Introduction

Emerging and innovative advances in technology are now making it easier and more affordable for individuals coping with hearing loss to lead a full and productive life. This Informed Consumer Guide focuses on those products that significantly improve a hearing impaired person's ability to recognize and respond to environmental sounds, engage in face-to-face and telephone communication, and enjoy music and television. For the purposes of this Guide, products are divided into three categories: those developed primarily to help people who are deaf, those designed to be used by people who are hard of hearing, and those created specifically for people who are deaf and blind.

Deafness and Hard of Hearing: Some Definitions

Frequently, the term "deaf" is mistakenly used in reference to people with a wide range of hearing disabilities. Here are a few definitions of terms that refer to various degrees and types of hearing loss.

Profound Deafness: *"refers to a hearing loss greater than 90 decibels (dB)." People are considered "deaf" if they are unable to hear or understand speech and must rely on vision for communication.*

Late Deafened: *"refers to people who lose their hearing later in life and are deaf."*

Pre-lingual Deafness: *"refers to deafness acquired before the development of speech."*

Post-lingual Deafness: *"refers to deafness acquired after the development of speech."*

Hard of Hearing: *"refers to a hearing loss from 25 dB (mild loss) to 90dB (severe loss)." An individual with this degree of loss frequently communicates using a combination of strategies that rely on residual auditory ability enhanced by a hearing aid or assistive listening device and often supplemented through lip-reading or other visual means.*

Deaf and Blind: "*refers to people who are unable to hear because of a defect, disease, or dysfunction of the ear, the vestibulocochlear nerve, or the brain and who have a central visual acuity of 20/200 or less in the better eye with corrective lenses or visual field restriction of 20 degrees or less or a progressive vision loss having a diagnosis leading to either one of these conditions."*

(Dorland's Illustrated Medical Dictionary 26th Edition. *Philadelphia: W. B. Saunders Company, 1981, p.605-606.*)

A Brief Overview of the Americans with Disabilities Act

In recent years, accessibility to assistive technology has increased immensely as a result of legislation and a growing awareness of disabilities in general. The most significant piece of legislation addressing the civil rights of people with disabilities is the Americans with Disabilities Act of 1990 (ADA). Briefly stated, Title I of the ADA makes it illegal for private and public employers to discriminate in the hiring process or in the workplace against qualified people with disabilities, and calls on employers to ensure "reasonable accommodation" for employees with disabilities. Accommodation is required unless the change would impose an undue financial hardship on the employer. As set forth in Title I of the ADA, any impairment that "substantially limits" the hearing and vision of an individual would satisfy the legal definition of a disability. A person who has a hearing disability or a hearing disability and blindness is therefore eligible for full protection against discrimination by an employer or service provider. Title II of the ADA prohibits state and local governments from discriminating against qualified individuals with disabilities and establishes standards to ensure that all government communications, facilities, and services are accessible. Title III addresses the need for fair and equal public accommodations for people with disabilities. In accordance with the law, a speech disabled, deaf, or deaf-blind person should never be denied access to goods, services, facilities, privileges, or advantages in a public place solely because of their disability. Finally, and perhaps most importantly, Title IV mandates that interstate and intrastate telecommunications relay services be made available to people with hearing or speech disabilities. The services provided through the telecommunications mandates enable individuals who are deaf or deaf-blind to have greater access to telephone communication and to communicate in a manner that is functionally equal to that of a hearing individual.

Finding the Appropriate Solution

The precise needs of people who are hard of hearing, deaf, or deaf-blind vary greatly with the individual. Someone who is hard of hearing, for example, often benefits tremendously from wearing a hearing aid; a profoundly deaf or deaf-blind person rarely receives any benefit from using such a device. Therefore, it is important to bear in mind that decisions about the purchase of assistive technology should be made carefully, with the full participation of the intended user. Clear communication between the user and service provider greatly enhances the likelihood of success in finding a solution that maximizes the user's productivity.

Technology to Assist People Who Are Deaf

Numerous tools exist to enable people who are deaf to function independently in daily life. Generally, these assistive devices and services fall into three categories: assistive devices to enhance face-to-face communication and personal enjoyment of television and radio; devices to improve telephone communication; and technology to provide greater awareness and recognition of environmental sounds and situations. Among the most common and innovative of these technologies are computer-assisted notetaking and pre-recorded or live captioning; telecommunications devices for the deaf (TDDs), teletext (TT) devices or teletypewriters (TTYs); and various alert systems that trigger a warning device such as a light or a vibrational device (e.g., a bed shaker). Most of them can be utilized in nearly any environment. Some of them can even be customized to meet an individual's specific needs.

Computer-assisted Notetaking and Pre-recorded or Live Captioning

One class of devices designed to aid the deaf in participating in classroom discussions, meetings, and group activities is **computer-assisted or speech recognition technology**. Computer-assisted and live captioning systems require typists or stenographers to type what is being said into the computer using a keyboard or a stenotype machine. Computer and video technology then project the typed words onto television or projection screens for viewing. In the same vane, speech recognition software runs on a high speed computer to convert spoken language into written text. With such software, sign language interpreters can convey complex or technical information for which few or no signs exist. Thus far, this has proven to be very effective in the classroom, especially in courses like chemistry, physics, and engineering. Foreign language recognition programs also make it possible for tpeople with disabilities to master a foreign language even when the interpreter has little or no knowledge of the language.

There are several speech recognition programs currently on the market. Three prominent speech recognition developers are Dragon Systems, IBM, and Kurzweil. **Dragon Dictate** is a voice input program that enables a person to dictate into a microphone that is connected to an audio card in the computer, and the computer then converts the speech into text. Dragon Systems manufactures several versions of this software. Each version enables the user to dictate text and control the computer's operation completly by his/her voice, with different versions allowing for more or less functionality. IBM produces a similar line of software packages called **ViaVoice**. A person simply uses speech to input text and control Window 95/98 and NT based applications. These programs support multiple users on a single system and have a large vocabulary that provides up to 7,000 user-specified words and commands in addition to a 100,000 word backup dictionary. **Kurzweil Voice** also provides for voice activated operation of computers and can be used with any number of applications, including specialized company software. All three recently announced low-priced (under $100.00) versions of their software which include a microphone and a vocabulary of up to 160,000 words. For more information, see the table at the conclusion of this guide.

Telephone Communication Systems

Since the telephone does not provide the user with visual cues, people with profound hearing loss often find it impossible to communicate with others via the phone. For people who cannot use voice telephones, visual telephones allow users to type conversations. Called Telecommunications Devices for the Devices for the Deaf (TDDs), Teletext (TT) devices, or teletypewriters (TTYs), such devices come with many options, including printers, large print displays, announcers, and voice carry over capability. TDDs can work with computers when appropriate hardware and software are used. Interstate and intrastate relay systems have also been mandated by the federal government to allow TDD users to talk to others via standard telephones. Relay systems enable TDD users to communicate with others through a relay systems operator in their area. The operators simply use a standard TDD machine and a telephone to relay messages back and forth between people with hearing and speech difficulties and people without them.

The **Ultratec Miniprint 425** (right) is one of many TDDs with a built-in printer. This model has a 24-character display and a 4-row keyboard with QWERTY layout. The printer prints at a speed of .8 lines per second on thermal paper and a TDD Announcer alerts hearing people to text telephone calls.

The Positron Express (left) functions as a TDD or TT machine when connected to a telephone and as an IBM compatible computer keyboard when connected to a PC. It also has a 4,000 character buffer that can be used to dump text from the

Express keyboard to the PC monitor (to a word editor or word processing program).

For a person with minimal residual auditory ability, products such as the **Ultratec Uniphone 1100** are helpful. They feature hearing aid compatibility and Voice Carry Over ability that allows the caller to use the telephone and TT features during the same call. For example, a person could speak for him or herself on the phone and then use the TT features to receive the other person's response. Or, a person could use the TT to express him or herself and then pick up the phone handset to listen to the other person. For more information on specific products and companies, see the table at the conclusion of this document.

Environmental Alert Devices

For a person who is deaf, simple tasks like answering the doorbell or telephone, doing the laundry, baking a cake, and responding to a fire alarm or the cries of a small child can be extremely challenging. Fortunately, myriad warning and alert devices now exist to make accomplishing these tasks somewhat simpler. Such systems use either microphones or electrical connections to detect the desired signal. The signal triggers a warning device such as a light, a loud horn, or a vibrational device (e.g., vibrating a bed shaker). These devices can alert people to sounds or noises regardless of where they are in their homes or offices. Various alerting devices are also portable and can be used as wake up devices, time reminders, and pagers. In accordance with the ADA, such alerting devices are now required in schools, stores, hotels, theaters, and other public places as well as in places of employment.

Clocks and Wake Up Alarm Systems use a combination of visual, auditory, and tactile stimulation to wake people with hearing disabilities. When connected to a lamp or bed shaker, most models provide the user with the option of waking up to flashing lights, horns, or a gentle shaking. For example, the **Sonic Boom Alarm Clock**, by Sonic Alert, is ideal for even the heaviest of sleepers. It has a built-in outlet for a lamp and an auxiliary jack for a bed vibrator. For someone who travels frequently, **Awake Master II**, by Silent Call, could be useful. It is portable and can be used with either a vibrator or a melody alarm. Hal-Hen's **Deluxe Alarm Clock** has a rear outlet for a lamp, bed vibrator, or strobe light. When the alarm goes off, either a light flashes or a bed vibrator is activated. Users can choose to have the light or vibrator turn on and off or have them stay on when the alarm goes off.

