

# **A Guide to Making Documents Accessible to People Who Are Blind or Visually Impaired**

## **by Jennifer Sutton**

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## I. GETTING STARTED

**This document contains a comprehensive discussion about how to make print and electronic information available to people with visual impairments in a variety of accessible formats. Consumers who have limited vision or are totally blind have unique access needs. These needs depend on the amount of vision each person has for reading. Some people have usable vision, allowing them to read large print. Others choose to read braille on paper, while a third group prefers to use a computer with synthetic speech, or refreshable braille display, to read electronic documents.**

**To make a text accessible, it is usually necessary to provide it in several formats. Alternate formats include large print, braille, audio tape, and electronic file. Even within these four categories, there are choices that are most appropriate, depending on a number of factors.**

**The process of developing alternate format documents can initially seem somewhat daunting and difficult. You will discover that some formats are easier to produce than others, but all formats need to be considered since some of the ones that take more effort to produce are essential for those who need them. Regardless of the alternate formats you are producing, the process will be easier if you think about it early, perhaps even during the writing phase. We urge you to take alternate format production as seriously as you would the production of a document in print. After all, the look, sound, and feel of your final product represent you to blind people in the same way that a print document represents you to sighted people. Fortunately, modern computers, when properly used, make this task easier. It is our purpose to offer helpful guidance in order to make the preparation of alternate format documents as straightforward as possible.**

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# **Who Will Find this Technical Assistance Guide Helpful?**

**You will find this guide helpful if:**

- **You need to make the manual for a piece of software or an appliance accessible to blind or visually impaired customers;**
- **You have been asked to find out how your company will provide bills that blind customers can read either with or without their computers;**
- **Your company is preparing for a conference, and you need to provide braille and large print handouts;**
- **You are a blind consumer who is advocating that a company make documents available to you in a form you can read;**
- **You want to offer a braille menu to the blind customer who comes into your restaurant;**
- **You are wondering how to enable blind customers to read forms or tables; or**
- **You want some basic guidance about how to make it easy for blind people to use a World Wide Web site.**

**While we cannot possibly discuss every kind of document here, you will find suggestions that will at least get you started. You will also be directed to other resources that may provide more detail about what to consider for a specific document type.**

**Many federal and state laws require that accessible documents be provided in certain situations. Some examples include Section 508 of the Rehabilitation Act, Section 504 of the Rehabilitation Act, Section 255 of the Telecommunications Act, and Titles II and III of the Americans with Disabilities Act. Obligations to provide accessible documentation can vary, depending on factors such as when the document was produced, who is furnishing the document, for whom, etc. A complete analysis of the laws and regulations pertaining to the provision of accessible documentation is beyond the purpose and scope of this guide. Here, we will provide guidance on how to produce accessible documents.**

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## **Why Provide Your Documents in Accessible Alternate Formats?**

**Certainly, as we have seen, the answer to this question could be a simple one. Documents should be made accessible because federal and some state laws mandate doing so. But we hope and expect that you will make documents available to blind and visually impaired people because you are eager to attract this group as loyal customers and because it's the right thing to do. Having equal and timely access to written information is absolutely critical for blind and sighted people alike.**

**What you may not realize is that offering accessible information to this consumer group gives you a chance to effectively target this population with its buying power. If you**

publicize how blind consumers can obtain accessible information, you will expand your customer base, and these customers are sure to spread the word about a company's obvious commitment to access. Blind consumers are willing to support companies that promote independence and maximize an individual's abilities.

Regardless of why you want to learn how to make information accessible, you will find tips and tricks here that will make the process much easier. For example, you will find specifications to consider as you develop a contract, resources to help locate experienced companies, and a few strategies to use to market and distribute completed alternate format publications.

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## How to Use This Guide

In order to get the most out of this guide, you are encouraged to carefully read through this introductory section, as well as the next section, "How to Design with Access in Mind." Important concepts are introduced that apply to all of the alternate format options. After you understand the basic principles described in these two sections, you can read the additional sections that best meet your needs. At any point in the process, you can find helpful references and resource links in the appendices. A discussion of strategies to assist with the marketing of the final product is located in Appendix A.

This technical assistance guide has been designed to be consulted on the World Wide Web. The online version provides many interactive links and can be found at [the website of the American Council of the Blind](#). A number of links are cited in the body of the document, but the appendices contain the majority of the online resources to which you may wish to refer.

The American Council of the Blind is pleased to provide this document on its web site in HTML and as a [braille file for use with a computer's refreshable braille display](#) or portable note-taker. The braille file is offered to facilitate access for blind consumers. Regular print, large print, audio tape, and hard copy braille will be provided upon request.

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## Factors for Selecting the Format(s) to Offer

When we begin to consider how to provide accessible documents to people who are blind or visually impaired, one of the first steps is to decide which formats will be offered. Unlike documents for sighted people who need legibly printed texts that are appealing in their presentation, blind or visually impaired people have needs that relate to what level of reading vision they have, what assistive technologies they will use, and where they will need to access the information. You may simply decide to offer large print, braille, and cassette

tape, as outlined in various regulations; however, combining one or two of these formats with an electronic document type can allow for maximum flexibility and some cost-savings.

One of the best methods to determine which formats to provide is to contact a representative sample of customers who are blind or visually impaired. Consumer groups, like the American Council of the Blind, and other local organizations serving blind people, often provide suggestions directly, or they may guide you to individuals willing to give advice. In addition, if texts are being prepared for an activity that requires people to register, the registration process can be used to ask blind people about their format preferences. What follows is a discussion of some of the issues and information you will want to consider.

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## Statistics Concerning the Blind and Visually Impaired Population

One of the issues to be considered is the number of people who are looking forward to reading accessible documents. According to the American Foundation for the Blind's document, ["Quick Facts and Figures on Blindness and Low Vision,"](#) "every seven minutes, someone in America will become blind or visually impaired." Additional statistics provided by the organization indicate that there are almost 8 million Americans with a visual impairment who have difficulty reading or are unable to read letters in regular print, even while wearing ordinary glasses. As a result, many in this group can benefit from clear print that is large enough to make it easy to read. As the population ages, it is reasonable to expect that the group of older individuals who are blind or have low vision will grow. Approximately 1.5 million people within this group are considered to be legally blind, and this population is the primary audience for whom alternate format publications are intended. Generally, a significant number of individuals who are legally blind find large print or audio texts helpful, while some 8-10 percent of the group use braille as a reading medium. Almost 200,000 people with a severe limitation in seeing have access to the Internet, and many of them use a computer on a regular basis.

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## Purpose and Portability

Thinking about the purpose of the document and the circumstances under which it will be read often determine which alternate formats are most appropriate. When possible, providing choices to enable blind and visually impaired people to be flexible about the format they prefer in different situations is ideal. Talking to the person or to groups of consumers about preferences ahead of time can result in innovative compromises and access solutions that might not be readily apparent at first. Asking questions like these may help to make the appropriate format choices clear.

- Is this a document that is likely only to be read once and then discarded?
- Are you producing text that will need to be searched?
- Are readers likely to be technologically sophisticated?
- Is this information that must be retained and reviewed over a number of years?
- Will someone need to interact with others while reading the document?
- Will customers need to complete and return the document to you?

The need to read a document only once suggests that all four formats should be considered, and appropriate ones should be made available depending on where the information will be read. If someone needs to read an agenda during a meeting, for example, an audio tape is not ideal, unless the tape is distributed ahead of time. In this situation, braille or large print may be the best choices, or if the agenda is available beforehand, the person may prefer to download the electronic file into a portable reading device for review during the meeting. Like sighted people, blind individuals want to follow along with the text and fully participate. Understandably, handouts may continue to change until close to the time of the meeting, so time pressure may become a concern. But good planning and communicating in advance with blind or visually impaired attendees will result in a better experience for everyone.

If sighted people would like to review the text periodically and refer to it over time, allowing blind people to choose among large print, braille, audio, and electronic file is best. If the information needs to be searched, electronic files may be the best way to make searching possible.

If the document needs to be carried from place to place, such as a conference program, and it is a long document, it may be unwieldy to carry in braille and to store for future reference. Readers might appreciate the option of having a shorter calendar portion in braille, and then being able to load an electronic file of the full program into a portable note-taking device so that it can be quickly searched and reviewed.

