

## **Nordic 2.4GHz Technology Enables Miniature Hearing Aid to Stream Audio from TVs and Other Consumer Devices**

*Leading hearing solutions company - GN ReSound - is using the Nordic nRF24L01+ in its award-winning ReSound Alera™ hearing aid to stream audio direct from TVs and other consumer devices such as computers and home cinema systems.*



Ultra low power RF specialist Nordic Semiconductor has announced that its proprietary 2.4GHz wireless technology is being employed by world-leading Danish hearing solutions company - GN ReSound - in its award-winning (2011 CES Innovations Award, Design & Engineering) ReSound Alera™ hearing aid product, which enables users to wirelessly stream audio from common consumer electronics (CE) devices such as TVs and smartphones (the latter via a chest-worn Bluetooth® wireless technology microphone clip) direct to their hearing aid(s) over a range of up to 20 meters.

In operation, the end user simply connects their TV (e.g. via a SCART cable) or other CE device (e.g. desktop PCs, laptops, tablet computers, home cinema systems, radios) to a small audio streamer box equipped with a Nordic nRF24L01+ 2.4GHz transceiver. This then pairs with a second nRF24L01+ located in the ReSound Alera hearing aid.

When the user wishes to watch TV they simply push a button on the back of their hearing aid or use a (cost optional) remote control to select the device's designated wireless channel (typically between 1 and 3) to immediately stream wireless audio in stereo direct from the TV to their hearing aid.

"It was extremely challenging to achieve this ease of end-user functionality, along with medical-grade [99.99%] field reliability and real-time audio performance in a hearing aid as small as [for the latest ReSound dot2 product] an adult finger nail weighing as much as a paper clip," admits Thomas Olsgaard, VP of Hardware Platforms at GN ReSound.

The entire ReSound Alera product range is built around a uniquely miniature 2.0cm (length) x 1.5cm (height) x 0.6cm (thick) product form factor that has to embed an even smaller 1.4cm (length) 0.6cm (height) x 0.4cm (thick) electronic module

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housing an antenna without groundplane (due to lack of space), Bluetooth wireless technology radio, a proprietary (Nordic nRF24L01+) 2.4GHz radio, plus an external microcontroller to perform the advanced audio signal processing (background noise cancellation and 'surround' sound processing) required in a hearing aid product marketed as being so sensitive it allows hearing-impaired users to hear, for example, snow being crushed under their footsteps, birds signing, and even the sound of falling rain.

Olsgaard continues: "But all of this functionality needed to run for several days from a replaceable ZincAir battery that is a fuel coin cell [that can store around 3x more energy than a standard coin cell]. This meant that the proprietary radio needed the lowest possible power consumption to enable the product to average 1.5mA in operation and peak at 4mA when streaming.

"In addition, the hearing aid needed to offer near 100% medical-grade operational reliability. For us this meant being able to work reliably and offer real-time audio streaming equating to 20ms maximum latency from the source CE device to the reception in the ear - even in the most hostile 2.4GHz operating environments such as 10 active 2.4GHz emitters all operating in the vicinity [e.g. smartphones, computer tablets, gaming devices, and Wi-Fi hubs]. And this demanded an extremely robust protocol design and an ultra linear radio performance from the Nordic chip that pushed this chip's operational capabilities to the limit - down to the system architectural level - in a way we're not sure any other manufacturer's 2.4GHz chip could actually manage."

"Learning that such a quality-of-life-enhancing hearing aid device that can stream audio from TVs and other popular CE devices with 99.99% reliability not being possible without the technical capabilities of 2.4GHz Nordic ultra-low power wireless solution makes you very proud indeed," comments Geir Langeland, Nordic Semiconductor's Director of Sales & Marketing. "We have long regarded ultra-low power wireless as an enabling technology that Nordic works extremely hard to make ever more relevant to an ever increasing range of products and applications such as this excellent hearing aid solution."

For more information, please visit [www.nordicsemi.com](http://www.nordicsemi.com) [1].

**Posted by Ron M. Seidel, Editorial Intern**

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**Links:**

[1] <http://www.nordicsemi.com>