Visual Alert Signalers and Remote Receivers monitor a wide variety of household devices including doorbells, telephones, and smoke detectors. Once a signaler has been activated, a remote receiver picks up the signal and immediately notifies the user (by emitting flashes of light or vibrations) that an alert has been received. Some models should be worn close to the body while others are better suited for tabletop use. Since a diverse array of signalers and receivers is available, it is highly recommended that people consult a healthcare professional before purchasing one. The following products demonstrate some of the options available:

• Ultratec's **Watchman Masters/Receivers** are designed to flash when the doorbell or telephone rings. When an Ultratec remote receiver is linked to an Ultratec signaler, lights throughout an entire house can flash after the signaler is activated.

• Parents with hearing difficulties might also find Sonic Alert's **BC 400**, a baby cry signaler, very useful. This wireless signaler plugs into the outlet closest to where a baby sleeps. When the child cries, the remote receiver is immediately activated. A lamp or bed vibrator can also be plugged into the remote receiver.

• For individuals who are deaf-blind, the **Personal Tactile Signaler** from Harris Communications may be useful. Different vibrating motions and a touch switch notify the user of all the activities monitored by an Alertmaster transmitter. The signaller can be worn on a belt and works up to 80 feet away from the transmitter

• The **Wireless Audio Visual Emergency System (WAVES)**, by MADAH-Com, is a wireless communication system which integrates sight and sound into a single network for simultaneous display providing an accessible public address system. Because the system is wireless and physically portable, receivers can be placed at a number of locations in such places as subways or large buildings, thus ensuring complete coverage of the facility. And because it transmits text as well as audio, simultaneous visual information can be displayed on large LED signs or TV monitors.

Hearing ear dogs, specially trained to alert owners to significant sounds, are also available. They are also an excellent source of protection and have been granted legal status equal to that afforded to seeing eye dogs.

Technology also makes television accessible. Closed Captioning (CC) is the process of encoding the dialogue and sound effects of any program into text form that can be read across the bottom of the screen much like subtitles on foreign movies. **Closed Captioning Decoders** are the devices that then allow a person to view the words of any program that is closed captioned. Many televisions sold today are equipped with closed caption decoders that can be activated by an on-screen menu. On some less expensive models, the decoders are offered as options that cost extra. Decoders are also available as separate, portable units that connect from a VCR to a

television with a standard video cable

As closed captioning has become more common several new features are being offered on CC-equipped televisions and on the portable decoders. Transparent captioning background provide enhanced video quality while not compromising caption display. Another new captioning feature allows a person to freeze captions and then display them on the screen.

When standard captioning decoders are not sufficient because the user does not understand English, some decoders, such as the Mycap Super, are able to decode more than one language. For example, the Super comes with additional character sets to permit correct typography in Spanish, Portuguese, French, German, Italian and several other European languages.

Cochlear Implants

Cochlear implants primarily benefit people with severe to profound nerve deafness that is not helped significantly by conventional hearing aids due to damage to the hair cells in the inner ear. Unlike conventional hearing aids that amplify sound and direct it into the ear canal, the cochlear implant bypasses the ear, transmitting sound directly to the auditory nerve. The implant does not restore normal hearing, and its effectiveness varies with the recipient. Some implant recipients may still be required to lip read in order to understand spoken language.

The cochlear implant consists of two parts, one external, the other internal. The external part consists of a small, directional microphone, a speech processor (a powerful miniaturized computer) and a transmitter. The internal component is a single electrode or electrode array connected to the external portion by a wire. The electrode(s) is implanted under the skin, receives the signal transmitted from the external component, and directs it into the cochlea in the inner ear, directly stimulating the auditory nerve. The auditory nerve transmits these signals to the brain leading to the perception of distinctive sounds.

Auditory Brainstem Implants

The Auditory Brainstem Implant (ABI) uses the same technology as the cochlear implant, but differs in the site where the electrodes are implanted. The ABI's electrodes are placed on the area of the brainstem that ordinarily receives neural impulses from the cochlea through the auditory nerve. Sound is transmitted from an external component similar to that of the cochlear implant to the electrodes, thus stimulating auditory responses in the brain. Although ABIs have not functioned as well auditorally as cochlear implants, they have offered hope to countless individuals with severed or damaged auditory nerves as cochlear implantation is only recommended to people with intact auditory nerves.

Technology for People Who Are Hard of Hearing

Advances in technology have also expanded the range of options for people who are hard of hearing. Numerous aids exist to enable people with diminished hearing capacity to function independently and successfully in their daily lives. In addition to the range of speech recognition, telephone communication, and alert system devices discussed above, various hearing aids, hearing implants, microphone and telephone amplifiers, speech training games and computer software, and speech therapy aids provide access to daily activities.

Assistive Listening Devices

Assistive Listening Devices (ALDs) minimize background noise that can sometimes impede the ability of a hard of hearing person to utilize his/her residual auditory ability and help that person to hear sounds from a source that may be some distance away.

Personal Amplification Systems are designed to be very portable and can be used anywhere, indoors or outdoors. They are great for one-on-one conversations and TV listening. They are particularly helpful in environments where it is difficult

to face the person who is speaking (i.e. in a car). The units are pocket-sized and can be used with earphones, headphones, and neckloops. Some personal amplification systems have the option of adding modules that can be used in other listening environments as receivers for FM, infrared, or loop transmissions. A hardwired remote microphone attached to a small amplifier or a hearing aid can preserve loudness and integrity of the speech signal. ALDs can also be wireless such as infrared, FM, and audioloop systems. With FM and infrared technologies, the receiver is connected to earphones or to a personal hearing aid, if equipped with a telecoil or direct audio input circuit. With an audioloop system, a listener's own hearing aid may be used, provided it has a telecoil. If not, a special telecoil receiver equipped with earphones or built into a hearing aid-like unit may be used if a listener's hearing loss is not too severe.

Infrared Systems transmit sounds by invisible light beams. To be effective, the receiver must be within direct line of sight of the light beam from the transmitter. There is added security in an infrared system because sound cannot "spill over" to other rooms. These systems cannot be used outside because of interference from sunlight. Bright, incandescent light may also cause interference. Infrared systems are perfect for TV listening and small group meetings. Relatively easy to set-up, the transmitters connect directly to TVs, audio output jacks, or microphones.

FM systems transmit sound via radio waves. The speaker wears a compact transmitter and microphone, while the listener uses a portable receiver with headphones or earphones. They are ideal for classroom/meeting use and work well both indoors and outdoors.

Loop systems operate on a principle of electronics called electro magnetics and are easily used by those having hearing

aids equipped with a telecoil circuit. The technology consists of a loop wire that is placed around a listening area. A special amplifier and microphone are used by the primary speaker. Speech signals are amplified and circulated through the loop wire.

Hearing Aids

There are several different types of hearing aids available. People who are hard of hearing should work with a healthcare professional in selecting the type of hearing aid that best suits them.

In the Ear (ITE), In the Canal (ITC) and Completely in the Canal (CIC) hearing aids are self-contained; a miniature microphone, amplifier and speaker inside the instrument amplify sound and carry it directly to the ear canal and auditory system. ITE, ITC and CIC aids are usually custom designed to fit in the user's ear. Here are some factors that may help you in selecting which type is right for you:

ITE: Most appropriate for mild to severe hearing loss; large enough to be easily handled by people with dexterity problems.

ITC: Significantly smaller than ITE aids so users need good dexterity; usually not as powerful as ITE aids; more likely to have feedback problems.

CIC: Least visible type of aid as only a very small portion is visible; sound is directed more naturally, wind noise is lessened, and telephone use is easier.; small size makes good dexterity a necessity in handling these hearing aids; most appropriate for mild to moderate hearing losses.

A Behind the Ear (BTE) hearing aid contains the same three elements (microphone, amplifier and speaker), in a unit worn behind a user's ear, but the speaker sends amplified sound signals to a custom designed mold worn inside the ear which carries the amplified sound to the eardrum. Because the microphone is located further from the receiver, there is less chance of feedback or whistling than with other types of hearing aids. BTE hearing aids are available in a wide range of power levels and colors that can match a user's hair color.

Some hearing aids have directional microphones that are designed to suppress sounds arriving at the listener from any other location but directly in front. This feature is commonly found on BTE aids. The user can control whether to listen in the omni-directional mode (which picks up sound from all directions) or the directional mode (which focuses the microphone on just one direction).

Most hearing aids are powered by small batteries that can be replaced as needed. **"Either Way Okay" (EWOK)** is a circuit within a hearing aid, designed by J. B. Compton, that automatically reverses the polarity if the battery is inserted backwards. This is not a trivial advantage for many people. Hearing aid batteries are so small, and the ridges on the batteries and in the battery compartment so tiny, that people often have difficulty seeing and/or feeling the right position, so they force the battery in however it will go. Not only does the aid not work, but it frequently has to be returned to the dealer or sent back to the factory for repairs. Hearing aids with EWOK are usually able to avoid this problem.

