

# Field Study News

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## RogerReady Automating the Roger™ experience

Phonak continuously strives to improve listening in complex environments for hearing aid users of all ages. The new RogerReady feature, available in Sky V and Naída V hearing aids, combines the benefits of a wireless system with the hearing performance afforded by automatic activation. In this study, technical measurements were performed to evaluate the activation- and deactivation time of RogerReady. Results revealed that this feature consistently captures remote microphone input in less than 400 ms, confirming that the RogerReady feature grants nearly instantaneous access to the Roger microphone signal. Based on these results, the RogerReady feature has been applied as the default setting for DSL fittings in Phonak Target Junior mode for the pediatric population, enabling more seamless application of automatic activation of the Roger program in the hearing aid.

### Introduction

It has been universally recognized that use of a Roger wireless communication system or personal FM will improve the speech perception and understanding for the hearing impaired child in the classroom (Thibodeau 2010; Anderson, Goldstein, Colodzin & Iglehart 2005; Boothroyd & Iglehart 1998). These devices have also been shown to provide significant benefit for individuals with auditory processing disorder, single sided deafness, and autism spectrum disorder by improving the signal-to-noise ratio (Rance, Saunders, Carew, Johansson & Tan 2013; Schafer et al 2012; Johnstone, John, Hall & Crandell 2009; Tharpe, Ricketts & Sladen 2003).

Previously, ensuring that remote microphone signals were easily accessible through the hearing aid often necessitated selecting a basic listening program that would incorporate direct audio input (DAI). These dedicated Roger/DAI +Mic programs excluded the use of advanced sound cleaning features available in the hearing aid. While this is a conservative approach to fittings, this hierarchy ensured that children would have dependable, automatic access to speakers, particularly teachers, using a remote microphone. This Roger/DAI configuration does not allow children to take advantage of Phonak automatic technology which has now been optimized for the listening environments of a child's life. AutoSense Sky OS is the Phonak pediatric operating system that allows for automatic adaptation of the hearing aid based on the listening scene. This system steers base program activation, gain model, and the activation of directional microphones, as well as other sound cleaning features. In the current default configuration for DSL fittings, older children have access to the automatic program and the associated sound cleaning features via a button press. Research has shown, however, that many

children do not reliably change their hearing aid program for different listening environments (Ricketts, Picou, Galster, Federman & Sladen 2010). So even when the automatic program is available, it is likely that many children did not consistently activate it. As a result, hearing performance in challenging listening environments such as working in groups, recess, and lunch time was sacrificed to ensure instantaneous and reliable access to Roger. This leaves children at a listening disadvantage when the wireless microphone is not in use, because the child is limited to using one default program in all environments encountered throughout the day. Wolfe (2016) has shown that use of a hearing aid automatic mode can have performance and comfort benefits for children that are not realized in a designated basic program that is typically applied as the default.

Automatic hearing aid capability is now available to pediatric hearing aid users, with no risk of incorrect program-switching, nor the need for manual activation due to a new feature, RogerReady. RogerReady activates the Roger/DAI+Mic program whenever speech inputs are detected by the Roger microphone. For children whose hearing aids are configured to start up in AutoSense Sky OS, RogerReady eliminates the need for a manual Roger/DAI+Mic program, and the need to have the Roger/DAI+Mic program as the startup default. AutoSense Sky OS can now be assigned as the startup program, and with RogerReady activated, the system is designed to consistently and reliably provide immediate access to the signal detected from the Roger transmitter.

## Methodology

This study was performed at the Phonak Audiology Research Center (PARC) in the USA (Warrenville, Illinois). The tests were conducted in a double-walled, sound-treated booth, using binaural Sky V90-P BTEs coupled to KEMAR's (Knowles Electronic Mannequin for Acoustic Research) ears with standard BTE couplers. The hearing aids were programmed using a flat 50 dB sensorineural hearing loss. Roger 18 design-integrated receivers were attached to the hearing aids and connected wirelessly to a Roger inspiro transmitter. AutoSense Sky OS was programmed as the startup program with the Roger/DAI+Mic triggered automatically via RogerReady. There were no manual programs accessible, and easy beeps were disabled, per the Junior mode fitting defaults. The aids were placed on KEMAR inside of the booth. The Roger inspiro was hung in front of a loudspeaker, located approximately two meters outside of the sound booth, with the iLapel microphone attached 20 cm below the center cone of the speaker. A diagram of the set up can be seen in figure 1. The target stimulus used was female speech taken from an audiobook. The stimulus was played via Adobe Audition software and was calibrated to 80 dBA at the inspiro microphone. Five minutes of recorded silence preceded the speech passage, thus ensuring the hearing aids were in AutoSense Sky OS. Once the sound file was started, both the sound booth and the outside room were vacated for the entire testing period.

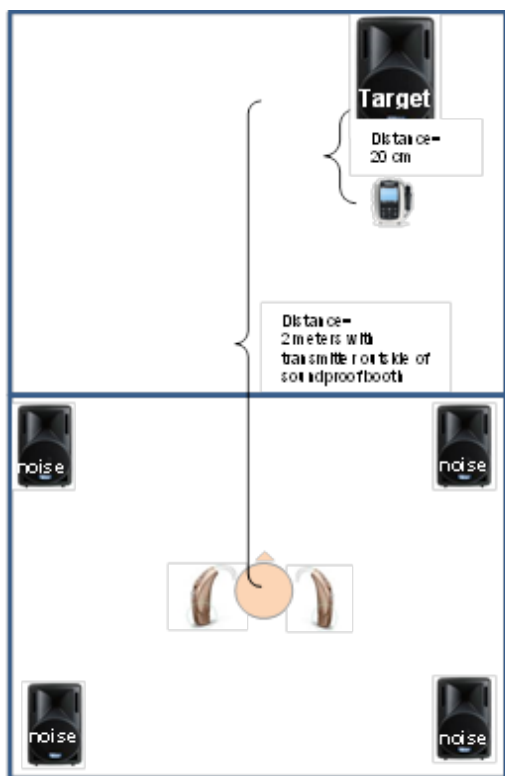


Figure 1. Sky V90-P hearing aids were placed on KEMAR's ears in the sound booth with door closed. The Roger inspiro was hung from a loudspeaker outside of the booth. The microphone of the inspiro was 20 cm below the center cone of the loudspeaker to simulate a teacher wearing an inspiro iLapel.

