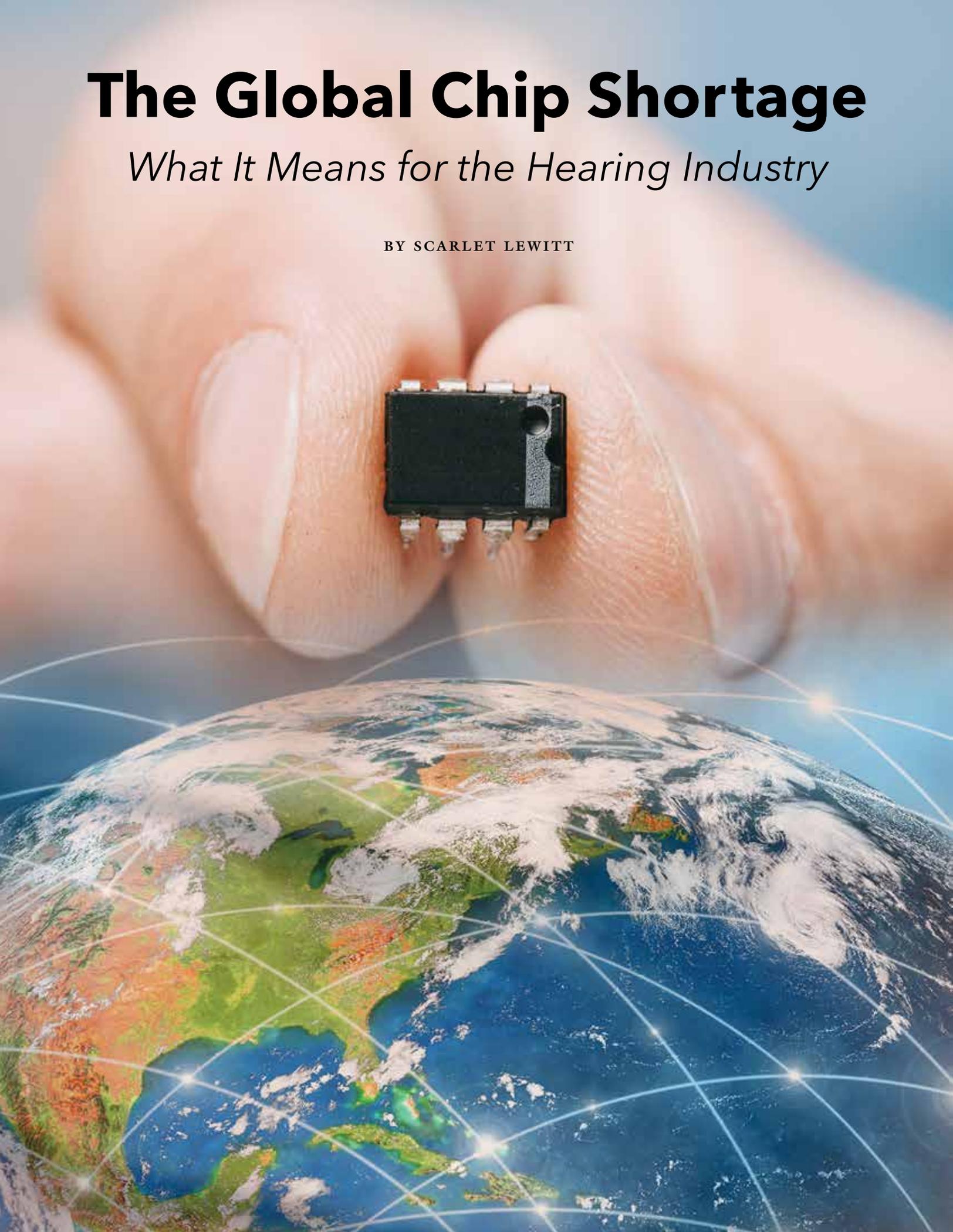


The Global Chip Shortage

What It Means for the Hearing Industry

BY SCARLET LEWITT



The last three years have seen an ongoing crisis which is often discussed, but little understood. The global chip shortage has seen the demand for integrated circuits, or semiconductor chips, far outstrip the supply. This crisis has led to major price increases, shortage queues and even scalping among consumers for products that require semiconductors. More than 169 industries have been affected, including the hearing industry. Like almost every other industry that is reliant on electronics, manufacturers of hearing technology are facing a difficult time and must make tough decisions about what to prioritize when it comes to the production of hearing aids and other assistive devices.

