

A standard cell phone can be a useful piece of assistive technology for a person with a disability. For example, it provides a way to call for assistance if a wheelchair or van lift breaks down, stranding a person. An employee with a disability may also be expected to use a cell phone on the job, the same as his or her coworkers. However, the trend toward smaller phones pose increasing access problems for people with disabilities effecting coordination or vision. New digital cell phones, quickly being adopted by the industry because they are more efficient, have compatibility problems when used with technology for people with hearing impairments.

### **FREQUENTLY ASKED QUESTIONS:**

#### **Why do hearing aid users hear a buzz/clicks when using a cell phone? Is there a solution?**

Current digital cell phone designs use a pulsing electrical current, and the magnetic field that results can be picked up in a hearing aid telecoil (t-coil), producing interference. Analog phones do not have this problem, but these systems are being phased out. Larger, more powerful, behind-the-ear hearing aids are reported to be affected more by the interference than smaller in-the-ear aids. People who use cochlear implants may encounter similar interference.

To avoid interference, the solution is to keep some distance between the two devices. For example, in-the-ear hearing aids may be less effected because they sit farther from the phone antennae. Neckloop accessories provide a microphone and t-coil listening connection so that the actual phone can be carried in a pocket away from the hearing aid. For example, Nokia's 'Loopset' consists of an inductive loop and box worn around the neck with a built-in microphone. AT&T Wireless Services and Motorola have similar products. Neckloops can be used only by people who have telecoils in their hearing aids to pick up the signal. Another approach is to use an external antenna accessory to keep the antenna's energy away from the ear, though this does not addresses the interference the phone's internal circuitry.

#### **How can a person use a cell phone if he or she is deaf?**

Ameriphone and Ultratec are two companies that have developed small, portable TTYs that can be used with a cell phone. Not all cell phones are TTY compatible, however. **Currently, digital cell phones can not accurately convert Baudot TTY tones back and forth to data for transmission, though new signal technology is expected later in 2002.** Until then, TTY users are limited to using analog cell phones. Note that dual analog/digital mode phones do not allow the user to choose which mode to use on a given call -- they simply allow a digital phone user to still use

their phone in areas with analog services. Dual mode phones have the same compatibility problems of digital phones.

Many people who are deaf are turning instead to text pagers or other text services. Short messages may be typed out on the phone's keypad. Companies such as **Wyndtell and ReachNET** provide two-way text pagers that can be used to send text messages back and forth. Note, however, that text pagers cannot be used to connect to 9-1-1 emergency services.

### **How can a person with a speech impediment use a cell phone?**

Speech to Speech (STS) is a service that enables individuals with speech impairments to communicate by telephone, including cell phones. This service provides 24 hour Communication Assistants (CA) who act as an intermediary for people struggling to be understood by the public on the telephone. An individual wishing to use STS service dials toll free to reach a CA. The CA facilitates the call by listening to the speaker with a speech impairment and then restating what the caller has said word-for-word. STS users can include people with cerebral palsy, a stutter, a laryngectomy, or people who use synthesized speech from a communication aid. To try STS or get more information: Call 800-854-7784 or visit the STS web site at <http://stsnews.com>

### **What features should a person look for on standard cell phones?**

With new technology products coming out every day, it is difficult to provide information about the accessibility of specific products. A person with a disability who is looking to purchase a cell phone will need to try out various products. However, depending on the person's disability, there are some specific features to consider.

#### *Sound amplification*

Many cell phones with Speakerphone features can provide as much as 20 db amplification for people with hearing impairments.

#### *Hearing aid compatibility*

As mentioned earlier, current cell phones have compatibility problems with digital cell phones. Look for a phone that has a 2.5 mm headphone jack that can be used to connect a neck induction loop for magnetic t-coil coupling.

#### *TTY compatibility*

Currently, no digital cell phones are compatible with TTYs though new technology should be available later in 2002. For now, use an analog cell phone and look for a phone that has a 2.5 mm headphone jack that can be used to connect a TTY.

#### *Vibrating alert*

People who have trouble hearing a telephone ring may want a phone that provides a vibration when a call is received. Many phones have this feature and either vibrate, or have a remote accessory that vibrates.

#### ***Hands-free voice dialing / phone control***

Not only can hands-free dialing be useful for a person with a disability effecting coordination, it can be useful for people with visual impairments who have trouble finding numbers on a keypad

or people with cognitive disabilities who have trouble remembering phone numbers. In addition to dialing a phone by voice, some phones can be answered with a voice command.

### *One-key speed dialing*

As with hands-free dialing, the ability to dial a phone number by pressing a single button can be a useful feature for just about any disability. Fortunately, this is also a common feature that is provided on most cell phones.

### Tegic T9 word prediction - many

### All controls on front of phone for use with mouthstick, not a clam shell or flip phone

### *Tactile keypads*

A person with a visual impairment can memorize the order of number buttons on a cell phone, but it is important that he/she be able to feel the buttons accurately. Look for a phone that has raised buttons, or a phone where the flat buttons are recessed. A tactile mark, or nib, on the middle '5' key can help an individual determine button positions; most phones already have this feature.

### *Backlit keypads / displays??*

People with low vision may be able to see the labels of a phone with less difficulty if they light up.

### *Voice output menus / voice output caller id / auditory buttons identification*

Voice output cues are not currently available on cell phones.

### Large print on display with scrolling ?

### **What types of adaptive cell phones exist?**

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VCO (voice carry-over) devices allow a person to read TTY information but speak for themselves when using a phone.

The cell phone's microphone will turn off when a cable is plugged into the phone's audio jack, and you will not be able to talk into the phone. Different VCO products approach this problem in different ways. Ameriphone (Q90) provides a microphone built into the TTY. Krown Manufacturing (Pocket VCO) picks up the TTY signals from an acoustic coupler to the cell phone's earpiece so that the device does not need to plug into the audio jack.

VCO devices still encounter the TTY compatibility problems discussed earlier.

also:

magnifier, text pagers, other?

## **OTHER INFORMATION RESOURCES:**

Cellular Telecommunications Industry Association (CTIA)  
[http://www.wow-com.com/consumer/access\\_wireless/](http://www.wow-com.com/consumer/access_wireless/)

Federal Communications Commission (FCC) Consumer Information Bureau  
<http://www.fcc.gov/cib/dro/>

Rehabilitation Engineering Research Center (RERC) on Telecommunications Access  
<http://www.trace.wisc.edu>  
<http://tap.gallaudet.edu>

RERC on Hearing Enhancement (information on compatibility with hearing aids)  
<http://www.hearingresearch.org>

RERC on Wireless Technology  
<http://www.wirelessrerc.gatech.edu>

WirelessAdvisor.com  
<http://www.wirelessadvisor.com>  
Lists standard (not necessarily accessible) wireless services provided across the U.S.

## **PRODUCT RESOURCES:**

AOL

A&T

Pacific Bell

SkyTel

ReachNET

Wynd Communications

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Ultratec

Soundbytes

Nokia

Audex

Lober & Walsh Engineering