Ideally, forms will be generated so that individuals can complete them independently. Distributing a form as a text file makes working with the form effortless for blind or visually impaired users in comparison to other alternatives. People can enter their responses, print out the document, and submit the form, though retaining formatting is difficult. Since interactive forms are increasingly offered in HTML on the World Wide Web for everyone, this is certainly another option, assuming that the interactive form has been created according to accessible web page design principles. Offering a form on a web page for everyone to complete using a specialized format requiring a specific plug-in to allow users to complete the form can present problems. Although the ability to provide accessible forms is progressing, the completion of automated forms like these still has some limitations. Today, completing them often requires the installation of a plug-in and a commitment to a particular computer operating system. Also, blind and visually impaired computer users need, but may not have, the most up-to-date specialized technology available. If the text in such forms is not generated properly, it can become jumbled and difficult to interpret even when converted by an accessibility plug-in.

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## Quantity

Deciding how many copies of each format to produce will depend, to some extent, upon whether the work is being done in-house or whether a contract is being established to have it done. For example, printing material in large print on demand is not difficult. Copying an accessible file onto a diskette or compact disc and then duplicating that product is increasingly easy to do and relatively inexpensive. Certainly, presenting a document online is one of the easiest ways to make copies freely available.

But deciding how many copies to produce in large print, in braille, or on cassette or compact disc is a matter of guesswork and some trial and error. To see some statistics concerning the blind and visually impaired population, be sure to read the section above entitled "Statistics Concerning the Blind and Visually Impaired Population."

Here are some additional suggestions that may be helpful.

One strategy, which may be useful for distributing braille, would be to have a few copies produced. Then, keep an electronic copy of the master braille file. An electronic braille file is basically just like any other computer file, except that it has an unfamiliar three-letter extension, and it looks rather strange if opened in a typical word processor. A contractor can easily generate additional paper copies from the electronic file upon request. Updating information that changes frequently, such as the text of a menu, is important and appreciated by blind customers.

A restaurant might want to have a handful of copies of its menus available in braille. A hotel could keep several copies of its local area guide and hotel directory on hand in both large print and braille for guests. Then, if either the restaurant or hotel has a larger group of blind visitors, it is not difficult to provide more copies for them.

If you contract to have your alternate format production needs met, the companies with which you choose to work can often advise about the quantities needed. Clearly, the advice you receive will be especially on target if the chosen contractor has previously produced documents with a similar purpose and audience.

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## Assistive Technology

People who are blind or visually impaired use various assistive technologies to enable them to access printed texts. Assistive technologies can make text accessible, but they cannot render graphics or graphical images in meaningful ways without textual information or representations that web page designers or document producers must provide. Assistive



technologies typically magnify print, verbalize text aloud in synthetic speech or from a recording, or give the user access to braille.

Those who read large print may be able to read a document with the aid of prescription lenses, but others may use handheld magnifiers for reading. Some of those who read large print use a closed circuit television (CCTV) at home or in an office. A CCTV is equipped with a camera that enlarges the print and projects it onto a television-like screen. Those who read large print may also have software to enlarge the print displayed on the computer's monitor.

Braille readers may read braille on paper or they may have access to a device that can display refreshable braille. Refreshable braille displays allow the reader to scroll through the text in an electronic file. Pins on the display move up and down, as needed, in order to generate the braille "dots" that form the letters read with the fingers. Refreshable braille displays can be found as part of portable note-takers that are small machines that typically function for blind people like handheld personal data assistants do for sighted people. Refreshable braille displays may also be attached to a desktop computer. Braille on paper is generated by using software to translate the text into braille and then using a braille printer, known as an embosser, to produce the paper copies.

Audio recordings are generally produced on cassette tape, but compact discs may be used in some circumstances, particularly as tape production and duplication become more difficult. Blind people may use commercially available tape recorders or stereos to listen to recorded texts, or they may use specialized half-speed, four-track cassette players which many blind people have available. You may wish to use this non-standard format to produce cassette tapes, especially if the document you are recording is longer than 90 minutes. Companies that regularly produce audio tapes for blind people are familiar with the logistics of providing recordings in this specialized format.

Electronic files may be read using a refreshable braille display attached to a computer, using a portable note-taker, or using synthetic speech. Synthetic speech may be built into a portable note-taker, or it may be produced using software and a voice synthesizer installed on a computer. Basically, a blind person who uses synthetic speech is able to hear all of the textual information that is displayed on a sighted person's screen. Electronic files can be distributed to blind people on World Wide Web pages, by e-mail, on diskettes, or on compact discs. Sometimes, producing an accessible electronic document can give the user the most flexibility since an electronic file can be searched, reviewed, and manipulated.

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## **Securing Customers' Personal Information**

Many companies do not need to consider customer privacy, but those who do must take this issue seriously, regardless of the alternate format being produced. Customer privacy is particularly important when a company is providing items like bills or bank statements. Offering this information in large print or braille, or via online access, are all certainly

options. What is most important is that the information be transmitted privately, accurately, and in a timely fashion. Blind people appreciate the opportunity to handle financial transactions and maintain written records of such transactions without relying on the assistance of sighted readers.

If you contract to have documents produced in alternate formats, be sure to have your contractor sign an agreement to prevent the disclosure of private information. Here are some specific suggestions about each format choice.

Simply enlarging and copying a statement on a copy machine tends to yield unsatisfactory results. The print must be large, clear, and dark to enable people with low vision to read it.

Methods for producing braille are dependent upon the computer hardware and software used to create the document in print. If bank statements, for example, are generated from a specialized computer system or software, a company may need to have an interface developed to facilitate the generation of braille using translation software and a braille embosser. While printing a statement in regular print and then using a scanner to scan it for production into braille might seem to be an option, scans of documents with columns and numbers frequently result in a text with errors.

Listening to private information read aloud on a recorded medium is the least ideal of all the format options. This approach allows others, such as those who read the information aloud, to have too much access to personal information, and tapes are difficult to search and review.

Offering electronic access to private information may be the simplest approach since companies increasingly allow sighted customers to have the same method of access. This form of access is the most convenient for those who know how to use computers and note-taking devices. Though a growing number of blind and visually impaired people do have access to a computer and the Internet, providing this alternative may not suffice for every customer. When a company chooses to provide access to private information online, it is critical that a company pay close attention to web accessibility guidelines. Tables and columns, for example, must be formatted properly. Customers must be able to enter their passwords independently, and they must be able to navigate the site using the keyboard for all tasks. Note that when the [World Wide Web Consortium's accessibility guidelines](#) are followed, it becomes fairly easy to generate braille and large print documents from the electronic files used on the web site.

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## Who Should Do the Work?

Deciding whether to contract with other companies that can produce alternate format documents or whether to do the work in-house requires some forethought. You may conclude that some production tasks can be performed in-house, while some of the document preparation should be done by companies with particular expertise. In general,

the master copy of large print materials and electronic documents can be produced in-house. On the other hand, it may be more convenient and efficient to call upon the expertise of outside contractors familiar with the intricacies of producing text in Braille and in audio formats. Consider the following questions:

- How many copies of each publication will you need?
- How frequently will you need to produce each document for a given customer?
- Will you be filling requests for accessible documents on an "as needed" basis?
- How often will you be revisiting the publication?
- Will you have a quick turn-around time?

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## Performing the Work In-House

Consider producing alternate format documents in-house if:

The primary audience for your product is blind or visually impaired people;

You often need to provide accessible information to visually impaired personnel; or

You frequently produce similarly formatted documents using a word processor.

Also consider generating alternate format documents in-house if you have a staff member or two who:

Has strong word processing skills and can understand the concepts necessary to produce high-quality large print

Has specific computer skills and is familiar with writing the code needed to design web pages

Has a clear, pleasant reading voice and is familiar with both the content and purpose of the material to be recorded

If you decide to produce some or all of the alternate format documents in-house, consider having qualified blind or visually impaired consumers review your work to suggest ways to improve the quality. It is especially important that a proofreader be hired to offer initial advice to assist with the smooth production of high-quality braille.

Each alternate format section in this guide has basic ideas to keep in mind. Links to additional references may be found in the appendices.

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## Hiring a Contractor

Since accessible documents may only need to be produced upon request, or when the print publication is revised, we suggest you consider contracting out some parts of the process. As you will see, it is relatively easy to use word processing software to modify a regular print document and produce acceptable large print. Web masters or desktop publishing staff who pay careful attention to detail can convert electronically generated text into a format that a blind or visually impaired person can read.

But producing the other alternate formats, such as braille and audio file, requires some specialized skill and financial outlay. An organization that chooses to record an audio version of the text or emboss it in Braille will need to purchase and install braille embossing equipment, become familiar with specialized software, need a cassette duplicator, and have some audio production experience.

The American Council of the Blind maintains a number of resource lists that contain helpful general information about blindness and visual impairment, or about companies that provide products and services of interest. See [the American Council of the Blind's Helpful Resources page](#).

