

access to telecommunications equipment  
and customer premises equipment  
by individuals with disabilities



telecommunications access advisory committee

final report  
january 1997

February 26, 1997

Ms. Judith E. Heumann  
Chairperson  
United States Architectural and  
Transportation Barriers Compliance Board  
1331 F Street, NW  
Washington, D.C. 20004-1111

Dear Ms. Heumann:

It gives me great pleasure to officially transmit to the Access Board, the *Telecommunications Access Advisory Committee's Final Report*. Although a challenging assignment, I'm sure the committee members would agree that our seven month effort was a most worthy endeavor and professionally enhancing experience. We believe we have developed a comprehensive set of recommendations that will help the Access Board in developing its accessibility guidelines for telecommunications equipment and customer premises equipment under section 255 of the Telecommunications Act of 1996.

As Chairman of the Committee I want to express my appreciation to you, the other members of the Board, and the staff for appointing such a knowledgeable, experienced and dedicated committee. Further, the staff support provided by the Access Board to assist the committee was, throughout the entire process, outstanding and invaluable. Without such a talented committee and such a capable staff, the Committee's report would surely be far less complete.

On behalf of the Committee, it was a distinct pleasure serving the Access Board in this very significant project. The Committee stands ready to assist in implementing its recommendations.

Sincerely,

Roberta E. Breden  
Chairman, Telecommunications Access Advisory Committee



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# 1.0

## OVERVIEW

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### 1.1. CHARGE AND RESPONSIBILITIES OF THE TELECOMMUNICATIONS ACCESS ADVISORY COMMITTEE

This report contains recommendations of the Telecommunications Access Advisory Committee (TAAC or Committee) to the Architectural and Transportation Barriers Compliance Board (Access Board). The TAAC was convened by the Access Board in June 1996 to assist the Board in fulfilling its mandate under the Communications Act of 1934 as amended by the Telecommunications Act of 1996, Section 255 (hereinafter referred to simply as section 255). Section 255 requires that the Access Board, in conjunction with the Federal Communications Commission (FCC or Commission), develop guidelines, by August 8, 1997, for access to telecommunications equipment and customer premises equipment (CPE) by individuals with disabilities. Portions of section 255 which are relevant to the charge of the TAAC read as follows:

*(b) MANUFACTURING -- A manufacturer of telecommunications equipment or customer premises equipment shall ensure that the equipment is designed, developed, and fabricated to be accessible to and usable by individuals with disabilities, if readily achievable.*

...

*(d) COMPATIBILITY -- Whenever the requirements of subsections (b) ... are not readily achievable, such a manufacturer ... shall ensure that the equipment ... is compatible with existing peripheral devices or specialized customer premises equipment commonly used by individuals with disabilities to achieve access, if readily achievable.*

*(e) GUIDELINES -- Within 18 months after the date of enactment of the Telecommunications Act of 1996, the Architectural and Transportation Barriers Compliance Board shall develop guidelines for accessibility of telecommunications equipment and customer premises equipment in conjunction with the Commission. The Board shall review and update the guidelines periodically.*

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In selecting members of the TAAC, the Access Board sought to ensure representation of the various interests affected by the promulgation of accessibility guidelines. Committee members represented organizations advocating for the access needs of individuals with disabilities, manufacturers of telecommunications equipment and customer premises equipment, manufacturers of specialized customer premises equipment, manufacturers of software, and telecommunications service providers. Between June 1996 and January 1997, the Committee held six meetings, each of three working days in length, during which members worked to develop recommendations for implementing section 255's requirements. This report contains those recommendations, and is intended to guide the Access Board in the final preparation of the section 255 guidelines. The Committee hopes that the diligent efforts to achieve consensus among the various interests represented on the TAAC have laid the groundwork for future cooperative efforts in the implementation of section 255.

In preparing the recommendations contained in this report, the Committee recognized that evolving telecommunications technologies often make it difficult to distinguish whether a product's functions and interfaces are the result of the design of the product itself, or are the result of a service provider's software or even an information service format. It was the intent of this Committee to recommend steps to ensure that telecommunications equipment and CPE are accessible to and usable by individuals. The recommended guidelines do not differentiate between hardware and software implementations of a product's functions or features, nor is any distinction made between functions or features built into the product and those that may be provided from a remote server over the network.

This report is divided into six sections:

Section 1: "Overview," describes the mandates and charges of the Access Board, the FCC, and the TAAC, as well as eight guiding principles created by the Committee to assist in the development of accessibility guidelines.

Section 2: "History of Telecommunications Access for Individuals with Disabilities," provides historical information on legislation and

manufacturing practices impacting telecommunications access for individuals with disabilities.

Section 3: "Definitions," sets forth definitions and terminology which are utilized throughout the TAAC Report.

Section 4: "Process Guidelines," sets forth proposed processes for manufacturers to follow in designing and developing accessible equipment.

Section 5: "Performance Guidelines," provides examples of how to make telecommunications equipment accessible. This section, along with Appendix C, will be updated on a regular basis, and is intended to provide engineers and product developers with a sense of what persons with disabilities need in order to effectively access and use telecommunications equipment and CPE.

Section 6: "Compliance and Coordination Guidelines," outlines a process for ensuring compliance with the accessibility guidelines and establishes mechanisms for coordination between industry and people with disabilities.

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## 1.2. PURPOSE

The provisions of section 255 reflect Congress' recognition that individuals with disabilities need improved access to telecommunications technology. Congress placed an obligation on manufacturers to consider accessibility when designing, developing, and fabricating telecommunications equipment and CPE. Among other things, these recommendations set forth factors to be considered throughout these processes to achieve accessibility. Because the pace of technological change is so rapid, it is expected that many aspects of accessibility which are not readily achievable today may become readily achievable in the future. Manufacturers need to remain current in their assessment of whether it is readily achievable to make their products accessible by seeking out information on how to incorporate access into those products.

An important approach in designing accessible products is called *universal design*. This is the

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practice of designing products so that they are usable by the broadest possible audience. Products designed in this way are usable by more people without reducing the usability or attractiveness for mass or core audiences of the product. With universal design, the goal is to ensure maximum flexibility, benefits, and ease of use for as many individuals as possible. In the past, some products or designs developed with universal design principles have attracted a wider audience than may have otherwise been attracted by the product. For example, curbcuts, originally designed to ensure wheelchair access, are routinely used by parents with strollers, bicyclists, and delivery personnel. Similarly, closed captioning on television programming, created for the benefit of individuals who are deaf or hard of hearing, is frequently used in airports, restaurants, and other noisy locations where it is difficult to hear the audio portion of the programming. Finally, an audio adjunct to caller ID not only enables individuals who are blind to learn the identity of a caller, but enables family members eating dinner to identify callers without leaving the dinner table. The TAAC encourages the use of universal design in the manufacture of telecommunications equipment and CPE.

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### 1.3. GUIDING PRINCIPLES

In developing the final accessibility guidelines required by section 255, the TAAC recommends that the Access Board adhere to the following eight principles:

1. The guidelines must be specific enough that one can determine when they have been followed.
2. The guidelines must be sufficiently flexible to give manufacturers the freedom to innovate.
3. Products should be made accessible to and usable by people with as wide a range of abilities or disabilities as is readily achievable.
4. Whenever it is not readily achievable to make a product accessible to and useable by individuals with disabilities, the manufacturer or provider of that product shall ensure that the product is compatible with existing peripheral devices or specialized customer premises equipment commonly used by individuals with disabilities to achieve access, if readily achievable.
5. The Committee understands that it may not be readily achievable to make every type of product accessible for every type of disability using present technology. Future technologies may result in accessibility where it is not currently readily achievable.
6. Because telecommunications technology is changing so rapidly it is expected that the guidelines will need to be updated on a regular basis.
7. The guidelines must reflect the fact that computer, telephone, information, and tele-transaction systems may converge such that single devices may simultaneously provide all of these functions.
8. The guidelines should address process, performance, and compliance and coordination issues.



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# 2.0

## HISTORY OF TELECOMMUNICATIONS ACCESS FOR INDIVIDUALS WITH DISABILITIES

This section contains a brief overview of historical developments affecting telecommunications for individuals with disabilities. It is intended that this section will provide a framework for the development of the TAAC recommendations contained in this report.

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### 2.1. BARRIERS TO TELECOMMUNICATIONS AND DESIGN SOLUTIONS

In order to understand the recommendations of this report, it is important to first consider some barriers individuals with disabilities have encountered in accessing telecommunications as well as some actions the telecommunications industry has taken to make telecommunications equipment accessible prior to the enactment of the Telecommunications Act of 1996.

Access to telecommunications has been of great concern to people with disabilities since the invention of the telephone. Initial advocacy efforts came from people who are deaf and hard of hearing. In the mid-1960s, a fundamental barrier -- the lack of a visual alternative to voice communication by people who are deaf -- began to fall with the invention of an acoustic coupler that allowed teletypewriter signals to be sent and received through the telephone network. AT&T and others donated teletypewriters and a volunteer organization of telecommunications workers, the Telephone Pioneers, worked with the deaf community to assist in bringing this technology to those who needed it. This demonstrated how industry and persons with disabilities can work together, given the opportunity.

Since the early 1970s, several telecommunications companies have initiated and supported the development of a number of access technologies. The application of Baudot technology (both TTY hardware and the protocol) to text terminals for deaf, hard of hearing, and speech disabled users, and its dissemination, was a principal focus of their efforts in this area. In addition to

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general initiatives, some of these companies provided case-by-case custom support for telecommunications functions for people with disabilities, including special assemblies, such as on-hook/off-hook switches that could be controlled by light touch, puff and sip, and electronic environmental controls. These products enabled many persons with disabilities to live more independently. The Telephone Pioneers published and distributed the first compendium of telecommunications accessibility tools known as the "Green Book."

In the late 1970s, consumers began to take their concerns to state utility commissions and legislatures. The state of California took the lead by assessing a line charge to finance the lending of TTYs. This program was later extended to other specialized customer premises equipment used by people who are hard of hearing as well as those with speech disabilities, and those experiencing other problems with telephone access.

In the 1980s, a number of telecommunications companies began efforts to maximize access for persons with disabilities. First, they participated in state equipment distribution programs for people with disabilities. Second, many companies participated in the initial efforts to establish telecommunications relay services (TRS). Finally, several companies initiated research in speech recognition technology that would offer new input and output opportunities for people who had speech, vision, and physical limitations.

The hearing aid compatibility standard grew out of a characteristic of older telephone receivers. These receivers leaked magnetic signals that could be picked up by a small coil in the hearing aid. This eliminated acoustic background noise and thus improved audibility of speech. When manufacturers switched to newer, more efficient receiver designs, the inductive coupling was no longer possible. This spurred a decade-long advocacy effort to achieve hearing aid compatibility in all telephones, and which resulted in the development of the EIA Standard RS-504, first issued in 1982, which established formal criteria defining the magnetic field intensity from a telephone receiver, and the Hearing Aid Compatibility Act of 1988. (The details

of the HAC Act are discussed in the legislative history section of this report.)

In general, solutions to telecommunications barriers had focused primarily on adaptations to inaccessible equipment and the provision of specialized customer premises equipment. Lately, some service providers and manufacturers have become aware that solutions to barriers for individuals with disabilities are sometimes of benefit to a wider range of customers as well. For example, the vibrating pager is accessible to deaf persons but it also means the pager won't interrupt an important business meeting. The voice-activated telephone dialer can be used by someone with limited use of her hands as well as a driver who wants to place a call on her cellular phone without taking her eyes off the road. The voice-output Caller ID device is usable by a blind person and, at the same time, allows identification of the caller without having to leave the dinner table to see the device. These and similar designs are examples of the application of universal design principles: that is, incorporating features in the product itself to make it more usable by a wider audience.

By the 1980s, telecommunications and customer premises equipment had become much more diverse. Some of the new technologies improved accessibility and offered new functionality. With the diversity, however, came a new array of access problems. For example, the proliferation of facsimile created a new barrier to people with low vision or blindness. At the same time, ongoing problems with access to the voice network led deaf individuals to advocate for telephone relay service in their states and ultimately nationwide, through Title IV of the ADA.

As the convergence of telephone, computers, and television technologies began to escalate in the late 1980s and early 1990s, individuals with disabilities began to realize both the tremendous potential of technology and the potential for setbacks in accessibility. Of particular concern was the impact of these technologies on employment and participation in the mainstream of technology. For example, the marriage of computers and networks brought the *graphical user interface*, an inaccessible interface for people who are blind, into the world of telecommunications, extending its importance as a tool in the workplace.

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As a result, consumers with different types of disabilities focused on telecommunications advocacy, with the goal of ensuring that telecommunications and customer premises equipment would be as accessible as possible.

Developing accessibility guidelines for the new generation of telecommunications and customer premises equipment poses a series of issues for both the industry and individuals with disabilities. For example, with the rapid pace of technological innovation within the telecommunications industry, individuals with disabilities are concerned that new technologies be accessible so that they can compete in the workplace. Moreover, as technology becomes commonplace in the American lifestyle, individuals with disabilities need to know if they will be able to use such equipment, or if it will be useable with specialized customer premises equipment. Also, how will individuals with disabilities know if a particular piece of equipment meets their needs? These issues are discussed in this report.

The telecommunications industry also has concerns with the implementation of section 255. A key issue for industry is how the criteria of readily achievable can be applied to telecommunications of equipment accessibility. Industry is also concerned with how to develop accessible products without discouraging innovation and thus putting them at a competitive disadvantage within the marketplace. Finally, there is a concern about what will happen if industry can make a given product accessible to some, but not all disabilities. These and other issues became the focus of discussions of the Telecommunications Access Advisory Committee.

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## 2.2. LEGISLATIVE HISTORY

Prior to the 1980s, little had been done by state or federal legislatures to address the needs of individuals with disabilities to utilize telecommunications equipment. Starting in the early 1980s, some states developed programs for the provision of telecommunications relay services and the distribution of specialized customer premises equipment, such as text telephones (TTYs), telebraille machines, and artificial larynxes. Relay services enable persons who are speech or hearing

disabled and who use TTYs to communicate by telephone with persons who use conventional voice telephones via a third party called a communications assistant. For the most part, these state relay and distribution programs could not meet all of the demands for telecommunications services or equipment by individuals with disabilities.

The first important step in the development of a national telecommunications policy for persons with disabilities was the Telecommunications for the Disabled Act of 1982. This law expressly allowed states to require carriers to continue providing subsidies for specialized equipment needed by persons with impaired hearing, speech, vision, or mobility. The 1982 Act also set forth requirements for certain telephones to be compatible with hearing aids. This new law made clear that compatibility between telephones and hearing aids was necessary to accommodate the needs of some persons with hearing loss. In this law, for the first time Congress recognized the FCC's obligation to ensure that individuals with disabilities "have access to the universal telephone network." H. Rep. No. 888 (97th Congress, 2d Session, 1982) 4. The House Report explained:

"Persons with normal hearing may be unable fully to appreciate the pervasiveness of the telephone both in commercial transactions and personal contacts. The inability to use this instrument, except through an interpreter, is not only a practical disability but a constant source of dependency and personal frustration. Conversely, the ability independently to use the telephone may enable persons with other severe handicaps ... to lead self-sufficient lives in regular contact with society. The Committee believes that making the benefits of the technological revolution in telecommunications available to all Americans, including those with disabilities, should be a priority of our national telecommunications policy." (Id. at 4-5).

In 1986, Congress continued to recognize the importance of providing access to information technology when, in Section 508 of the 1986 Amendments to the Rehabilitation Act, Congress directed federal government agencies to limit their purchases to information technology that is accessible or could support accessibility. In 1988,

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Congress took an additional step in recognition of the crucial role that access to technology plays in the lives of individuals with disabilities, with the Technology Related Assistance for Individuals with Disabilities Act. Title I of that Act provides federal funding for grants to states to increase access to assistive technology and accessible information technology.

In 1988, Congress also passed the Hearing Aid Compatibility Act (HAC Act). The HAC Act required that all landline telephones (with the exception of secure telephones) made in or imported into the United States after a certain date (August 1989, with the exception of cordless telephones, which were given an extension until August 1991) must be hearing aid compatible. In 1988, Congress also passed the Telecommunications Access Enhancement Act. This legislation established an expanded federal relay services for calls to, from, and within the federal government, and was designed to improve telecommunications access for persons who use TTYs.

