1990).

Tinkel, Kathleen and Daniel Will-Harris. "Typography for the Desktop." *Personal Publishing.* (June 1989).

Treacy, Joseph D. "Re:Design." *Personal Publishing.* (June 1990).

Computer Terminology

Computer Dictionary—The Comprehensive Standard for Business, School, Office, and Home. Redmond, WA: Microsoft Press, 1991.

DeVito, Albert. *Computer Midi Desktop Publishing Dictionary.* Milwaukee, WI: Kenyon Publications, 1991.

Downing, Douglas and Michael Covington. *Dictionary of Computer Terms.* Hauppauge, NY: Barron's Educational Sources, 1989.

Gunton, Tony. *Dictionary of Information Technology and Computer Sciences.* New York: Penguin Books USA, 1992.

Margolis, Philip E. *The Random House Personal Computer Dictionary*. New York: Random House, 1991.

Pfaffenberger, Bryan. *Que's Computer Users Dictionary*. Carmel, IN: Que Corporation, 1991.

Webster's New World Dictionary of Computer Terms. New York: Prentice Hall General Reference, 1988.

Wyatt, Allen. *Computer Professional's Dictionary*. Berkeley, CA: Osborne/McGraw-Hill, 1990.

Font Design

Beaumont, Michael. *Type: Design, Color, Character & Use*. Cincinnati, OH: North Light Books/F&W Publications, 1987.

Hess, Stanley. *The Modification of Letterforms*. New York: Art Direction Book Company, 1972.

Knuth, Donald E. *The MetaFont Book*. New York: Addison-Wesley, 1991.

Rogondino, Michael. *Computer Type—A Designer's Guide to Computer Generated Type*. San Francisco, CA: Chronicle Books, 1991.

Font Usage

Burke, Clifford. *Type from the Desktop*. Chapel Hill, NC: Ventana Press, 1990.

Busch, David D. *The Font Problem Solver*. Homewood, IL: Business One Irwin/Richard C. Irwin, Inc., 1992.

Felici, James. *How to Get Great Type Out of Your Computer*. Cincinnati, OH: North Light Books/F&W Publications, 1992.

Magazines

BBS Callers Digest. Callers Digest, Inc., 701 Stokes Rd., Medford, NJ 08055.

Byte. McGraw-Hill, Inc., One Phoenix Mill Lane, Peterborough, NH 03458.

Emigre Magazine. Emigre, 4475 D St., Sacramento, CA 95819.

Macintosh Product Registry. Redgate Communications, 660 Beachland Blvd., Vero Beach, FL 32963.

MacUser. Ziff-Davis Publishing Co., One Park Avenue, New York, NY 10016.

Mac World. Mac World Communications, International Data Group, 501 Second St., San Francisco, CA 94107.

Online Access. Chicago Fine Print, Inc., 920 N. Franklin St., Suite 203, Chicago, IL 60610.

The Page. The Page, Box 14493, Dept. P, Chicago, IL 60614.

PC Magazine. Ziff-Davis Publishing Co., One Park Avenue, New York, NY 10016.

PC Novice. Peed Corp., 120 W. Harvest Dr., P.O. Box 85380, Lincoln, NE 68501.

PC Publishing. Hunter Publishing Limited Partnership, 950 Lee Street, Des Plaines, IL 60016.

PC Sources. Costal Associates Publishing, L.P., One Park Ave., New York, NY 10016.

PC Today. Peed Corp., 120 W. Harvest Dr., P.O. Box 85380 Lincoln, NE 68501.

PC World. PC World, 501 Second St., #600, San Francisco, CA 94107.

Personal Publishing. Hitchcock Publishing Co., 191 So. Gary Ave., Carol Stream, IL 60188.

Publish. Integrated Media, Inc., 501 Second St., San Francisco, CA 94107.

SHAREWARE Magazine. PC-SIG, 1030-D East Duane Ave., Sunnyvale, CA 94086.

