



EPOS

Take Control of Your Sound Environment

Why Active Noise Cancellation?

Open offices can be distracting

The benefits of today's open offices are multiple. They encourage a more collaborative working environment where dynamic teamwork can flourish. A quick question to a colleague across the room and an issue can be resolved there and then.

However, while excellent for collaboration, the open office presents challenges when you need to focus as noise levels range from between 60–65 dB(A)*. Furthermore, flying for work can be particularly draining, with passengers often subjected to noise levels between 60–85 dB(A)**.

ANC is the solution

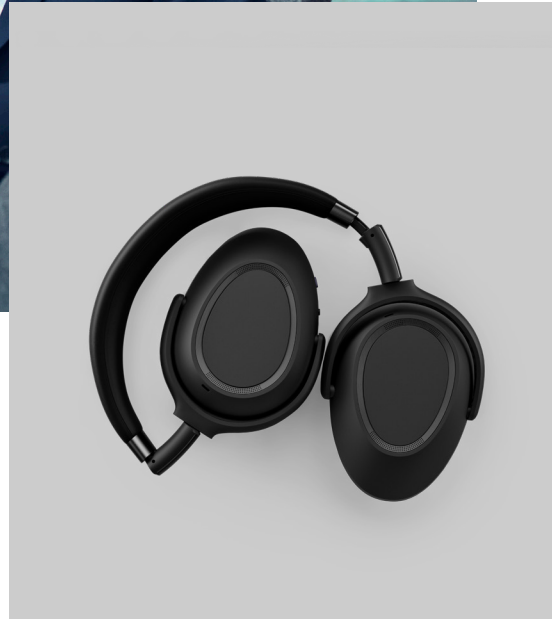
The constant buzz of conversation in the open office can be at best annoying and at worst stressful if your work requires concentration. Headsets with active noise cancellation offer an effective solution to this situation, enabling users to tune out of the open office and into their individual world of work.

Boost productivity with EPOS ANC headsets

EPOS ANC headsets reduce background noise so that you can focus when and where you need to, boosting your productivity and helping you perform to the best of your ability.

* Source: "Noise Pollution and Acoustics in the Office" – Steelcase, www.steelcase.com
<https://www.steelcase.com/research/articles/topics/open-plan-workplace/much-noise/>

** Study: "In-cabin noise levels during commercial aircraft flights" H Kurtulus Ozcan, Semih Nemlioglu, 2006



Passive or Active?

Passive noise cancellation, or noise isolation, is the most fundamental way of protecting ears from ambient noise. Any headset offers some degree of passive noise cancellation because the headset itself physically blocks sound. The best passive noise-cancelling headsets, also called hearing protectors, offer great noise cancellation but are bulky and very uncomfortable to wear. To offer the comfort and versatility required for an office worker using their headset for concentration and calls, the design can't provide the same passive damping as a hearing protector. Furthermore, these more comfortable, versatile passive noise-cancelling headsets, only offer noise cancellation at high frequencies above 800Hz. Here is where active noise-cancelling headsets offer multiple benefits. The active system complements the passive system by offering noise cancellation at low frequencies (20-800 Hz) with no added physical discomfort. Furthermore, the active system can be set in different modes (on/off/adaptive) to give the best user experience in a given situation – namely the ability to concentrate better in a changing open office environment.

The Active Advantage

Active noise-cancelling (ANC) headsets provide all the benefits of passive noise-cancelling headsets but add an extra level of noise reduction by effectively removing lower frequency sound waves.

How ANC Technology Works

Both types of waves – the intrusive incoming waves originating from an external source (ambient noise) and the noise-cancelling waves produced by the headsets (anti-noise) – have the same amplitude and frequency. The anti-noise is played so that the peaks and troughs are synchronized and inverted with the ambient noise.

Ambient noise

Anti noise



This alignment causes the waves to cancel each other out. The result – virtual silence for the relieved headset user.

The Technology Involved



Microphone

One or more microphones placed inside or outside the headset's ear cup picks up the ambient noise.



Battery

A rechargeable battery provides the required power to generate the anti-noise signals.



Speaker

The anti-noise is transmitted into the headset's speakers in addition to the normal audio. In many cases this would impact the normal (desired) audio sound waves; however, high-end active noise cancellation technology eliminates this factor so that the normal audio is not compromised.