In July of 1990, the Americans with Disabilities Act (ADA) was signed into law. The ADA was the first comprehensive civil rights law to prohibit discrimination against persons with disabilities in employment, state and local government programs, places of public accommodation, transportation, and telecommunications. Title IV of the ADA mandated the establishment of a nationwide telecommunications relay service (TRS) by July 26, 1993. The ADA's requirement for TRS has begun to open the world of telecomm unications to individuals with hearing and speech disabilities. Titles I, II, and III have also impacted somewhat on telecommunications access by individuals with disabilities. Although these sections

do not impose any requirements for the development of accessible telecommunications products and services, they do require employers, state and local governments, and places of public accommodation, respectively, to provide auxiliary aids and services, which may include accessible telecommunications products and services, to achieve effective communication by individuals with disabilities. Finally, the ADA Accessibility Guidelines (ADAAG), promulgated by the Access Board, require certain telephones covered by the ADA to be physically accessible, hearing aid compatible, and have volume control. These guidelines also require TTYs to be provided at certain public pay phone locations. Notwithstanding these various mandates for telecommunications access under the ADA, nothing in the ADA requires the manufacture of telecommunications products that are accessible. Among other things, section 255 of the Communications Act (as amended) is intended to fill this gap.

In October of 1990, Congress went on to enact the Television Decoder Circuitry Act. This law now requires television sets with screens 13 inches or larger, manufactured or imported into the United States, to be equipped with a computer chip which decodes closed captioning on television programs. Decoder equipped televisions enable persons who are deaf or hard of hearing to receive caption output with regular television programming where captioning is otherwise incorporated into the programming. A new Section 713 of the Communications Act, added by the 1996 Act, further expands such television access by applying new requirements for captioning on new and previously published video programming.

The Telecommunications Act of 1996 follows this long history of legislative efforts to improve telecommunications access for individuals with disabilities. In addition to mandating access to telecommunications equipment and customer premises equipment, section 255 of this Act mandates access to telecommunications services. The FCC is charged with enforcing section 255, and is expected to initiate further proceedings.

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### **2.3. ESTABLISHMENT OF THE TELECOMMUNICATIONS ACCESS ADVISORY COMMITTEE**

In order to meet its responsibilities under section 255(e) of the Telecommunications Act, the Access Board chartered the Telecommunications Access Advisory Committee, under the Federal Advisory Committee Act. The purpose of this Advisory Committee was to bring together members of the telecommunications industry, manufacturers of telecommunications equipment and customer premises equipment, and persons with disabilities to provide the Access Board with recommendations on what the accessibility guidelines should address.

On March 28, 1996, the Access Board published a notice of intent to establish an advisory committee to make recommendations to the Access Board on accessibility guidelines for telecommunications equipment and customer premises equipment. (See Appendix D) The notice requested nominations for

membership on the Committee from manufacturers of telecommunications equipment and customer premises equipment; manufacturers and developers of peripheral devices or specialized customer premises equipment commonly used by individuals with disabilities to achieve access; organizations representing the access needs of individuals with disabilities affecting hearing, vision, movement, manipulation, speech, and interpretation of information; telecommunications providers and carriers; developers of telecommunications software; and other persons affected by the accessibility guidelines.

Over 60 nominations were submitted. From this group, the Board selected 33 organizations. (See Appendix D) Of this original group, three organizations did not send a representative and one organization withdrew midway through the process. Once established, the Committee accepted the applications of four additional members to achieve better representation of the interests in this proceeding.



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# 3.0

## TERMS AND DEFINITIONS

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### 3.1. GENERAL TERMINOLOGY: DEFINITION OF GUIDELINE TERMS

**Strategies** -- state precisely how a design feature should be implemented. Illustrative examples might include:

- If a numeric keypad is used then there should be a tactile indicator on the 5 key;
- If an Infrared port is used then it should support XYZ standard; and
- Modems should all support QRS communication protocol.

**Performance Guidelines** -- are guidelines which state what should be achieved but do not specify how it would be achieved. Illustrative examples might include:

- Product should have sufficient volume to be heard above ambient noise;
- Product should be usable without looking at it;
- Product should be usable if it is not possible to hear it.

**Process Guidelines** -- are guidelines that specify the process that a company should use in designing and bringing a product to market as well as post introduction processes. Illustrative examples might include:

- The initial product documentation on system requirements and description should include accessibility considerations;
- Information on products should be available in alternate accessible forms;
- Product support lines will be knowledgeable of assistive technologies that are commonly used with their product.

**Compliance Guidelines** -- are guidelines that specify the steps a manufacturer should take to demonstrate that it has met the guidelines. Illustrative examples might include:

- The manufacturer has filed a Declaration of Conformity;
- The manufacturer has fully documented its good faith efforts;

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- The product has been reviewed by a qualified access specialist.

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## 3.2. DEFINITIONS

The meaning of terms not specifically defined in this document shall be as defined by collegiate dictionaries in the sense that the context implies.

**Accessible** -- Means that a person with a disability can use the equipment to perform the same tasks, access the same information, with the same ease, in the same time and at the same cost as a person using the equipment without a disability, and that the person can use the product in its standard manufactured and shipped form without having to modify the product or to purchase special technologies.

**Alternate Formats, Alternate Methods** -- Alternate formats and alternate methods may include, but are not limited to: voice, FAX, TRS (relay service), Internet posting, closed captioning, audiotext, audio-cassette recording, audio-description, Braille, ASCII text, and large print.

**Communications Act** -- The Communications Act of 1934 [47 U.S.C.] was amended by the Telecommunications Act of 1996, which added a number of sections, including section 255 (see Appendix B).

**Compatible** -- Means that the telecommunications or customer premises equipment is designed so that it can be used with, does not interfere with, and, where applicable, can be connected to existing peripheral devices or specialized customer premises equipment commonly used by individuals with disabilities to achieve access.

**Customer Premises Equipment (CPE)** -- The term 'customer premises equipment' means equipment employed on the premises of a person (other than a carrier) to originate, route, or terminate telecommunications. (47 U.S.C. 153)

*Comment* -- The TAAC members agree that the statutory definitions for "telecommunications equipment" and "customer premises equipment" are meant to be interpreted broadly to include a wide array of electronic products which provide telecommunications, including personal computers. Because electronic products are largely software driven, the TAAC concludes that the definition of telecommunications equipment and customer premises equipment includes the software which provides telecommunications functions.

**Customer Premises User Interface (CPUI)** -- the interface which the user must interact with when using CPE for telecommunications.

**Disability** -- The term 'disability' has the meaning given to it by section 3(2)(A) of the Americans with Disabilities Act of 1990 (42 U.S.C. 12102(2)(A)). [47 U.S.C. 255(a)(1)]

*As Defined in the ADA* -- "The term 'disability' means, with respect to an individual - (a) a physical or mental impairment that substantially limits one or more of the major life activities of such individual; (b) a record of such an impairment; or (c) being regarded as having such an impairment." [42 U.S.C. 12102(2)(A)]

The TAAC report reflects the intent of Congress as noted in the following language from the Senate Committee Report on the Telecommunications Act of 1996: "The [Senate] Committee intends the definition of disability to principally cover individuals with functional limitations of hearing, vision, movement, manipulation, speech, or interpretation of information ...."

**Manufacturer** -- Denotes a manufacturer of telecommunications equipment and/or customer premises equipment (CPE). Specifically included are manufacturers of the customer premises user interface for telecommunications and/or customer premises equipment, including software which provides the interface.

**Readily Achievable** -- The term 'readily achievable' has the meaning given to it by section 301(9) of the Americans with Disabilities Act (42 U.S.C. 12181(9)). [47 U.S.C. 255(a)(2)]

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*As Defined in the ADA, Section 301(9)* -- “The term ‘readily achievable’ means easily accomplishable and able to be carried out without much difficulty or expense. In determining whether an action is readily achievable, factors to be considered include:

(A) the nature and cost of the action needed under this Act;

(B) the overall financial resources of the facility or facilities involved in the action; the number of persons employed at such facility; the effect on expenses and resources, or the impact otherwise of such action upon the operation of the facility;

(C) the overall financial resources of the covered entity; the overall size of the business of a covered entity with respect to the number of its employees; the number, type, and location of its facilities; and

(D) the type of operation or operations of the covered entity, including the composition, structure, and functions of the workforce of such entity; the geographic separateness, administrative or fiscal relationship of the facility or facilities in question to the covered entity.” [42 U.S.C. 12181(9)]

*Comment* -- The TAAC interprets the application of the readily achievable criteria in the 1996 Act to be somewhat different from the use of “readily achievable” in the Americans with Disabilities Act. The ADA’s use of “readily achievable” applies to retrofitting of buildings, and is used to determine the proportion of effort to be expended in providing architectural accessibility. The 1996 Telecommunication Act’s use of the term applies to the design, development and fabrication of telecommunications equipment and customer premises equipment. The TAAC’s recommended guidelines provide more information on how readily achievable should be implemented in practice.

Several factors are important in the determination of whether certain accessibility features are readily achievable. They include the size of the manufacturer and the amount of effort required to implement accessibility and marketability of the resulting product. For instance, implementing certain accessibility features is not readily achievable if doing so would drive the manufacturer out of business, require efforts far exceeding those involved

in designing the product without the access features or render the product unmarketable. Implementing certain accessibility features is readily achievable if the cost to do so is small relative to the cost of the entire production design effort, adds little or nothing to the manufacturing and distribution costs, and has minimal or positive impact on the product’s marketability. The Design Process portion of this report will assist in moving these two extremes closer to each other.

**Telecommunications** -- The term ‘telecommunications’ means the transmission, between or among points specified by the user, of information of the user’s choosing, without change in the form or content of the information as sent and received. [47 U.S.C. 153]

*Comment* -- A change in information format (e.g., text to Braille or text to speech) to provide access is not a “change in the form or content” excluded under the definition of telecommunications.

**Telecommunications Act** -- The Telecommunications Act of 1996 amended the Communications Act of 1934 and added several sections including section 255.

**Telecommunications Equipment** -- The term ‘telecommunications equipment’ means equipment, other than customer premise equipment, used by a carrier to provide telecommunications services and includes software integral to such equipment (including upgrades). [47 U.S.C. 153]

**Telecommunications Service** -- The term ‘telecommunications service’ means the offering of telecommunications for a fee directly to the public, or to such classes of users as to be effectively available directly to the public, regardless of the facilities used. [47 U.S.C. 153]

**Text Telephone (TTY)** -- Machinery or equipment that employs interactive graphic (i.e., typed) communications through the transmission of coded signals across the standard telecommunications network. Text telephones can include, for example, devices known as TDDs (telecommunication display devices or

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telecommunication devices for deaf persons) or computers.

**Usable** -- The term 'usable' means the telecommunications equipment or CPE can be effectively used by individuals with disabilities, including, but not limited to, the availability of instructions, accessible feature information, documentation, technical support and delivery in alternate formats or through alternate methods.

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# 4.0

## PROCESS GUIDELINES

The guidelines that follow address the process of designing for accessibility rather than the performance of accessible devices. The processes used by a manufacturer to design, develop, fabricate and deliver telecommunications or customer premises equipment, and to make decisions related to the design, development, fabrication and delivery of their products are unique to that manufacturer. The intent of the guidelines in this section is to identify elements the TAAC expects to make up processes for achieving accessibility and usability for individuals with disabilities. Manufacturers would decide how each element may be integrated into their individual process.

Each guideline consists of a basic statement about the element. The basic statement may be accompanied by additional statements about particular aspects of that element, a rationale, and/or a list of examples or situations in which the guideline would apply.

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### 4.1. GENERAL

Section 255 requires that manufacturers provide access to telecommunications equipment and customer premises equipment where readily achievable. Accessibility is easier to achieve if considered at the beginning of and throughout the design process. Manufacturers shall consider access to telecommunications by individuals with disabilities throughout product design, development, fabrication and delivery, as early and consistently as possible.

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### 4.2. EXISTING PRODUCTS

Periodically, manufacturers change, upgrade, or distribute new releases of existing products. Whenever they do so, manufacturers are expected to consider accessibility features, and incorporate those features into existing products when readily achievable. Minor or insubstantial changes such as cosmetic changes, or cost-reduction measures, that do not affect functionality, need not trigger accessibility reviews.

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### 4.3. MARKET RESEARCH

Manufacturers are expected to address the needs of individuals with disabilities in their market research and this research should be comparable to other market research efforts. Examples of primary market research may include targeted recruitment of individuals with disabilities, surveys conducted in an accessible manner and separate or integrated focus groups. Examples of secondary market research may include cooperative studies or research, as well as general access related research and product specific studies.

*INDUSTRY NOTE: The clause "... and this research should be comparable to other market research efforts" is subject to a variety of interpretations. In the interest of preventing future misunderstandings, Committee members representing manufacturers and their trade associations submit the following as their opinion about the interpretation of this clause: "This clause should not mean that, when conducting market research related to products for general distribution, manufacturers are expected to duplicate their market research expenditures in order to conduct additional market research related to the use of products for general distribution by individuals with disabilities. Rather, with respect to market research studies, it should mean that manufacturers are expected to: (a) recognize that individuals with disabilities are among the potential customers whose desire to purchase and use products is being studied and (b) treat the population of individuals with disabilities in a manner substantially similar to its treatment of other groups of potential customers. Accordingly, inclusion of individuals with disabilities in market research related to products for general distribution would satisfy both this section and section 4.7."*

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### 4.4. MARKETING COMMUNICATIONS

Information about products and their accessibility or compatibility features should be available to and usable by individuals with disabilities. Examples of such communications include broadcast and print media advertising,

product brochures, collateral publicity, internet sites or other media. Such information needs to be available to consumers contemplating the purchase of a device, or to end users of CPE.

Steps which manufacturers should consider in addressing this need for accessible information include:

1. Making product information available in alternate formats, upon request;
2. Where a telephone contact with the manufacturer is provided in the marketing communications, providing operator access in alternate formats and in alternate methods upon request and at an equivalent cost to the consumer (e.g., toll free or local rates);
3. Providing closed captioning in TV advertising for telecommunications products;
4. Working cooperatively with organizations representing individuals with disabilities, for example by providing information for newsletters, mailings, or meetings, as appropriate; and
5. Making reasonable efforts to validate any unproved access solutions through testing with individuals with disabilities or with appropriate disability-related organizations who have documented expertise with individuals with disabilities.

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### 4.5. CUSTOMER SERVICE

Individuals with disabilities need to be able to go through the steps of ordering, billing, and interacting with customer service representatives. Steps that can be taken by manufacturers to meet this need include making customer service processes available through alternate formats and alternate methods, upon request.

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### 4.6. PRODUCT AND OPERATIONAL SUPPORT

Individuals with disabilities require access to documentation (e.g., user guides, installation guides for end-user installable devices) and product support communications, regarding both the product in



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general and specifically the accessibility features of the product. Steps that shall be taken by manufacturers that will assist individuals with disabilities to meet these needs include:

1. Providing a description of the accessibility and compatibility features of the product upon request, including, as needed, in alternate formats;
2. Providing end user product documentation in alternate formats, promptly, at no additional cost;
3. Ensuring accessible customer support and technical support, upon request, in the call centers and service centers which support their products;

Other steps that can be taken include but are not limited to:

1. Encouraging third party distributors of the manufacturer's products to follow similar accessibility guidelines in product and operational support; and
2. Encouraging resellers and distributors of the manufacturer's products to refer unresolved customer requests concerning accessibility and compatibility of the product to the manufacturer, as appropriate.

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#### **4.7. DETERMINATION OF ACCESSIBILITY NEEDS**

Consultation with end users and end-user testing are important in achieving a product that meets the design goals. To achieve a product that is accessible to and usable by individuals with disabilities, the needs of individuals with disabilities should be considered as early as possible during the development of the product concept, and at appropriate stages during product design, development, fabrication and delivery. Manufacturers should consult with individuals with disabilities regarding the accessibility of the product, as needed, to achieve accessibility and usability. Some methods that may be used to achieve this are:

1. Inclusion of individuals with disabilities in the target populations of market research;
2. Inclusion of individuals with disabilities in product trials;

3. Direct consultation with disability advocacy organizations; and

4. Direct consultation with individuals with disabilities.

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#### **4.8. PRODUCT DESIGN AND DEVELOPMENT**

Manufacturers shall consider accessibility and usability of their products for individuals with disabilities. To this end, manufacturers are expected to identify potential or actual barriers to accessibility and usability as part of the product development process. When accessibility is not readily achievable, manufacturers shall design products compatible with existing peripheral devices and/or specialized customer premises equipment, if readily achievable.