The American Foundation for the Blind offers a comprehensive database on its web site that will guide you to local organizations that can assist with the production of alternate format documents. See the [AFB Directory of Services for Blind and Visually Impaired Persons in the United States and Canada](#).

The American Printing House for the Blind has compiled a similar database which offers information about Accessible Media Producers. See the [Accessible Media Producers Database](#).

the National Library Service for the Blind and Physically Handicapped has recently revised its resource publication, [Sources of Custom-Produced Books: Braille, Audio Recordings, and Large Print](#). You can obtain the publication online, or it can be ordered in braille or print by contacting the Reference Section at the National Library Service for the Blind and Physically Handicapped, The Library of Congress, Washington, DC 20542.

All three of these comprehensive resources allow users to search with more or less flexibility for local and regional organizations. Searches can be limited to organizations that perform certain services, such as braille transcription and proofreading, or recording of documents. Volunteers staff a number of the organizations listed in the resources mentioned above, but we encourage you to hire contractors, especially due to the time limitations under which volunteers may be working. As you would when making arrangements with any contractor, we urge you to seek recommendations from consumers, use this guide to prepare yourself to ask explicit questions, be able to describe the alternate format product you expect to receive, and generally make sure that the contractor you select has had experience providing what you need in a timely fashion.

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## **II. HOW TO DESIGN WITH ACCESS IN MIND**

**One of the most important steps you can take to simplify the process of creating accessible documents is to make certain, during each phase of composition, that those who are developing the document use word processing software properly. Assuring that this happens may be difficult when several individuals work collaboratively on a project, so designating someone to review a document for inconsistencies could be helpful. Clearly, these concerns about correctly word-processed texts only apply to the creation of large print, braille, and electronic documents.**

**Following the conventional techniques for formatting documents with a word processor is important because doing so facilitates the production of these alternate formats. Software used to translate text into braille, for example, is designed to find and utilize standard word processing codes and to apply them to generate text formatted in the ways that are common practice for the production of braille. When generating large print, often a text must be reformatted, and this task is easier when proper coding in the word processor makes the page numbering, margins, line spacing, tabs, etc. consistent.**

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### **A Word About Wizards**

**While software wizards that automatically format a text can be helpful in generating documents, it is important to understand that they may not always facilitate a smooth transition from regular print to another format. Often, these wizards add extraneous coding to a document which web page designers must then later strip from it in order to create a clean and accessible final product.**

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### **Dos and Don'ts of Word Processing**

**Do use tabs and hanging indents rather than using the spacebar.**

**Do always use numbers as appropriate. For example, use the number one rather than the letter "L" and the number zero rather than the letter "O."**

**Do insert hard page break codes at the proper locations rather than using the enter key repeatedly in order to move to the next page.**

**Do use page numbering codes, rather than simply typing in page numbers.**

**Do use style codes to generate passages of text, such as bold, italics, or underlining, but remember that text for large print readers should already be in boldface type to improve contrast.**

**Don't use the enter key to end each line, as you would when using a typewriter. Rather, only use the enter key when a new paragraph should begin or when blank lines are needed.**

**Don't use columns in the document.**

**Keep in mind that you or a contractor may need to reformat certain areas of documents, such as tables or spreadsheets, to assure that blind people who use screen readers can understand the text and the concepts that the visual presentation is meant to convey. When information like this has been reformatted to make it more accessible to blind readers, remember to update it when revising the document.**

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## **Special Kinds of Documents and Formats**

**When preparing a document for production in any of the accessible alternate formats, you will want to pay special attention to certain information such as:**

- **Tables**
- **Graphs**
- **Charts**
- **Spreadsheets**
- **Pictures**
- **Diagrams**
- **Captions**
- **Boxes**
- **Side Bars**
- **Tables of Contents**
- **Footnotes and Endnotes**
- **Glossaries and Indices**

**The contents of these areas of documents need to be transmitted accurately in large print, braille, and electronic file. The information must also be explained clearly and concisely in the audio presentation of the text.**

**With respect to tables of contents, indices, glossaries, and footnotes and endnotes, it is critical that readers have flexibility in terms of page number references. Ideally, the accessible final product will include page numbers that both reflect the formatting of that product, as well as page numbering that refers to the regular print version. Such careful attention to detail permits blind and sighted users to discuss a document together. Because**

these portions of text typically contain unusual formatting, they must be carefully reviewed when converting a word-processed file into another electronic file format. Providing a complex document with content like this as a stand-alone HTML file, or posting it on the World Wide Web, can be a helpful solution. Including internal links from a table of contents to chapters, or from a term to its definition in a glossary, provides a pleasant reading experience for blind and sighted readers alike.

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## **Thinking About Images**

If there are pictures in the document, be sure that they are clearly explained in the text. Images that are to be posted on the World Wide Web require descriptions in order to be understood. What is generally important to consider with respect to images is that for the blind and visually impaired audience, text that refers to a picture of a product with an arrow pointing to the "green button," for example, may be of little or no value to a blind reader if the text does not also specifically describe the location of that green button, i.e. the first button on the left in the top row. If the button is tactilely distinct from other buttons, it is helpful to explain that it has a different shape or size to the touch. Note that clearly written explanations benefit both sighted customers and customers with disabilities. After all, many people learn best by having the choice to read text or look at a picture. Detailed textual discussions enable many people to focus on the most relevant portions of a diagram or picture.

When a document is updated, the descriptions of visual information may need to be revised, too. This detail may seem obvious, but if it is overlooked, confusion can arise for blind readers.

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## **III. PROVIDING LARGE PRINT**

Generating large print documents for individuals who have low vision is a task that most companies can accomplish in-house. Simply using a copy machine to enlarge and darken the print, however, is not the best approach. Rather, documents in large print need to be printed very clearly, reformatted to increase the size of the font, improve print contrast, and generally make the text easier to track visually. A master document in large, dark print may be copied if the machine will produce a very clean duplicate.

People who read large print may read with prescription lenses, special magnifiers, or closed circuit television (CCTV) technology. A CCTV consists of a camera, under which the user places the text, and then, the camera enlarges and projects the text image onto a television-like screen.

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## **Deciding on the Number of Copies**

Many individuals who are legally blind are able to read large print, so it is reasonable to conclude that there are likely to be more requests for this format. As with other alternate formats, it will be helpful to retain an electronic file of the large print version so that it can be quickly printed, e-mailed, or refined upon request. For further details about the number of copies to make available, see the section in "Getting Started" entitled "Quantity."

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## **Formatting and Printing for Large Print Readers**

When producing large print, it will be helpful to follow the general guidelines outlined in the section called "How to Design with Access in Mind." In order to generate the most legible large print documents, make an effort to implement the following specific suggestions, unless a consumer specifies another type-size or font preference. The large print version will consist of about three pages of large print for every page of 11-12 point print.

Many large print readers recommend printing text in 18-point type. Although 14-point type is often mentioned as acceptable in regulations, such as those issued by the U.S. Postal Service, using 18-point type will accommodate a wider audience.

Select a font that is plain, rather than one that is fine or fancy. There should be normal white space between characters.

Bold the entire document so that the print will be dark enough to offer an additional level of contrast between the print and the paper.

Left-justify the text so that the spacing between letters is consistent and easy to track visually. Use the block style for paragraphs whenever possible. If the beginning of each paragraph must be indented, use two spaces, instead of the usual five.

Left and right margins of one inch are ideal.

Number pages at the top or bottom left-hand side of the page.

Use 8-1/2 by 11-inch, non-glossy, off-white paper whenever possible. White paper can create glare, and colored paper lessens the contrast between the print and paper. Also, choose paper that does not permit the letters to bleed through to the other side of the page when printing on both sides.

Make sure that the ink in the printer is generating clean copy without lines or smudges.

Eliminate the automatic hyphenation of words.



Do not center text.

Do not double-space the document, but rather, set line spacing to 1.5.

Areas within the document that are not straight text, such as pictures, tables, graphs, charts, and information in columns, will require some modification. Graphs, diagrams, and pictures should be removed and described instead, or they may be enlarged and included on separate pages for those readers who find them useful. Information in tables, columns, and charts needs to be arranged so that it can easily be tracked with the eye. Column formatting should be removed. Data in tables and charts should be explained in the text, or if the information can be made to fit on the page, adding dot leaders can help the reader follow the presentation.

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## Labeling and Binding Large Print Documents

Just as with documents provided in regular print, the presentation of the final product is important. In fact, binding or stapling the large print version may be even more important since there are many additional pages. Selecting a binding method that will permit readers to use magnifying equipment is especially helpful. For example, putting several staples along the vertical edge of the pages is not recommended because doing so often makes the pages difficult to flatten entirely and may obscure the print close to the binding. Using spiral binding would be preferable since the book can either be opened flat or folded in half, making it easier to maneuver while reading.

