

# Phone Solutions to Fit Every Need

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The phone is used globally as a means of communication for both business and pleasure as well as for safety reasons. The inability to communicate on the phone is linked to a self-reported reduction in the quality of life among individuals with hearing loss. When fitted with hearing instruments, inadequate success with the phone also reduces perceived success overall with amplification. Several factors contribute to experienced difficulties communicating on the phone; these include the absence of visual cues, inappropriate or inadequate methods of using the phone with hearing instruments, the presence of background noise, and feedback. Finding the right phone solution for every end user is therefore central to successful hearing instrument use. ReSound offers phone solutions to fit every need.

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## Introduction

The phone is used globally as a means of communication. The level of need for phone use, the environment in which the person uses the phone, and the types of phone are variable,<sup>1</sup> but some degree of need for adequate phone use is common to the vast majority of the world population. An inability to communicate on the phone has been linked at a statistically significant level to a perceived reduction in the quality of life among individuals with hearing loss.<sup>2</sup> Recent reports indicate that phone solutions with contemporary hearing instruments reduce the level of experienced hearing handicap by about 60%.<sup>3</sup> Despite the potential impact on quality of life that successful phone use can provide, many hearing instrument users still fail to perform at a satisfactory level on the phone,<sup>4</sup> and failure to use hearing instruments with the phone is reported as one of the main reasons why hearing instrument owners do not use their hearing instruments.<sup>5</sup>

There are several factors that contribute to experienced difficulties communicating on the phone. These include the absence of visual cues, inappropriate or inadequate methods of using the phone with hearing instruments, and the presence of background noise.<sup>6,7</sup> Some hearing instrument users opt to remove the hearing instrument when using the phone, due to a lack of perceived benefit or a reduction in perceived speech understanding when using hearing instruments on the phone. This is problematic, as phone use may be one of the main reasons why people with hearing loss initially pursue amplification. Finding the

right phone solution for every end user is therefore central to successful hearing instrument use. For this reason, ReSound strives to offer phone solutions with hearing instruments and accessories to fit the needs of nearly every individual.

## ReSound's Menu of Phone Options

All technology to connect hearing instruments to mobile phones and landline phones has one major functional goal – to improve the signal-to-noise ratio, thereby making speech easier to hear in the presence of background noise. The phone can be used directly with the hearing instruments by holding the receiver to the ear. Other methods of using the phone with hearing instruments include the use of inductive telecoil technology and digital wireless signal routing.

## Traditional Phone Use with Hearing Instruments

Although it is possible and natural to hold the phone next to the hearing instrument, there is a significant risk of feedback if the gains are set relatively high and/or if the fitting is open.<sup>1</sup> Feedback occurs most often when the phone receiver is held in close proximity to the hearing instrument. Fortunately, the last decade has seen the development of feedback management algorithms aimed at significantly reducing feedback. ReSound Verso offers DFS Ultra II, a feature designed to control feedback even in extremely dynamic situations such as when a phone is held near the hearing instrument during a typical phone conversation. Overall gain is preserved while only the feedback is eliminated. The feature models both the feedback path and

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rediscovers hearing

the input signal, which improves its accuracy in identifying true feedback from other tonal input sounds. Recent improvements in precision and scaling result in a higher degree of accuracy in cancelling feedback than was previously possible. In sum, DFS Ultra II offers increased stable gain and combats feedback in the most difficult situations, while preserving overall sound quality.

### **Inductive Telecoils**

For some users with high gain requirements, regular hearing instrument use with the phone does not provide adequate benefit. In many cases, these users rely on inductive telecoils for phone use. Telecoil technology is a wireless signal transmission strategy aimed at providing an enhanced phone signal by amplifying the stray magnetic field from the phone handset.<sup>8</sup> Telecoil systems have been an integrated part of hearing instrument technology for many years. Typically, these systems require the individual to manually activate a specific telecoil program in the hearing instruments. When using a telecoil program for listening on the phone, the hearing instrument microphone can be turned off, which enhances the signal-to-noise ratio for that ear. With no simultaneous microphone input, there is no acoustic sound transmission and feedback is not a concern. When some degree of environmental sound awareness is desirable, the hearing instrument microphone may be activated along with the telecoil. Aside from phone use, telecoils integrated in hearing instruments can also be used to achieve a better signal-to-noise ratio in public areas that are equipped with looping technology, such as theaters.