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#### **4.9. TRAINING**

Manufacturers should actively seek to stay current in their accessibility designs. Manufacturers should also provide employees (engineers, product managers, service representatives, etc.) with periodic training regarding the requirements of section 255 directly relevant to that employee's function. Where appropriate to an employee's function, such training should include:

1. Accessibility requirements of individuals with disabilities;
2. Means of communicating with individuals with disabilities;
3. Commonly-used adaptive technology appropriate to their products;
4. Designing for accessibility;
5. Solutions for accessibility and/or compatibility; and
6. Identification of contact person(s) within the company who will address customer requests concerning accessibility and compatibility.

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It is strongly encouraged that training programs include input from the disability community and representative agencies.

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## **4.10. CONSUMER INFORMATIONAL INQUIRIES**

### **4.10.1. Point of Contact.**

A manufacturer shall establish and maintain a point of contact to assist customers regarding access features. Wherever possible, the point of contact should include a voice telephone number, TTY number, e-mail address, fax number, and postal address for consumer inquiries regarding the accessibility of their products. Manufacturers shall publish this contact information in product literature.

### **4.10.2. Response Time.**

Manufacturers should advise all individuals who make informational inquiries with the point of contact that they can expect a response to their inquiry within fourteen (14) calendar days.

### **4.10.3. Information Provided.**

A manufacturer's response to an inquiry should be made promptly, and should include information on accessibility features, compatibility standards that are supported by the product, and commonly used compatibility options available through adaptive devices, as needed to guide the individual to the best access provisions available. Should the individual require further assistance, the manufacturer should give the individual information on how to contact the Access Board for further help.

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## **4.11. DISABILITY ACCESS STATEMENT**

Manufacturers shall promptly provide to consumers, upon request, a disability access statement explaining the accessibility and compatibility features of a product. This statement shall be provided in alternate formats as needed. Such a statement should include:

1. A list of the product's accessibility or compatibility features;
2. Compatibility standards supported by the product;
3. Information about other accessible or compatible products from that manufacturer; and
4. Identification of contact person(s) who will address customer inquiries concerning accessibility and compatibility (as in 4.10.1.).

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## **4.12. SPECIALIZED CPE (SCPE)**

Manufacturers of SCPE and manufacturers of telecommunications equipment and CPE should coordinate (for instance, through voluntary standards setting) to ensure compatibility between SCPE and telecommunications equipment and CPE.

Rationale: Compatibility should be readily achievable more frequently if SCPE, CPE, and telecommunications equipment manufacturers collaborate to minimize overall effort and expense. SCPE, CPE and telecommunications equipment manufacturers could develop voluntary interface standards that would help to reduce the number of different interfaces and the conflicting interface technologies which otherwise would proliferate.

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# 5.0

## PERFORMANCE GUIDELINES

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### 5.1. INTRODUCTION

These guidelines provide objectives for product performance which will assist manufacturers in designing, developing and fabricating telecommunications and customer premises equipment to be more accessible to and usable by individuals with disabilities. In addition, these performance guidelines should encourage the use and further development of design practices intended to make products more usable by people with a wide range of disabilities.

Appendix C provides examples of strategies for addressing these guidelines.

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### 5.2. LEVEL 1 -- GENERAL PERFORMANCE GUIDELINES

Level 1 guidelines are intended to help define the overall goals that a company should try to achieve in the design of its products. They give no guidance as to how to achieve the goals but help to define what is meant by “access to the widest range of people.”

#### 5.2.1. Accessible To and Usable By Individuals with Disabilities, Where Readily Achievable.

General Guideline A: Where readily achievable, products shall be designed, developed and fabricated to be accessible to and usable by individuals with disabilities. This includes people with visual disabilities (e.g., low vision and blindness), hearing disabilities (e.g., hard of hearing, deafness), people with physical disabilities (e.g., limited strength, reach or manipulation, tremor, speech impairments, lack of sensation), people with language or cognitive disabilities (e.g., reading disabilities, thinking, remembering, sequencing disabilities), and other disabilities (e.g., epilepsy, short stature), and individuals with any combination of these disabling conditions (e.g., deaf-blindness). Older individuals in particular commonly have multiple functional limitations.

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(Note: The list above is illustrative of the range of disabling conditions of approximately 10-20% of the U.S. population, but is not an exhaustive list of every type and combination of disability. Also, there are many people who do not have disabilities who also fit the above descriptions and would benefit -- for example, someone who cannot read, someone who has broken his/her arm, people who must work with gloves on, etc.)

Since there is no single interface design that accommodates all disabilities, accessibility is likely to be accomplished through product designs which emphasize interface flexibility to maximize user configurability and multiple, alternative and redundant modalities of input and output.

### **5.2.2. Compatible with Existing Peripheral Devices or SCPE Used by Individuals with Disabilities, Where Readily Achievable.**

General Guideline B: Whenever it is not readily achievable to make a product accessible to and usable by individuals with disabilities, the product shall be compatible with existing peripheral devices or specialized customer premises equipment commonly used by individuals with disabilities to achieve access, if readily achievable.

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## **5.3. LEVEL 2 GUIDELINES**

Section 255 requires that manufacturers ensure the usability as well as the accessibility and/or compatibility of products, if readily achievable. It is understood that there will be cases where manufacturers may not be able to achieve the creation of a single product that addresses accessibility for all or some combinations of disabilities without sacrificing product usability. Therefore, there will be cases where a company will have to use discretion in choosing among accessibility features. In this situation, manufacturers should consider incorporating in another comparable product, the access feature or features not addressed. A manufacturer may not ignore consideration of the needs of any covered group of individuals with disabilities when determining what accessibility features the product should address.

### **5.3.1. Input, Control and Mechanicals.**

#### **5.3.1.1 (I-1). Locate, Identify, and Operate Controls without Vision.**

Guideline: Where readily achievable, product input, control and mechanical functions shall be fully operable via at least one mode whose components are locatable, identifiable, and accurately operable without requiring the user to see.

Rationale: Individuals with severe visual disabilities or blindness cannot locate or identify controls, latches, input slits etc. by sight or operate controls that require sight.

#### **5.3.1.2 (I-2). Operate with Low Vision without Requiring Audio.**

Guideline: Where readily achievable, the product input, control and mechanical functions shall be fully operable via at least one mode by individuals who have low vision but are not legally blind, which does not rely on audio output.

Note: 20/70 after correction is the beginning of low vision; 20/200 after correction is the beginning of legal blindness; a field of vision of less than 20 degrees after correction also constitutes legal blindness.

Rationale: Individuals with severe visual disabilities often also have severe hearing disabilities (especially older users) and cannot rely on audio access modes commonly used by those who are blind.

#### **5.3.1.3 (I-3). Operate without Color Perception or with Color Perception Limitations.**

Guideline: Where readily achievable, product input, control, mechanical and display functions shall be fully operable via at least one mode that does not require color perception.

Rationale: Many people have an inability to see or distinguish between certain color combinations. Others are unable to see color at all.

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#### **5.3.1.4 (I-4). Locate, Identify, and Operate Controls without Hearing.**

Guideline: Where readily achievable, product input, control and mechanical functions shall be fully operable via at least one mode whose components are locatable, identifiable, and accurately operable without requiring the user to hear.

Rationale: Individuals who are hard of hearing or deaf cannot locate or identify those controls that require hearing.

#### **5.3.1.5 (I-5). Low Manipulation Requirement.**

Guideline: Where readily achievable, product input, control and mechanical functions shall be fully operable via at least one mode that does not require fine motor control or simultaneous actions.

Rationale: Individuals with tremor, cerebral palsy, paralyzes, arthritis, artificial hands, and other conditions may have difficulty operating systems which require fine motor control, assume a steady hand, or require two hands or fingers for operation.

#### **5.3.1.6 (I-6). Operate with Limited Reach and Strength.**

Guideline: Where readily achievable, product input, control and mechanical functions shall be fully operable via at least one mode that is operable with limited reach or strength.

Rationale: Individuals with spinal cord injuries, ALS, arthritis, MS, MD and other conditions may have difficulty operating systems which require reach or strength.

#### **5.3.1.7 (I-7). Non-Time-Dependent Controls.**

Guideline: Where readily achievable, product input, control and mechanical functions shall be fully operable via at least one mode that does not require a response within a period of time, or where the response time is adjustable over a wide range.

Rationale: Individuals with physical, sensory and cognitive disabilities may not be able to find, read and operate a control quickly.

#### **5.3.1.8 (I-8). Identify and Operate Controls without Speech.**

Guideline: Where readily achievable, product input and control functions shall be fully operable via at least one mode that does not require speech.

Rationale: Many individuals cannot speak or speak clearly either due to physical disability or deafness. Products which require speech in order to fully operate them, and which do not provide an alternate way to achieve the same function are not usable by these people.

#### **5.3.1.9 (I-9). Language and Cognitive Requirements.**

Guideline: Where readily achievable, product input, control and mechanical functions shall be fully operable via at least one mode that minimizes the cognitive, memory and learning skills required of the user to operate the product.

Rationale: Many individuals have reduced cognitive abilities either from birth, accident/illness, or aging. These include reduced memory, sequencing, reading, and interpretive skills.

### **5.3.2. Output, Displays and Feedback.**

#### **5.3.2.1 (O-1). Visual Information Available in Auditory Form.**

Guideline: Where readily achievable, all information (text, static or dynamic images and labels) which is provided visually shall also be available in auditory form.

Rationale: Some individuals have difficulty seeing or reading, or cannot see or read.

#### **5.3.2.2 (O-2). Make Visual Information Accessible to People with Low Vision without Requiring Audio.**

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Guideline: Where readily achievable, all information which is provided through a visual display including text and dynamic images, labels or incidental operating cues, shall be perceivable via at least one mode by individuals who have low vision but are not blind, without requiring audio presentation.

Rationale: Individuals with severe visual disabilities often also have severe hearing disabilities (especially older users) and cannot rely on audio access modes used by those who are blind.

### **5.3.2.3 (O-3). Access to Moving Text.**

Guideline: Where readily achievable, text which is presented in a moving fashion shall also be available via at least one static presentation mode at the option of the user.

Rationale: Moving text can be an access problem because individuals with low vision, physical or sensorimotor disabilities find it difficult or impossible to track moving text with their eyes.

### **5.3.2.4 (O-4). Visual and/or Tactile Availability of Auditory Information.**

Guideline: Where readily achievable, all information which is provided auditorially, including those incidental operating sounds and speech, which are important for use of the product, shall be available via at least one mode in appropriate visual form and/or where appropriate in tactile form.

Rationale: Individuals who have difficulty hearing or who are unable to hear the product are unable to hear auditory output or to hear mechanical and other sounds that are emitted by a device which may be needed for its safe or effective operation.

### **5.3.2.5 (O-5). Make Auditory Information Accessible to People who are Hard of Hearing without Requiring Vision.**

Guideline: Where readily achievable, all information which is provided auditorially, including incidental operating sounds, which is important for use of the product, shall be available via at least one mode in enhanced auditory fashion (for example,

increased amplification, or reduction of background noise).

Rationale: Individuals who have difficulty hearing but are not deaf find it much easier to use their hearing than to have to rely on access strategies used by people who are deaf.

CLOSELY RELATED GUIDELINES: See C-2 and C-3 dealing with hearing aid compatibility.

### **5.3.2.6 (O-6). Prevention of Visually-Induced Seizures.**

Guideline: Where readily achievable, visual displays shall be designed so as to avoid high probability of triggering a seizure in an individual with photo-sensitive epilepsy.

Rationale: Individuals with photo-sensitive epilepsy can have a seizure triggered by displays which flicker or flash, particularly if the flash has a high intensity and is within certain frequency ranges.

### **5.3.2.7 (O-7). Prevention of Sound-Induced Seizures.**

Guideline: Where readily achievable, sound displays shall be designed so as to avoid audio behaviors that create a high probability of a seizure in an individual with sound-induced epilepsy.

Rationale: Individuals with sound-induced epilepsy can have a seizure triggered by acoustic output.

### **5.3.2.8 (O-8). Audio Cutoff.**

Guideline: Where readily achievable, products which use audio output access modes, shall have a headphone jack or personal listening device (e.g., phone-like handset or earcup) which cuts off the speaker when used.

Rationale: Individuals using the audio access mode, as well as those using a device with the volume turned up, need a way to limit the range of audio broadcast.

## **5.3.3. Documentation.**

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**5.3.3.1 (D-1). Ability to Access Product Documentation and Related On-Line Information.**

Guideline: Documentation (printed, on-line or tutorial, including promotional materials) shall be accessible to and usable by individuals with all disabilities or alternate formats shall be available.

Rationale: People who have disabilities often are unable to use standard printed documentation if they cannot see, documentation that is presented on screen in small fonts if they have poor vision, documentation that presents important information auditorially if they are deaf, etc.

**5.3.4. Compatibility Guidelines.**

**5.3.4.1 (C-1). External Electronic Access to All Information and Control Mechanisms.**

Guideline: Where readily achievable,

1. All information needed for the operation of a product (including output, alerts, labels, on-line help, and documentation) shall be available in a standard electronic text format on a cross-industry standard port;

2. All input to and control of a product shall allow for real time operation via electronic text input into a cross-industry standard external port and in cross-industry standard format; and

3. The port used for 1 and 2 shall not require manipulation of a connector by the user.

Rationale: Some individuals with severe or multiple disabilities are unable to use the built-in displays and control mechanisms on a product.

**5.3.4.2 (C-2). Connection Point for External Audio Processing Devices.**

Guideline: Where readily achievable, products providing auditory output shall provide the auditory signal via an industry standard connector and signal level.

Rationale: Individuals using amplifiers, audio couplers, and other audio processing devices need a

place to tap into the audio generated by the product in a standard way.

**5.3.4.3 (C-3). Hearing Aid Coupling.**

Guideline: Where readily achievable, products providing auditory output via an audio transducer which is normally held up to the ear shall provide a means for effective wireless coupling to hearing aids.

Rationale: Individuals who are hard of hearing use hearing aids with a T-coil feature to allow them to listen to audio output of products without picking up background noise and to avoid problems with feedback, signal attenuation or degradation.

**5.3.4.4 (C-4). Non-Interference with Hearing Technologies.**

Guideline: Where readily achievable, products shall not cause interference with hearing technologies (including hearing aids, cochlear implants, and assistive listening devices) which are used by a product user or bystanders.

Rationale: Individuals who are hard of hearing use hearing aids and other assistive listening devices, but they cannot be used if other products introduce noise into the hearing technologies because of stray electromagnetic interference.

**5.3.4.5 (C-5). Prosthetic Compatibility of Controls.**

Guideline: Where readily achievable, touchscreen and touch-operated controls shall be able to be activated without requiring body contact or close body proximity.

Rationale: Individuals who have artificial hands or use headsticks or mouthsticks to operate products have difficulty with capacitive or heat-operated controls which require contact with a person's body rather than a tool.

**5.3.4.6 (C-6). Text Telephone Connectability.**

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Guideline: Where readily achievable, products which provide a function allowing voice communication and which do not themselves provide a TTY functionality shall provide a standard non-acoustic connection point for TTYs. It shall also be possible for the user to easily turn any acoustic pickup on the product on and off to allow the user who can talk to intermix speech (live microphone) with text telephone use.

Rationale: Individuals who use text telephones (TTYs) to communicate using text-over-telephones

must have some non-acoustic way to connect TTYs to telephones to get clear TTY connections. Acoustic coupling is subject to interference from ambient noise, as many handsets do not provide an adequate seal with TTYs. Therefore, alternate (non-acoustic) connections are needed. Control of the microphone is needed for situations such as pay-phone usage, where ambient noise picked up by the mouthpiece often garbles the signal (user needs to be able to mute the handset microphone). Some users of TTYs cannot hear and use the TTY to receive communication but can talk and use speech for outgoing communication. The microphone on/off switch on the telephone should therefore be easy to flip back and forth or have a push-to-talk mode available.

