REXTON BICORE
AUTOECHO REDUCER

HANDBOOK

JULY 2022

REXTON

INTRODUCTION

As we go about our day, we encounter various situations, each with different sound environments. In order to truly rely on our hearing in these constantly changing environments, speech must be intelligible in all situations. Some settings might be especially challenging to hearing aid users due to reverberations, such as lecture halls, places of worship, or even tiled rooms at home.

In the past, for reverberant situations, Rexton has offered Reverb Reducer in a dedicated signal processing algorithm active in a dedicated reverberation program. Now Rexton BiCore introduces **AutoEcho Reducer**, which automatically scans the environment and reduces the effects of disturbing reverberation on the perceived sound signal. This means the hearing aids are doing the hard work, while hearing aid users can focus on daily life rather than worry about their hearing.

AutoEcho Reducer is a solution for reverberant environments, such as rooms with plain surfaces like tiled floors, blank walls, large windows, etc. Sounds can be reflected by those surfaces and bounce back, arriving at the listener's ears later than the original sound. Not all sound reflections are unwanted; early reflections are very important to us to reliably identify the environment we are in. They make sure that what the ear hears matches what the eyes see. If sound reflections are completely missing, like in anechoic chambers, people feel very uncomfortable and can get dizzy after a short while.

Late reflections, which are sounds that may have bounced of several surfaces before they reach the listener's ears, can however become a problem for hearing aid users. In order to fit all sounds – soft and loud – to the reduced auditory range of hard-of-hearing individuals, hearing aids have to amplify soft sounds more than louder sounds. This can lead to overamplifying the very soft late sound reflections in a reverberant environment. In this case, amplification of late sound reflections interferes with wanted sound like speech, making it difficult for hearing aid users to follow a conversation.
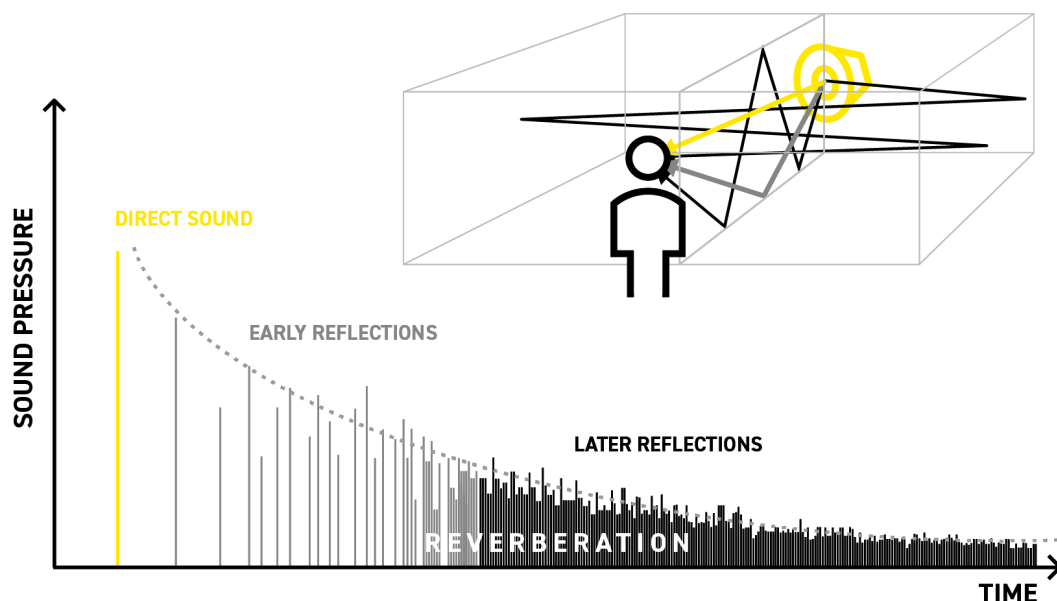
Figure 1. Illustration of direct sound, early reflections and later reflections when an impulse sound is transmitted to a listener in a room with reverberation.