### **ReSound's PhoneNow Feature**

PhoneNow is a feature that automatically switches the hearing instrument to a phone program. If there is no telecoil in the hearing instrument, an acoustic phone program with a frequency response optimized for use with the phone is selected. If the hearing instrument also contains a telecoil, PhoneNow can be programmed to switch to inductive transmission of the phone signal through the telecoil. Regardless of the presence or absence of a telecoil in the hearing instrument, PhoneNow is activated through a small magnet that is affixed to the phone receiver. When the phone with the magnet affixed is brought next to the hearing

instrument, PhoneNow will cause the hearing instrument to switch to the telephone program.

When speaking on the phone in noisy environments, hearing instrument users may experience amplified ambient noise in the non-phone ear. The room noise picked up by the non-phone ear can make listening on the phone a more difficult task. With the introduction of bilateral wireless streaming between the hearing instruments in a binaural fitting, the PhoneNow feature has been further enhanced to include Comfort Phone. Comfort Phone utilizes the bilateral wireless synchronization between hearing instruments to identify the "phone ear" and the "non-phone ear." The amplification for the non-phone ear is then attenuated by 6 dB. This reduces the level of disturbance caused by the amplification of sounds and background noise in the listening environment, and by extension, reduces the listening effort required in this situation. However, the non-phone ear still does receive some sound inputs in the environment, which allows the user to have a more natural yet easier experience while using the phone. When the user ends the phone conversation, both hearing instruments automatically return to their previous or optimized microphone program and volume setting.

The phone solutions that have been discussed so far present the phone signal monaurally. This is the natural mode of using the phone, employed by unaided listeners as well. The alternative to monaural listening is binaural listening. Binaural listening affords several benefits, including improved speech recognition. The following section discusses digital wireless streaming in combination with phone use and the binaural listening advantages offered by this technology.

### **Digital Wireless Streaming**

ReSound Unite wireless technology provides a robust wireless connection, made possible through the ReSound Range™ II integrated chip and the use of proprietary 2.4 GHz wireless technology. This technology enables the transmission of the signal over longer distances, at least 7 meters. Proprietary 2.4 GHz technology limits interference from other devices and allows for a smaller antenna to be integrated into the hearing instrument.

One of the main benefits of wireless signal routing is the simultaneous delivery of the signal to both ears. Several lines of evidence suggest that listening with two ears generally results in better results than listening monaurally.<sup>6,9,10</sup> Binaural hearing instrument use improves speech perception both in quiet and in noise, and also improves horizontal localization abilities.<sup>10,11,12</sup> In a recent study, Picou and Ricketts<sup>6</sup> observed significant benefit when speech was transmitted bilaterally in the presence of several different noise configurations. This benefit was attributed to binaural summation (or binaural redundancy), and binaural squelch. However, the drawback to binaural listening to a streamed signal such as the phone conversation is the loss of environmental sound awareness. This is especially true if no microphone input is selected along with the streamed signal.

The new Unite Phone Clip+ is a small wireless accessory that links a Bluetooth-enabled mobile or landline phone to the hearing instruments. As a small device, it can be affixed to the clothing. The phone signal alone can be transmitted to both ears simultaneously, resulting in improved speech intelligibility in both quiet and noisy surroundings. It is possible to add hearing instrument microphone input to the streamed signal, and the amount of microphone versus streamed signal can be adjusted through the microphone-streaming balance in the Aventa fitting software and via the Unite Remote Control. The sound received in the hearing instruments for the streamed and/or microphone input is amplified as programmed for the individual user, accounting for the specific frequency response needed for the individual's hearing loss.