Circuitry

The ear cup contains electronics which receive the microphone's input and create the anti-noise based on the microphone signal.

Together, these components provide active noise cancellation of up to 30 dB (at low frequencies) in addition to the 15–30 dB passive noise cancellation (at high frequencies), making headsets with ANC a good choice for open offices or when travelling for work on planes or trains where background noise can be up to 88 dB(A). Indeed, in any other noisy, distracting location, ANC that combines these components can be a distinct advantage when trying to concentrate on work.*

* Study: "In-cabin noise levels during commercial aircraft flights" H Kurtulus Ozcan, Semih Nemlioglu, 2006

The Evolution of ANC Technology

Three types of active noise cancellation

Active noise cancellation can be implemented in three different ways. That's why we talk about Feedforward, Feedback, and Hybrid active noise cancellation.

Feedforward active noise cancellation

Feedforward ANC works by placing a microphone outside of the ear cup to reduce noise coming into the ear in the high frequency spectrum (such as colleagues chatting). The microphone detects surrounding noise early on and generates anti-noise into the ear cup at the same level as the noise that made it through the passive noise-cancellation.

Feedback active noise cancellation

Feedback ANC works by placing a microphone inside the ear cup to reduce the noise coming into the ear in the low frequency spectrum (such as an airplane's engine). The microphone measures unwanted sound signals as they enter the ear cup but before they reach the ears and generates anti-noise to cancel out the ambient noise. Feedback ANC can be found in the

ADAPT 300 Series. Combined with its extremely comfortable over-the-ear, leatherette ear pads offering excellent passive noise cancellation, ADAPT 300 headsets are a reliable companion for any professional working in open offices or remotely.

Hybrid active noise cancellation

Hybrid ANC blends Feedforward and Feedback ANC into one system. It works by using two microphones on each cup (a total of four) – one outside the ear cup and a second one inside the ear cup. This coupling recognizes ambient noise outside the ear cup and creates anti-noise. The inside microphone detects noise as it leaks in and generates anti-noise to neutralize the unwanted noise before it reaches the ears. Using both Feedforward and Feedback ANC guarantees a broader and better noise cancellation covering a wide range of frequencies from low to high of up to 30 dB. This hybrid solution is to date the most effective noise cancellation technology available, combining the best aspects of the Feedforward and Feedback ANC solutions.



Feedback ANC and excellent passive noise cancellation in the ADAPT 300 Series create an ideal concentration tool for modern professionals working in open offices and remotely.



EPOS Hybrid Active Noise Cancellation Technology

Hybrid ANC as standard

EPOS has raised the bar of ANC technology with its latest ADAPT product series. The ADAPT 500 Series include Hybrid ANC as standard, and the top of the line ADAPT 600 includes our most advanced ANC technology yet – Hybrid Adaptive ANC.

The two series leverage advanced Hybrid ANC technology to provide today's workforce with elegant, effective audio tools. These are specifically designed to adjust to the noise challenges of open office environments and beyond.

EPOS Hybrid active noise cancellation utilizes a four microphone ANC system. This detects ambient noise and generate anti-noise to cancel it out before it reaches the user's ears. The result is a dramatic increase in the worker's ability to concentrate in noisy environments, and boosts general wellbeing throughout the working day.

Taking ANC further

To enhance the effectiveness of Hybrid ANC even further, EPOS has developed Hybrid Adaptive ANC and integrated this into our top of the range product series – ADAPT 600. This innovation in Hybrid ANC introduces a unique, adaptive dimension to the technology that constantly monitors your background environment and seamlessly adjusts to the ambient noise around you. This provides the precise level of noise cancellation where and when it's needed. In this way, EPOS Hybrid Adaptive ANC empowers you in the best way yet to take control of your sound environment.

Furthermore, EPOS Hybrid Adaptive ANC not only monitors your indoor environment, but also your outdoor environment to reduce wind noise. The entire ADAPT line of superior headset solutions radically reduces the constant disruptions of today's open offices and working environments on-the-move – meaning employees are empowered to work wherever, whenever.

For more information on ADAPT 500 and ADAPT 600, please visit: eposaudio.com/adapt