2600: The Hackers Quarterly. 2600 Enterprises, Inc., 7 Strong's Lane, Setauket, NY 11733.

Verbum. Verbum, P.O. Box 15439, San Diego, CA 92115.

VideoMaker. VideoMaker, Inc., P.O. Box 4591, Chico, CA 95927.

The Windows Shopper's Guide. WhiteFox Communications, Inc., P.O. Box 7125, Beaverton, OR 97007.

Manufacturer Publications

The Art and Technology of Typography. Wilmington, MA: AGFA Compugraphics.

Font & Function. Mountain View, CA: Adobe Systems.

FP Design Booklet. Mountain View, CA: Software Publishing Corporation (SPC).

Karow, Peter. *TypeWorks - URW TypeWorks Library.* Hamburg, Germany: URW.

The Omnifont and Services Catalog. San Antonio, TX: Architext, Inc.

The Unabridged HP MasterType Library Encyclopedia. Cupertino, CA: Hewlett-Packard.

Layout and Design

Chicago Manual of Style. Chicago, IL: University of Chicago Press, 1982.

Collier, David. *Collier's Rules for Desktop Design and Typography.* New York: Addison-Wesley, 1991.

Dayton, Linnea and Michael Gosnet. *The Verbum Book of Electronic Page Design.* Redwood City, CA: M&T Books, 1990.

Felici, James. *The Desktop Style Guide.* New York: Bantam Books, 1991.

Manousos, Stephen E. and Scott W. Tilden. *The Professional Look.* San Jose, CA: Venture Perspectives Press, 1990.

Mantus, Roberta. *Design Guidelines for Desktop Publishing.* Albany, NY: Delmar Publishers, 1992.

Parker, Roger C. *Looking Good in Print.* Chapel Hill, NC: Ventana Press, 1990.

The Presentation Design Book. Edited by Margaret Y. Rabb. Chapel Hill, NC: Ventana Press, 1990.

Shaw, David R. *Computer Assisted Publishing Digital Pre-press.* Oxford Mills, Canada: Curvet Press, 1990.

Shushan, Ronnie and Don Wright. *Desktop Publishing by Design.* Redmond, WA: Microsoft Press, 1991.

Type Styles and Typefaces

Dewsnap, Don. *Desktop Publishers' Easy Type Guide.* Rockport, MA: Rockport Publishers, 1992.

Fenton, Erfert. *The Macintosh Font Book.* Berkeley, CA: Peachpit Press, 1989.

Larcher, Jean. *Fantastic Alphabets.* New York: Dover Publications, 1976.

Pfeiffer, Katherine Shelly. *The LaserJet Font Book.* Berkeley, CA: Peachpit Press, 1990.

Typeface Directory. Edited by Frank Merriman. New York: Typographers Association of New York.

The Type Specimen Book. V & M Typographical, Inc. New York. Van Nostrand Reinhold Company, 1974.

Typography

Craig, James. *Designing with Type.* Lakewood, NJ: Watson-Guptill Publication, 1980.

Gosney, Michael, Linnea Dayton, and Jennifer Ball. *The Verbum Book of Digital Typography.* Redwood City, CA: M&T Books, 1990.

Lem, Dean Philips. *Graphics Master.* Los Angeles, CA: Dean Lem Associates, 1990.

Solomon, Martin. *The Art of Typography.* Lakewood, NJ: Watson-Guptill Publication, 1986.

Will-Harris, Daniel. *TYPEStyle: How to Choose and Use Type on a Personal Computer.* Berkeley, CA: Peachpit Press, 1990.

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ABOUT THE AUTHOR...

Glenn Searfoss has provided custom font design and consulting services since 1987. He has extensive experience in technical support on issues covering fonts, graphic design, and software design and development. In addition, he has written articles for **Dr. Dobb's Journal** and the **C User's Journal**.

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