Hearing Loss: A Story Lately Told

Hearing loss is something of an untold story in the U.S. It has been estimated that 15% (37.5 million) of American adults aged 18 and older report difficulty hearing, and around one in eight people aged 12 and older has a hearing loss in both ears. Despite rapid developments in hearing aid technology, the number of people experiencing hearing difficulties continues to grow. Of that 37.5 million people, about 28.8 million could benefit from using hearing aids, according to research from the National Institute on Deafness and Other Communication Disorders (NIDCD) Epidemiology and Statistics Program. However, among adults older than 70 who could benefit, only 30% have ever used them. For those aged 20 to 69, the number is even smaller: only 16% have ever used hearing aids.

Unaddressed hearing loss can have detrimental impacts for the affected individual and for wider society. According to research conducted by the World Health Organization (WHO), untreated hearing loss in the U.S. costs about \$133 billion per year or \$9,100 per person. This is due to a combination of factors, including increased use of health and social care services, unemployment rates, sick leave rates and limited career progression. In today's atmosphere of inflation and pandemic-related difficulties, Americans face some financial and logistical barriers when buying hearing aids. For some, it has simply become a lower priority but for others, even finding a nearby audiologist has proven difficult.

Public awareness of hearing loss is on the rise, however, especially after WHO announced that 1.1 billion teenagers and young adults were at risk of permanent, irreversible hearing loss as a result of unsafe listening practices. To bypass the specialist and bring the product directly to the consumer, a new law was established as part of the FDA Reauthorization Act of 2017

(FDARA) to allow those with mild-to-moderate hearing loss to buy hearing aids over the counter. It was spurred by decades of complaints about the nationwide shortage of audiologists and the high cost of hearing aids and was passed with the hope that it would lower prices and encourage people with hearing loss to wear hearing devices. It is no surprise that this, combined with the increased awareness of hearing loss, has sparked interest in hearing aids, with one survey revealing that hearing aid sales increased by 37% in 2021.

Everyone's Affected When the Chips are Down

The reasons for the chip shortage are multifaceted and stem from a confluence of events but the COVID-19 pandemic created a ripple effect. Global lockdowns shut down chip production facilities, which led to a depletion of inventories. The corresponding increase in remote work and learning triggered a surge in demand for computers and other consumer electronics, as did the spike in electronic entertainment device purchases by people who were suddenly homebound. The health crisis has also underscored issues with U.S. reliance on supply chains abroad in many areas, and the semiconductor industry is no different. According to the Semiconductor Industry Association, a coalition backed by several chipmakers, the U.S. accounts for about only 12.5% of semiconductor manufacturing.

Meanwhile, the trade war that started in 2020 has had ramifications for the rest of the globe, as the U.S. placed restrictions on the Semiconductor Manufacturing International Corporation (SMIC), China's largest chip producer, making things more difficult for any company that has ties with the U.S. Alternatives such as Samsung, which is based in South Korea, and the Taiwan Semiconductor Manufacturing Company (TSMC) have already been running at full capacity, meaning that other options are difficult to find.

The Perfect Storm

The chip shortage has been exacerbated by adverse weather conditions. Last year, TSMC suffered a severe drought period in wider Taiwan. Chip manufacturers use thousands of tons of ultrapure water to clean their factories, and TSMC, which supplies more than 50% of the global market, has been unable to use its previous 63,000 tons of water per day due to the drought conditions. Concurrently, a severe winter storm hit Austin, Texas, and a prolonged power outage forced the closure of two plants owned by Samsung and NXP Semiconductors. Disasters have struck elsewhere, too, such as in

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Japan. Asahi Kasei's semiconductor plant caught fire in October 2020, as did Japan's Renesas Electronics, which supplies approximately 30% of the global market for microcontroller units in March 2021.

Matters have also been made considerably worse by the Russia-Ukraine war. The price of neon, a noble gas needed for the lasers in chip manufacturing, increased sixfold between December 2021 and March 2022 due to the COVID-19 pandemic and the political tensions in Ukraine. When Russia invaded Ukraine in February 2022, the supply of neon was sharply constrained, igniting fears that the conflict would worsen the chip shortage. Ukraine produces around half of the neon supply as a byproduct of the Russian steel industry and 90% of the semiconductor-grade neon used in the U.S. As expected, semiconductor manufacturers have been frantically searching for alternate suppliers such as the noble gas manufacturers in China, but the problem is that any new supplier could take at least nine months to increase production. To further complicate matters, Russia exports about 40% of the global supply of palladium, the metal used in certain chip components and the palladium supply could be affected by trade sanctions imposed by Western governments.