#### **5.3.4.7 (C-7). Text Telephone Signal Compatibility.**

Guideline: Where readily achievable, products providing voice communication functionality shall be able to support use of all cross-manufacturer non-proprietary standard signals used by telecommunication devices designed for use by or with people who are deaf, hard of hearing or have speech impairments.

Rationale: Some telecommunication systems, which have been developed and released, compress the audio signal in such a manner that standard signals used by TTYs are distorted or attenuated, preventing successful TTY communication over the systems.



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# 6.0

## COMPLIANCE AND COORDINATION

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### 6.1. COMPLIANCE AND COORDINATION OVERVIEW

The committee was unable to reach consensus on this introductory section due to time constraints. Some committee members believed this section should be characterized as the following:

This section describes the compliance and coordination partnership which is recommended by the committee for guiding the access requirements of section 255. Some components of the structure are not in existence at this time. Others are only now being initiated. For this reason this section is as much a roadmap to the future as it is a system for judging compliance.

The compliance system presented in this document, and more specifically in this section requires and relies upon a coordinated partnership between industry and individuals with disabilities. Specifically it requires a system which facilitates effective partnering throughout all stages of the process, including development of guidelines, standards, product design and development, verification of accessibility, complaint investigation, and market monitoring. In order to succeed, this system requires the good faith support of these parties. In keeping with this understanding, this section is written with an assumption of reasonableness and balance from all parties. Any interpretations that may be made which are clearly unbalanced and consistently prejudicial to any interest are not intended.

The section describes three mechanisms for controlling and assessing compliance. At the first and highest level are the guidelines developed by the Access Board. These provide the overall direction for this effort. Supporting the guidelines are access related consensus standards developed by standards setting bodies. Where they are appropriate and available, these documents provide specific technical guidance for important parts of the compliance assessment. Standards often serve to document standard test methodologies, compatibility requirements and at times to provide technical guidance to established practice. The third level,

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found in section 6.4, is expert opinion, fostered by an ongoing dialogue between consumer and industry representative.

**Rationale:** This section proposes that the optimum structure for the development of telecommunications access is a mix of public and private sector initiatives. A variety of such models exist today throughout the government. One example is the FCC's handling of the issue of TV interference. In the early 1980s, the FCC was given regulatory authority in this area. However, it implemented that authority by working with a private sector standard setting body to write the required technical standards. In parallel with this effort, dialogue with the affected manufacturers resulted in voluntary inclusion of the required suppression circuitry in most TV sets. The FCC continues to actively monitor the issue to assure that the public interest is being served. In that not all of the components described in this section are currently sufficiently developed, it is implied, and at times stated, that the Access Board and FCC will work with the appropriate parties to develop these components. The agencies should monitor the development of these components, and to the extent that some components do not develop as envisioned, the Access Board should expeditiously review the compliance and coordination model, and may change it sooner than the recommended five-year review.

However, the committee believes that the structure envisioned is quite realistic. Indeed it is heartening to note that since the inception of the TAAC, the National Association of Radio and Telecommunications Engineers (NARTE) has initiated an Association of Access Engineers and Specialists. It is hoped that this new organization, working in close cooperation with other interested organizations, such as RESNA (Rehabilitation Engineering and Assistive Technology Society of North America), TIA (Telecommunications Industry Association), IEEE (Institute of Electrical and Electronics Engineers), EIF (Electronic Industries Foundation), RERC (Rehabilitation Engineering Research Centers), and others will provide many of the services called for in section 6.4.

Other committee members believed this section should be characterized as the following:

This section describes the committee's recommendation for a framework for coordination among manufacturers and consumers to identify access needs and solutions to those needs, ensuring compliance with the requirements of section 255, and encouraging the prompt, informal resolution of complaints about the accessibility of telecommunications and customer premises equipment. The principal elements comprising this framework are:

1. these guidelines;
2. the anticipated development, when and where appropriate, of consensus standards for telecommunications accessibility by standards setting bodies;
3. a coordination point to facilitate the exchange of information about access needs and solution among manufacturers and consumers;
4. manufacturers' verification of the readily achievable accessibility and usability of their equipment and supplying a declaration of conformity of adherence to the Access Board and FCC guidelines for determining whether accessibility, usability, or compatibility is readily achievable; and
5. alternate approaches to inquiries and complaints that encourage manufacturers to provide consumers information about the accessibility features of their products and consumers to express informally their concerns about a product's accessibility prior to complaining to the FCC.

**Rationale:** The framework described in this section relies heavily on private sector initiatives and cooperation among manufacturers and individuals with disabilities and organizations advocating for their interests to foster the development of those elements of the framework that are in the early stages of development. For example, the National Association of Radio and Telecommunications Engineers (NARTE) has initiated an Association of Access Engineers and Specialists. This new organization, and others that may be established, in cooperation with other existing organizations like the Rehabilitation Engineering and Assistive Technology Society of North America (RESNA), the Institute of Electrical and Electronics Engineers (IEEE), the Telecommunications Industry Association (TIA), the Electronic Industries Foundation (EIF), and the Rehabilitation Engineering Research Centers (RERC), could provide many of the contact point

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functions described in section 6.4. It is expected that the FCC and Access Board will encourage the development of the cooperative elements of this framework and monitor and evaluate the progress of their development and take further action if appropriate.

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## **6.2. ACCESS BOARD GUIDELINES**

### **6.2.1. Reauthorization of Guidelines.**

The Access Board shall review and reauthorize these guidelines at a maximum interval of five years, incorporating input from representatives of industry, individuals with a wide range of disabilities and organizations which represent the needs of individuals with disabilities, academic and research specialists in the area of access engineering, the FCC, and input from the annual market monitoring report.

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## **6.3. CONSENSUS STANDARDS**

### **6.3.1. Development of Standards.**

Where standards are appropriate, the Access Board and FCC should work in conjunction with standards setting bodies, including consortia, to encourage the development of and where appropriate, officially recognize consensus standards developed for telecommunications accessibility. This process shall incorporate input from individuals with a wide range of disabilities and organizations which represent the needs of individuals with disabilities. Examples of areas in which standards would be useful are: to provide objective evaluation and test methods, provide for standardized user interfaces, provide for compatibility between CPE and SCPE and others. The utmost care should be exercised to assure that these standards do not hinder innovation and technological development, but rather work in concert with innovation.

### **6.3.2. Refreshment of Standards.**

In order to receive official recognition of a consensus standard, developed for

telecommunications accessibility, the standard setting body sponsoring the standard should review and refresh it every five years or more frequently, if needed.

### **6.3.3. Coordination of Standards.**

Industry should coordinate the development of accessibility standards with officially recognized standard setting bodies such as the American National Standards Institute (ANSI) wherever appropriate.

### **6.3.4. International Harmonization.**

Industry should promote harmonization of accessibility standards with international bodies such as the International Standards Organization (ISO) or the International Electrotechnical Commission (IEC) wherever appropriate.

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## **6.4. COORDINATION POINT**

### **6.4.1. Establishment of Coordination Point.**

The model described in section 6 relies heavily on the presence of an organization or organizations to provide effective and efficient communications and feedback for the implementation of telecommunications access. Such a “coordination point” might be a sub-society of an existing engineering society, governed by its own board comprised of industry representatives, individuals with disabilities, representatives of organizations which represent the needs of individuals with disabilities, and academic and research specialists in the area of access. If a coordination point or points is established, the FCC and Access Board are encouraged to support and assist, as appropriate, the development of such organizations to serve the purposes listed in this section. If such organizations do not develop as required in this model, the Access Board and FCC shall as expeditiously as possible review the model and change it if appropriate.

Rationale: The industry members of the TAAC have argued that many aspects of the effort to provide telecommunications access will be most

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effectively and efficiently provided through private sector initiative. This section assumes that the monetary savings and the administrative simplicity of a Declaration of Conformity system will provide sufficient motivation for the creation and support of the initiative described in this section. The committee observes with great interest the development of an accessible design society sponsored by NARTE. The committee encourages the Access Board and FCC to monitor the development of this, or other similar efforts, and to the degree they appropriately fulfill the functions described in this section, utilize these initiatives. Should initiatives such as these fail, other kinds of solutions will be required.

#### **6.4.2. Participation of Individuals with Disabilities.**

The coordination point should facilitate participation of individuals and organizations representing the needs of individuals with disabilities by ensuring accessibility of events and accommodations such as communication access and alternative formats for materials, and by supporting attendance and participation in training by individuals with disabilities through sponsorships.

#### **6.4.3. Access Engineering Specialist Training.**

The coordination point could facilitate the development of appropriate curricula through entities such as universities and trade associations, and should ensure provision of training on access needs and strategies to access specialists, in conjunction with training provided to individuals with disabilities.

#### **6.4.4. Disability Representatives Training.**

The coordination point should facilitate the development of appropriate curricula and should provide on-going training on fundamentals of telecommunications and access to individuals with disabilities and representatives of organizations representing the needs of individuals with disabilities, in conjunction with training provided to access specialists.

#### **6.4.5. Access Specialist Certification.**

The coordination point should support the development of a certification process for access specialists. Such a certification process should contain provisions for annual updating of access specialist training to ensure that practitioners are current with the state-of-the-art.

#### **6.4.6. Presentation of Access Needs and Strategies.**

The coordination point could host an annual symposium with technical sessions to provide a forum for presentation of papers and research results on access engineering. This annual symposium could also receive and review the annual marketing monitoring report from the Access Board to identify key areas of need in access for the coming year.

#### **6.4.7. Input into Guidelines.**

The coordination point may, if requested, provide industry and disability input into periodic refreshment of the Access Board guidelines.

#### **6.4.8. Input into Standards.**

The coordination point could, if requested, provide industry and disability input into the development, refreshment, coordination and international harmonization of standards.

#### **6.4.9. Industry/Disability Advisory Panel to the FCC.**

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The coordination point could, if requested, convene and maintain an advisory panel comprised of industry representatives, individuals with disabilities and representatives of organizations representing the needs of individuals with disabilities, to provide opinion, at the FCC's request, on inquiries and complaints which have been submitted to the FCC.

#### **6.4.10. Research.**

The coordination point could identify areas of access needs where research and development are in demand and sponsor research in those areas.

#### **6.4.11. Recognition for Access Innovation.**

The coordination point could establish an awards program for access innovations to stimulate industry efforts in this area.

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### **6.5. ACCESS VERIFICATION**

#### **6.5.1. Verification of Accessibility, Usability, and Compatibility.**

Manufacturers shall verify readily achievable accessibility and usability of products, and compatibility of products with existing peripherals and specialized CPE where access and usability is not readily achievable, through:

1. Utilization of the expert opinion of qualified access specialists, when other methods are not available for a given application; or
2. Whenever possible, using standard tests where available and recommended testing approaches where standard tests are unavailable. It is strongly recommended that such testing be supervised by a qualified access specialist; or

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### **6.6. DECLARATION OF CONFORMITY**

3. Use of standardized methods and techniques, where such methods have been validated for the intended application; or

4. Utilization of certified access testing laboratories where available.

The terms standard and standardized in items 2 and 3, above, refer to tests, methods and techniques which are documented in consensus standards, developed by recognized standards settings bodies and recognized as being appropriate by the Access Board and FCC, as provided for in section 6.3.1.

#### **6.5.2. Use of Qualified Access Specialists.**

When utilizing the verification methods of expert opinion or standard tests, manufacturers should use qualified access specialists to supervise the verification and, as appropriate, in implementing process and performance plans throughout product design and development.

#### **6.5.3. Documentation.**

Note: Consensus was not reached on the use of shall or should on this item. [Should/shall] is therefore used in the following paragraph.

Manufacturers [should/shall] document accessibility design decisions, whether or not access solutions are found to be readily achievable. Documentation sufficient to show compliance with the accessibility requirements of section 255 [should/shall] be retained.

#### **6.5.4. Certification of Access Testing Laboratories.**

The Access Board, in cooperation with recognized laboratory accrediting agencies, should promote the development of a certification process for access testing laboratories.

#### **6.6.1. Issuing Declaration of Conformity.**

For all telecommunications equipment and customer premises equipment, the manufacturer shall supply with the product, at the time of marketing or

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importation, a declaration of conformity (DOC) with section 255.

Rationale: The declaration represents a manufacturer's self-evaluation of adherence to Access Board and/or FCC evolving guidelines in determining whether accessibility and usability of a product by individuals with disabilities is readily achievable, or to the extent that accessibility and usability is not readily achievable, compatibility of the product with existing peripheral devices or specialized customer premises equipment commonly used by individuals with disabilities is readily achievable for the given product.

The DOC is relatively brief (see 6.6.3, 6.6.4), and because it provides no information about the accessibility or compatibility features of the particular product, it cannot replace the provision of useful consumer information, as covered in sections 4.4, 4.6, 4.10, and other places in this report.

If standards concerning appropriate methods of evaluation and verification of accessibility are developed by standards setting bodies as described in section 6.3, whether or not formally adopted by the Access Board or the FCC, it is expected that these methods will be used by manufacturers in evaluating and verifying accessibility and compatibility.

### **6.6.2. Location of Declaration of Conformity.**

The DOC shall be included as a separate sheet or other medium in the product box, or located within a user's manual in such a way that the user may quickly find the declaration itself, or an accessible visual, auditory, or tactile prompt to its location.

Rationale: The DOC, which includes contact information, must be easily locatable by individuals who customarily use alternate formats, in order that they may contact the manufacturer's point of contact to request alternate formats of the product literature including the user manual. Some manufacturers may choose to provide with the product a declaration alternatively formatted for the individuals with particular disabilities for whom the product is designed, developed, and fabricated.

### **6.6.3. Contents of Declaration of Conformity.**

The declaration of conformity shall include the following:

1. A brief statement of the purpose of section 255 (see 6.6.4);
2. Identification of the product, e.g., name and model number;
3. A statement of product conformity (see 6.6.5);
4. Information on how to contact the manufacturer's responsible party (see 4.10.1).

### **6.6.4. Text of Declaration of Conformity.**

Section 255 requires manufacturers to design, develop, and fabricate telecommunications products to be accessible to and usable by individuals with disabilities if readily achievable. When accessibility and usability is not readily achievable, such products must be compatible with peripheral devices commonly used by individuals with disabilities, if that is readily achievable. The TAAC urges the FCC to adopt a consistent content and format for a declaration of conformity to reduce confusion by both consumers and manufacturers as to the specific requirement.

Some committee members believed that the declaration of conformity should contain the following language:

This product complies with section 255 of the Communications Act. This means that the manufacturer [or enter name of manufacturer] considered access and use by individuals with disabilities during product design, development, and fabrication. The manufacturer [or insert name of manufacturer] incorporated accessibility or compatibility to the extent that it was readily achievable to do so. The resulting product may not be completely accessible to each and every type and degree of disability, or compatible with any particular specialized customer premises equipment or peripheral devices commonly used by individuals with disabilities.

For further information about the accessibility or compatibility features of this product, product

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documentation in alternate formats, or other questions about accessibility matters, please contact our Accessibility Coordinator. [Provide contact address information, see section 4.10.1]

Rationale: This text conveys the disability access requirements and readily achievable limitation contained in section 255 and clarifies that compliance with section 255 does not necessarily mean that access or compatibility is readily achievable for all or any specific disability or specialized equipment used by individuals with disabilities. This formulation avoids troubling language in the proposal below which would likely lead consumers to believe that disability access is not necessarily required by section 255.

Other committee members believed the statement should contain the following:

This product complies with section 255 of the Communications Act. This means that the manufacturer [or enter name of manufacturer] considered access and use by individuals with disabilities during product design, development, and fabrication and incorporated accessibility or compatibility features to the extent that it was readily achievable to do so. It does not mean that the product necessarily is, or is required to be, accessible to or usable by an individual with any particular type or degree of disability or compatible with any specific peripheral device.

For further information about the accessibility or compatibility features of this product, product documentation in alternate formats, or other questions about accessibility matters, please contact our Accessibility Coordinator. [Provide contact address information, see section 4.10.1]

Rationale: Without the qualifications reflected in the third sentence, purchasers of its products could be misled by the statement about the extent to which the product incorporates accessibility features or about the extent of the manufacturer's obligation to do so. This language has the virtue of bluntness. The more blunt the statement, the less likely consumers will be misled by the statement and the less likely manufacturers and consumer advocates will be blamed for misunderstandings.