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## IV. PROVIDING BRAILLE

Braille is a system of raised-dot combinations that represent print letters both to blind and deaf-blind readers. National Braille Press makes a [representation of the braille alphabet](#) available online for interested print readers.

Braille does not consist of dot formations that correspond precisely to print. Rather, most of those who read braille are accustomed to reading a sort of shorthand, called Grade II braille, in which many contractions are used. Because readers expect to see these contractions and various other common format modifications, braille translation software is a necessary part of the process of providing braille.

Though the population of braille readers may be comparatively small, it is important that this format be offered to those who need it. If a braille reader is attending a meeting where printed documents are being reviewed, and the blind person has nothing to review, he or she cannot participate fully in the activity.

If a company intends to produce braille texts in-house, the company must purchase a braille embosser, the appropriate paper, and software to translate electronic files into braille. Although a method for electronically embossing braille onto paper is in widespread use today, one never knows when a new method may become inexpensive enough to be adopted as the accepted technology. The [Duxbury Braille Translator](#) is one of the leading software packages currently in use in the Microsoft® Windows® environment. A few free braille translators are available and are listed in Appendix C, but these free packages may not offer the support or flexibility that other packages do.

Several assistive technology companies manufacture and support braille embossers. A list of these companies may be found by visiting [Duxbury Systems' Resources On or Off the Web](#). The National Library Service for the Blind and Physically Handicapped provides another list entitled [Braille Embossers](#).

While an electronic file can be translated into braille and embossed on paper, if the document is complex, a proofreader's assistance will be valuable. A proofreader can assure that braille readers receive error-free documents. Braille proofreaders are listed in some of the sites gathered in Appendix C.

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## **Braille Translation Software and Word Processing Techniques**

Major software packages for braille translation are able to handle many file types. For example, the Duxbury Braille Translator is flexible and can translate files produced in word processing programs such as Microsoft Word® and Corel WordPerfect®. Duxbury's software can also translate HTML documents prepared for the World Wide Web and information generated by spreadsheet packages. It is important to keep in mind that braille translation software cannot currently translate documents produced using graphical desktop publishing packages such as QuarkXPress™, Adobe® PageMaker®, or an Adobe product that generates Portable Document Format® (PDF) files. Braille translation must be performed on text-based characters, rather than graphical images of those characters. If a software package is not supported, it will be necessary to convert files to a format supported by the braille translation software first.

Principles of proper word processing are important to observe when producing braille documents because braille translation software takes word processing styles and other specialized indicators into account. For example, a tab stop beginning a paragraph in print is translated into the two blank spaces that denote the beginning of a paragraph in braille. Braille translation software also renders bulleted points, italics, bolding, underlining, and other similar styles into specialized configurations recognizable to braille readers.

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## **Making Visual Information Accessible to Braille Readers**

Pictures, diagrams, tables, charts, and graphs may be more difficult to render in braille than basic textual documents are. Pictures cannot be translated, so including text descriptions of them, and making sure that captions are descriptive and translate correctly, will be helpful. Diagrams and graphs also require attention so that the information contained in them is adequately conveyed. Again, notes inserted into the text can be valuable, and depending upon the purpose of the diagram or graph, it may be worthwhile to have tactile graphic representations produced. Finding a contractor with previous experience in developing tactile graphics is advisable, and several of the resource collections in Appendix C can guide you to such contractors.

Tables and spreadsheets can be translated into braille. When working with spreadsheets and tables, a semblance of their layout must be retained so that all headings and data are accurate and placed correctly. Often, the intervention of a proofreader is necessary for complicated documents like these.

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## **Embossing, Binding, and Labeling Braille Documents**

When the document is ready to be translated into braille, you will need to make some decisions about the presentation of the final product.

Will the document be embossed on one side of the paper or on two? The braille printer you have may only allow for the embossing of single-sided pages, but if you have a choice, consider using both sides of the page. Embossing on both sides of the page is an especially good idea if the document is long. Clearly, double-sided pages save paper, and the braille version becomes less bulky to carry and store. If you are embossing several different items at the same time, such as pieces of a packet, be careful to check that each new document begins on the front side of a page since doing so makes each piece easier to locate quickly.

Which size paper will be used? There are two basic sizes of braille paper from which to choose. Standard 8-1/2 by 11-inch paper is easier to carry and is often the best choice for short documents. On the other hand, larger paper, measuring 11 by 11-1/2 inches, may be more suitable for books.

Braille translation software allows users to set margins and indicate whether the document will be single-sided or double-sided so that pages will be numbered in sequence. Unfortunately, if top and bottom margins are not set properly, text can be embossed on the perforations between the fan-fold pages, and when this happens, the braille becomes impossible to read. Running a test copy permits the producer to make any necessary adjustments.

Be sure to purchase fan-fold paper that can be loaded into the printer. Also, selecting paper with pre-punched holes in it may be helpful if it is appropriate to bind the text in a three-hole binder or with a 19-hole comb binding.

After the text has been embossed in braille, consider whether the document needs simply to have the pages stapled together, whether it needs to be bound with covers on front and back, and whether it needs a braille label on it and perhaps also a print one. Without print labels on them, a large collection of braille documents can become difficult for sighted people to identify and distribute. Stapling, binding, and labeling are often neglected, but extra touches like these demonstrate to blind readers that companies care about the image conveyed by the braille product. Even if you choose not to staple the pages, always be sure to separate the fan-fold braille pages, just as you would if the document were in print.

Additional copies of the document can be generated from the electronic file. For suggestions about the number of copies, see "Quantity" in the section entitled "Getting Started."

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## V. PROVIDING AN AUDIO VERSION OF THE TEXT

Since many people who are blind or visually impaired have become accustomed to listening to recorded texts, this alternate format is certainly one that should be considered. In fact, depending upon the circumstances in which reading will be done, this medium may be the best "one size fits all" choice. Offering an audio-based publication is especially necessary if there is a need to reach the widest range of blind or visually impaired readers who may not have access to computers or the Internet. Because they must frequently rely upon cassette-based publications, blind or visually impaired people are likely to have access to audio cassette players. It is also worth noting that people who have learning disabilities may also benefit from listening to information on tape. In this section, several aspects of the production process will be discussed including selecting a reader, choosing the recording medium, describing visual information, and labeling and packaging the final product.

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### Selecting a Reader

The person who records the text should be someone who has a clear, pleasant reading voice. In most cases, a dramatic reading is not necessary and may sometimes even be distracting. Professionals with specific experience reading for blind people may be hired, but doing so is not always essential. What is important is that the information be made available and be fully comprehensible to the intended audience.

Using a recorder of good quality with an external microphone generally produces satisfactory results. Eliminate as much background noise as possible.

Besides speaking clearly and reading at an even pace, the individual who records the text may need to be familiar with its content. If the document is a manual, or otherwise technical in nature, all terms should be pronounced correctly, and unfamiliar words should be spelled.

---

## Recording Tips

If the recorded information will remain unchanged over several years, it will be worthwhile to record in a format that can easily be transformed into other audio media types. We recommend creating and retaining a high quality master archive copy.

Generally, someone who is recording a text reads all of the printed information contained in it. If the document is complicated, notes to the reader may be required, and when a note is inserted, the reader should be made aware of it. Here are a few suggestions for those who are recording.

At the beginning of the tape, announce the side of the tape and the tape number if there are multiple tapes in a series. Also, indicate the page number where the reading for that side will begin. Read the table of contents and include the print page number references.

Describe visual information in the text so that the meaning will be clear while listening to the audio version. For example, when listening to tables, it is often helpful to hear column and row headings repeated along with the data, though if the table is not too complicated, headings are usually easy to remember.

Descriptions become especially important if a manual for an appliance is being recorded and there are frequent references to controls depicted in diagrams. In such cases, a reader should offer as much verbal description as possible in order to pinpoint the location of controls on a device. If extended description is necessary, such as during initial orientation to a device and its controls, preparing notes or a short script is a good idea.

---

## Choosing a Tape Format

If the text is being recorded in-house, the regular commercial tape format may generally be used, especially if the document is short enough to fit on a 60- or 90-minute tape. Longer projects, like books and manuals, can be recorded on tape using a special format. This format, developed by the National Library Service for the Blind and Physically Handicapped, requires that recordings be made at a slower speed. Four tracks of a tape are

used, instead of two. Blind people frequently own the players that must be used, but members of the general public cannot use the tapes produced in this manner. Note that this special format is not universally used outside of the United States.