Telephone Communication Systems

Since many telephone signals are not totally intelligible to people with hearing loss, modular and portable telephone amplifiers are available for use with or without a hearing aid. Some ALDs enable use of both ears with a telephone, often improving word clarity. Amplifiers for telephone answering systems are also available.

Amplified telephones enable people with varying degrees of hearing loss to use standard telephones because spoken words are made clearer and louder. For example, individuals with high-frequency hearing loss cannot hear sounds like "st" and "ch" so words like " stair" and " chair" sound like "air." Just increasing the volume of telephone reception does not help, because it amplifies all frequencies. Upper-range sounds still do not come through, which just results in louder muddle. The **Walker Clarity** phone, which is available from several distributors, solves this problem in a unique way. It features a built-in sound equalizer that selectively increases the volume of high-frequency sounds. To adjust the clarity of words, the user simply moves up the control slide bar until the words become clear.

Individuals with both hearing and vision impairments might find that a product like the **Tel-Ease with Backtalk** from Communication Products and Equipment Company is helpful as well. Large inch-high numbers with Braille coding make dialing this phone simple, and adjustable volume controls for the ringer and the receiver make listening to conversations more enjoyable. Additionally, this particular model has "back talk" capability which allows numbers to be read back by a voice synthesizer as they are dialed and a flashing red light atop the phone to announce incoming calls.

For those people whose needs regarding telephone use are limited to amplification, there is no need to replace the entire phone. **Amplified handsets** that connect to any telephone are available. The amplifiers can be battery powered or plugged into an AC outlet. Several types of volume controls are offered including rotary (turning a knob) and touchbar. Amplified handsets are also available for use with radios.

The other amplification accessory for telephones is the **In-Line Amplifier**. The amplifier connects to a telephone from which it receives the signal that is intended for the handset. The amplifier increases the volume of incoming signal and

sends out the boosted signal to the handset. In-line amplifiers are available with either AC or battery power. Consumers who buy AC-powered amplifiers should be sure to ask if the amplifier has an automatic bypass to permit a user to continue to use the phone without amplification in case of power failure (this is a feature that is desirable for amplified handsets as well). Volume can be controlled on the majority of amplifiers. As with the handsets, consumers can usually find controls that fit their individual needs/abilities. Some amplifiers, such as **HA-40** from Ameriphone, even block out distracting background noise to improve overall speech clarity up to 100 times more than standard telephones. Many amplifiers, such as the **W10** from the Walker Equipment Corporation, are compatible with multi- or single-line standard or electric phones. In the case of the W10, each unit is equipped with the ability to increase telephone volume more than three times above normal (-2dB to 19Db) with variable volume control. This portable unit has sliding controls for both volume and tone.

Environmental Alert Systems

Many individuals with mild to moderate hearing loss can also benefit from the alert system devices designed primarily for the profoundly deaf. Additionally, there are car alert alarms and personal computer beep indicators created with the hard of hearing in mind.

Car alert systems, such as the **Early Alert Response System** (E.A.R.S.), emit a high pitched sound to enhance a person's residual auditory ability to detect any unusual or sudden noises (i.e., police sirens). E.A.R.S. uses a digital signal processor to detect and convey any siren sound in use in the United States. A digital microphone detects the siren and the detection is then conveyed to a processor fitted with four red warning lights. Each system includes a triangular microphone with suction cups and the rectangular processor. Once installed, the system uses an audible tone and a brief flash of the red lights to signal readiness for operation when the vehicle's engine is started. E.A.R.S. can be plugged into the car's cigarette lighter or it may be wired directly to the car's fuse box or "hot wires" such as the ignition. The features of E.AR.S. are representative of most car alert systems.
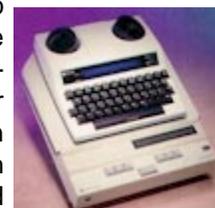
Visual beep indicator programs are particularly useful to computer users with little or no residual hearing ability. They convert audible computer beeps indicating an error or other message to an additional visual indication. Two options are possible: the entire screen can flash and change color, or a visual "beep" can appear where the cursor is positioned. Visual beep indicator software is compatible with most applications and the flash time can generally be adjusted from 0.2 to 2 seconds.

Technology for People Who Are Deaf and Blind

As the deaf-blind population and its needs become more recognized, the variety of products to meet them also expands. Many deaf-blind individuals are dependent on braille and other tactile communication methods. Now, they have the opportunity to reap the benefits from emerging technologies for both the deaf and the blind. Among the most common areas where assistive devices can effectively assist the deaf-blind are communication (both interpersonal and telephone) and environmental alert systems for use both indoors and outside.

Interpersonal Communication Aids and Assistive Listening Devices

Given that a deaf-blind individual cannot visually or auditorally process information, standard assistive devices for the blind or the deaf need to be modified to account for the other disability. The **Telebraille III** from Blazie Engineering provides a fine example of how technology for the deaf and technology for the blind can combine to meet the needs of someone with both disabilities. It combines a modified Ultratec Supercom TDD with a modified 20-cell, 6-dot braille display. Typed information is translated and displayed via refreshable braille cells. TeleBraille III enables a deaf-blind person and a person using a TDD to communicate by telephone, and can be used for face-to-face communications between a deaf-blind person and a sighted person. For telephone conversations, TeleBraille III functions as a one-piece device by placing the telephone handset on the acoustic coupler or by connecting directly to the telephone line. The braille display is then used for reading and either the braille or standard keyboard can be used for writing. By separating the two units, face-to-face conversation is easy. The sighted partner uses the TDD by typing on a typewriter keyboard and seeing the messages on a visual display. The deaf-blind partner keys in messages on the braille keyboard and reads messages on the braille display.

Writing Guides enable a blind-deaf person to write or print using only his/her sense of touch. They are available in several different forms: 1) a board with a metal horizontal bar to assist people who have difficulty writing in a confined space or on a straight line; 2) pocket size plastic, metal, or cardboard, with a single space cut-out for one's signature; 3) plastic bank check or envelope guides.

If a blind person has any residual auditory ability, **Loop** and **FM Systems** can be used in conjunction with hearing aids to transmit sound by radio waves through a microphone held by the speaker. The transmitter transmits the sound to the receiver, which magnifies the sound of the speaker's voice louder than other noise in the room. Specially trained interpreters can facilitate communication for those with no usable sight and hearing. **Portable braille computers** enable the braille

user to easily take notes in meetings using six or eight dot braille cells and a braille keyboard. Most of these systems are compatible with many braille printers, making it simple to print braille documents.

Telephone Communication Systems

In addition to the Telebraille III and other products that combine TTY/TDD and braille, other innovative communication devices enable deaf-blind individuals to enjoy the advantages of telephone communication.

Tactile Speech Indicators are telephone devices designed to receive sound through tactile cues by means of vibration. The deaf-blind individual must be capable of using speech to express a message. When a simple yes/ no question is asked, the received answer is distinguished tactually by the basic code of: "no" (1 vibration), "yes-yes" (2 vibrations) and " I don't understand/ know" (3 vibrations).

For individuals who are deaf and have low vision, **Large Print Display TTY/ TDD** is a an option for telephone communication. It is a large print display that attaches to a specific TDD to produce letters approximately two inches in height. It can be used over the phone and in interpreting situations.

Teletouch Keyboards are portable devices with both typewriting and braille keyboards on one side and a braille cell on the back. Letters are typed and felt one at a time. They are most effective with an individual who uses speech.

Environmental Alert Systems

Deaf-blind individuals rely on similar alert systems that other deaf and hard of hearing people use with the requirement that all cues are tactile (usually vibrations). Wireless paging systems transmit basic information such as doorbell, telephone, fire alarm, smoke detector, or baby cry signals. Transmitters and receivers identify each sound source. The transmitter sends out signals that are felt as vibrations by the deaf-blind person carrying or wearing the receiver.

Proximity sensors are also available on canes to aid deaf-blind individuals while they are walking (or wheeling) in unfamiliar environments. For example, Nurion Industries makes the N-8 Laser Cane. The N-8 emits two invisible light beams. One beam is angled upward for head-height protection; the second is directed forward for straight ahead information. When the light beam strikes an object within range it is reflected back to a receiving unit built into the cane. A vibrating unit signals the user's index finger . Proximity sensors are also available for wheelchairs.

Closed Captioning for the Deaf-Blind

It is possible for deaf-blind individuals to enjoy closed captioned programming on television by products that translate the captions into braille. The **Closed Caption to Braille System** from Dewtronics uses a computer to convert the output of a telecaption unit into braille. Users can vary the speed of the braille and store the captions into an ASCII file to read at a later time.

Funding Sources

Various funding sources are available to assist with the purchase of these types of assistive devices. The extent and type of assistance depends upon an individual's eligibility for medical and social services, income support, or vocational services from any of a number of different resources. Additional information is available from the publications listed below and from ABLEDATA's *Informed Consumer Guide to Information on Funding Assistive Technology*.

