

# Patient-Focused 2.4 GHz Accessories: Empowering Patients to Hear Better and Live Better



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At Starkey, helping people hear better and live better is the foundation of what we do. Our comprehensive line of 2.4 GHz accessories provides solutions for everyday situations in which hearing aid users struggle the most. With many options to choose from, and the ability to pair up to five accessories to 2.4 GHz Thrive platform hearing aids, all patients can reap the benefits of our versatile accessories, ensuring they are empowered to engage with their world like never before.

## Table Microphone

With Starkey's latest remote microphone solution, patients will benefit from the increased speech understanding in noise that multiple microphones can provide. Using eight built-in directional microphones and beam-forming technology, our Table Microphone (Figure 1) can stream conversations directly to patients' hearing aids. Using four streaming modes, a seamless listening experience can be achieved in challenging environments. Automatic and Manual mode are ideal for listening to speech in noise, such as at family gatherings or noisy restaurants. In Automatic mode, the Table Microphone automatically detects the dominant speech signal and dynamically switches the active



*Figure 1: 2.4 GHz Table Microphone*

microphone towards that direction while simultaneously reducing background noise. In Manual mode, the user can simply tap the top of the device to change the direction of the beam and select up to two speakers to focus on. For quiet environments, Surround mode activates all of the microphones and amplifies sound from every direction. If a user wishes to use the device as a personal remote microphone, by simply attaching the device to a magnetic lanyard and placing it around the conversational partner's neck, a vertical orientation will be detected, and the directional beam will automatically focus upwards on their mouth.

## Remote Microphone +

For users seeking multiple solutions for their listening challenges, the Remote Microphone + (Figure 2) offers an all-in-one solution. With our first 2.4 GHz accessory to offer streaming capability from multiple audio sources, users can simply select which setting they desire for a seamless streaming experience in any environment. Using an integrated sensor, the Remote Microphone + changes its focus based on its physical orientation. When worn by a speaker in the vertical position, the Remote Microphone + focuses on the speaker's voice and reduces background noise. When placed horizontally (e.g. on a tabletop), the Remote



*Figure 2: 2.4 GHz Remote Microphone +*

Microphone + gathers sound from every direction. Patients may also take advantage of the FM mode or on-board telecoil to stream audio from other inputs, making this the ideal solution for patients who do not have a telecoil setting in their hearing aids. For instances where a patient desires phone streaming capability, but does not own a compatible mobile phone, the Remote Microphone + is compatible with Apple®, Android™, and most mobile phones with Bluetooth® technology and can stream phone calls and other audio (e.g. music) directly to 2.4 GHz Thrive platform hearing aids. For audio sources without Bluetooth, a line-in cable can directly attach the Remote Microphone + to an electronic audio source, such as a computer, and stream audio directly to the hearing aids.

### Mini Remote Microphone

For those who desire a single-purpose remote microphone for one-on-one conversations where noise or distance prevents easy listening, the Mini Remote Microphone (Figure 3) is an elegantly simple device that allows users to focus on a single speaker. If desired, it may also provide benefit when watching television by placing it near the television's speakers.



Figure 3: 2.4 GHz Mini Remote Microphone

### TV Streamer

The inability to understand speech on television may be one of the top complaints from individuals who have difficulty hearing, often leading to in-home disagreements on a comfortable volume. The TV streamer (Figure 4) offers a direct solution to this common complaint by directly streaming television audio to a patient's hearing aids. The hearing aid user can listen to the TV at a



Figure 4: 2.4 GHz TV streamer

comfortable volume, while their loved ones are able to listen to audio from the TV speakers. With a streaming range of up to 50 feet, patients may experience exceptional sound quality while moving around their house watching their favorite show.

### Remote

Dexterity issues resulting in difficulty using the on-board hearing aid user controls or the desire to make discreet adjustments without the use of a smartphone can be resolved using the Remote (Figure 5). Featuring a simple and intuitive design, patients can make multiple adjustments to their hearing aids such as volume, memory changes, or mute. The Favorite button can be programmed in Inspire to either start/stop an audio stream, start/stop the Multiflex Tinnitus stimulus, activate Comfort Boost, an aggressive noise reduction feature, or jump to memory 4. Featuring a long battery life, the Remote is ready to use right out of the box, requiring no battery changes or need for charging.



Figure 5: 2.4 GHz Remote

### Thrive Hearing Control App

The Thrive Hearing Control app (Figure 6) gives patients ultimate control over 2.4 GHz Thrive Platform hearing aids. Providing convenient tools and Healthable technology, the Thrive app serves as a “one-stop-shop” for patients with diverse needs. Patients not only can easily manage hearing aid volume and memory changes, but they can also customize professionally programmed memories for specific environments, track brain and body health, manage streaming



Figure 6: Thrive Hearing Control app

from any of their 2.4 GHz accessories, and utilize many other features within the app such as Remote Programming, Fall Alert, and Self Check. Basic and Advanced modes of the mobile app are also available. Advanced mode provides full functionality for every feature, whereas the Basic mode allows for volume and memory adjustments, simple customization of memories, Remote Programming, and Fall Alert.

### Mini Turbo Charger

For patients experiencing the convenience of Starkey’s lithium-ion rechargeable hearing aids, there may be moments when a quick charge is needed when on the go. The Mini Turbo Charger (Figure 7) is a pocket-sized solution that features an on-board battery capable of completely charging hearing aids in under three hours, up to four times. When the hearing aids are nearly depleted, the charger provides enough battery life for 3.5 hours of hearing aid use in just seven minutes. The added value and convenience of this accessory makes it an excellent complimentary device for active patients who desire the confidence and security of a power source when traveling, camping, or who are otherwise on the go.