When the sound is speech, the direct sound and early reflections both contribute positively to speech intelligibility at the position of the listener, whereas the later reflections may have a deteriorating effect if they are so loud that they cause temporal and spectral smearing that distorts the speech.

The problems caused by reverberation are experienced by all listeners, both with and without hearing loss. However, for people wearing hearing aids, the problems may be increased due to the non-linear gain, which typically is provided by modern hearing aids. The fact that gain is higher for lower input means that rather soft late reflections may be overamplified to a degree where they create additional problems for the wearer when listening to speech in reverberation.

To address this issue, Rexton BiCore hearing aids constantly measure room acoustics-related information from the input signal. AutoEcho Reducer analysis can accurately differentiate between direct sound, early reflections, and later reflections in any room, within a few seconds. This analysis also provides an estimate of the amount of potentially disturbing later reflections and passes this information to the processing module of AutoEcho Reducer (see Figure 2).
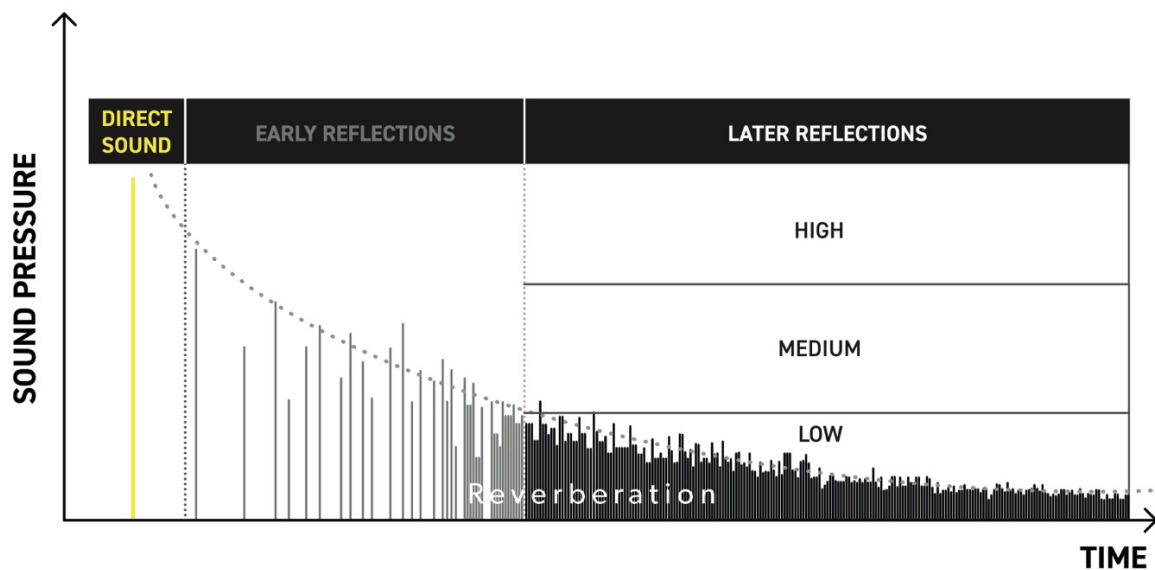
Figure 2. Differentiation of direct sound, early reflections and later reflections

HOW IT WORKS

As the name indicates, the AutoEcho Reducer feature builds on some of the same principles that are already applied in the dedicated Reverb Reducer program. However, as opposed to the manually selected program which only includes one setting of the processing, AutoEcho Reducer automatically scans the environments and kicks in when needed, and it adjusts its processing to the detected amount of reverberation in the room where the wearer is present. Thus, AutoEcho Reducer constantly optimizes the processing to the acoustic surroundings, no matter whether this includes low or high amounts of reverberation.

PREREQUISITES
- Install Connexx 9.7, Rexfit 9.7.0
- Update hearing aid firmware if necessary
- Once firmware updated, AutoEcho Reducer is available for performance level 80

ACTIVATE AUTOECHO REDUCER

AutoEcho Reducer will automatically be part of the Automatic Program after First Fit for BiCore performance level 80. You can see whether the feature is active or not in the *Fine Tuning* section in Connexx under *Noise Reduction/ Microphone* (Figure 3). It is not recommended to deactivate the feature.