Resources and Recommended Reading

National Rehabilitation Information Center (NARIC)

NARIC maintains an extensive collection of printed material pertaining to the procurement and utilization of assistive technology. The following documents from the NARIC library have been selected as being particularly useful for people trying to purchase assistive devices for the hearing impaired. Copies are offered by request for a minimal fee. NARIC's mailing address, telephone number, and website address are as follows: NARIC, 1010 Wayne Avenue, Suite 800, Silver Spring, MD 20910. 800/346-2742 or 301/562-2410; http://www.naric.com/naric.

1. "Computer Speech Recognition: A New Tool for Sign Language Interpreters and Members of the Deaf/ Hard of Hearing Community," by Jack Johnson, Carl Jensema. In **JADARA**, Vol.30, No.4, 1997 (pp. 29-30). NARIC Accession Number: J34623

This is an excellent article, addressed primarily toward sign language interpreters, that talks about the advantages of supplementing traditional interpreting services with computer speech recognition technology. It also explores the benefit of using such technology to assist the deaf and hard of hearing in learning foreign languages.

2. "Developments in Research and Technology," by Mark Ross. In **Hearing Loss**, Vol. 18, No. 4, July/ August 1997 (pp.33-35). NARIC Accession Number J33927

This article highlights some of the new advances in research and assistive technology for people with hearing disabilities. Specifically, it emphasizes innovations in hearing aid technology and discusses the benefits and drawbacks of using the Cochlear and Multichannel Auditory Brainstem Implants.

3. "What Are TTYs? TTs? TDDs?," by the National Information Center on Deafness. Gallaudet University. 1994. NARIC Accession Number: R06607

Purchasing assistive telecommunications devices can be a confusing and daunting task for anyone. This brochure was designed especially for someone with little or no knowledge of the products available. It provides visual and written descriptions of TTYs, TTs, and TDDs and answers the most commonly asked questions about using them.

4. "Deaf-blind services in the 21st century: changing faces

and changing service delivery systems," by C. L. Ingraham, C. C. Davis, A. Carey, M. Danek, D. Watson. In **Journal of Vocational Rehabilitation**, Vol.6 (1996) pp. 125-132. NARIC Accession Number J31171

This article explores the impact of the 1992 Amendments to the Rehabilitation Act, the Americans with Disabilities Act (ADA) and the Individuals with Disability Education Act (IDEA) on the service delivery system for a deaf-blind population that appears to be growing and changing. The impact of these laws and suggestions for service delivery systems are presented.

5. "Communication Issues and Strategies for Deaf-Blind Individuals: Case Studies Basic on Etiology and Language Level," by Nancy W. Godfrey and Margaret A. Costello. In **American Rehabilitation**, Vol.21, No.2 , Summer 1995 (pp. 40-45).

Five case studies of adults with dual sensory impairments are examined in this article. In each case, various communication strategies are applied and described in great detail. Among the highlights are: Congenital Deafness and Blindness without a formal language system, Congenital Deafness with Visual Impairment and minimal language skills, Congenital Deafness with Visual Impairment and no linguistic deficits, Congenital Blindness with an Adventious Hearing Loss, and Sudden Loss of Vision and Hearing. An accompanying table also provides a brief description of communicative aids and devices that may apply.

6. "Access for Deaf and Hard of Hearing People in the Public Domain: Where Are We?," by A. Doden, J. Redelsperger, G. Long. In **JADARA**, Vol. 30, No.4, 1997 (pp. 24-28). NARIC Accession Number: J34622

As the title suggests, this article examines two studies to measure how well the needs of the deaf and hard of hearing are being met in the public domain. The first study investigated telecommunication accessibility across government, emergency, and private business numbers. The second study assessed the availability of assistive technology for deaf and hard of hearing hotel guests. Suggestions for service improvement are also offered.

7. "Technology and Full Participation for Children and Adults Who Are Deaf," by Robert R. Davila. **American Annals of the Deaf**, Vol. 139 (1994), pp.6-10. NARIC Accession Number: J26878

This article is an excerpt from an address at the National Technology Symposium in 1994. It briefly chronicles the progress society has made since 1972 in making the world more accessible to people with hearing deficits and then proposes that a National Practice Improvement Center be created. Emerging innovations in telecommunications devices and computer software are also presented.

General Resources

1. *Life After Deafness: A Resource Book for Late-Deafened Adults*, by Bena Shuster. Bena Shuster, 1995. NARIC Accession Number: R06910

This book is a compilation of Bena Shuster personal experiences with late-deafness. It offers her views on ways to live with deafness. Her survival tips cover everything from health and rehabilitation to social interaction in the hearing world.

2. *The Special-Needs Reading List: An Annotated Guide to the Best Publications for Parents and Professionals*, by Wilma K. Sweeney. Woodbine House, 1998. NARIC Accession Number: R07809

This handy resource guide provides short reviews and recommendations of the best books, journals, newsletters, organizations, and other information sources about children with disabilities. For convenience, the book is divided into two sections. The first part relates to disability issues in general; and the second part focuses on specific disabilities. A few of the impairments included are: Cerebral Palsy, Autism, Speech and Language Disorders, and learning disabilities.

Organizations

Technical Aids and Assistance for the Disabled Center (TAAD). 1950 West Roosevelt Road, Chicago, IL 60608. 800/ 346-2939 (V); 312/ 421-3373 (V/TT).

The Technical Aids and Assistance for the Disabled Center (TAAD) is an environment created by COPH-2 (Committee on Personal Computers and the Handicapped) to provide options in using personal computer technology to people with disabilities. The TAAD Center provides services with an emphasis on selection and application of microcomputers that is an alternative to the conventional approach of the rehabilitation network. The center's approach allows the end users to make informed decisions as to which systems or devices best meet their needs. This is accomplished by 1) provide hands-on use of various computers, adaptive devices, and software; 2) drawing upon consumer experiences via COPH-2 Bulletin Boards; 3) providing technical Information through the collection and dissemination of printed materials, videotapes, and software and via the AppleLink database. Other services include equipment loans, workshops and product demonstrations, and advocacy before manufacturers, equipment dealers, rehabilitation providers, educators, and others. The TAAD Center is a charter member of the Alliance for Technology Access (ATA).

National Information Center on Deafness. Gallaudet University, 800 Florida Avenue, N.E., Washington, DC 20002. 202/651-5051 (V); 202/ 651-5052 (TTY).

The National Information Center on Deafness provides information and referrals. It strives to collect, develop, and disseminate the latest information on deafness, hearing loss, organizations, and services for deaf and hard of hearing people.

Hear Now. 9745 E. Hampden Ave., Ste. 300, Denver, CO 80231. 800/ 648-HEAR; 303/ 695-7797 (V/TTY).

Hear Now is dedicated to making hearing technology accessible to the deaf and hard of hearing. Its nationwide network of fully qualified healthcare professionals prescribe and fit new and refurbished hearing aids for qualified recipients free of charge. Through its Sound Investment Society and national

registry, service clubs and other organizations sponsor low-income members of their communities needing help with their hearing. Hear Now also coordinates the philanthropic efforts of cochlear implant manufacturers, implant teams, and local fundraising leaders to give the gift of sound to people who could otherwise not afford it.

Helen Keller National Center for Deaf-Blind Youths and Adults (HKNC). 111 Middle Neck Road, Sands Point, NY 11050. 516/ 944-8900 (V); 516/ 944-8637 (TT).

The Helen Keller National Center for Deaf-Blind Youths and Adults is operated by Helen Keller Services for the Blind and is funded by congressional appropriations. Extensive evaluative and rehabilitative services are provided to youths and adults who are deaf-blind. Individualized training in orientation and mobility, communication and daily living skills, as well as in other areas, is conducted in a residential setting for up to fifty clients at a time, for periods ranging from several months to several years. When the training is complete, a major effort is made to assist in the appropriate placement of clients in work or living settings. Mobility and orientation training in both the workplace and residential setting are similarly provided. The center conducts research in personal adjustment, education, and rehabilitation techniques, and offers training in the field and at the headquarters to new and prospective professionals who plan to work with individuals who are deaf-blind. Additionally, HKNC operates an extensive nationwide network of field services through its ten regional offices and some forty affiliated programs.

Telecommunications for the Deaf, Inc. (TDI). 8719 Colesville Road, Ste. 300, Silver Spring, MD 20910. 301/ 589-3786 (V); 301/ 589-3006 (TT).

Telecommunications for the Deaf, Inc., (TDI) serves members, people with deafness and hearing impairments, and the general public by providing public information about telecommunications and deafness/hearing impairment, assuring equal access to telecommunications technologies and services, supporting issues and concerns across the country. TDI publishes the *International Telephone Directory of TDD Users* annually. It includes the TDD numbers of federal, state, local agencies, businesses, and organizations that serve people who are deaf or who have hearing impairments. The *National Directory of TTY Numbers* and the *GA-SK Newsletter* are also produced for TDI members.

National Institute on Deafness and Other Communication Disorders (NIDCD). NIH, 1 Communication Avenue, Bethesda, MD 20892. 800/241-1044 (V); 800/ 241-1055 (TTY).