Figure 7: Mini Turbo Charger

### Clinical Validation

During the development process, Starkey conducts validation studies to ensure products and accessories meet patient needs. Prior to our most recent release, a validation study consisting of 23 participants (13 males and 10 females) with an age range of 51 to 80 (mean age of 69) years old were fit with Livio Edge AI hearing aids for a period of six to seven weeks. All the participants used either the Apple or Android version of the Thrive app. In addition, twenty participants opted to use either a Remote, TV streamer, Remote Microphone +, Mini Remote Microphone or

the Table Microphone. All participants had, on average, a symmetrical bilateral moderate-to-severe sensorineural hearing loss. They were fit with various styles of Livio Edge AI hearing aids, programmed to Starkey’s proprietary fitting formula e-STAT (Scheller & Rosenthal, 2012), with venting appropriate for their hearing losses. The functionality of the mobile app and each accessory was discussed with participants, and if desired, they selected which accessory best fit their lifestyle. Over the course of their field trial, participants were asked to use the products in their day-to-day lives and complete subjective questionnaires.

Ratings of sound quality while streaming with their Mini Remote Microphone, Remote Microphone +, Table Microphone, or TV streamer were evaluated using a seven-point Likert scale ranging from “very poor” to “very good” with the majority of participants providing ratings of “good” to “very good” (Figure 8). Likelihood to recommend the overall system (hearing aids, Thrive app, and accessories)

was evaluated using an 11-point scale ranging from 0 (“not at all likely”) to 10 (“extremely likely”), with the majority of participants providing a rating of eight or higher (Figure 9).

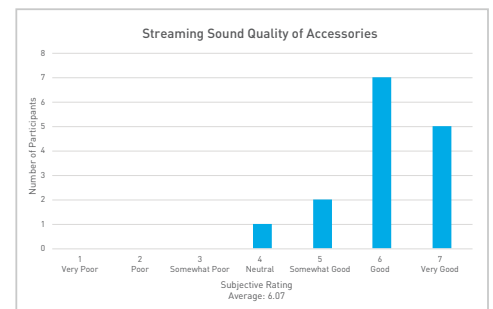


Figure 8: Participant subjective ratings of streaming sound quality. Data represents that of 15 participants; some participants did not answer the question. Most participants rated sound quality as “good” to “very good.”

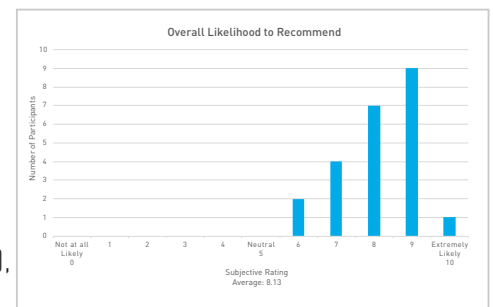


Figure 9: Participant subjective ratings of their likelihood to recommend the system. Data represents that of 23 participants. Most participants rated likelihood to recommend as an 8 or higher.

Performance of the Table Microphone was evaluated by hearing aid users in a separate validation study. Eighteen participants completed the Hearing In Noise Test (HINT) while unaided, aided wearing Livio Edge AI custom rechargeable hearing aids, aided with the Remote Microphone +, and aided with the Table Microphone. Results demonstrated statistically significant improvement in speech intelligibility in noise using the Table Microphone compared to performance with hearing aids alone and while using the Remote Microphone + (Figure 10). For more details regarding the study methodology and results, see the 2.4 GHz Table Microphone white paper (Walsh & Zakharenko, 2020).

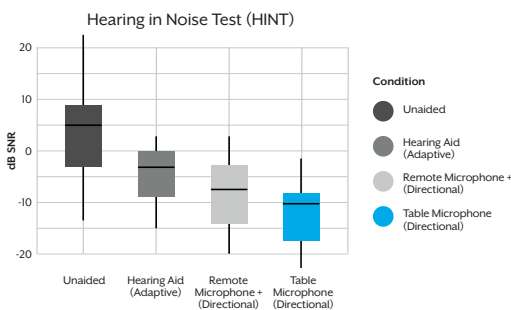


Figure 10: Boxplot of HINT results. The lower the signal to noise ratio (SNR), the better the performance. Data represents that of 18 participants.

## Conclusion

Offering an accessory can empower patients to take control over their environment, further encouraging them to be an active participant in their hearing health. For patients who have difficulty hearing in noise, Starkey's three remote microphone solutions ensures that hearing professionals can select a device that meets their patient's exact needs. To overcome the challenge those with hearing difficulties often have while watching TV, the TV streamer offers a discreet way to stream audio directly

to their hearing aids and allows them to adjust the volume to their personal preference without disturbing others. The Remote is a great option for patients with dexterity issues who struggle to use the on-board hearing aid user controls, or for those who desire a discreet way to adjust their hearing aids without the use of their smartphone. The Thrive Hearing Control app gives patients ultimate control of their hearing aids and 2.4 GHz accessories, while offering many beneficial features for diverse patient populations. For patients fit with Starkey's standard rechargeable hearing aids, the small yet functional Mini Turbo Charger is the perfect solution for those who desire the peace of mind of a quick charge to get them through their day. The comprehensive and versatile line of 2.4 GHz accessories offers solutions for patients requiring additional assistance in their day-to-day lives. Supported by Starkey's promise to help people hear better and live better, hearing professionals can rest assured they can find an accessory solution for any patient need.

## References

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