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## **6.7. INQUIRIES AND COMPLAINTS**

### **6.7.1. Manufacturer's Point of Contact.**

As required in section 4.10, manufacturers shall establish and maintain a point of contact to assist customers regarding access features. The equipment manufacturer should be the initial and, it is hoped, primary resolver of consumer inquiries and complaints. When a manufacturer cannot adequately meet a consumer's needs they are required in section 4.10.3 to deliver the material described in 6.7.2 to the consumer.

### **6.7.2. Consumer Information.**

The Access Board shall develop material which gives consumer information regarding telecommunications access. This material is intended to provide a bridge for a consumer to the best telecommunications access information available. This material should provide points of contact for help with the needs of specific disabilities. It should also assist the consumer by providing information sources on available adaptive devices. Equipment manufacturers who are unable to fully meet a consumer's needs are required to give them the information in section 4.10.3.

### **6.7.3. FCC Point of Contact.**

The FCC should maintain a point of contact for individuals with disabilities, and manufacturers for receipt of inquiries and complaints regarding accessibility of telecommunications equipment and CPE, and publish this FCC point of contact in the Federal Register.

### **6.7.4. FCC Review of Complaints.**

#### **6.7.4.1 Informal Resolution.**

FCC policies with respect to complaints about the accessibility of telecommunications or customer premises equipment should:

(a) encourage consumers to express informally their concerns or grievances about a product to the

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manufacturer or supplier who brought the product to market before complaining to the FCC; and

(b) encourage manufacturers to respond within 30 days to consumer concerns or grievances about the accessibility of their products with information or actions sufficient to resolve the concerns.

#### **6.7.4.2 Referral of Inquiries.**

If the manufacturer has issued a declaration of conformity, individuals with disabilities are encouraged to make inquiries to the manufacturer regarding product features relating to accessibility and compatibility, before bringing a complaint to the FCC. When a complaint is made to the FCC, the FCC should determine whether the complainant has discussed concerns and grievances with the manufacturer but was unable to satisfactorily resolve the complaint. If the complainant has not conducted any such discussions, the FCC should encourage the complainant to contact the manufacturer for this purpose or the FCC should take such action as it deems appropriate to assist the complainant to resolve the complaint informally.

#### **6.7.4.3 Implementation.**

The Access Board and/or the FCC should allow adequate time for manufacturers to reflect these guidelines in their processes for designing, developing, fabricating and delivering telecommunications equipment and customer premises equipment.

#### **6.7.4.4 Significance of Declaration of Conformity.**

While the committee reached consensus on the use of a declaration of conformity, it could not agree on the weight such a declaration should be given by the FCC in dealing with complaints.

Some committee members believed that the DOC should be given the following consideration:

A manufacturer responding to a complaint should be presumed to have complied with section 255 if the manufacturer:

(a) Demonstrates adherence to section 255 guidelines, including any recognized good practices associated with design, development, and fabrication that may be associated with such guidelines; and

(b) Supplies a declaration of conformity as provided in section 6.6; or

(c) Demonstrates that one or more of the manufacturer's other products or product options provides a satisfactory substitute for the challenged product, through reasonably comparable features, prices and availability.

Where the FCC finds that a manufacturer has not complied with section 255, punitive measures should be avoided if the manufacturer has documented good-faith efforts to follow section 255 guidelines and any related good practices; instead, the FCC may require the manufacturer to address the lack of accessibility, usability, or compatibility.

Rationale: The only significant difference in the two versions, is in section 6.7.4.4(c), which allows the availability of an accessible or compatible equipment alternative to create a presumption of compliance. Since the effect is only presumptive, the



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complainant may still prevail by offering evidence sufficient to overcome the presumption.

Other committee members felt the DOC should be given the following consideration:

In determining whether a manufacturer has complied with section 255 with respect to a particular product, the FCC shall give considerable weight to the extent to which the manufacturer undertook good faith efforts to comply with the guidelines implementing section 255.

Where the FCC finds that a manufacturer's product does not comply with section 255, punitive measures should be avoided if the manufacturer has documented good faith efforts to fully and adequately follow section 255 guidelines, or, if one or more of the manufacturer's other products or product options, having comparable features, functions, price, and availability, provides a satisfactory substitute for the accessibility and usability, or compatibility which may be lacking in the product which is the subject of a complaint. The FCC may require the manufacturer to address the lack of accessibility, usability, or compatibility in the product which is the subject of a complaint if it finds that it would have been readily achievable to have designed, developed or fabricated the product to be accessible and usable or compatible.

Rationale: In attempting to determine the compliance of a telecommunications product with section 255, it is proper for the FCC to carefully consider a manufacturer's good faith efforts to comply with the guidelines implementing section 255. However, a "blanket" presumption of compliance cannot be accorded inasmuch as the FCC may determine that the disability access efforts were not sufficient, even though the efforts were carried out in good faith. Furthermore, section 255 does not provide the FCC with the authority to make a finding of compliance based on substitute or comparable products. The law is clear in its application to all covered products. However, it is reasonable for the FCC to mitigate penalties against a manufacturer who can demonstrate compliance with the guidelines implementing section 255 or who can show that an equivalent product is available as a substitute for a product which is inaccessible. The FCC is expected

to determine the extent to which accessibility and usability or compatibility was readily achievable for the product and to require the manufacturer to take steps to resolve the inaccessibility.

#### **6.7.4.5 Review of Manufacturer's Documentation by FCC.**

In considering whether a manufacturer has demonstrated adherence to the section 255 guidelines with respect to a particular product, the FCC shall consider:

1. The extent to which the manufacturer undertook good faith efforts to achieve accessibility and usability during the product design, development, fabrication, and delivery of that product, and
2. In the case where accessibility and usability was not readily achievable, the extent to which the manufacturer undertook good faith efforts to achieve compatibility during the design development, fabrication and delivery of that product.

For the purpose of making the above consideration, the FCC may request from the manufacturer documentation on:

1. The good faith efforts undertaken by the company to achieve access or compatibility and
2. Alternatives considered during the design process to achieve accessibility and compatibility.

#### **6.7.5. FCC Discretionary Use of Industry/Disability Advisory Panel.**

The FCC may at its discretion refer inquiries and complaints to a joint industry/disability advisory panel for opinion.

#### **6.7.6. FCC Selection of Measures in Instances of Non-Compliance.**

In selection of measures, the FCC may consider whether a manufacturer showed due diligence in complying with mandatory specifications and requirements of these guidelines, and followed advisory specifications and recommendations from these guidelines, or utilized alternative implementation.

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### **6.7.7. Collection of Data.**

The FCC should maintain a database of inquiries and complaints received and the resulting findings or complaint resolutions for annual compilation and review. The FCC shall make this and other access related information it has available to the Access Board.

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## **6.8. MARKET MONITORING REPORT**

### **6.8.1. Access Board Production of Annual Report.**

The Access Board shall survey the marketplace annually to assess the state of the telecommunications market relative to product accessibility and to suggest means to improve telecommunications access for people with disabilities.

### **6.8.2. Contents of the Report.**

The annual market monitoring report shall include information on the availability of accessible telecommunications products in the marketplace by type and by applicable disability. The annual market monitoring report shall include information from the FCC on number and types of inquiries and complaints, with their final resolution or findings, across all covered market sectors. The Access Board, working with the FCC, shall identify trends which impact

telecommunications access for people with disabilities. In addition, the Access Board should identify research or product development work needed to rectify an existing market deficiency or pattern of inaccessibility to prevent future deficiencies.

Rationale: The annual market monitoring report is intended to present a balanced, high level viewpoint of the state of telecommunications accessibility. It should cite positive trends and progress. It should also identify deficiencies, trends or patterns of lack of access and areas needing further work. Its primary purpose is to guide the application of resources to access issues. Hence, it should applaud areas where resources are being effectively applied and identify areas needing additional action, with suggestions as to the kinds of action needed.

### **6.8.3. Availability of Report.**

The Access Board shall announce the availability of the annual market monitoring report to the public in the Federal Register, and shall deliver the report to the FCC, and to the members of the coordination point (see 6.4). The Access Board shall make the report available, in print or alternate formats, to any interested party upon request.

### **6.8.4. Actions Triggered by Report.**

If the annual market monitoring report indicates important product areas showing lack of progress or if substantial patterns of non-compliance with section 255 are identified, the FCC and/or the Access Board may call for associated industry cooperative efforts or may initiate proceedings to develop more stringent compliance measures for section 255. The Access Board may also recognize and recommend processes or innovative technical solutions (best practices) which may improve product design or accessibility.

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## REFERENCES

NOTE: The Access Board will be maintaining updated reference material on telecommunication access on its web site at <http://www.access-board.gov>. The Trace Research and Development Center, under sponsorship of the U.S. Department of Education's National Institute on Disability and Rehabilitation Research (NIDRR) will also be maintaining a web site at <http://trace.wisc.edu/telecom> that will contain continually updated bibliographic information on telecommunications access as well as an on-line design tool and an on-line collection of examples of accessible designs and techniques.



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# 8.0

## APPENDICES



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## APPENDIX A

### Acronyms

ADA -- Americans with Disabilities Act	ITU -- International Telecommunications Union
ADAAG -- Americans with Disabilities Act Accessibility Guidelines	NARTE -- National Association of Radio and Telecommunications Engineers
ANSI -- American National Standards Institute	QWERTY -- The standard alpha-numeric keyboard. Name is taken from the letters on the top row of the keys.
CPE -- Customer Premises Equipment	RERC -- Rehabilitation Engineering Research Centers
DOC -- Declaration of Conformity	RESNA -- Rehabilitation Engineering and Assistive Technology Society of North America
EIA -- Electronic Industries Association	RF -- radio frequency
FCC -- Federal Communication Commission	TAAC -- Telecommunications Access Advisory Committee
HAC -- Hearing Aid Compatibility Act	TIA -- Telecommunications Industry Association
HTTP -- Hyper Text Transport Protocol (part of an internet web address)	TRS -- Telephone Relay Service
IEEE -- Institute of Electrical and Electronic Engineers	TTY -- Text Telephone
ISO -- International Organization for Standardization	U.S.C.-- United States Code
IrDA -- Infra Red Data Association	





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## APPENDIX B

### Disability Related Provisions of the Telecommunications Act of 1996.

#### Contents

- I. Section 255: Access by Persons with Disabilities
- II. Section 251: Interconnection
- III. Section 305: Video Programming Accessibility

NOTE: Although video programming accessibility is not within the scope of this document and is not covered or treated elsewhere, it is included in this Appendix for reference and because it is a disability related provision in the Telecommunications Act of 1996.

#### I. Section 255: Access by Persons with Disabilities.

(a) DEFINITIONS -- As used in this section --

(1) DISABILITY -- The term 'disability' has the meaning given to it by section 3(2)(A) of the Americans with Disabilities Act of 1990 (42 U.S.C. 12102(2)(A)).

(2) READILY ACHIEVABLE -- The term 'readily achievable' has the meaning given to it by section 301(9) of that Act (42 U.S.C. 12181(9)).

(b) MANUFACTURING -- A manufacturer of telecommunications equipment or customer premises equipment shall ensure that the equipment is designed, developed, and fabricated to be accessible to and usable by individuals with disabilities, if readily achievable.

(c) TELECOMMUNICATIONS SERVICES -- A provider of telecommunications services shall ensure that the service is accessible to and usable by individuals with disabilities, if readily achievable.

(d) COMPATIBILITY -- Whenever the requirements of subsections (b) and (c) are not readily achievable, such a manufacturer or provider

shall ensure that the equipment or service is compatible with existing peripheral devices or specialized customer premises equipment commonly used by individuals with disabilities to achieve access, if readily achievable.

(e) GUIDELINES -- Within 18 months after the date of enactment of the Telecommunications Act of 1996, the Architectural and Transportation Barriers Compliance Board shall develop guidelines for accessibility of telecommunications equipment and customer premises equipment in conjunction with the Commission. The Board shall review and update the guidelines periodically.

(f) NO ADDITIONAL PRIVACY RIGHTS AUTHORIZED -- Nothing in this section shall be construed to authorize any privacy right of action to enforce any requirement of this section or any regulation thereunder. The Commission shall have exclusive jurisdiction with respect to any complaint under this section.

#### II. Section 251: Interconnection.

(a) GENERAL DUTY OF TELECOMMUNICATIONS CARRIERS -- Each telecommunications carrier has the duty --

1. to interconnect directly or indirectly with the facilities and equipment of other telecommunications carriers; and

2. not to install network features, functions, or capabilities that do not comply with the guidelines and standards established pursuant to section 255 or 256.

#### III. Section 305: Video Programming Accessibility.

Title VII is amended by inserting after section 712 (47 U.S.C. 612) the following new section:

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**“SEC. 713. VIDEO PROGRAMMING ACCESSIBILITY.**

(a) Commission Inquiry.--Within 180 days after the date of enactment of the Telecommunications Act of 1996, the Federal Communications Commission shall complete an inquiry to ascertain the level at which video programming is closed captioned. Such inquiry shall examine the extent to which existing or previously published programming is closed captioned, the size of the video programming provider or programming owner providing closed captioning, the size of the market served, the relative audience shares achieved, or any other related factors. The Commission shall submit to the Congress a report on the results of such inquiry.

(b) Accountability Criteria.--Within 18 months after such date of enactment, the Commission shall prescribe such regulations as are necessary to implement this section. Such regulations shall ensure that--

(1) video programming first published or exhibited after the effective date of such regulations is fully accessible through the provision of closed captions, except as provided in subsection (d); and

(2) video programming providers or owners maximize the accessibility of video programming first published or exhibited prior to the effective date of such regulations through the provision of closed captions, except as provided in subsection (d).

(c) Deadlines for Captioning.--Such regulations shall include an appropriate schedule of deadlines for the provision of closed captioning of video programming.

(d) Exemptions.--Notwithstanding subsection (b)-

(1) the Commission may exempt by regulation programs, classes of programs, or services for which the Commission has determined that the provision of closed captioning would be economically burdensome to the provider or owner of such programming;

(2) a provider of video programming or the owner of any program carried by the provider shall not be obligated to supply closed captions if such action would be inconsistent with contracts in effect

on the date of enactment of the Telecommunications Act of 1996, except that nothing in this section shall be construed to relieve a video programming provider of its obligations to provide services required by Federal law; and

(3) a provider of video programming or program owner may petition the Commission for an exemption from the requirements of this section, and the Commission may grant such petition upon a showing that the requirements contained in this section would result in an undue burden.

(e) Undue Burden.--The term ‘undue burden’ means significant difficulty or expense. In determining whether the closed captions necessary to comply with the requirements of this paragraph would result in an undue economic burden, the factors to be considered include--

(1) the nature and cost of the closed captions for the programming;

(2) the impact on the operation of the provider or program owner;

(3) the financial resources of the provider or program owner; and

(4) the type of operations of the provider or program owner.

(f) Video Descriptions Inquiry.--Within 6 months after the date of enactment of the Telecommunications Act of 1996, the Commission shall commence an inquiry to examine the use of video descriptions on video programming in order to ensure the accessibility of video programming to persons with visual impairments, and report to Congress on its findings. The Commission’s report shall assess appropriate methods and schedules for phasing video descriptions into the marketplace, technical and quality standards for video descriptions, a definition of programming for which video descriptions would apply, and other technical and legal issues that the Commission deems appropriate.

(g) Video Description.--For purposes of this section, ‘video description’ means the insertion of audio narrated descriptions of a television program’s key visual elements into natural pauses between the program’s dialogue.

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(h) Private Rights of Actions Prohibited.--  
Nothing in this section shall be construed to authorize any private right of action to enforce any requirement of this section or any regulation thereunder. The Commission shall have exclusive jurisdiction with respect to any complaint under this section.