The National Institute on Deafness and Other Communication Disorders (NIDCD) created in October 1988 as one of the National Institutes of Health, conducts and supports biomedical and behavioral research training on normal mechanisms as well as disordered processes of hearing, balance, smell, taste, voice, speech, and language. The NIDCD also fosters disease prevention and health promotion and supports research efforts for development of augmentative devices for individuals with communication disorders. Mandated by the legislation that created the NIDCD, the NIDCD Clearinghouse provides an information service to respond to professional and public inquiries; develops and distributes publications such as fact sheets, bibliographies, information packets, and organizational directories; and maintains a database of references to journal articles, books, audiovisual materials, brochures, fact sheets, newsletter articles, manuals, and other educational materials. This database is available to the public as the Deafness and Other Communication Disorders (DC) Subfile of the Combined Health Information Database (CHID). CHID is available on the World Wide Web at: http://www.nih.gov/nidcd .

DEAF-Blind Service Center. 2366 Eastlake Ave. East, Ste. 206, Seattle, WA 98102. 206/ 323-9178.

The Deaf-Blind Service Center provides information to employers, service providers, and the general public about the best ways to interact with and accommodate people who are deaf and blind.

Self Help for Hard of Hearing People, Inc. (SHHH). 7910 Woodmont Ave., Ste. 1200, Bethesda, MD 20814. 301/ 657-2248 (V); 301/ 657-2249 (TTY).

Self Help for Hard of Hearing People, Inc. (SHHH) is a consumer-education organization that strives to develop acceptance of people with hearing loss and to promote education about hearing loss detection, management, and prevention of further loss. It publishes a bimonthly journal and brochures on topics such as hearing aids, psychological effects of hearing loss, and assertiveness for individuals with hearing loss. There is a charge for most publications.

Conclusion

This ABLEDATA *Informed Consumer Guide* is an introduction to the various kinds of assistive technology available to enable people who are deaf, hard of hearing, and deaf-blind to live life to its fullest. ABLEDATA publications are available in alternative formats (braille, large print, cassette, and PC-compatible diskette) upon request. It is recommended that the information in this guide be used in conjunction with consultations with medical and/or hearing professionals.

The ABLEDATA database of assistive technology provides information about and descriptions of more than 25,000 products for people with physical, sensory, or cognitive disabilities. Information specialists are available to provide specific information about a particular device, type of device, or manufacturers and distributors of assistive technology. ABLEDATA can be reached by phone or fax at: 800/ 227-0216, 301/ 608-8998 (V), 301/ 608-8912 (TTY), or 301/ 608-8958 (Fax). Anyone with access to a computer, modem, and the World Wide Web may also search the database 24 hours a day by visiting ABLEDATA's web site at: http://www.abledata.com . ABLEDATA's fact sheets and informed consumer guides are available in the *Information area*; and, the latest on assistive technology and disability issues in general can be found in the *News area*.

-written and researched by Anjanette Daigle, ABLEDATA Research Assistant.

Manufacturers of Devices for Individuals Who Are Deaf or Hard of Hearing

8X8, Inc.
2445 Mission College Blvd., Santa Clara, CA 95054.
(408) 727-1885; (888) VIEW-8x8; (888) 289-6889 (TT)
Telephone Communication Systems- TDDs and TTYs with and without printers; Video TTYs

Able-Phone (formerly DQP, Inc.)
7601 Clmnt Mesa Blvd., Suite 201, San Diego, CA 92111.
(619) 296-9705
Telephone Communication Systems- TDDs and TTYs and Accessories

Adco Hearing Conservation
7310 S. Alton Way, Suite A, Englewood, CO 80112.
(303) 290-8339; (800) 726-0851
Personal Amplification Systems and Accessories

Aiphone Corporation
1700 130th Avenue, NE, P.O. Box 90075, Bellevue, WA 98009.
(425) 455-0510
Video Display Telephones; Closed Circuit TV Systems; Security Systems

Akron Resources, Inc.
11627 Clark Street, Suite 101, Arcadia, CA 91006.
(626) 358-1133
Personal Amplification Systems

American Foundation for the Blind Product Center
100 Enterprise Place, P.O. Box 7044, Dover, DE 19903.
(800) 232-5463
Resources, Information, and Products for People Who Are Blind and Deaf-Blind

Ameriphone, Inc.
12082 Western Ave., Garden Grove, CA 92841-2913.
(714) 897-0808; (800) 874-3005
Amplifier, Large Button, and Hearing Aid Compatible Telephones

Amtel Systems Corporation
8701 100th Street, Kenosha, WI 53142-7718.
(414) 947-0600; (800) 999-8903
Paging Systems- Inter-Office Communication

Ann Morris Enterprises, Inc.
890 Farms Court, East Meadow, NY 11554-5101.
(516) 292-9232
Hearing Aids and Accessories

Assistance Dogs of America
8806 State Route 64, Swanton, OH 43558.
(419) 825-3622
Hearing Ear Dogs

AT&T CPU Leasing
5 Woodhollow Road, # 2A21, Parsippany, NJ 07054-2821.
(800) 233-1222
Telephone Communication Systems- TDDs, TTYs, TTs, and Accessories; Amplifier, Large Button, and Hearing Aid Compatible Telephones and Accessories

AT&T Information Products and Systems
650 Liberty Ave., Room 2-202, Union, NJ 07083-8107.
(908) 851-3084; (800) 327-7440
Amplifier, Large Button, and Hearing Aid Compatible Telephones

Audex/Audiometrics, Inc.
710 Standard Street, Long View, TX 75604.
(903) 758-9392; (800) 237-0716
Personal Amplification Systems and Accessories; Amplification Systems for Television and Accessories

Audio Enhancement (Distributor for Comtek)
1748 West 12600 South 84065, Riverton, UT 84065.
(801) 254-9263; (800) 383-9362
Personal Amplification Systems and Accessories

Audiological Engineering Corporation
35 Medford Street, Somerville, MA 02143.
(617) 623-5562; (800) 283-4601; (800) 955-7204 (TT)
Personal Amplification Systems

Audiotone, Inc.
4120 Olson Memorial Highway, Golden Valley, MN 55422.
(612) 520-9723; (800) 757-8055
Behind the Ear (BTE) Hearing Aids and Accessories

Auditory Display, Inc.
162 Schoolhouse Lane, Mount Laurel, NJ 08054.
(973) 234-4446
Telephone Communication Systems- TDDs, TTYs, TTs, and Accessories

AVR Communications Ltd.
P.O. Box 6122, Haifa 31060, Israel
Personal Amplification Systems; Hearing Aids and Accessories

Behavioral Controls, Division of Alps Inc.
3818 West Mitchell St., Milwaukee, WI 53215.
(414) 671-3332
Speech Teaching Computer Programs

Blazie Engineering
105 East Jarretsville Road, Forest Hill, MD 21050.
(410) 893-9333
Braille and Voice Output Devices and Accessories-
Braille TDDs and Computer Software

Canadian Hearing Society
271 Spadina Road, Toronto, ONT M5R 2V3, Canada.
(416) 964-9595 (V); (416) 964-0023 (TT)
Environmental Alert Systems- Telephone and Doorbell
Signalers, Security Systems, and Sound Monitors;
Telephone Communication Systems- TDDs, TTYs,
TTs and Accessories; Information on Hearing Loss

Canine Companions For Independence
P.O. Box 446, Santa Rosa, CA 95402-0446.
(707) 528-0830
Service Dogs

Caption Center
125 Western Ave., Boston, MA 02134.
(617) 492- 9225; (617) 562-0590 FAX
Open and Closed Captioning Devices

Cepco
21515 Parthenia Street, Canoga Park, CA 91304.
(818) 998-7315
Security Systems

Cochlear Corporation
61 Inverness Drive East, Suite 200, Englewood, CO
80112.
(800) 523-5798 (V/T); (303) 792-9025 FAX
Research and Information on Hearing and Cochlear
Implantation; Cochlear Implants

Comm-Tel
1208 Kahului Street, Honolulu, HI 96825.
(808) 396-5941
PC Telecommunication Programs

Communication Products and Equipment Co.
P.O. Box 275, Bridgeport, IL 62417.
(618) 943-3012; (800) 833-4273
Telephone Communication Systems- TDDs, TTYs,
and TTs and Accessories; Amplifier and Large Button
Telephones and Accessories

Compu-TTY, Inc.
3115 Lackland Road, Fort Worth, TX 76116. (817)
738-2485 (V); (817) 738-8993 (T); (800) 366-9950
Telephone Communication Systems-TDDs, TTYs,
TTs, and Accessories

Connevans Limited
54 Albert Road North, Reigate, Surrey RH2 9YR, UK
Personal Amplication Systems and Accessories

Crestwood Company
6625 North Sidney Place, Milwaukee, WI 53209-3259.
(414) 352-5678
Speech/Sign Language Training Devices- Games and
Instructional Materials; Personal Amplification Sys-
tems; Signal Amplifiers

Datawave
P.O. Box 3097, Cary, NC 27519.
(919) 557-1224; (800) 272-9283
Environmental Alert Devices; Signal Amplifiers

Dawn Sign Press
9080-A Activity Road, San Diego, CA 92126-4421.
(619) 549-5330 (V); (619) 549-5333 (TT)
Sign Language Training Aids- Books, Posters,
Games, and Flash Cards

Deaf Communications of Cinncinnati
550 Palmerston Drive, Cinncinnati, OH 45231.
(513) 451-3722
Telephone Communication Systems- TDDs, TTYs,
TTs and Accessories