If it is desired, you can still set up a dedicated *Reverberant* Room program in the *Program Handling* section of Connexx.

Rexton AutoEcho Reducer – Handbook

In case you would like to offer AutoEcho Reducer to a client who already wears Rexton BiCore hearing aids, connect the devices to Connexx and update firmware if a firmware update is offered. Once the firmware is updated, AutoEcho Reducer will automatically be active in the Automatic Program. In case the wearer already had a Reverb Reducer program and would like to keep using it, delete and create again to incorporate update.
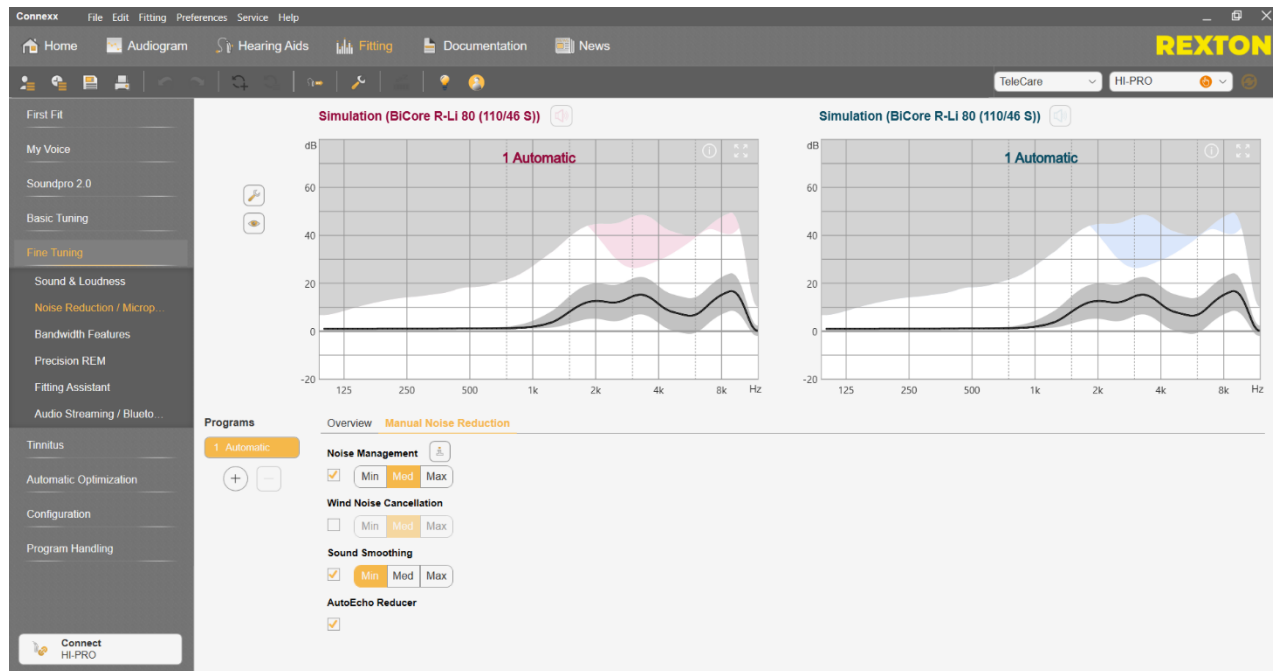

Figure 3. AutoEcho Reducer is automatically active

RELY ON REXTON

We believe that nothing hearing related should ever be left to chance, both for the people with hearing loss, and those who depend upon them. We understand their challenges and we meet them with proven hearing technology that is made Lifeproof so it can be counted upon to perform reliably in even the harshest environments. At work, at home, during leisure time, exercise and in all weather, you can always **RELY ON REXTON**.

**GETTING
THE JOB DONE
SINCE 1955**

WWW.REXTON.COM