If there is a frequent need to create long pieces of audio material for wide distribution, it may be economical to purchase a special tape recorder and a standard stereo duplicator. Otherwise, it may be best to hire one of the contractors already equipped to produce these special format tapes.

---

## **Providing Audio Files on Compact Disc**

Compact discs (CDs) generally hold about 70 minutes of audio data. They can either be played on home stereo equipment, or they can be played on computers. They are likely to become increasingly popular as audio tape technology is phased out. It may also be easier to disseminate a CD as an insert into a package, or into the back of a print book, to enable each user to choose a preferred reading medium.

---

## **Choosing a File Format for a Computer or the Internet**

When the audio version of the text will be included on a web page, it is generally a good idea to use some form of streaming media. Users with dial-up connections can often listen to these files. Generally, only the most technologically equipped users have connections fast enough to allow them to conveniently download and save a file created in a format like MP3. Files can, however, be copied onto CDs for distribution. We encourage you to include a player for the files on each CD.

One of the benefits of using a multimedia audio format, like MP3, is that such audio files can be merged with a document produced in the Extensible Markup Language (XML) to allow for simultaneous text and audio access. A detailed technical explanation of how this process works is beyond the scope of this guide; however, some additional information is included in "Providing Electronic Documents" under the section entitled "Providing Simultaneous Text and Audio Access."

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## **Including Place Markers in Audio Formats**

Place markers are helpful to blind readers if the recorded text refers to specific page numbers or sections which the reader must locate. A simple newsletter may not require place markers, but a book or manual does.

Commonly referred to as tone indexing, including these place markers means placing tones, or beeps, in the cassette recordings. These beeps can be heard when a cassette player capable of utilizing this feature is placed in fast-forward or rewind mode. Experienced blind people generally have access to the required special players and are accustomed to listening for these sounds. Traditionally, a single beep tone marks a new page and two tones indicate the beginning of a chapter or section. Simple devices for generating beep tones can be purchased from companies that cater to blind customers. One company that markets a beep-tone indicator is [Ann Morris Enterprises, Inc.](#)

A CD can be created so that listeners who use players capable of doing so can skip from section to section much as they would move from song to song on a music CD. Plain audio files posted on the Internet may be divided into appropriate sections, but they, like individual CDs, can be difficult to skim and search, depending upon the limitations of the player being used. Creating files that contain simultaneous text and audio offers readers the ability to browse through a document, and players for these files give users added control over how the file is viewed.

---

## **Copying, Labeling, and Packaging Audio Products**

Copies of CDs can often be made and distributed in-house, but duplicating tapes in-house may be more difficult, depending upon the tape format selected. For suggestions about the number of copies, see "Quantity" in the section entitled "Getting Started."

Adding braille and large print labels to tapes and compact discs is appreciated, and doing so demonstrates that an organization cares about the presentation of its accessible documents. Braille labels also allow a blind person to identify quickly which side of a cassette is the first side. Labels should be placed on the outside of CD jewel cases or cardboard jackets. Be careful not to place a braille label directly on the CD itself since it can prevent the disc from rotating properly.

Packaging for cassettes and CDs varies widely, and selecting an appropriate packaging style often depends upon how the product will be distributed. If the cassettes or discs will be sent alone by mail, for example, sturdy cases will protect the items. But if a short document is distributed on tape and is likely to be read once or twice and then discarded, a tape without a case is generally adequate.

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# **VI. PROVIDING ELECTRONIC DOCUMENTS**



**This section covers suggestions for making a wide variety of electronic texts accessible. Discussed here are tips for producing documents for distribution on diskette or compact disc, disseminating electronic files via e-mail, and posting accessible texts on the World Wide Web. Topics are generally outlined, and Appendix E should be consulted for more technical details.**

**In some ways, receiving information electronically is increasingly becoming the preference for blind people who use computers. Of course, the usefulness of this option depends upon where the information needs to be read and whether the user can realistically manipulate an object while using a computer (such as when reading a manual for assembly directions). What can make this option an ideal choice is that readers can manipulate the text according to their needs. Documents can be enlarged on a computer screen, downloaded and saved into portable note-taking devices, or embossed on paper in braille.**

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## **Word Processing for Maximum Flexibility**

**Preparing information for electronic distribution to blind and visually impaired computer users is not difficult if the general principles outlined in "How to Design with Access in Mind" are followed. Images should be described and tables and columns should be reformatted so that information is conveyed logically to those using screen readers. Often, particularly when disseminating electronic files, it can be helpful to use the "save as" feature found in the file menu of word processing programs. Saving the file as plain text can assure that users are able to read it and/or transform it into another file format of choice.**

**In order to view a text file before distributing it, open it in one of the text editors found among the programs run on the major computer platforms. Since the Microsoft Windows, Macintosh™, and Linux environments can vary so much, suggesting an appropriate program is difficult; check with someone who is knowledgeable about computers if you are unsure.**

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## **Distributing a Text File**

**Files may be provided in several ways. Often, readers receive electronic files on 3.5-inch diskettes. For help in determining the number needed, refer to "Getting Started," and see the section entitled "Quantity." Certainly, a diskette can be a fine choice in some situations. In other circumstances, however, being handed a computer diskette in a meeting, where documents will be reviewed, is only ideal when readers have stated this preference and will have assistive technology on hand to enable them to access the diskette, follow along, and participate.**



Plain text files are the most likely to be accessible to all blind computer users. Though many people use Microsoft Word, or have methods to convert files generated in this file format, it is risky to assume that everyone can open a Microsoft Word document. Again, plain text and HTML are generally the most universally accessible choices.

If the file is large, common archiving software may be used to compress and distribute it. The file may first be archived using any of the available programs for compressing files since programs to restore compressed files are generally available.

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## **Sending Information via E-mail**

Plain text files may be e-mailed directly to those who request this accommodation. Most users can receive and open attachments, but as with sighted computer users, it is best to know first that attachments are acceptable. When sending an e-mail attachment, contact the recipient in advance, to alert him or her that an attachment is going to be sent. Many people set their e-mail programs to discard attachments in order to avoid computer viruses. Often, pasting text into a message is the simplest solution.

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## **Putting a Braille File Online**

Blind and visually impaired readers can download, save, and access electronic braille files. If a braille hard copy version of a document is made available, then it is a simple matter to place a link to the electronic file on a web page. During the upload process, a braille file should be treated as a binary file so that it will transfer to the user's machine properly. Putting the braille file online enables readers to have the pleasure of reading braille without having to accumulate thick braille texts. In addition, electronic braille files permit companies to have a level of security concerning the documents they put online. Without considerable effort or previous knowledge, sighted people cannot decipher the braille code. Finally, posting the electronic braille file demonstrates to all site visitors that your organization promotes accessibility to information for blind users.

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## **Providing Electronic Files on Compact Disc**

Compact discs containing large files, or a variety of electronic versions, can be distributed when 3.5-inch diskettes are not adequate. A compact disc might simply include both a plain text and an HTML version of a document.

Regardless of the CD's content, it is critical that the CD work smoothly with computers running assistive technology. Blind users should be able to read all instructions and serial

numbers as required. Access to this kind of printed information should be provided whether it is placed on the CD itself or printed on the package. Blind people must be able to control their computers at all times and be aware of any installation procedures and initial choices. If it is necessary to include a user interface to the CD, all menu options must be accessible, and a user who is blind should be able to navigate through the menus by using standard keyboard commands. Since we are focusing here on access to text-related information, a specific discussion of software accessibility requirements is beyond the scope of this guide. Note that a number of the resources in Appendix E can offer more specific information about this issue, so be sure to explore them thoroughly.

CDs with documents on them should be labeled and packaged like audio CDs. For more details, see the section entitled "Copying, Labeling, and Packaging of Audio Products."

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## Creating Accessible Web Sites

Like sighted people, blind people increasingly turn to the World Wide Web as their first source of information. Perhaps, in some cases, they may even rely on it more than sighted people do. For example, those blind or visually impaired individuals who have access to the Internet are likely to look on the World Wide Web when braille, large print, or an audio format document is not handy or when it has not yet been made available.

Much of what is required to make a web site accessible to people who are blind or visually impaired is a matter of implementing good web page design practices. If standards or relevant legal provisions are not followed, someone who uses assistive technology may not be able to find the information on the page. Even if the information is located, a screen reader may read the page, but it may sound like total gibberish and be difficult or impossible to decipher. Here, we will discuss what is important in terms of accessibility for blind people; however, we strongly encourage site designers to apply the concepts of universal design so that pages will be accessible to everyone, regardless of whether site visitors have a disability. You can learn more about what constitutes "universal design," at the [TRACE Research Development Center](#), which has produced many white papers and other documents that explore these concepts.