Deafworks Company
P.O. Box 1265, Provo, UT 84603-1265.
(801) 465-1957 (V/T)
Telephone Communication Systems and Accesso-
ries-TDDs and TTYs; TDD and TTY Training Systems

Dewtronics
P.O. Box 308, Ghent, WV 25843-0308.
(304) 787-9712
Braille Telecaptioning

DFE Inc.
P.O. Box 725, Oklahoma City, OK 73101.
(405) 232-2809
Security Systems

Dogs for the Deaf
10175 Wheeler Road, Central Point, OR 97502.
(503) 826-9221
Hearing Ear Dogs

Dragon Systems, Inc.
320 Nevada Street, Newton, MA 02160.
(617) 965-5200; (800) 443-7077; (617) 527-0372 FAX
Speech Recognition and Voice Input Computer Software

Dyna-Aura Engineering Labs, Inc.
8057 Vickers Street, San Diego, CA 92111-1917.
(619) 565-4922
Hearing Aids and Accessories

E & IS SignWare
206 Angie Drive, P.O. Box 521, Ceder Falls, IA 50613
Sign Language Training- Games, Computer Programs, and Instructional Materials

Earmark, Inc.
1125 Dixwell Ave., Hamden, CT 06514.
(203) 777-2130
Amplification Systems and Accessories

Ebsco Curriculum Materials
P.O. Box 1943, Birmingham, AL 35201.
(205) 991-1208; (800) 633-8623
Sign Language Teaching Aids- Computer Programs, Instructional Materials

Eckstein Brothers, Inc.
4807 West 118th Place, Hawthorne, CA 90250.
(562) 772-6113; (800) 432-4913
Personal Amplification Systems and Accessories

Edmark Corporation
P.O. Box 97201, Redmond, WA 98073-9721.
(425) 556-8400; (800) 362-2890
Sign Language Training- Instructional Materials

Elcombe Systems Limited
P.O. Box 72088, 603 March Road, Kanata, ONT
Canada K2K 2M5.
(613) 591-5678
Emergency Alert Systems; Large Button and Hearing Aid Compatible Telephones

Electone, Inc. P.O. Box
910 Winter Park, FL 32790.
(407) 831-2555; (800) 432-7483
Hearing Aids and Accessories

Everett Assistive Resources Co.
P.O. Box 3353 Everett, WA 98203-8353.
(425) 353-5680; (800) 669-7371
Hearing Aids and Accessories

Exceptional Hearing Services
515 Northgate Drive, Suite D, San Rafael, CA 94903-3639.
(415) 499-7766
Amplification Systems

Four Point Design
1575 Catamount Road, Fairfield, CT 06430.
(203) 259-1174
Personal Amplification Systems; Amplification Systems for Television

Fourth Dimension Instruments, Inc.
P.O. Box 376, Spring, TX 77373.
(281) 288-9366 (V/T)
Environmental Alert Devices- Flashing Lights, Doorbell and Telephone Signalers, Vibrating Alarm Clocks and Pagers, and Bed Shakers; Amplification Systems and Accessories

Futura Wave Communications
7209 Cipriano Spring Drive, Lanham, MD 20706.
(301) 552-4405 (V/T)
Telephone Communication Systems- TDDs, TTYs, TTs and Accessories; TTY Compatible Computer Software

Gentex Corporation
10985 Chicago Drive, Zeeland, MI 49464.
(616) 392-7195
Environmental Alert Devices- Smoke Alarms and Flashing Lights

Global Assistive Devices, Inc.
4950 North Dixie Highway, Suite 121, Fort Lauderdale, FL 33334.
(954) 784-0035 (V/T)
Environmental Alert Devices- Bed Vibrators, Flashing and Amplifier Alarm Clock with Bright Digital Displays, and Motion Signalers

GN Netcom, Inc.
7688 Executive Drive, Eden Prairie, MN 55344-3677.
(612) 932-2992
Hearing Aids and Accessories

Greg Verity
53 Haven Ave., Port Washington, NY 11050.
(516) 944-8356
Tactile Speech Indicators

Guardian Angel Products
401-417 Fayette Avenue, Springfield, IL 62704.
(217) 753-2505
Environmental Alert Systems- Sound Monitors

Guinta Associates
37 Terhune Ave., Lodi, NJ 07644.
(212) 594-4522; (800) 631-0821
Speech and Auditory Training Devices

Hal Hen Company
35-53 24th Street, Long Island City, NY 11106.
(718) 392-6020; (800) 242-5436
Environmental Alert Systems- Bed and Pillow Vibrators, Digital and Flashing Alarm Clocks, Telephone and Doorbell Signalers; Amplication Systems for Radio and TV

HARC Mercantile, Ltd.,
1111 W. Centre Ave., P.O. Box 3055, Kalamazoo, MI 49003-3055.
(800) 445-9968 (V); (800) 413-5245 (TTY)
Amplifier Telephones; Amplification Systems; Environmental Alert Devices-telephone and doorbell signalers

Harmony House, Inc.
111 West Maple Street, Suite 3002, Chicago, IL 60610.
(312) 280-8334
Sign Language Training Aids- Cards, Videotapes, and Sign Language Dictionaries

Harris Communications, Inc.
15159 Technology Drive, Eden Prairie, MN 55344-2277.
(800) 825-6758 (V); (800) 825-9187 (TTY); (612) 906-1099 FAX
Telephone Communication Systems, Environmental Alert Systems, Hearing Aid Batteries and Accessories, and Books and Videotapes

Hear-More, Inc.
P.O. Box 3413, 42 Executive Blvd., Farmingdale, NY 11735.
(516) 752-0738; (800) 881-4327 (V/T)
Environmental Alert System- Digital Alarm Clock with Strobe Light

Hearing Impaired TEChnologies (HI-TEC)
8160 Madison, Burr Ridge, IL 60521.
(847) 654-9200 (V/T); (800) 288-8303 (V/T)
Telephone Communication Systems and Accessories- TDDs and TTYs with and without printers; Environmental Alert Devices- bell and signal amplifiers

Hearing Services International (HSI)
10340 W. 70th Street, Eden Prairie, MN 55344-3445.
(612) 829-5757; (800) 328-3832
Hearing Aids and Accessories

Heartsong
P.O. Box 2455, Glenview, IL 60025.
(847) 724-2336
Sign Language Training Video Package

Heidico Inc., Nutri-Max Products Division
561 Keystone Ave. # 296, Reno, NV 89503.
(702) 324-7104 V,TT, FAX
Environmental Alert Systems for Vehicles

Hello Direct, Inc.
5884 Eden Park Place, San Jose, CA 95138.
(408) 972-1990; (800) 444-3556
Telephone Communication Systems- TDDs, TTYs, TTs and Accessories; Large Button and Amplifier Telephones and Accessories

House EAR Institute
2100 West Third Street, Los Angeles, CA 90057.
(213) 483-4431; (213) 483-8789
Research and Information on Hearing and Hearing Aid Implantation

Housing Devices, Inc.
407 R. Mystic Avenue, Medford, MA 02155.
(617) 395-5200; (800) 392-5200
Environmental Alert Systems- Telephone, Doorbell, and Flashing Light Signals

Huggie Aids
837 10th Street, NW, Oklahoma City, OK 73106.
(405) 232-7848
Hearing Aid Accessories

IBM Corporation
1000 NW 51st Street, # 5432, Boca Raton, FL 33429.
(561) 443-4224; (800) 426-2468
Speech Recognition and Voice Input Computer Software

Independent Living Aids
27 East Mall, Plainview, NY 11803.
(516) 752-8080; (800) 537-2118
Writing Guides for People Who Are Deaf-Blind

Instant Replay, Inc.,
601 South Bayshore Drive, Suite 1050, Coconut Grove, FL 33133.
(305) 854-8777; (800) 749-8779
Open telecaptioning devices; telephone accessories; amplification systems

ITT
7635 Plantation Road, P.O. Box 7065, Roanoke, VA 24019.
(703) 563-0371
Large Button, Hearing Aid Compatible, and Amplifier Telephones; Amplifier Telephones with Braille Markings

Jean Rose
369 E. Van Koevering, Rialto, CA 92376-5143.
(909) 875-0285
Lip Reading Training- Videotapes

Joy Enterprises, Inc.
3800 N. Fairfax Drive, # 1301, Arlington, VA 22203.
(703) 528-4220
Sign Language Dictionaries on Videotape

Kay Elemetrics Corporation
2 Bridgewater Lane, Lincoln Park, NJ 07035-1439.
(973) 628-6200; (973) 628-6363; (800) 289-5297
Computerized Speech Teaching Devices- Speech Labs and Waveform Display Systems

Kaplan
1310 Lewisville-Clemmons Road, P.O. Box 609, Lewisville, NC 27023-0609.
(910) 766-7374; (800) 334-2014
Speech Training and Sign Language- Games and Instructional Materials

Kopptronix Co.
P.O. Box 361, Stanhope, NJ 07874.
(973) 543-6819
Sign Language Training- Games, Flash Cards, and Instructional Materials