The ReSound Unite Phone Clip+

In addition to streaming sound from the phone directly to the hearing instruments, the Phone Clip+ also offers other functionality. This functionality applies regardless of whether the user is on the phone. Conveni-

ently located on the front of the Phone Clip+, there is a mute button (“M”) and a program button (“P”). Volume adjustments can be made through the “+/-“ buttons on the side of the device. The table below shows the functionality of these controls both when the user is using and not using phone.

Condition/Function	During a Phone Call	Not During a Phone Call
Mute button	Mutes the hearing instrument microphone(s)	Mutes the hearing instrument microphone(s)
Program button	n/a	Changes hearing instrument program binaurally
Volume changes	Controls volume of the caller	Controls volume of the hearing instrument binaurally

Operation of the Phone Clip+ controls during and outside of a phone call.

An on/off switch is included on the side of the Phone Clip+. Separate LED lights indicate the operational status. Directional microphones are integrated in the device, and covered with a wind screen to reduce wind noise when using the Phone Clip+ outdoors. A new swivel-clip is also included, to optimize the directional response of the microphones and to facilitate attaching to the user's clothing.

### Conclusions

The need to communicate on the phone is universal. In many instances, the desire for better listening abilities on the phone is the driving force behind people with hearing loss deciding to pursue amplification. Lacking success in this area can often lead to a decreased use of hearing instruments overall. It is therefore crucial that the clinician identifies the best phone solution for the needs of the individual hearing instrument user. ReSound offers a wide array of phone solutions, including digital wireless technology that takes advantage of binaural listening benefits such as improved speech intelligibility. For hearing instrument users who desire the most natural phone experience along with environmental awareness, the Comfort Phone enhancement of the PhoneNow feature may be optimal. From natural acoustic transmission of the phone to the hearing instruments to wireless accessories, ReSound offers phone options to fit every need.

## References

1. Palmer, C., Ring, ring! Is anybody there? Telephone solutions for hearing aid users. *The Hearing Journal*, 2001. 54(9): p. 10-18.
2. Dalton, D.S., et al., The impact of hearing loss on quality of life in older adults. *Gerontologist*, 2003. 43(5): p. 661-8.
3. Kochkin, S., MarkeTrak VIII: Patients report improved quality of life with hearing aid usage. *The Hearing Journal*, 2011. 64(6): p. 25-32.
4. Desjardins, J.L. and K.A. Doherty, Do experienced hearing aid users know how to use their hearing aids correctly? *Am J Audiol*, 2009. 18(1): p. 69-76.
5. Kochkin, S., MarkeTrak V: "Why are my hearing aids are in the drawer": The consumer's perspective. *The Hearing Journal*, 2000. 53(2): p. 34-41.
6. Picou, E.M. and T.A. Ricketts, Comparison of wireless and acoustic hearing aid-based telephone listening strategies. *Ear Hear*, 2011. 32(2): p. 209-20.
7. Mackersie, C.L., et al., Evaluation of cellular phone technology with digital hearing aid features: effects of encoding and individualized amplification. *J Am Acad Audiol*, 2009. 20(2): p. 109-18.
8. Goldberg, H., Telephone amplifying pick-up devices. *Hearing Instruments*, 1975. 26: p. 19-20.
9. Kochkin, S. and F. Kuk, The Binaural Advantage: Evidence From Subjective Benefit & Customer Satisfaction. *The Hearing Journal*, 1997. 4(4): p. 29,30,31,32,34.
10. Boymans, M., et al., A prospective multi-centre study of the benefits of bilateral hearing aids. *Ear Hear*, 2008. 29(6): p. 930-41.
11. Hawkins, D.B. and W.S. Yacullo, Signal-to-noise ratio advantage of binaural hearing aids and directional microphones under different levels of reverberation. *J Speech Hear Disord*, 1984. 49(3): p. 278-86.
12. Kobler, S. and U. Rosenhall, Horizontal localization and speech intelligibility with bilateral and unilateral hearing aid amplification. *Int J Audiol*, 2002. 41(7): p. 395-400.

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