In this section, we will touch briefly and generally on a number of accessibility-related issues. For additional specific web page design techniques, we refer you to Appendix E in which a variety of resources, including tutorials, have been collected for your convenience. Also, many of the web sites mentioned throughout this guide as resources have been designed with accessibility in mind so they can serve as representative models.

As we have discussed, it is risky to assume that all users will be able to open files created with specific word processing software or in other software formats, such as Adobe PDF or Microsoft's Reader format. We stress that consumers should be consulted about preferences when possible. In general, an HTML or text version should be provided as an

option in order to accommodate the widest audience; however, we believe that advances in technology will eventually make additional format choices more accessible and desirable.

In addition to simply including a link to a file for download from a web page, the web pages themselves, with all of the information they contain, should be made accessible to blind people who use assistive technology and the Internet. As with documents in other alternate formats, visual information must be described to blind surfers. Images need text descriptions, graphics should be labeled, and tables require careful formatting. Image descriptions, labeled graphics, and correct tables not only benefit blind users, they also make web pages accessible to all users who may not wish to, or be able to, download images, for example.

Along with the data on the web page, the code that controls the navigation and structure of the page needs to be compatible with assistive technology. Site users with disabilities appreciate being able to skim and search. Input controls should also be labeled so that assistive technology can recognize them. Using cascading style sheets makes it possible to adjust the on-screen presentation to reflect reading preferences. Because software wizards that generate web pages rarely offer total control over the final product, they should be used with care.

We recommend that educated consumers who use a variety of assistive technologies and operate on multiple computer platforms test web pages. Users with various disabilities should have a range of experience accessing different kinds of web pages. Sighted web designers may do some initial testing by opening the web pages without loading images. They should also familiarize themselves with the keyboard commands for navigating the web, so that they can make sure that the site can be accessed without a mouse. Though the focus of this discussion is on the needs of site visitors who are blind, we urge you to take the needs of people with all kinds of disabilities into account when designing web pages.

In order to understand the surfing experience for blind people, perhaps the most effective strategy is for a practiced blind consumer to work physically, side-by-side, with a sighted person who is familiar with the web site being tested. Sometimes, arrangements can be made for each person to use readily accessible and available collaborative software so that a sighted person can monitor a blind person's experiences of web pages. Both discussing the web site with the blind user and observing what the screen reader is conveying enable sighted people to grasp the issues rapidly.

A sighted person may wish to test pages with the screen reading software that blind or visually impaired people use. While this approach may give some sense of where problem areas exist, we do not encourage it. Preparing to test with screen readers that blind people use requires a significant time investment. In addition, a sighted person can rarely mimic or imagine the blind surfer's experience of a page.

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## Common Web Site Accessibility Issues

Below is a list of some of the most common accessibility issues that can make a site frustrating to use for a blind person. Resources in Appendix E, such as those available from the [World Wide Web Consortium](#), and [Section508.gov](#), should be consulted for more comprehensive information. As you consider this sketch of the issues, below, or when you are making needed modifications to web pages, remember that what you are doing makes a real difference. More often than not, thoughtful site design that keeps the needs of people with disabilities in mind results in a better user experience for everyone.

Associate text with images using an alternative text attribute that refers to the image tag. Sometimes this attribute is referred to as an "alt tag." Brief image descriptions often are meaningful to blind people or to those who are looking at web pages without images turned on, such as when someone is reading on the screen of a cell phone or another similar small device. The image description should be relevant to the content of the page. For example, it is not necessary for a blind person to hear about the existence of all separators or blank space images on a page. Purely decorative images like these should be tagged like this: alt="". On the other hand, labeling the image of a button or a logo would be important. Note that a graphic containing text is not accessible; that text must be included in an alternative text attribute for the graphic.

Include a link to allow blind people to skip repetitive navigation links and go directly to the main content of the page. The [American Council of the Blind's](#) web site contains such a link, and for another example, you can visit the very accessible web site of the [Cable News Network](#).

Make sure that the contents of image maps are tagged so that they speak correctly as words, rather than as HTML code. Just as a sighted person might not be able to decipher the HTML code as it appears on a page, a blind person who hears the code is likely to be frustrated by having to listen to something that sounds like an unfamiliar foreign language.

In tables, associate row and column headings so that assistive technology can present the data in a logical order. Specifically, in data tables, be careful to indicate which cells are row and column headings so that assistive technology can present the data in a meaningful way. For simple tables, use the "TH" tag to indicate that a cell is a heading cell, or use the scope attribute. For complex tables, use the headers attribute on each data cell.

Give frames titles and use them sparingly. Many screen readers can navigate through frames, but titles make doing so informative rather than tedious. Also, use the "noframes" tag appropriately.

When possible, make link names clear and specific. A link named "here" or "click here" does not provide much context to assistive technology users who may skim through just the page links for an overview.

Label all input controls so that assistive technology can identify them. Controls include check boxes, list boxes, combo boxes, edit boxes, and all buttons. If controls are not labeled properly, searching a page, or completing a form, becomes frustrating or altogether

impossible. Ideally, all site visitors should be able to complete forms independently. Interactive HTML forms can work quite well if all controls are labeled so that assistive technology can identify the form fields.

Currently, including forms created with specialized software can be a problem since blind users must be able to run and have installed a plug-in. All guidance about making such forms accessible must also be followed.

Cascading style sheets are of great value to those who use assistive technology. People who prefer to read in large print on their computer screens can control the page presentation through the browser. Braille can be generated from HTML pages that are accompanied by cascading style sheets that dictate the page formatting.

A video should include audio descriptions to make members of the audience who are blind aware of visual information that is vital to the presentation. Descriptions of needed information conveyed in animation should be provided. To assist viewers who are deaf, text captions for the audio presentation should also be included.

Pages should be validated with tools designed to correct code generally, as well as with at least one tool that identifies potential accessibility issues. Some links to web page assessment tools can be found in Appendix E.

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## Making Information in Presentations Accessible

Frequently, blind and visually impaired people have difficulty following along with presentations that rely on graphics and slides. When possible, the information conveyed via images on a screen should be verbalized, but more to the point here, if printed handouts are distributed to sighted participants, or if the graphics and/or slides are posted on the World Wide Web, they should be made accessible and offered to blind users.

The [Powerpoint Accessibility Wizzard](#) has been created to assist with the conversion of Microsoft PowerPoint® documents to HTML. Please produce a suitable representation of the data and provide descriptions as needed. For those who use TeX tools, such as LaTeX, on Unix/Linux computers, you will find that making alternate versions of these documents is very straightforward. Just convert them to text or HTML, and be sure to describe the informative graphics and charts appropriately. Regardless of the software or the computer platform used to generate content, it is important that users have access to the content of the presentation and be able to refer to an accurate version of the information later.

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## Offering Files in Other Specialized Formats

Adobe and Microsoft have made efforts to accommodate blind and visually impaired people who need to read documents generated by their specialized software. While companies' efforts to work with assistive technology vendors to resolve compatibility issues have been somewhat successful, accessible documents in Microsoft's Reader format or in Adobe PDF must be constructed in very specific ways, be created with particular settings enabled, and follow guidelines that Adobe and Microsoft each outline. To get started with producing Adobe documents, see the booklet entitled [How To Create Accessible Adobe PDF Files](#). For information about creating accessible Microsoft Reader® files, see [Microsoft Reader - Accessibility Frequently Asked Questions](#).

In addition to being sure that documents meet these criteria, a company should be aware that blind or visually impaired people must have technology that conforms to Microsoft's requirements, they must have downloaded Microsoft's Reader software, and they must have it configured to read accessible texts. In order to read Adobe's PDF documents, people must again have the most up-to-date assistive technology software, and they must install and configure the necessary Adobe plug-in. Even accessible documents in these formats do not always allow for maximum flexibility and user preferences with respect to reading, printing, or portability.

So, while these documents can and should be made available in a specialized format to those people who choose to use them in that format, offering another universally accessible document-type, such as HTML or plain text, is advisable. Though specialized formats allow the document to be read by sighted people exactly as intended, these formats are not nearly as useful and friendly to blind readers.