Severe Disruption for the Hearing Industry

It's no secret that the hearing industry has been hard hit by the semiconductor chip shortage since hearing devices will not function without them. Manufacturers of hearing technology have had to make difficult decisions about which items to prioritize, and many have been backordered indefinitely, which has left millions without the essential equipment they need to aid them with their hearing loss. This exposes them to the health risks associated with untreated hearing loss, such as accelerated cognitive decline, an increased risk of trips and falls and mental health issues.

Many manufacturers in the hearing industry have reported disruption from the same multiple factors outlined earlier. Following the onset of the COVID-19 pandemic, and the subsequent surge in mask-wearing, WS Audiology, the manufacturer of Signia hearing technologies, announced that it was experiencing significant delays with its silk in-the-ear (ITE) hearing aids because of a spike in demand, as they were easier than behind-

the-ear (BTE) hearing aids to wear with masks. In August 2021, Oticon's headquarters in New Jersey was severely disrupted by Tropical Storm Ida, resulting in delays for multiple products and challenges with customer support communications. Oticon was able to make a quick recovery following the storm but was forced to notify distributors that it was unable to fulfill orders for its wildly popular TV Adaptor 3.0 accessory.

In addition, Starkey Hearing Technologies announced that it would be unable to fulfill certain orders due to the global chip shortage. After the release of its new Evolve AI hearing aid, Starkey notified its provider network that order fulfillment would be slower due to supply chain issues coupled with the high demand. The same goes for hearing aid manufacturer Phonak, which experienced significant delays for its TV Connector, Partner Mic wireless microphone and critical components used in custom earmolds. It appears that TV Connectors seem to have been most affected by the shortage, with Signia still experiencing delays on its Streamline TV streamers at present.

Taking Bold Action to Alleviate Future Shortages

It has been imperative for governments and businesses to act by reevaluating and improving supply chains of semiconductor chips, and changes are being made to legislation to address the shortage.

In February 2021, U.S. President Joe Biden signed an executive order to address the chip shortage by reviewing options to strengthen the semiconductor supply chain. Then, in April, CEOs from major technology companies and U.S. government officials attended a virtual conclave to talk about improving the resilience of the supply chain. Meanwhile, European leaders are planning to introduce a European Chips Act in the first half of 2023 to bolster flagging supplies. The European Union also announced that it will use legislation to drive greater resilience and sovereignty in regional supply chains.

Estimates have been muddled as to when the shortage will end. CEOs of electronic companies expect the shortage to persist into 2023. TSMC has said that it is actively supporting and working with all stakeholders to overcome the global chip shortage and has announced that it plans to invest \$100 billion during the next three years to increase capacity at its plants.

Is a Chip Imbalance on the Horizon?

In a major twist, however, the persistent inflation for basic commodities like food, gas and energy, combined with China's latest pandemic restrictions, is driving down the overall demand for electronics. Consumer spending is

on the decline, as people are returning to pre-pandemic spending habits; purchasing services over goods, and this has resulted in a 6.3% decline in semiconductor chip sales in the third quarter of 2022, as well as a chip imbalance, as far as some industries are concerned. Manufacturers are accelerating production levels, while companies are simultaneously panic buying and overordering. These stockpiles, coupled with a drop in demand, have left many companies sitting on excess inventory.

This does not mean, in any way, that the chip shortage is over. While it can be said that some industries are now experiencing an oversupply of semiconductor chips, many others are still combatting shortages. Semiconductor chips are not a homogenous commodity that allows for widespread substitutions, either. There are many kinds of chips that perform different functions and, of course, every industry has unique needs. For example, a Digital Signal Processor (DSP) is the microchip used inside hearing aids, and specifically functions by converting incoming sounds into digital signals.

What We're Hearing About the Future

With the recent ban on semiconductor exports to China, and the growing tensions between China and Taiwan, the future of the chip industry remains largely unstable and unpredictable. It appears that issues are arising quicker than they can be solved, and there is little doubt that the shortage will continue to have cataclysmic impacts on industries around the world.

The hearing industry remains challenged to keep up with demand, especially as rates of hearing loss continue to rise at unprecedented levels. The global chip shortage has left many without indispensable hearing equipment and has also led to an increase in people experiencing the negative effects of untreated hearing loss. It is important to recognize, however, that the hearing industry has started to bounce back from the shortage, but supply chains will need to be maintained and strengthened to satisfy demands. **HL**



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