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## APPENDIX C

### Example Strategies for Addressing Guidelines

This appendix provides example strategies and notes to assist in understanding the guidelines and as a source of ideas for alternate strategies for achieving them. The strategies, and notes here are not mandatory in nature. The manufacturer is not required to incorporate all of these strategies or any specific strategy. They are free to use these or other strategies in addressing the guidelines. The listing below is not comprehensive. Nor does following these example strategies guarantee an accessible product. For a comprehensive listing of all of the published strategies to date, as well as for further information and links to on-going discussions the reader is referred to the Access Board's web page at: <http://www.access-board.gov> and the National Institute on Disability and Rehabilitation Research's Rehabilitation Engineering Center on Access to Telecommunications System's strategies web page which can be found at: <http://trace.wisc.edu/telecom>.

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#### 5.3.1. Input, Control and Mechanicals

##### **I-1: Locate, Identify, and Operate Controls without Vision**

**Guideline:** Where readily achievable, product input, control and mechanical functions shall be fully operable via at least one mode whose components are locatable, identifiable, and accurately operable without requiring the user to see.

**Rationale:** Individuals with severe visual disabilities or blindness cannot locate or identify controls, latches, input slits etc. by sight or operate controls that require sight.

**Goal:** All individuals, regardless of onset of blindness, will be able to accurately and efficiently operate products without assistance.

**Problems:** Individuals who cannot see must use either touch or sound to locate and identify controls. If a product uses a flat, smooth touch screen or touch membrane, the user without vision will not be able to even locate the controls without auditory or tactile cues. Once the controls have been located, the user must then be able to tell what the functions of the controls are. Finally, they must be able to operate the controls. Individuals who have low vision or are blind cannot accurately operate some types of controls which require vision for use. These include mice, trackballs, dials without markings or stops, and push-button controls with only one physical state, where the only indication of the setting is visual.

**Example Strategies for Making Controls Locatable and Identifiable and for Orienting the User:**

If you use buttons on your product, making them discrete buttons which can be felt allows a person to locate them tactilely. If you are using a flat membrane keyboard, putting a raised edge around the control areas or buttons makes it possible to tactilely locate the keys. Once an individual locates the different controls, they need to identify what they are. If you have a standard number pad arrangement, putting a nib on the "5" key may be all that is necessary for identifying the numbers. On a QWERTY keyboard, putting a tactile nib on the "F" and "J" keys allows a touch typist who is blind to easily locate their hands on the keys. Providing distinct shapes for keys can either indicate their function or make it easy to tell them apart. Providing braille labels for keys and controls allows individuals who know braille to figure out what the controls are for. Providing large raised letters can work for short labels on large objects. Where it is not possible to use raised large letters, you may be able to incorporate a voice mode which announces keys when pressed, but does not activate them. This

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would allow people to turn on the voice mode long enough to explore and locate the item they are interested in, then release the voice mode and press the control. If it is an adjustable control, voice confirmation of the status may also be important.

For connectors, either provide a tactile indication as to the way the plug should be oriented or use orientation-independent or self-orienting plugs. Wireless connection strategies, which eliminate the need to orient or insert connectors, also solves the problem.

Avoiding buttons that are activated when touched will allow an individual to explore the controls in order to find the desired button. If you cannot avoid touch-activated controls (for example, on a touch screen), you can provide an alternate mode where a confirm button is used to confirm selections (for example, items are read when touched, and activated when the confirm button is pressed). It is also a good idea to make all actions reversible, or require confirmation before executing non-reversible actions.

Example Strategies for Creating Controls which can be Used without Vision

Once controls have been located and users know what the functions of the controls are, they must be able to operate the controls. Individuals who have low vision or blindness cannot accurately operate some types of controls which require vision for use. These include mice, track balls, dials without markings or stops, and push-button controls with only one state where the only indication of the position or setting of the control (mouse, pointer, etc.) is visual.

Providing a rotational or linear stop and tactile or audio detents is one strategy that can be used. Another is to provide keyboard or discrete push-button access to the functions. If the product has an audio system and microprocessor, audio feedback of the setting may be used. For simpler devices, tactile markings may be sufficient. Controls can also be shaped in a fashion that they can easily be tactilely read (e.g., a twist knob shaped like a pie wedge). If using keys, particularly keys which do not have any physical travel, some type of audio and tactile feedback should be provided so that the individual

knows when the key has been activated. If the key is a two-state key (on/off), use a key that is physically different (a toggle switch or a push-in/pop-out switch), so the person can tell what state it is in by feeling it.

If you have an optional voice mode for operating the product a simple “query” mode could be provided, which would allow the individual to find out both the function and state of a switch without actually activating it.

In many cases, there may be other design considerations which make the optimal mode of operation for someone who is sighted something which would not be easily operated by someone without vision (e.g., use of a touchscreen or mouse). In this case, the primary strategy may be to provide a closely linked parallel method for efficiently achieving the same results (e.g., keyboard access) if you have keyboard “SpeedList” access for touchscreens, etc.

Compatibility with assistive devices: See also guidelines dealing with compatibility with software and hardware assistive technologies.

## **I-2: Operate with Low Vision without Requiring Audio**

Guideline: Where readily achievable, the product input, control and mechanical functions shall be fully operable via at least one mode which is operable by individuals who have low vision but are not legally blind, which does not rely on audio output.

Note: 20/70 after correction is the beginning of low vision; 20/200 after correction is the beginning of legal blindness; a field of vision of less than 20 degrees after correction also constitutes legal blindness.

Rationale: Individuals with severe visual disabilities often also have severe hearing disabilities (especially older users) and cannot rely on audio access modes commonly used by those who are blind.

Problem/Objective: For individuals who have low vision and who also have hearing impairments or

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who are deaf, many of the auditory strategies used by individuals who are blind cannot be used. Tactile strategies are still quite useful, except for braille which few people with low vision know, especially individuals who are older. The objective here, therefore, is to maximize the number of people who can use their residual vision combined with tactile senses to operate the product. It should be noted, however, that individuals with diabetes who are losing their vision also lose fine tactile sensation in their fingertips, although more pronounced tactile information (e.g., the shape of a large knob or strong tactile detents) can be felt.

Goal: Anyone who has low vision can use products, even if they have no useful hearing.

Example non-auditory strategies for maximizing usability for people with low vision:

Strategies for addressing this guideline basically revolve around making the information on the product easier to see. This includes using high-contrast print symbols and visual indicators, minimizing glare on the display and control surfaces, providing adequate lighting, positioning controls near the items they control to make them easy to find, and using Arabic instead of Roman numerals. The type-face and type-spacing you use can greatly affect legibility and symbols can sometimes be used which are much more legible and understandable than fine print. Where the display is dynamic, an ability to enlarge the visual display can also be used.

In addition to making it easier to see, there are strategies which can be used to reduce the need to see things clearly in order to operate them. A judicious use of color-coding (always redundant with other cues) and following standard conventions and stereotypes can be used to reduce the need to read labels (or read labels more than the first time). In addition, all of the tactile strategies discussed under the previous guideline (I-1) can also be used here.

### **I-3: Operate with Color Perception Problems**

Guideline: Where readily achievable, product input, control, mechanical and display functions shall be fully operable via at least one mode that does not require color perception.

Rationale: Many people have an inability to see or distinguish between certain color combinations. Others are unable to see color at all.

Goal: Anyone who has trouble perceiving color accurately can use products.

Example strategies for maximizing usability by people with color perception anomalies or color blindness:

Strategies for addressing this guideline basically revolve around eliminating the requirement that a person see color to operate the device. This does not eliminate the use of color in any way as long as the information conveyed by the color is also conveyed in some other fashion. In addition, there are a number of things that can be done to allow even individuals with color anomalies to be able to take advantage of the color-coded information. First, there are a number of common pairs of colors that are indistinguishable by people with color perception anomalies. Avoiding these color pairs avoids or reduces the problems for these individuals. In addition, as long as the colors have different hues and intensity, differently colored objects can be distinguished even on a black and white screen by their different appearance. Depending upon the product, the manufacturer may also be able to allow the user to adjust colors to match their preferences and visual abilities. It is generally a good idea to also avoid colors with a low luminance.

### **I-4: Locate, Identify, and Operate Controls without Hearing**

Guideline: Where readily achievable, product input, control and mechanical functions shall be fully operable via at least one mode whose components are locatable, identifiable, and accurately operable without requiring the user to hear.

Rationale: Individuals who are hard of hearing or deaf cannot locate or identify those controls that require hearing.

Problem: Products that provide only audio prompts cannot be controlled by individuals who are deaf or hard of hearing. For example, a voice-based interactive system that can be controlled only by

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listening to menu items and then pressing buttons is not accessible. If the user has to wait for a tone in order to move to the next step in a process, an individual who is deaf or hard of hearing will have difficulty using the product.

Example strategies for dealing with this guideline:

By addressing the output issues under O-4, many accessibility problems that affect input under this guideline can be solved. For example, text versions of audio prompts could be provided (synchronized with the audio so that the timing is the same). If prompts are provided visually (O-4) and no speech or vocalization is required (I-8), most problems under I-4 will be solved.

### **I-5: Low Manipulation Requirement**

**Guideline:** Where readily achievable, product input, control and mechanical functions shall be fully operable via at least one mode that does not require fine motor control or simultaneous actions.

**Rationale:** Individuals with tremor, cerebral palsy, paralysis, arthritis, artificial hands, and other conditions may have difficulty operating systems which require fine motor control, assume a steady hand, or require two hands or fingers for operation.

**Problem:** Individuals may have difficulty manipulating controls on products for any one of a number of reasons. They may have Cerebral Palsy, Parkinson's Disease, or some other neuromuscular condition which reduces the amount of physical control they may have. They may have a spinal cord injury, ALS, or MS which limits their strength or their ability to manipulate objects with their fingers. They may have arthritis which either prevents them from being able to move their joints or which results in great pain. They may have missing limbs or artificial hands which only provide a grasping function but not a twisting or other fine, manipulative motions, or their movements may just be slower, meaning that it will take them longer than average to carry out activities.

**Goal:** Individuals who have tremor, irregular movement, who cannot twist controls, or who can

use only a mouthstick or headstick to control things will be able to operate products.

Some example strategies for creating products that are more usable by individuals with reduced manipulation abilities are provided below, grouped by topic.

Example strategies for dealing with timing and time-outs: See Guideline I-7 Non-time dependent controls.

Example strategies to avoid accidental activation of controls:

Using larger buttons or controls, or buttons which are more widely spaced, is one strategy. Providing guard bars between the buttons or near the buttons so that accidental movements would hit the guard bars can help avoid accidental bumping of switches. An optional mode where buttons must be depressed for a longer period of time (SlowKeys) before they would accept input can also be used to separate between inadvertent motions or bumps and desired activation.

Avoid buttons which are activated when touched or, where that is difficult to do (e.g., with touchscreens) provide a mode where there is a confirm button which an individual can use to confirm that the item they touched is the one they are interested in. It is also a good idea to make all actions reversible and/or to request confirmation before entering into non-reversible actions.

Example strategies to deal with reduced manipulation or grip:

Latches, controls, key combinations, etc. which require simultaneous activation of two or more buttons, latches, etc. (to open, operate, etc.) can be difficult or impossible for individuals to operate who have arthritis or who operate them with a head stick or mouse stick, etc. The same goes for very small controls or controls which require rotation of the wrist or pinch and twist. One strategy would be to avoid these types of controls, another would be to provide alternate means for achieving the same functions.



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Controls which have non-slip surfaces and those that can be operated with the side of the hand, elbow or pencil can be used to minimize physical activity required. In some cases, rotary controls can be used if they can be operated without grasping and twisting (e.g., a thin pie slice shape control or an edge control). Providing a concave top on buttons makes them easier to use with head sticks, mouse sticks and artificial or trembling hands.

Strategies for making it easier to insert cards or connectors include providing a bevel around the slot or connector, using cards or connectors which can be inserted in any orientation or which self-center or self-align. Locating the slot or connector on the front and near a ledge or open space that the individual can use to brace their hand or arm can also increase their ability to either rest or steady their arm/hand and facilitate use of the slot or connector.

Again, on some designs it will be controls which are difficult to manipulate which may be the most efficient, logical or effective mechanism for a majority of users. In this case, alternate strategies for achieving the same functions which do not require that fine manipulation be used could be provided.

Alternate access methods:

Where the optimal technique for users without disabilities involves techniques which would cause problems for people with physical disabilities, provide alternate means for achieving the same functions. One could also support speech input/voice recognition as an alternative input, although it should not be the only input technique (see I-8).

### **I-6: Operate with Limited Reach and Strength**

Guideline: Where readily achievable, product input, control and mechanical functions shall be fully operable via at least one mode that is operable with limited reach or strength.

Rationale: Individuals with spinal cord injuries, ALS, arthritis, MS, MD and other conditions may have difficulty operating systems which require reach or strength.

Example strategies for minimizing reach requirements for products:

The most straight-forward strategy is to place the controls where they can be easily reached with minimal changes to body position. Many products which have controls located on different parts of the product also allow the functions to be controlled from the keyboard, which is located directly in front of the user. Allowing voice recognition to be used as an option also provides input flexibility, but it should never be the only means for achieving a function. Finally, providing a remote control option for a product not only moves all of the controls for the product together on a unit that can be positioned optimally for the individual, but also allows the individual to operate the device without having to move to it. In this case, using a standard communication format would be important to allow the use of alternate remote controls for those who cannot use the standard remote control.

Example strategies for minimizing strength requirements for products:

Basic strategies involve reducing the force needed to operate controls, latches, etc., as well as avoiding the need for sustained pressure or activity (e.g., use guards rather than increased strength requirements to avoid accidental activation of crucial switches). Other strategies involve providing arm or wrist rests or supports, providing shortcuts to reduce the number of actions needed, or completely eliminating the need to operate controls wherever possible by having automatic adjustments. Reducing the need to reach (see above) is also very helpful here.

### **I-7: Non-Time Dependent Controls**

Guideline: Where readily achievable, product input, control and mechanical functions shall be fully operable via at least one mode that does not require a response within a period of time, or where the response time is adjustable over a wide range.

Rationale: Individuals with physical, sensory and cognitive disabilities may not be able to find, read and operate a control quickly.

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Goal: Products can be operated by individuals regardless of how long it takes them to respond.

Example strategies for minimizing response time requirements:

Running out of time is a common problem for people both with and without disabilities. Addressing the problem of individuals with disabilities usually involves just applying and extending the strategies traditionally employed. The easiest solution is to avoid any time-out situations or places where the user must respond to a question or moving display in a set amount of time or at a specific time (e.g., a rotating display). Where timed responses are required or appropriate, allowing the user to adjust them or set them to very high values can be useful. Warning a user that time is running out and allowing them to secure extended time can also be used in many cases. Finally, if the standard mode of operation would be awkward or inefficient, then an alternate mode of operation could be provided which provided these abilities.

### **I-8: No Speech Required**

Guideline: Where readily achievable, product input and control functions shall be fully operable via at least one mode that does not require speech.

Rationale: Many individuals cannot speak or speak clearly either due to physical disability or deafness. Products which require speech in order to operate them, and which do not provide an alternate way to achieve the same function will not be usable by these people.

Example strategies for avoiding speech:

Basically, the way to address this guideline is simply to provide an alternate mechanism for achieving all of the functions which are controlled by speech. If a product includes speech identification or verification, an alternate mechanism for this should be provided as well.

Example strategies to maximize use of speech systems:

It is helpful to try to maximize the number of individuals who can use their speech to control the product even if they have a disability. Almost all of the standard strategies for improving speech recognition reliability will be helpful here. In addition, it is important to include individuals who are deaf or who have dysarthria (speech movement disability) in the subject populations that are used to develop the voice recognition algorithms, so that the algorithms will better accommodate with the speech characteristics exhibited by these groups.

### **I-9: Language and Cognitive Requirements**

Guideline: Where readily achievable, product input, control and mechanical functions shall be fully operable via at least one mode that minimizes the cognitive, memory and learning skills required of the user to operate the product.

Rationale: Many individuals have reduced cognitive abilities either from birth, accident/illness, or aging. These include reduced memory, sequencing, reading, and interpretive skills.

Goal: No one is prevented from using a telecommunication product or feature because they cannot figure out how to operate it.

Example strategies for minimizing language, memory, learning and cognitive skills required:

Most of these strategies in this category are just extensions of techniques for making products easier for everyone to learn and use. Many of these can be found in any human factors design manual, including following conventions, using standard colors and shapes, grouping things together which work together, etc. On devices which have some controls that are used by everybody and other controls which would only be used by advanced users, it is generally good practice to separate the two, putting the more advanced features behind a door or under a separate menu item, etc.