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## Providing Simultaneous Text and Audio Access

As a result of the blind community's promotion of technological advances, which take advantage of developments in the World Wide Web Consortium's specifications, a new digital audio format is on the horizon which promises to revolutionize reading of texts for blind and visually impaired people. Since the necessary players have not yet become widely available in the United States, the format should be adopted with care. But for certain document types targeted to knowledgeable users, it should be increasingly considered over the next several years as an option. This digital multimedia format, commonly known as the DAISY/NISO format, makes it easy to surf a document based on its organization. The DAISY/NISO format allows for the simultaneous presentation of full text and graphics coupled with an audio file. Text is created in the Extensible Markup Language (XML), and the audio format is synchronized with the text using the Synchronized Multimedia Integration Language (SMIL). Text and audio descriptions of graphics may be incorporated, and users may be able to control how they view the graphics. For technical details about how to construct documents in the DAISY/NISO format, consult Appendix E. Especially note both the [DAISY web site](#), and a web page maintained by the [National Library Service for the Blind and Physically Handicapped](#) which contains information about the implementation of the standard.



Benefits of the DAISY/NISO file format are particularly noticeable and appreciated in documents that require explicit navigation capabilities. Books and manuals produced in this format could be created to allow the user to skip from sentence to sentence, or even jump directly from a word in the text to its definition in a glossary, depending upon how the files are coded. What will be truly revolutionary, however, is the user's ability to move through the document based on the structure of the content. For example, in a travel-related book, a user might be able to navigate to information by moving from chapter to chapter or continent to continent. Then, within a continent, the user could move from country to country, or city to city.

Basically, SMIL serves as the "glue" that binds the information in XML to the audio file(s) in order to create the DAISY/NISO document. Audio files may be generated in MP3, PCM, or .wav format. Players for the DAISY/NISO format can either consist of computer software (which is sometimes free or very inexpensive), or hardware-based stand-alone CD players. We encourage the inclusion of one of the software players on any CD that contains a text in the DAISY/NISO file format since all users may not have pre-installed a player on a computer. Sources of information about hardware and software players are listed in Appendix E.

Simultaneous text and audio access also offers maximum flexibility to readers who wish to listen to portions of the text and then review the format of the text or the characters that comprise it. The DAISY/NISO format provides for varying degrees of text and audio presentation so that document designers can choose to have some parts of a document with full text and audio, while other areas could have only some of the text combined with a complete audio presentation.

Individuals who read large print or have learning disabilities will also increasingly be able to benefit from reading files in this format. Currently, at least one reader allows people to control the font size or type, as well as change foreground and background colors to provide needed print contrast. People with learning disabilities are often able to track the text more easily when a player has an option to highlight words in the text while the user listens to the audio file.

On behalf of blind consumers, the American Council of the Blind commends you and your company for your commitment to making information accessible to everyone. We hope that this guide will facilitate the process of offering equal access to documents for all consumers.

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## **APPENDIX A: Marketing the Final Product**

Once the final product is complete, it is important to alert the community of blind and visually impaired consumers that they can obtain it in an accessible alternate format. Customer service representatives should be informed about the availability of the alternate

versions, and they should be prepared to arrange for their delivery. It is also helpful to periodically remind those who handle inquiries that these alternate format publications must be provided to those who would benefit from them. While some of the typical marketing strategies companies may employ will be effective for this audience, it will be helpful to become familiar with the unique avenues of communication among members of this community.

For example, it could be valuable to mention in all print materials that an accessible version of the document is available and give information about how to obtain it. Sighted people who know a blind person may notice that you are promoting accessibility, and they may point it out to blind friends or family. But generally, a notice in a print bill is not a reliable method of alerting a blind person that accessible bills are available. A more effective strategy is to include a notice on a web site highlighting the company's commitment to alternate format document provision. Mentioning such a commitment in a television or radio commercial, or announcing it on e-mail listservs or in publications geared toward this consumer group, is also effective.

Outreach efforts must especially be undertaken to inform this consumer group of the company's commitment to independent access to information. To enable you to target the blind and visually impaired people who need accessible publications, here are some resources and points of contact to assist you with marketing.

A large database with resources related to agencies and organizations that serve people with various disabilities, including blindness and visual impairment, is maintained by [ABLEDATA](#).

Companies are encouraged to attend consumer conventions, such as the annual one sponsored by the American Council of the Blind. Conventions offer the opportunity to exhibit and demonstrate products to consumers. You can also publicize the availability of accessible documents by advertising in convention programs or by including accessible flyers in convention packets. For more information, send e-mail to [info@acb.org](mailto:info@acb.org).

A variety of organizations publish magazines or newsletters, and depending upon the accessible document that has been produced, some of the following options are worth exploring.

The American Council of the Blind has more than 70 state and special-interest affiliates, and many of their representatives may be contacted online. Some of them may have newsletters, or other communication methods, to enable companies to market to their members. Find the American Council of the Blind state and special-interest affiliates by linking to the [ACB Affiliates](#) page on the ACB web site.

Contact information for the regional libraries of the [National Library Service for the Blind and Physically Handicapped](#) may be located by visiting the library's main page. Regional libraries may publish newsletters in which it could be appropriate to announce the availability of accessible publications.



Representatives of state rehabilitation agencies are sometimes able to share relevant information with consumers with whom they work. Many of the agencies are listed online in the [AFB Directory of Services for Blind and Visually Impaired Persons in the United States and Canada](#).

Here is a list of some of the magazines geared toward blind and visually impaired readers:

- The Braille Forum, published monthly by the [American Council of the Blind](#)
- The Braille Monitor, published monthly by the [National Federation of the Blind](#)
- Dialogue, published quarterly by [Blindskills, Inc.](#)
- [Matilda Ziegler Magazine for the Blind](#), published monthly by the E. Matilda Ziegler Foundation for the Blind

Community radio reading services present information particularly geared to the needs of people who are print impaired. To explore possible publicity opportunities, visit the [International Association of Audio Information Services](#), telephone: (800) 280-5325.

The Internet can also assist with publicizing the availability of alternate format documents. For example, the American Council of the Blind hosts [ACB Radio](#), which is a webcasting service allowing people to listen to audio content via computer. If you are interested in exploring publicity opportunities, on ACB Radio's four channels of audio content, send e-mail to [info@acbradio.org](mailto:info@acbradio.org).

There are scores of e-mail listservs that focus on specific topics of interest to blind and visually impaired people. Sending an e-mail message describing the accessible publication and providing contact information is an excellent way to advertise. Directing a message to owners of general lists where issues of concern to blind people are discussed could be valuable, too. Or it might be even better to send a message to those lists that relate to the subject of the alternate format document. Regardless of which e-mail lists you may decide to contact, asking the list owner to post a message for you avoids the appearance of spamming a list with irrelevant messages. [Mailing Lists](#) and [Blindness-Related E-mailing Lists](#) are two online resources which present compilations of listservs focusing on blindness issues. Obtain [subscription instructions for all ACB mailing lists](#) from the ACB website.

The following appendices provide more specific information about how to produce documents in each of the four alternate formats -- large print, braille, audio versions, and electronic documents. Each appendix is brief and assumes that readers are familiar with the corresponding section of the guide and the resources listed there. A few of the most important resources are repeated in these appendices for your convenience.

These collections of resources are by no means comprehensive. The sites listed here are offered as pointers to help get you started, or to direct you to sources containing more technical details.

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## **APPENDIX B: Resources to Assist with Production of Large Print**

Although large print documents can be produced in-house, there may be times when the expertise of an outside contractor can be helpful. There are three primary collections of company listings to consult.

There is a database maintained by the American Foundation for the Blind. See the [AFB Directory of Services for Blind and Visually Impaired Persons in the United States and Canada](#).

The American Printing House for the Blind maintains the [Accessible Media Producers Database](#), which consists of companies that produce documents in accessible media.

Finally, the National Library Service maintains [Sources of Custom-Produced Books](#), which is a comprehensive directory.

The Texas School for the Blind and Visually Impaired has also placed a short list of [Suppliers and Publishers of Educational Resources in Large Print](#) online.

The American Printing House for the Blind has developed a font, called [APHont](#), specifically for low vision readers. According to the organization's web site, the font embodies characteristics "of size and shape that have been shown to enhance reading speed, comprehension, and comfort for readers of large print." APHont Suite, the complete set of APHont, will be ready for sale in the spring of 2002. Please be aware that the American Printing House for the Blind makes no claim that APHont is the appropriate typeface for students who are just learning to read.

Although accessible web pages should be created using cascading style sheets, an interesting reference exists to give sighted people a sense of [How a Large Print Reader Could View Text on the Web](#).

Of general interest may be [Large-Print.NET](#) that bills itself as The Large Print & Low Vision Resource Network.

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## **APPENDIX C: Resources to Assist with Production of Braille Documents**

There are many commercial organizations that can generate braille documents. Some companies are national in their focus, while other braille transcribers are local

entrepreneurs who can be hired to proofread braille files or create a full product. There are three primary collections of company listings to consult when seeking a contractor.

