

# LANTRONIX®

## INDUSTRY:

# Medical, Healthcare & AI

Empowering Whisper to Reimagine Hearing



### Success Highlights

- Enables OEMs to fast-track product development
- Facilitates quick creation of a market-ready prototype
- Reduces the total cost of development
- FCC/IC and Canada Pre-certifications

### Case Study Overview:

Created by San Francisco-based Whisper, the Whisper Hearing System is a learning hearing aid that gets better over time and uses artificial intelligence to process sound. It is based on the advanced processing power of the Lantronix Open-Q™ 820  $\mu$ SOM. The Open-Q 820 provides Neural Network processing for sound as well as the low latencies required for speech intelligibility and the processing power to make it all work.

### Challenge: Reimagine Hearing Systems

After seeing family members struggle with hearing loss, the co-founders of Whisper decided to reinvent the way hearing systems work by utilizing artificial intelligence, machine learning and powerful processing. Their goal was to use technology to help users hear better and to use machine learning to improve the system over time.

### Challenges included:

- Reducing the latency between the actual sound and when it reaches the user's ears so that speech is more intelligible, as even small delays make speech less understandable
- Providing the processing power needed to extract speech from background noise
- Delivering big capabilities in a very small and portable form factor

“ Utilizing Lantronix Open-Q 820  $\mu$ SOM, we were able to create the Whisper Hearing System, giving people with hearing loss a technologically advanced way to hear better. ”

– Shlomo Zippel,  
Co-Founder of Whisper



### Lantronix Open-Q 820 $\mu$ SOM

Lantronix's Open-Q 820  $\mu$ SOM is the world's smallest production-ready, pre-certified micro computing module based on the Qualcomm® cutting-edge Snapdragon™ 820 processor.

Designed for OEMs, its advanced technology and extensive range of peripherals provide the perfect platform for creating high-performance embedded and mobile devices.

For more information, visit <https://www.lantronix.com/products/open-q-820-usom/>



## Solution: Lantronix Open-Q 820 $\mu$ SOM

Like a traditional hearing aid, the Whisper Hearing System has earpieces with tiny microphones. What makes it unique is the pocket-sized power and intelligence of the Whisper Brain, which is powered by the Lantronix Open-Q 820  $\mu$ SOM.

### Benefits provided by the Open-Q 820 include:

- **Wireless Communication.** Microphones located in the earpieces communicate with the Open Q 820-based processing module in the Whisper Brain. Sound is magnified so users can better hear conversations.
- **Reduced Latencies.** The Open-Q 820 DSP enables the Neural Network algorithms to directly access and transfer the data stream with minimal delays, resulting in clearer hearing.
- **Processing Power.** The Open-Q 820 supplies the processing power needed to run Whisper's proprietary Sound Separation Engine, which uses artificial intelligence algorithms to process and optimize sound in real time. This capability enables speech to be extracted from background noise, making conversations easier to hear.



Whisper Brain

Processes and optimizes sound in real time using our Sound Separation Engine.



Earpieces

Transmit the optimized sound to your ears.



Whisper app

Delivers regular software upgrades.

## Results: An Affordable Prototype and Speed to Market

Utilizing the Open-Q 820  $\mu$ SOM enabled the designers to revolutionize hearing systems by using artificial intelligence, machine learning and wireless technology.

Unlike traditional hearing aids, the Open-Q 820  $\mu$ SOM's unique architecture combines traditional powerful CPU cores with a unique advanced digital signaling processor, resulting in efficient power consumption while reducing sound delays and providing advanced separation of speech from background noise.

Its efficient power consumption reduces delays in sounds and separates speech from background noise, unlike traditional hearing aids. The optimized sound is wirelessly sent to the earpieces, creating a clear hearing experience.

The Whisper App delivers regular software upgrades to give users the benefit of the very latest advances in hearing technology, delivering the only hearing system that actually learns and gets better over time.

## About Whisper

Established in 2017, Whisper is a team of artificial intelligence, hearing care, hardware, and software experts coming together to solve the challenge of providing better hearing. The team created the Whisper Hearing System so their parents, grandparents, friends and teammates can have a tomorrow that sounds even better than today.



## Open-Q 820 $\mu$ SOM Development Kit

The Lantronix Open-Q 820  $\mu$ SOM Development Kit is a versatile, easy-to-use exposed board platform utilizing Lantronix's ultra-small form-factor. Based on Qualcomm® Snapdragon 820 (APQ8096), the development kit is the ideal starting point for creating the next generation embedded and Internet of Things (IoT) devices.

The platform consists of Lantronix's Open-Q 820  $\mu$ SOM, a carrier board exposing all the available I/O and a range of accessories to fast-track product development.

For more information, visit: <https://www.lantronix.com/products/open-q-820-usom-development-kit/>

## About Lantronix

Lantronix Inc. is a global provider of secure turnkey solutions for the Internet of Things (IoT) and Remote Environment Management (REM), offering Software as a Service (SaaS), connectivity services, engineering services and intelligent hardware. Lantronix enables its customers to provide reliable and secure solutions while accelerating their time to market. Lantronix's products and services dramatically simplify operations through the creation, development, deployment and management of customer projects at scale while providing quality, reliability and security.

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