Some of the techniques and strategies listed for providing access for individuals who are blind are also very helpful here. For example, devices which read the contents of the display aloud, controls which will announce their settings or their functions, etc.,

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not only make it possible for people who are blind to figure out the controls and displays, but also make it easier for these products to be used by individuals who have difficulty reading.

Wherever possible, designing products that are self-adjusting helps to eliminate additional controls which must be learned, and reduces the visual clutter. On systems which have sign-in procedures, it is helpful to allow users' settings to be associated with them when they sign in, insert their identification card, etc. The system can then autoconfigure to them. Some new "smart cards" are being designed with user preferences encoded on the card.

Where a complex series of steps is required, some type of cueing might be provided to help lead the person through the process. It is also helpful to provide an "undo" or back up function, so that any mistakes can be easily corrected. Where systems are not reversible, some type of confirmation might be requested.

On labels and instructions, it is helpful to use short and simple phrases or sentences. Abbreviations should be avoided wherever possible. Eliminating the need to respond within a certain time or to read text within a certain time window is also helpful here.

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### **5.3.2 Output, Displays and Feedback**

#### **O-1: Visual Information Available in Auditory Form**

**Guideline:** Where readily achievable, all information (text, static or dynamic images and labels) which is provided visually shall also be available in auditory form.

**Rationale:** Some individuals have difficulty seeing or reading, or cannot see or read.

**Problem:** Individuals with cognitive or language disabilities, as well as individuals with low vision or blindness, are not able to access text which is presented visually, but not available in auditory form.

In addition, people with low vision or blindness are also unable to access information presented graphically or in other visual forms unless it is also presented auditorally. Visual presentations which are purely decorative in nature are not as essential as that information which is needed for understanding and use of the products.

**Goal:** All information is perceivable by all individuals who cannot read or see.

**Example strategies for achieving this objective:**

The most universal way to address this problem is to provide speech output of all text which is presented on the display as well as labels of the product. For information which is presented in non-text form (e.g., a picture or graphic), a verbal description should also be provided, unless it is just decorative in nature. Although most people who are legally blind do not know braille, it is an extremely effective mechanism for those who do: providing braille labels for controls, for example. Large raised print can also be used but is generally restricted to rather large objects due to the size of the letters.

When speech output is provided, there could be a mechanism to allow for the spoken message to be repeated if the message is very long. A message for stepping through them is helpful.

#### **O-2: Make Visual Information Accessible by People with Low Vision without Requiring Audio**

**Guideline:** Where readily achievable, all information which is provided through a visual display including text and dynamic images, labels or incidental operating cues shall be perceivable via at least one mode by individuals who have low vision but are not blind, without requiring audio presentation.

**Rationale:** Individuals with severe visual disabilities often also have severe hearing disabilities (especially older users) and cannot rely on audio access modes used by those who are blind.

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Goal: All people who have low vision but are not legally blind can use their vision to access visually presented information on a product.

Example strategies for achieving this goal:

Strategies for achieving this guideline generally revolve around providing larger, higher contrast print and graphics. Individuals with 20/200 vision can see lettering if they get close to it, unless it is very small or very poor contrast. Although 14 or 18 point type is recommended, it is usually not possible to put this size print on small devices. Making the lettering as large and high contrast as possible, however, will maximize the number of people who are able to use the product. On displays where the font size could be varied, allowing the user to increase the font size is helpful, even if it means that the user must pan or step around the display in order to see the full display.

### **O-3: Perceive Moving Text**

Guideline: Where readily achievable, text which is presented in a moving fashion will also be available via at least one mode in a static presentation mode at the option of the user.

Rationale: Moving text can be an access problem because individuals with low vision, physical or sensorimotor disabilities find it difficult or impossible to track moving text with their eyes.

Example strategies for achieving this guideline:

Strategies here usually involve some mechanism for freezing the text. A "Times Square" display which provides a line at a time would be one example. Allowing the user to freeze the text to read it would be another strategy. A third approach might be simply to provide the same information in another type of display which does not move.

### **O-4: Visual and/or Tactile Availability of Auditory Information**

Guideline: Where readily achievable, all information which is provided auditorially, including those incidental operating sounds and speech, which are important for use of the product, shall be

available via at least one mode in appropriate visual form and/or where appropriate in tactile form.

Rationale: Individuals who have difficulty hearing or who are unable to hear the product are unable to hear auditory output or to hear mechanical and other sounds that are emitted by a device which may be needed for its safe or effective operation

Goal: Information which is presented auditorially is available to all users, even if they cannot hear.

Example strategies for achieving this guideline are provided below by topic.

Alerting and status functions:

To alert the user to a call, page, or other message, or to warn the user, a visual or tactile signal that will attract the person's attention can be used. In portable devices, a tactile signal such as vibration is often more effective than a visual signal for this purpose because a visual signal may easily be missed. A remote vibrating signaler is a promising solution if it is not readily achievable or effective to build vibration into a portable device. For stationary devices, a prominent visual indication in the field of vision (e.g., a screen flash for a computer user, a flashing light for a phone user) is effective.

Text presentation:

To inform the user of the status of a process (e.g., line status on a phone call, power on, saving to disk, disconnected), text messages may be used. It is also desirable to have an image or light that is activated whenever acoustic energy is present on a telephone line.

Speech messages can be made accessible if portrayed simultaneously in text form (as standard or optional mode) and displayed where easily seen by the user. Such captions should usually be verbatim and displayed long enough to be easily read. If the equipment provides speech messages and the user must respond to those messages (e.g., interactive voice response and voice mail), a text-telephone-accessible method of accessing the system could be provided. If the system provides interactive communication using speech and video, it would be

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helpful to provide a method and channel for allowing non-speech communication (e.g., text conversation) in parallel with the video.

Certain operations of equipment make sounds that give status information, although these sounds are not programmed signals. Examples include the whir of an operating disk drive and the click of a key being pushed. Where sounds of this type provide information important for operating the device, they should be made visually accessible by use of a light or other visual confirmation of activation.

Voice interaction:

If equipment uses voice or speech messages to which the user must respond (e.g., voice mail, interactive voice response, etc.), a TTY-accessible method for using the system could also be provided. If the system provides interactive communication using speech and video, a mechanism for allowing non-speech communication in parallel with the video could be provided.

#### **O-5: Make Auditory Information Accessible by People Who are Hard of Hearing without Requiring Vision**

Guideline: Where readily achievable, all information which is provided auditorially, including incidental operating sounds, which is important for use of the product, shall be available via at least one mode in enhanced auditory fashion (for example, increased amplification, or reduction of background noise).

Rationale: Individuals who have difficulty hearing but are not deaf find it much easier to use their hearing than to have to rely on access strategies used by people who are deaf.

Goal: All people who are hard of hearing but not deaf can use their hearing to access auditorially presented information on a product.

CLOSELY RELATED GUIDELINES: See also C-2 and C-3 which deal with hearing aid compatibility.

Example strategies for addressing this guideline:

Strategies for addressing this guideline include improving the signal to noise ratio by making the volume adjustable, increasing the maximum undistorted volume, and minimizing background noise by such methods as better coupling between the signal source and the user.

Alerting tones are most likely to be heard if they involve multiple tones separated in frequency which contrast with the environment. Occasionally, varying tones may be preferred for attracting attention.

If speech is used, it is best to test its intelligibility with individuals who are hard of hearing to maximize its clarity and ease of understanding to this population group. Again, the ability for the user to have any messages repeated or to repeat the message if no response is received from the user is helpful. For essential auditory information, the information might be repeated and an acknowledgment from the user requested.

The intelligibility of the output can also be maximized by the location of the speakers and by keeping them away from noise sources. However, visual displays are often more desirable than loud prompts or alerts, because the latter reduce privacy and can annoy others unless the amplified signal is isolated by means of a headphone, induction coupling, direct plug-in to a hearing aid, or other methods. (See strategies under O-4.) The use of a telephone handset or earcup which can be held up to the ear can improve intelligibility without disturbing others in the area. If a handset or ear cup is used, making it compatible with a hearing aid (T-coil) allows the user to directly couple the auditory signal to their hearing aids. If the microphone in the handset is not being used, turning it off will also reduce the amount of background noise which the person hears in the earpiece. Providing a headphone jack also allows individuals to plug in headphones, induction loops, or amplifiers which they may use to hear better.

#### **O-6: Prevention of Visually-Induced Seizures**

Guideline: Where readily achievable, visual displays shall be designed so as to avoid high

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probability of triggering a seizure in an individual with photo-sensitive epilepsy.

Rationale: Individuals with photo-sensitive epilepsy can have a seizure triggered by displays which flicker or flash, particularly if the flash has a high intensity and is within certain frequency ranges.

Examples of strategies for achieving this guideline:

Strategies here will revolve around reducing or eliminating screen flicker or image flashing. In particular, the 10-30 hertz range is the most sensitive frequency range, and should be avoided. The chance of triggering seizures can also be reduced by avoiding very bright flashes which occupy a large part of the visual field (particularly in the center of the visual field) in order to minimize the impact on the visual cortex.

### **O-7: Prevention of Sound-Induced Seizures**

Guideline: Where readily achievable, sound displays shall be designed so as to avoid audio behaviors that create a high probability of a seizure in an individual with sound-induced epilepsy.

Rationale: Individuals with sound-induced epilepsy can have a seizure triggered by audio output.

Examples of strategies for achieving this guideline:

Strategies here revolve around avoiding sudden or rapidly repeating and loud sounds.

### **O-8: Audio Cutoff**

Guideline: Where readily achievable, products which use audio output access modes, shall have a headphone jack or personal listening device (e.g., phone-like handset or earcup) which cuts off the speaker when used.

Rationale: Individuals using the audio access mode, as well as those using a device with the volume turned up, need a way to limit the range of audio broadcasts.

Example strategies for achieving this guideline:

If an audio headphone jack is provided, a cut-off switch can be included in the jack so that insertion of the jack would cut off the speaker. If a telephone-like handset is used, the external speakers can be turned off when the handset is removed from the cradle.

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## **5.3.3. Documentation**

### **D-1: Ability to Access Product Documentation and Related On-Line Information**

Guideline: Documentation (printed, on-line or tutorial, including promotional materials) shall be accessible to and usable by individuals with all disabilities or alternate formats shall be available.

Rationale: People who have disabilities often are unable to use standard printed documentation if they cannot see, documentation that is presented on screen in small fonts if they have poor vision, documentation that presents important information auditorially if they are deaf, etc.

Example strategies for achieving this guideline:

Strategies for addressing this guideline fall into two categories. Making the standard documentation as accessible as possible and providing alternate formats.

There are a number of strategies for making print easier to read. These include using larger type size, high contrast between lettering and background, and not printing text over patterned backgrounds. Materials that can be copied in black and white are easier for users to enlarge using copier machines. Controlling the language level and keeping the document as easy to read as possible is also important.

Manuals which are spiral bound or bound so that they can lie flat are easier for people with physical disabilities to use. Tabs are also helpful.

Electronic manuals and on-line help have the advantage that they can be easily presented in either

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visual or auditory form (via speech synthesizer), and can also be more easily electronically enlarged. In order for this to work however, all information must be available in electronic text form. Any information that is presented in graphic form would also need to be presented in the text or the graphics would have to be described. Any text which is presented as a graphic and cannot be saved as ASCII or is not written to the screen using the standard system text drawing tools would not be accessible to the screen reader/voice synthesizer.

Alternate forms for print documentation include braille, audio tape, and enlarged printed documentation (14 to 18 point). Videotapes can be captioned (either open or closed captioned) to make them accessible by those who are hard of hearing or deaf. Adding video description can make many of them accessible to people who have low vision or blindness. The most universal form of alternate documentation is the ASCII text file. However, it is only usable by those who have a computer which may or may not fit the consumer profile for a product.

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### 5.3.4. Compatibility Guidelines

#### **C-1: External Electronic Access to All Information and Control Mechanisms**

Guideline: Where readily achievable:

1. All information needed for the operation of a product (including output, alerts, labels, on-line help, and documentation) shall be available in a standard electronic text format on a cross-industry standard port;
2. All input to and control of a product shall allow for real time operation via electronic text input into a cross-industry standard external port and in cross-industry standard format; and
3. The port used for 1 and 2 shall not require manipulation of a connector by the user.

Rationale: Some individuals with severe or multiple disabilities are unable to use the built-in displays and control mechanisms on a product.

Example strategies for achieving this guideline:

The two most common forms of manipulation-free connections are an infrared connection or an RF connection point. At the present time, the IrDA infrared connection point is the most universally used approach.

At the present time, a cross-industry standard for alternative control and display does not exist. A standard protocol is under development. A cross-industry standards effort is required in order to provide a common reference point that both CPE and SCPE manufacturers can work toward.

#### **C-2: Connection Point for External Audio Processing Devices**

Guideline: Where readily achievable, products providing auditory output shall provide the auditory signal via an industry standard connector and signal level.

Rationale: Individuals using amplifiers, audio couplers, and other audio processing devices need a place to tap into the audio generated by the product in a standard way.

Problem: Individuals who cannot hear well can often use the products if they can isolate and enhance the audio output. For example, they could plug in a headphone which makes the audio louder and helps shut out background noise; they might feed the signal through an amplifier to make it louder, or through filters or frequency shifters to make it better fit their audio profile. If they are wearing a hearing aid, they may directly connect their hearing aid to the audio signal or plug in a small audio loop which allows them to couple the audio signal through their hearing aid's built-in T-coil. Devices which can process the information and provide visual and/or tactile output are also possible.

Example strategies for achieving this guideline:

The most common strategy for achieving this objective is the use of a standard miniature plug-in jack. For small products, a subminiature phone jack could be used.

This is an area where on-going coordination between manufacturers of CPE and manufacturers of

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assistive technology would be important, to ensure that changes in technology are addressed by standards.

### **C-3: Hearing Aid Coupling**

**Guideline:** Where readily achievable, products providing auditory output via an audio transducer which is normally held up to the ear shall provide a means for effective wireless coupling to hearing aids.

**Rationale:** Individuals who are hard of hearing use hearing aids with a T-coil feature to allow them to listen to audio output of products without picking up background noise and to avoid problems with feedback, signal attenuation or degradation.

Example strategies for achieving this guideline:

The Hearing Aid Compatibility (HAC) Act defines a telephone as hearing aid compatible if it provides internal means for effective use with hearing aids that are designed to be compatible with telephones which meet established technical standards for hearing aid compatibility.

The technical standards for the HAC telephones are specified in two documents, ANSI/EIA-504-1989, "Magnetic Field Intensity Criteria for Telephone Compatibility with Hearing Aids," and ANSI/TIA/EIA-504-1-1994, "An Addendum to EIA-504," which adds the HAC requirements.

A good strategy for addressing this guideline for any product held up to the ear would be to meet these same technical requirements.

If not readily achievable to provide built-in telecoil compatibility, an accessory or other means of providing the electro-magnetic signal is the next strategy to be considered. Alternate methods of internal coupling, not yet identified, are also encouraged, and these should be developed in concert with the hearing aid industry and individuals who are hard of hearing.

### **C-4: Non-Interference with Hearing Technologies**

**Guideline:** Where readily achievable, products shall not cause interference with hearing technologies (including hearing aids, cochlear implants, and assistive listening devices) which are used by a product user or bystanders.

**Rationale:** Individuals who are hard of hearing use hearing aids and other assistive listening devices, but they cannot be used if products introduce noise into the listening aids because of stray electromagnetic interference.

Example strategies for achieving this guideline:

Strategies for reducing interference (as well as improving hearing aid immunity) are being researched. The most desirable strategy is to avoid the root causes of interference when telecommunications equipment is initially designed. The industry should work toward transmission and channel-sharing technologies that do not generate interference, and should test new technologies for possible interference with assistive technologies.

If the root sources of interference cannot readily be removed, then shielding, placement of components to avoid hearing aid interference, and field-canceling techniques are among those that may be effective.

The ongoing work of ANSI C-63, which is working toward improvements in usability of certain phones by wearers of hearing aids, should be monitored and incorporated if a standard is adopted.