KRI Communications, Inc. (Formerly Krown Research, Inc.)
129 Sheldon Street, El Segundo, CA 90245.
(562) 322-3202; (800) 833-4968
Telephone Communication Systems- TDDs, TTYs, TTs and Accessories

Kurzweil Applied Intelligence
411 Waverly Oaks Road, Waltham, MA 02154.
(617) 893-5151
Speech Recognition and Voice Input Computer Software; Braille and Voice Output Devices and Software

Linear Electronics
P.O. Box 9003, Carsbad, CA 92008.
(800) 421-1587
Wireless Signal Transmitters

LPB, Inc.
28 Bacton Hill Road, Frazer, PA 19355.
(610) 644-1123
Amplification Systems and Accessories

Maico Hearing Instruments, Inc.
7375 Bush Lake Road, Minneapolis, MN 55439-2029.
(612) 835-4400; (800) 328-6366
Programmable Hearing Aids and Accessories

Mainstream Designs
114 Ridge Road, Jupiter, FL 33477.
(561) 746-9185 (V/T)
Touch Tone Message Decoders

Maple Leaf Chapter Bell Telephone of Canada
483 Bay Street, Toronto, ONT M5S 2E1, Canada
Voice Amplifiers

Maxi-Signal Products, Division of Mill Specialties, Inc.
5 East 49th Street, P.O. Box 398, La Grange, IL 60525.
(847) 354-4730; (800) 227-9636
Signal Systems- Flashing Lights, Auxiliary Bells, and Horns

Metavox, Inc.
8375 Leesburg Pike, Suite 421, Vienna, VA 22182.
(703) 698-0802
Personal Amplification Systems and Accessories

Micro Audiometrics Corporation
2200 South Ridgewood Ave., US # 1, South Daytona, FL 32119-3018.
(904) 788-9331; (800) 729-9509
Hearing Screening Instuments

Micro Video Corporation
210 Collingwood, Suite 100, P.O. Box 7357, Ann Arbor, MI 48107-7357.
(734) 996-0626; (800) 537-2182
Video Voice Speech Training Systems

Microflip, Inc.
11211 Petworth Lane, Glenn Dale, MD 20769.
(301) 262-6020 (V/T)
Modems for TDDs and TTs

Microsystems Software, Inc.
600 Worcester Road, Framingham, MA 01701.
(508) 879-9000; (800) 828-2600; (508) 879-1069 FAX
Visual Beep Indicator Computer Software

Midwest Health Programs, Inc.
P.O. Box 3023, Urbana, IL 61801.
(217) 367-5293
Sign Language Computer Programs

Mirac
542 Route 62, Winchester, OH 45697.
(937) 442-2401 (V/T)
Environmental Alert Systems- Smoke Alarms and
Flashing Light Signals; Telephone Communication
Systems- TDDs,TTYs, and TTs and Accessories

National Association of the Deaf
814 Thayer Avenue, Silver Spring, MD 20910.
(301) 587-1788
Research, Information, and Instructional Materials
Pertaining to Deafness and Hearing Loss

National Captioning Institute
5203 Leesburg Pike, Falls Church, VA 22041.
(703) 998-2400; (800) 533-9673
Information on Captioning; Open and Closed
Captioning Devices

National Hearing Aid Distributors, Inc.,
145 Tremont Street, Boston, MA 02111.
(617) 426-9845; (800) 627-9930
Personal Amplication Systems; Hearing Aids and
Accessories

Nationwide Flashing Signal Systems, Inc.
8120 Fenton Street, Room 200, Silver Spring, MD
20910
(301) 589-6671 (V); (301) 589-6670 (T)
Environmental Alert Systems- Flashing Light, Fire
Alarm, and Telephone Signalers; Bed Shakers, Vibrat-
ing and Flashing Alarm Clocks, and Sound Monitors

Northern Wolf Enterprises
391 Page Street, Lunenburg, MA 01462.
(508) 582-9057
Environmental Alert Systems for Vehicles

NXi Communications, Inc.
3191 South Valley Street, Suite 205, Salt Lake City, UT
84109.
(801) 466-1258 (V); (801) 466-0453 (T)
Telephone Communications Systems- TDDs,
TTYs,TTs and Accessories; TT Fax Machines; TDD
Answering Systems, and Universal Modems

Omni Group, Inc.
P.O. Box 398, Timonium, MD 21093.
(301) 363-8780; (800) 628-2233
Closed Circuit TV Systems; Security Systems

Omni Hearing Systems
3418 Midcourt, Suite 105, Carrolton, TX 75006.
(972) 934-2961; (800) 527-0872
Hearing Aids and Accessories

One To One Communicators
1714 Penrose, Olathe, KS 66062.
(913) 764-4072
Personal Amplification Systems

Oticon Corporation
29 Schoolhouse Road, P.O. Box 424, Somerset, NJ
08873.
(732) 560-1220; (800) 526-3921
Personal Amplification Systems

Oto Sonic, Inc.
4200 West Bryn Mawr Avenue, Chicago, IL 60646.
(800) 837-6642
Hearing Aids and Accessories

Oval Window Audio
33 Wildflower Court, Nederland, CO 80466.
(303) 447-3607 (V/T)
Amplification Systems and Accessories

Page Net
1121 Industrial Road, San Carlos, CA 94070-4106.
(415) 591-7900
Tactile Paging Systems

Palmetto Technologies, Inc.
P.O. Box 498, Duncan, SC 29334.
(864) 576-2886
Touch Tone Message Decoders

Panasonic Company
1 Panasonic Way, Mail Stop 2F3, Secaucus, NJ
07094.
(201) 348-7000; (800) 447-4700
Hearing Aids and Accessories; Amplification Devices;
Vibrating Alarm Clocks

Phoenix Management, Inc.- Hatis Systems
5195 Fontaine Blvd., Fountain, CO 80817.
(719) 392-1442
Telephone Communication Systems- TDDs, TTYs,
TTs and Accessories; Handset Amplifiers

Phonak, Inc.
850 E. Diehl Road, P.O. Box 3017, Naperville, IL
60566.
(630) 505-7007; (800) 777-7333
Hearing Aids and Amplification Systems

Phone TTY, Inc.
202 Lexington Avenue, Hackensack, NJ 07601.
(201) 489-7889 (V); (201) 489-7890
Environmental Alert Systems- Telephone, Doorbell, and Fire Alarm Signalers, Bed Shakers; Telephone Communication Systems- TDDs, TTYs, TTs and Accessories

Phonic Ear, Inc.
3880 Cypress Drive, Petaluma, CA 94954-7600.
(707) 769-1110; (800) 227-0735
Amplification Systems and Accessories

Plantronics
345 Encinal Street, Santa Cruz, CA 95060.
(800) 544-4660
Telephone and Signal Amplifiers

Positron Industries
5101 Buchan Street, Montreal, QUE H4P2K9, Canada.
(514) 345-2200; (514) 731-8662 FAX
Telephone Communication Systems and Accessories- TDDs and TTYs with and without printers

Precision Acoustics
501 Fifth Avenue, Suite 704, New York, NY 10017.
(212) 986-6470
Auditory Trainers; Speech Teaching Devices

Pro-Ed
8700 Shoal Creek Blvd., Austin, TX 78757-6897.
(512) 451-3246; (800) 897-3202
Speech Teaching Devices- Games, Pictures, and Flash Cards

Prospect Marketing
60 East Main, P.O. Box 479 Stockbridge, MA 01262.
(413) 298-4371
Sign Language Training Aids- Games, Instructional Materials, and Computer Programs

Qualitone, Hearing Aids & Audiometers,
4931 West 35th Street, Minneapolis, MN 55416.
(612) 927-7161; (800) 328-3897
Hearing Aids and Accessories; Audiometers

Quest Electronics
510 South Worthington Street, Oconomowoc, WI 53066.
(414) 567-9157; (800) 245-0779
Tactile Paging Systems

Radio Shack/ Division of Tandy Corporation
1500 One Tandy Center, Fort Worth, TX 76102.
(817) 390-3011
Amplification Systems and Accessories; Amplifier, Large Button, and Hearing Aid Compatible Telephones; Environmental Alert Systems- Flashing Light and Telephone Signalers

Rapidtext, Inc.
230 Newport Center Drive, Suite 250, Newport, CA 92660-7510.
(714) 644-6500
Video Telecaption Systems

RCI, Inc.
731-B Norwich Road, P.O. Box 122, Plainfield, CT 06374.
(860) 564-5276
Hearing Aids and Accessories

RDM Sales
P.O. Box 95, North Hollywood, CA 91603.
(818) 851-2786
Voice and Signal Amplifiers

Reach Paging System, Inc.
P.O. Box 30193, Bethesda, MD 20824.
(301) 601-8733; (800) 875-2724
Emergency Alert Systems; Tactile Paging Systems

Reliable Fire Eqipment Company
12845 South Cicero Avenue, Alsip, IL 60658.
(708) 597-4600
Environmental Alert Systems- Smoke Alarms and Flashing Light Signals

ReSound Corporation
220 Saginaw Drive, Seaport Centre, Redwood City, CA 94063.
(800) 582-4327
Hearing Aids and Accessories

Rogers Engineering Corporation
4805-B Eisenhower Avenue, Alexandria, VA 22304.
(703) 370-5628
Environmental Alert Systems- Security Systems, Light Signals, and Accessories