Deactivation or switching out of the Roger/DAI+Mic program was also assessed. The previously described arrangement was used for

this measurement. Additionally, a stimulus consisting of 4-talker babble was played through the speakers in the sound booth with KEMAR. The environmental mic was disabled in the Roger/DAI program to allow for clear distinction between the Roger/DAI program and AutoSense Sky OS. Visual analysis of the recordings from KEMAR's ears confirmed precisely when the hearing aids switched out of the Roger/DAI program and back into AutoSense Sky OS, as the hearing aid microphones resumed amplifying the babble in the sound booth.

## Results

Adobe Audition software was used to analyze the recording from the hearing aids placed on KEMAR. The acoustic signal started precisely five minutes after the recorded silence. The Roger program was activated in less than 400 ms from the onset of the target stimulus (see Figure 2). These results were replicated ten times. In each trial, less than one syllable of speech directed to the Roger microphone was missed. An example of the original passage is seen below with the missed phoneme crossed out:

"~~B~~esides the beautiful birch..."

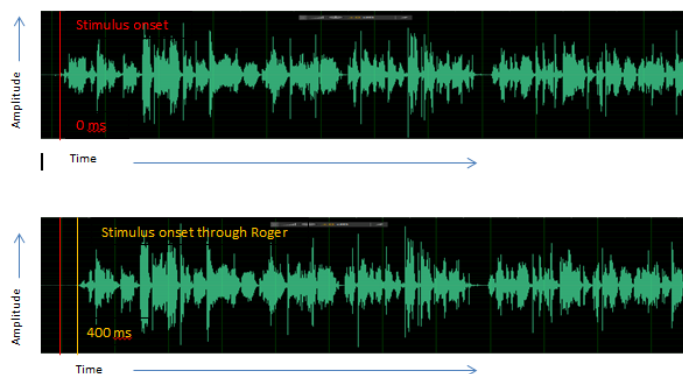


Figure 2. Analysis from Adobe Audition software. The top graph is the raw stimulus with the red vertical line indicating when the stimulus begins. In the bottom graph, the red vertical line again indicates the start of the stimulus, while the yellow vertical line indicates the onset of speech through Roger. The time between the red and yellow lines is the activation time of RogerReady. The time difference between the red and yellow lines was repeatedly 400 ms.

This recording was done with the Easy Beeps disabled in the hearing aid. It's worth noting, if the Easy Beeps are enabled, the activation time extends to an average of 830 ms, resulting in three syllables being missed in all trials. Therefore the Easy Beeps are disabled by default for all Target Junior mode fittings. These results show that the automatic activation of the Roger/DAI+Mic program is fast and can be used with minimal loss of speech content. The activation of earlier versions of EasyFM was as long as 2.0 seconds (Dechant, 2010).

Deactivation was measured as the time it took the devices to switch out of the Roger/DAI program and back into AutoSense Sky OS. This was validated by the Adobe Audition recording as seen in figure 3. In the ten trials, the hearing aids automatically switched back into AutoSense Sky OS within 50 seconds of the speech stimulus ending. For testing purposes, the

hearing aid microphone was disabled in the Roger program. However, in normal use, children would have uninterrupted access to the hearing aid microphone in the Roger program and in AutoSense Sky OS.

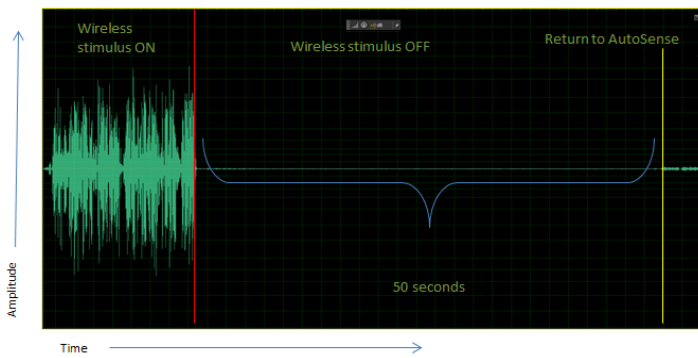


Figure 3. The deactivation of RogerReady is 50 seconds from the time the stimulus is off to the exit from the Roger program and into AutoSense Sky OS. The return to AutoSense Sky OS can be visualized by the presence of noise presented to the hearing aid microphones which is seen as a low amplitude input in the segment of the recording past the yellow line.

## Conclusion

Phonak Junior mode defaults for DSL fittings provide children nine years of age and older with Roger/DAI+Mic as the start-up program and AutoSense Sky OS as an alternative manual program. This study confirms the new RogerReady feature consistently and reliably governs switching into and out of the Roger/DAI+Mic program. Roger activation was achieved within one syllable of the onset of speech through the Roger microphone. Deactivation also occurred reliably, allowing children the benefit of resuming the performance and comfort benefits of an adaptive hearing aid operating system when speech was not present at the Roger microphone. These results are favorable for the application of the RogerReady feature for children of all ages.

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## Authors and investigators



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