### **C-5: Prosthetic Compatibility of Controls**

**Guideline:** Where readily achievable, touchscreen and touch-operated controls shall be able to be activated without requiring body contact or close body proximity.

**Rationale:** Individuals who have artificial hands or use headsticks or mouthsticks to operate products have difficulty with capacitive or heat-operated controls which require contact with a person's body rather than a tool.

**Problem:** Individuals who wear prosthetics are unable to operate some types of products because



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they either require motions that cannot easily be made with a prosthetic hand, or because products are designed which require touch of the human skin to operate them (e.g., capacitive touchscreen kiosks), making it impossible for individuals with artificial arms or hands to operate the kiosks, except perhaps with their nose or chin. Some individuals who do not have the use of their arms use either a headstick or a mouthstick to operate products.

Example strategies for achieving this guideline:

Avoid controls and mechanisms which require a grasping and twisting motion. Use controls and sensors which can be activated with a mechanical device.

### **C-6: Text Telephone Connectability**

Guideline: Where readily achievable, products which provide a function allowing voice communication and which do not themselves provide a text telephone functionality shall provide a standard non-acoustic connection point for text telephones. It shall also be possible for the user to easily turn any acoustic pickup on the product on and off to allow the user who can talk to intermix speech (live microphone) with text telephone use.

Rationale: Individuals who use TTYs to communicate using text over telephones must have some non-acoustic way to connect TTYs to telephones to get clear TTY connections. Acoustic coupling is subject to interference from ambient noise, as many hand sets do not provide an adequate seal with TTYs. Therefore, alternate (non-acoustic) connections are needed. Control of the microphone is needed for situations such as pay-phone usage, where ambient noise picked up by the mouthpiece often garbles the signal (user needs to be able to mute the handset microphone). Some users of TTYs cannot hear and use the TTY to receive communication but can talk and use speech for outgoing communication. The microphone on/off switch on the telephone should therefore be easy to flip back and forth or have a push-to-talk mode available.

Goal: A text telephone can be connected to and used with any telecommunications product

supporting speech communication without requiring purchase of a special adapter, and the user is able to intermix speech and clear text telephone communication.

Example strategies for implementing this guideline:

The most common approach today is to provide an RJ-11 jack. On very small products, where there may not be room for this large jack, a miniature or subminiature phone-jack wired as a "headset" jack (with both speaker and microphone connections) could be used as an alternate approach. In either case, a mechanism for turning the phone mouthpiece (microphone) on and off would reduce garbling in noisy environments, while allowing the user to speak into the microphone when desired (to conduct conversations with mixed voice and text telephone).

Note: For equipment that combines voice communications, screens, keyboards and data communication functions, it is desirable to build in text telephone capability for direct access to voice communications channels.

### **C-7: Text Telephone Signal Compatibility**

Guideline: Where readily achievable, products providing voice communication functionality shall be able to support use of all cross-manufacturer non-proprietary standard signals used by telecommunication devices designed for use by or with people who are deaf, hard of hearing or have speech impairments.

Rationale: Some telecommunication systems, which have been developed and released, compress

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the audio signal in such a manner that standard signals used by text telephones are distorted or attenuated, preventing successful text telephone communication over the systems.

Goal: A text telephone can be used with any product providing voice communication function.

Example solution strategies for achieving this guideline:

The *de facto* standard of domestic text telephones is Baudot, which has been defined in ITU Recommendation V.18. This guideline can be addressed by ensuring that the tones used can travel through the phone's compression circuits undistorted. It is even more desirable to provide undistorted connectivity to the telephone line in the frequency range of 390 Hz to 2300 Hz (ITU-T Recommendation V.18), as this range covers all of the text telephone protocols known throughout the world.

An alternate strategy might be to recognize the tones, transmit them as codes, and resynthesize them at the far end.

In addition, as noted above, it should be possible for individuals using TTYs to conduct conversations with mixed voice and TTY, and to control all aspects of the product/system and receive any messages generated by the product/system.

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## APPENDIX D

### ARCHITECTURAL AND TRANSPORTATION BARRIERS COMPLIANCE BOARD

#### Telecommunications Act Accessibility Guidelines for Customer Premises Equipment and Telecommunications Equipment

**AGENCY:** Architectural and Transportation Barriers Compliance Board.

**ACTION:** Notice of intent to establish advisory committee.

**SUMMARY:** The Architectural and Transportation Barriers Compliance Board (Access Board) announces its intent to establish a Telecommunications Access Advisory Committee (Committee) to develop accessibility guidelines under the Telecommunications Act of 1996 and requests applications from interested organizations for representatives to serve on the Committee. The Committee will make recommendations to the Access Board on accessibility guidelines for telecommunications equipment and customer premises equipment.

**DATES:** Applications should be received by April 27, 1996.

**ADDRESSES:** Applications should be sent to the Office of Technical and Information Services, Architectural and Transportation Barriers Compliance Board, 1331 F Street, NW., suite 1000, Washington, D.C. 20004-1111. Fax number (202) 272-5447. Applications may also be sent via electronic mail to the Access Board at the following address: [cannon@access-board.gov](mailto:cannon@access-board.gov).

**FOR FURTHER INFORMATION CONTACT:** Dennis Cannon, Office of Technical and Information Services, Architectural and Transportation Barriers Compliance Board, 1331 F Street, NW., suite 1000, Washington, D.C. 20004-1111. Telephone number (202) 272-5434 extension 35 (Voice); (202) 272-5449 (TTY). Electronic mail address: [cannon@access-board.gov](mailto:cannon@access-board.gov). This document is

available in alternate formats (cassette tape, braille, large print, or computer disc) upon request.

**SUPPLEMENTARY INFORMATION:** On February 8, 1996, the President signed the Telecommunications Act of 1996. The Architectural and Transportation Barriers Compliance Board (Access Board) is responsible for developing accessibility guidelines in conjunction with the Federal Communications Commission under section 255 (e) of the Act for telecommunications equipment and customer premises equipment.<sup>1</sup>

The term "telecommunications equipment" is defined as equipment, other than customer premises equipment, used by a carrier to provide telecommunications services, and includes software integral to such equipment (including upgrades). P.L. 104-104, sec. 3 (a)(2)(50). The term "customer premises equipment" is defined as equipment employed on the premises of a person (other than a carrier) to originate, route, or terminate telecommunications. P.L. 104-104, sec. 3 (a)(2)(38).

The Telecommunications Act requires the accessibility guidelines to be issued within 18 months after the date of enactment. The Board is also required to review and update the guidelines periodically. The Board's guidelines for telecommunications equipment and customer

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<sup>1</sup> The Access Board is an independent Federal agency established by section 502 of the Rehabilitation Act of 1973, as amended, whose primary mission is to promote accessibility for individuals with disabilities. The Access Board consists of 25 members. Thirteen are appointed by the President from among the public, a majority of who are required to be individuals with disabilities. The other twelve are heads of the following Federal agencies or their designees whose positions are Executive Level IV or above: The Departments of Health and Human Services, Education, Transportation, Housing and Urban Development, Labor, Interior, Defense, Justice, Veterans Affairs, and Commerce; General Services Administration; and United States Postal Services.

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premises equipment are required to principally address the access needs of individuals with disabilities affecting hearing, vision, movement, manipulation, speech, and interpretation of information.

The Senate report to the Telecommunications Act directs the Board to develop its guidelines by involving parties affected by the law. "The Committee expects that manufacturers of equipment and providers of service will be fully included in this process." S. Rept. 104-23, at 53. Throughout the process of developing its guidelines, the Access Board, in conjunction with the Federal Communications Commission, intends to coordinate and consult with representatives of individuals with disabilities and interested telecommunications equipment and service providers to ensure that their concerns and interests are given full consideration in the rulemaking process.

The Access Board will begin the process of developing the accessibility guidelines by establishing a Telecommunications Access Advisory Committee. The establishment of the Committee is in the public interest and will support the agency in performing its duties and responsibilities under the Telecommunications Act of 1996. The Access Board believes that the Committee will facilitate the involvement of individuals with disabilities and telecommunications equipment and service providers in the development of the guidelines.

The Committee will make recommendations to the Access Board on issues such as:

- types of equipment to be covered by the guidelines;
- barriers to the use of such equipment by persons with disabilities affecting hearing, vision, movement, manipulation, speech, and interpretation of information;
- solutions to such barriers, if known, categorized by disability (different solutions may be needed for different disabilities) and research on such barriers; and
- contents of the guidelines.

The Committee will be expected to present a report with its recommendations to the Access Board within six months of the Committee's first meeting.

The Access Board requests applications from organizations representing the following interests for membership on the Committee:

- manufacturers of telecommunications equipment and customer premises equipment;
- manufacturers and developers of peripheral devices or specialized customer premises equipment commonly used by individuals with disabilities to achieve access;
- organizations representing the access needs of individuals with disabilities affecting hearing, vision, movement, manipulation, speech, and interpretation of information;
- telecommunications providers and carriers;
- developers of telecommunications software; and
- other persons affected by these accessibility guidelines.

The number of Committee members will be limited to effectively accomplish the Committee's work and will be balanced in terms of interests represented. Organizations with similar interests are encouraged to nominate a single organization to represent their interest. Although the Committee will be limited in size, there will be opportunities for the public to present written information to the Committee, participate through the Internet and to comment at Committee meetings.

Applications should be sent to the Access Board at the address listed at the beginning of this notice. The application should include a statement of the organization's interests and the name, title, address and telephone number of the person who would represent the organization on the Committee. The application should also describe the person's qualifications, including any experience the person has had with making telecommunications equipment and customer premises equipment accessible to individuals with disabilities.

Committee members will not be compensated for their service. The Access Board may pay travel expenses for a limited number of persons who would otherwise be unable to participate on the Committee. Committee members will serve as representatives of their organizations, not as individuals. They will not be considered special government employees and

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will not be required to file confidential financial disclosure reports.

After the applications have been reviewed, the Access Board will publish a notice in the **Federal Register** announcing the appointment of Committee members and the first meeting of the Committee. The first meeting of the Committee is tentatively scheduled

for June 10-12, 1996 in Washington, D.C. The Committee will operate in accordance with the Federal Advisory Committee Act, 5 U.S.C. app 2. Committee meetings will be held in Washington, D.C. Each meeting will be open to the public. A notice of each meeting will be published in the **Federal Register** at least fifteen days in advance of the meeting. Records will be kept of each meeting and made available for public inspection.

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Judith E. Heumann,  
Chairman, U.S. Architectural and Transportation  
Barriers Compliance Board.



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**ARCHITECTURAL AND TRANSPORTATION  
BARRIERS COMPLIANCE BOARD**

**Telecommunications Act Accessibility Guidelines  
for Telecommunications Equipment and  
Customer Premises Equipment**

**AGENCY:** Architectural and Transportation  
Barriers Compliance Board.

**ACTION:** Notice of appointment of advisory  
committee members and notice of first meeting.

**SUMMARY:** The Architectural and  
Transportation Barriers Compliance Board (Access  
Board) is announcing the appointment of members to  
its Telecommunications Access Advisory Committee  
(Committee). The Committee will make  
recommendations to the Access Board on  
accessibility guidelines for telecommunications  
equipment and customer premises equipment. These  
recommendations will be used by the Access Board  
to develop accessibility guidelines under section 255  
(e) of the Telecommunications Act of 1996. The  
Committee is composed of representatives of  
manufacturers of telecommunications equipment  
and customer premises equipment; organizations  
representing the access needs of individuals with  
disabilities; telecommunications providers and  
carriers; and other persons affected by the guidelines.  
This notice also announces the time and place of the  
first Committee meeting, which will be open to the  
public.

**DATES:** The first meeting of the Committee is  
scheduled for Wednesday, June 12, 1996 through  
Friday, June 14, 1996, beginning at 9:30 a.m. each  
day. Decisions with respect to future meetings will  
be made at the first meeting and from time to time  
thereafter. Notices of future meetings will be  
published in the **Federal Register**.

**ADDRESSES:** The first meeting of the Committee  
will be held at the American Speech-Language and  
Hearing Association offices, 10801 Rockville Pike,  
Rockville, MD 20852. Persons attending the  
meetings are strongly encouraged to use public  
transportation since parking is extremely limited.  
The American Speech-Language and Hearing  
Association offices are located north of the

Grosvenor Metro subway station. Persons who must  
drive should call Dennis Cannon at the Access  
Board. The facility is accessible to individuals with  
disabilities. Sign language interpreters, assistive  
listening systems and real time transcription will be  
available. Subsequent meetings will be held at  
locations to be announced.

**FOR FURTHER INFORMATION CONTACT:**  
Dennis Cannon, Office of Technical and Information  
Services, Architectural and Transportation Barriers  
Compliance Board, 1331 F Street, NW., suite 1000,  
Washington, D.C. 20004-1111. Telephone number  
(202) 272-5434 extension 35 (Voice); (202) 272-  
5449 (TTY). Electronic mail address:  
cannon@access-board.gov. This document is  
available in alternate formats (cassette tape, braille,  
large print, or computer disc) upon request.

**SUPPLEMENTARY INFORMATION:** On  
March 28, 1996, the Access Board published a  
notice of intent to establish an advisory committee to  
make recommendations to the Access Board on  
accessibility guidelines for telecommunications  
equipment and customer premises equipment. 61 FR  
13813 (March 28, 1996). Under section 255 (e)  
of the Telecommunications Act of 1996, the Access  
Board is responsible for developing these guidelines,  
in conjunction with the Federal Communications  
Commission. The notice requested nominations for  
membership on the Committee from manufacturers  
of telecommunications equipment and customer  
premises equipment; manufacturers and developers  
of peripheral devices or specialized customer  
premises equipment commonly used by individuals  
with disabilities to achieve access; organizations  
representing the access needs of individuals with  
disabilities affecting hearing, vision, movement,  
manipulation, speech, and interpretation of  
information; telecommunications providers and  
carriers; developers of telecommunications software;  
and other persons affected by these accessibility  
guidelines.

Over 60 nominations were submitted. For the  
reasons stated in the notice of intent, the Access  
Board has determined that establishing the  
Committee is necessary and in the public interest.  
The Access Board has appointed members to the  
Committee from the following organizations:

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AT&T  
American Council of the Blind  
American Foundation for the Blind  
Arkenstone  
Broad Alliance for Multimedia Technology and Applications  
Cellular Telecommunications Industry Association  
Consumer Action Network  
Consumer Electronics Manufacturers Association  
The Council of Organizational Representatives  
Deaf and Disabled Telecommunications Program  
Digital Equipment Corporation  
The Ericsson Corporation  
Gallaudet University  
Inclusive Technologies  
Lucent Technologies  
Massachusetts Assistive Technology Partnership  
NCR  
National Association for State Relay Administration  
National Federation of the Blind  
Northern Telecom  
NYNEX Corporation  
Pacific Bell  
Pennsylvania Citizens Consumer Council  
Personal Communications Industry Association  
RESNA  
Self Help for Hard of Hearing People, Inc.  
Siemens Rolm Communications, Inc.  
Telecommunications Industry Association  
Trace Research and Development Center  
United Cerebral Palsy Associations, Inc.  
U.S. Society for Augmentative and Alternative Communication  
United States Telephone Association  
World Institute on Disability

The Access Board regrets being unable to accommodate all requests for membership on the Committee. There were several factors which were important in the Access Board's decision not to add more members. In order to keep the Committee to a size that can be effective, it is necessary to limit membership. It is also desirable to have balance among members of the Committee representing different clusters of interest, such as disability organizations and the telecommunications industry. In addition, it is not essential that every concerned organization is represented, so long as every interest is represented by an appropriate organization. The Committee membership identified above provides representation for each interest affected by issues to be discussed.

Committee meetings will be open to the public and interested persons can attend the meetings and communicate their views. Members of the public will have an opportunity to address the Committee on issues of interest to them and the Committee. Members of groups or individuals who are not members of the Committee may also have the opportunity to participate with subcommittees of the Committee. The Access Board believes that participation of this kind can be very valuable for the advisory committee process. Additionally, all interested persons will have the opportunity to comment when the proposed accessibility guidelines for telecommunications equipment and customer premises equipment are issued in the **Federal Register** by the Access Board.

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Judith E. Heumann,  
Chairman, U.S. Architectural and Transportation  
Barriers Compliance Board.