[AFB Directory of Services for Blind and Visually Impaired Persons in the United States and Canada](#) provides a comprehensive listing.

The American Printing House for the Blind maintains the [Accessible Media Producers Database](#), which consists of companies that produce documents in accessible media.

Finally, the National Library Service maintains [Sources of Custom-Produced Books](#), which is a comprehensive directory.

Some other sites have compilations of resources worth considering, though company listings may overlap among all of these sites.

- <http://www.acb.org/resources/transcribers.html>> American Council of the Blind's Braille Producers and Transcription Groups list
- [Duxbury Systems' list of world wide braille producers](#)
- [National Braille Press' text file of individual transcribers who produce an individual copy of a braille document](#)

Duxbury Systems has compiled a list of [Sources of Braille Production Equipment](#), and the [National Library Service for the Blind and Physically Handicapped](#) has compiled a similar list of Braille embossers in one of its reference circulars.

Duxbury Systems [Vendors of Graphics Products](#) available to those who may be interested in producing tactile graphics.

There are a few free braille translators that may be useful. These software packages can generate basic braille files that can be forwarded online to end users and/or proofreaders, as well as to contractors. Such individuals or contractors can then emboss the files on paper and provide them to a company for distribution to blind or visually impaired customers. These free braille translators can usually do a decent job of providing basic braille texts. Be sure to read any accompanying documentation carefully to be sure that you can install and run the package on your computer system. Two of these free braille translators are: [TurboBraille](#), and [NFBTRANS](#).

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## APPENDIX D: Resources to Assist with Production of Audio Formats

Since audio versions of documents can often be recorded without specialized equipment, we present only a few resources here. When searching for companies with which to contract

for small recording jobs, it may be helpful to contact local organizations, focusing on those for-profit companies included in the three main resources below. The [American Foundation for the Blind](#) and the [American Printing House for the Blind](#) both have experience in producing recordings for blind people, and there certainly are other companies with specific relevant experience. There are three primary collections of company listings to consult.

[AFB Directory of Services for Blind and Visually Impaired Persons in the United States and Canada](#) provides a comprehensive listing.

The American Printing House for the Blind maintains the [Accessible Media Producers Database](#), which consists of companies that produce documents in accessible media.

Finally, the National Library Service maintains [Sources of Custom-Produced Books](#). The NLS publication [The Art and Science of Audio Book Production](#), although somewhat technical in nature, may be a helpful resource for those who are contemplating audio-format productions in-house.

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## APPENDIX E: Resources to Assist with Production of Electronic Documents

A number of resources are listed here to assist with the generation of accessible World Wide Web pages and the provision of electronic documents in specialized formats for the World Wide Web. Resources have been grouped together for easy reference. You will find that many of these sites are worth exploring due to the quality and breadth of information they contain. Visit the sites often because information is updated and expanded frequently.

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## Miscellaneous General Web Sites Concerning Accessibility

Here are three resources that offer useful information about overall issues related to information access for people with disabilities:

- The [Information Technology Technical Assistance and Training Center](#)
  - [Microsoft's Accessibility Homepage](#)
  - [TRACE Research & Development Center](#)
-

# Web Page Accessibility Provisions and Guidelines

Many sites offer advice with regard to ensuring accessibility of the World Wide Web for people with disabilities. Federal agencies and some states have specific mandates that must be followed, and an agency's resources and directives certainly should be considered and addressed first. Here are several sites to consult.

As a result of recent regulations implementing [Section 508 of the Vocational Rehabilitation Act](#) the federal government has published provisions that relate to web page accessibility.

Also become familiar with the [World Wide Web Consortium's Web Accessibility Initiative](#). Some of the specific pages on this site that may be especially important are: [HTML Techniques for Web Content Accessibility Guidelines 1.0](#) and information about [web style sheets](#).

Note that the Web Accessibility Initiative's Content Accessibility Guidelines are evolving; be sure to consult the most up-to-date version.

Three other references are:

- The [IBM Accessibility Center Web Accessibility Checklist](#)
- The TRACE Research & Development Center's [Designing More Usable Web Sites](#)
- [Web Accessibility in Mind](#)

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## Web Page Accessibility Tutorials

A number of tutorials outlining the technical details of making web pages accessible are located on sites like these:

- The federal government's collection of resources on its [Section 508 site](#).
- The [HTML Writers' Guild Course on Accessible Web Design](#)
- The [Information Technology Technical Assistance and Training Center's Course on Web Accessibility for Section 508](#)
- [Web Accessibility Initiative](#)

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## Tools for Web Page Assessment

Some of the tools for validating or assessing web pages are listed below in alphabetical order. Each tool has its strengths, so it is worthwhile to read about each of them before deciding which one(s) to use. Some tools are free, while others are not. Regardless of the tool(s) you use to assess your web pages, keep in mind that no tool can replace human judgment or feedback from site visitors with disabilities. Accessibility assessment tools can only help to pinpoint where there might be problems with a site. Take a look at the following list of validators and other tools to get you started:

- [AccMonitor, AccRepair, and AccVerify](#)
- [A-Prompt Project](#)
- [Bobby WorldWide 3.2](#)
- [HTML Tidy](#)
- [InFocus and InSight software](#)
- [PageScreamer Suite of Products](#)
- [W3C HTML Validation Service](#)
- [The Wave](#)

A list entitled [Evaluation, Repair, and Transform Tools for Web Content Accessibility](#) may also prove helpful.

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## Miscellaneous Tools for Publishing Online in Special Formats

When you use Adobe's PDF or Microsoft's Reader format, you are encouraged to take steps to make the content accessible for that portion of the blind population which is able to use these formats to some degree. For guidance about how to make documents in these formats accessible, see the following: [How To Create Accessible Adobe PDF Files](#) Booklet and the [Microsoft Reader - Accessibility Frequently Asked Questions](#).

The [PowerPoint Accessibility Wizard](#) has been created to assist with the conversion of Microsoft PowerPoint documents to HTML.

[Popchart](#) from CORDA Technologies is a tool which may help to make information in charts accessible to blind people.

Here are three web sites that may offer assistance with producing interactive forms. Before choosing a particular company's product, be sure to consider what assistive technology blind and visually impaired users are likely to have available and which operating systems individuals who need to complete the forms are using on their computers. Explore what these companies have to offer:

Accelio Products and Services [Accessibility](#)

- [Adobe Systems Incorporated Information and Resources](#)
  - Intercon Associates Inc. [Accessible FormNet](#)
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## Multimedia

For general information about audio description, the [CPB-WGBH National Center for Accessible Media](#) offers tutorials and tools that explain [How to Add Audio Description](#) and [How to Add Captioning](#) to online videos.

Some efforts to make Flash® accessible to blind and visually impaired people have been undertaken. For two resources about Flash accessibility, see: [Macromedia - Flash Accessibility](#) and [Making Flash Accessible](#).

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## Providing Simultaneous Text and Audio Access

Several general sites can be consulted for an overview of the state-of-the-art with respect to offering simultaneous text and audio access to documents in the DAISY/NISO format. The text markup is an XML tag set using a Document Type Definition (DTD) that will continue to be enhanced. The audio is contained in computer audio files, such as PCM, WAV, or MPEG/MP3. The Synchronized Multimedia Integration Language (SMIL) synchronizes the text with XML markup and the audio file. Of special importance are the [DAISY Structure Guidelines for Producing Content](#).

A white paper and an article each give an overview describing why this format is valuable. These documents are: [Get Ready: Digital Talking Books Are Coming!](#) and [Surpassing Gutenberg --Access to Published Information for Blind Readers](#).

To experience a sample of a basic text in the DAISY/NISO format, look and listen to [Martin Luther King Jr.'s "I Have a Dream" speech in the DAISY/NISO Format](#).

[DAISY](#) is one of the several consortia involved in establishing standards. The National Library Service for the Blind and Physically Handicapped also participates in the development of [Standards for the provision of simultaneous text and audio](#). Finally, the [Open eBook Forum](#) has a special-interest group concerned with accessibility as it pertains to electronic books.

For specific information about SMIL, review the tutorial for the audio format with which you are working. [SMIL Tutorials](#) are located at the Rich Media Resource Center.

**During the first few months of 2002, the American Printing House for the Blind anticipates [The release of a Player and a Software Tool to Create Files in the SMIL Format.](#)**

**To find other companies that are involved in various ways with this technology, such as those that are developing additional players, explore both the [DAISY Friends List](#) and the [Members List](#). Generally, "Friends" are commercial companies, while "Members" are non-profit organizations.**

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**Return to the [ACB Home Page](#).**