Rollins Protective Services Company
2170 Piedmont Road, Atlanta, GA 30324.
(404) 252-4440
Security Systems

Sammons Preston, Inc., A Bissell Healthcare Company
P.O. Box 5071, Boilingbrook, IL 60440-5071.
(800) 323-5547
Pediatric Speech Trainers

Schlage Lock Co.
2401 Bayshore Blvd., San Francisco, CA 94134.
(650) 541-8881
Environmental Alert Systems- Security Systems and Burglar Alarms

See-Sign Productions
15 Bluebill Avenue, Suite 1104, Naples, FL 33963.
(941) 598-3067
Sign Language Training- Computer Programs and Instructional Materials

Sennheiser Electronic Corporation
6 Vista Drive, P.O. Box 987, Old Lyme, CT 06371.
(860) 434-9190 (V); (860) 434-0509 (T)
Personal Amplification Systems and Accessories

SET INC 3205
Spyglass Drive, Vancouver, WA 98684-3724.
(360) 944-2029; (360) 260-1660
Personal Amplification Systems and Accessories; Speech Synthesizers

Seton Name Plate Company
P.O. Box 1331, New Haven, CT 06505.
(203) 488-8059 (V); (800) 243-6624 (V); (800) 824-7259 (T)
Environmental Alert Systems- Flashing Light Smoke Detectors

Shake Awake (Base Resource, Inc.)
181 S. Riverside Avenue, Croton-on-Hudson, NY 10520.
(914) 739-5602
Environmental Alert Systems- Vibrating Alarm Clocks; Personal Amplification Systems and Accessories

Siemens Hearing Instruments, Inc.
10 Constitution Ave., P.O. Box 1397, Piscataway, NJ 08855-1397.
(732) 562-6600; (800) 766-4500
Hearing Aids and Accessories

Silent Call Corporation
P.O. Box 868, Clarkston, MI 48347-0868.
(248) 673-0221 (V); (248) 673-6069 (T); (800) 572-5227 (V/T)
Environmental Alert Systems- Flashing Light, Doorbell, and Telephone Signals, Smoke Alarms, Vibrating Alarm Clocks and Pillows, and Tactile Paging Systems

SilentRadio, Inc.
20732 Lassen Street, Chatsworth, CA 91311.
(818) 718-4200; (800) 753-4888
Speech Processor/Stenotext Systems For Use With Large Audiences

Silver Creek Industries
1909 Silver Creek Road, P.O. Box 1988, Manitowoc, WI 54221.
(920) 684-1225; (800) 533-3277
Hearing Aids and Personal Amplification Systems; Transitional Lighting Digital Alarm Clocks

Solar World
2807 N. Prospect, Colorado Springs, CO 80907.
(719) 635-5125
Solar Pocket-Sized Hearing Aid Battery Chargers

Sonic Alert, Inc.
1750 W. Hamlin Road, Rochester Hills, MI 48309.
(248) 656-3110
Environmental Alert Systems- Flashing Light, Doorbell, Telephone, and Call Waiting Signalers, Smoke Alarms, Pillow and Bed Vibrators, Digital Flashing Alarm Clocks, Sound Monitors, and Tactile Paging Systems

Sound Resources, Inc.
201 East Ogden Avenue, Hinsdale, IL 60521.
(847) 323-7970
Environmental Alert Systems- Telephone and TV Amplifiers, Flashing Light, Doorbell, and Telephone Signalers; Bed Shakers

Specialsoft\ James Stamfield & Co.
P.O. Box 41058, Santa Barbara, CA 93140.
(800) 421-6534
Sign Language Training Computer Programs

Stanton Magnetics, Inc.
101 Sunnyside Blvd., Plainview, NY 11803.
(516) 349-0235
Speech Amplifiers and Speech Teaching Devices

Starkey Labs, Inc.
6700 Washington Avenue South, P.O. Box 9457,
Minneapolis, MN 55440.
(612) 941-6401; (800) 328-8602
Hearing Aids and Accessories

Subtle Impact Software, Inc.
7195 Sand Trap Drive, Colorado Springs, CO 80925.
(719) 382-5437 (V/T)
Sign Language Training Computer Programs

Suffridge and Treni Communications, Inc.
P.O. Box 1226, Ridgewood, NJ 07451.
(201) 445-5052
Personal Amplification Systems and Accessories

SunBelt Industries, Inc.
1254 Fish Hook Way, Point Verde Beach, FL 32082.
(904) 285-4788
Open and Closed Telecaptioning Decoders

Telecom International
28302 Industrial Blvd., # H, Hayward, CA 94545-4437.
(510) 343-3000 (V/T)
Telephone Communication Systems- TDDs, TTYs,
TTs, and Accessories; Hearing Aid Compatible Tele-
phones

Telephone Extension Corporation
83 E. Central Avenue, Pearl River, NY 10965.
(914) 735-7877
Environmental Alert Systems- Flashing Light and Bell
Telephone Signalers for Indoor and Outdoor Use

Telephone Pioneers of America New England Tele-
phone & Telegraph, Vermont, New Hampshire Chap-
ter
1228 Elm Street, Manchester, NH 0301.
(603) 645-2666
Helmet with Hearing Aid

Telesensory Corporation
520 Almanor Avenue, Sunnyvale, CA 94086.
(408) 616-8700; (800) 804-8004
Telephone Communication Systems- Braille TDD and
Accessories; Universal Modems for TDDs, TTYs, and
TTs

Telex Communications, Inc.
9600 Aldrich Avenue South, Minneapolis, MN 55420.
(612) 884-4051; (800) 328-3102
Binaural Hearing Aids and Accessories; Personal
Amplification Systems and Accessories, and Auditory
Trainers

Theodore N. Vail State Chapter Telephone
529 South 7th Street, # 4A, Springfield, IL 62721.
(217) 789-8066
Sound Activated Speech Therapy Aids

Tone Commander Systems
P.O. Box 97039, 4320 150th Avenue NE, Redmond,
WA 98052.
(425) 883-3600
Amplifiers for Telephones

Toys For Special Children
385 Warburton Ave., Hastings-On-Hudson, NY 10706.
(914) 478-0960; (800) TEC-TOYS
Environmental Alert Devices- Wireless and Vibrating
Pagers

Trident Technologies
3309 Winthrop, # 85, Fort Worth, TX 76116.
(817) 738-2485; (800) 366-9950
Telephone Communication Systems- Pocket-Sized/
Portable TDDs and TTs

Trinity Software,
Village Square, Suite 215, 607 Tenney Mountain
Highway, Plymouth, NH 03264.
(607) 536-9661; (800) 352-1282
Interactive Sign Language Computer Programs-
Games and Instructional Materials

Typewriting Institute for the Handicapped
3102 W. Augusta Avenue, Phoenix, AZ 85051.
(602) 939-5344
Carriage Return Light Signals

Ultratec, Inc.
450 Science Drive, Madison, WI 53711.
(608) 238-5400 (V/TTY); (608) 238-3008 FAX
Telephone Communication Systems and Accesso-
ries- TDDs and TTYs with and without printers

Universal Learning Technology
39 Cross Street, Peabody, MA 01960.
(508) 538-0036
Video Telecaption Systems

Universal Security Instruments, Inc.
10324 South Dolfield Road, Owings Mills, MD 21117-
3586.
(410) 363-3000
Closed Telecaption Decoders; Pediatric Direction
Tutorial Programs

Valiant Edcational Videos
18210 Sherman Way, Suite 106, Reseda, CA 91335-4554.
(818) 996-9512
Sign Language Training Computer Programs

Walker Equipment Corporation
P.O. Box 829, Highway 151 South, Ringgold, GA 30736.
(706) 935-2600; (800) 426-3738
Telephone Communication Systems and Accessories- TDDs and TTYs with and without printers; Amplifier Telephones

Western Psychological Services
12031 Wilshire Blvd., Los Angeles, CA 90025-1251.
(562) 478—2061; (800) 648-8857
Voice Output Speech Teaching Devices; Direct Selection Communicators

Whelen Engineering Co.
Route 145, Winthrop Road, Chester, CT 06412.
(860) 526-9504
Environmental Alert Systems- Smoke Alarms with Strobe Lights; Flashing Light, Doorbell, and Telephone Signalers

Williams Sound Corporation
10399 West 70th Street, Eden Prairie, MN 55344-3459.
(612) 943-2252; (800) 328-6190
Personal Amplification Systems and Accessories; Signal Amplifiers; Amplifier, Large Button, and Hearing Compatible Telephones

Won-Door Corporation
3609 Fox Glove Drive, Mid-Atlantic Branch Office, Huntingtown, MD 20639.
(410) 535-8620
Fire Resistant Doors

X-10 (USA), Inc.
91 Ruckman Road, Closter, NJ 07624-0420.
(201) 784-9700; (800) 526-0027
Environmental Alert Systems- Flashing Light, Doorbell, and Telephone Signalers; Security Systems

ZiCom Technologies, Inc.
636 Lorna Lane, Los Angeles, CA 90049-4217.
(619) 727-7110
Telephone Communication Systems- TDDs, TTYs, TTs and Accessories