

## Achieving Ambience With Personal Monitor

By Jack Kontney

Can you hear me now?

**P**ersonal monitors (IEMs) are radically different from the traditional floor wedge method of providing a monitor mix to performers. For many artists and engineers, they are the ideal monitor solution. But for others, they're simply a method of trading one set of problems (extreme volume, tiny sweet spot, feedback potential) for another (sense of isolation, can't hear amps or audience). Clever engineers and earphone

manufacturers have come up with various methods of handling these issues, all of which revolve around how ambient sound is dealt with.

The goal of most professional earphones is isolation. Think of it in terms of signal-to-noise ratio. The intended signal (monitor mix) is pumped directly into the ear, while the undesirable noise (ambient sound) is shut out. The greater the isolation, the higher the S/N ratio. Isolating ear-

phones can typically achieve about 18-24 dB of isolation (with some custom designs achieving up to 37 dB). Without the competition from ambient noise on stage, the user can hear the monitor mix with exceptional clarity at significantly lower volumes. This is the source of the hearing conservation claims typically mentioned as a selling point for in-ear systems. But it's up to the musician to take advantage of this new listening environment by reducing volume settings.

### ELIMINATING AMBIENCE - A GOOD THING?

But the very isolation that makes personal monitors effective can cause problems for performers. By eliminating ambient sound, IEM systems performers can no longer hear the acoustic output of instruments (drums, piano) and amplifiers, and the hopefully-rapturous sound of the audience. And on-stage communication becomes impossible without removing an earpiece.

In fact, many artists have taken to performing with one earpiece in and the other out. In terms of hearing protection, this is the worst of all possible worlds. The in-ear mix is now competing with information from the open ear, requiring at least 6 dB of extra level to be as intelligible as it is with both earpieces inserted. At the same time, the open ear is fully exposed to uncontrolled stage levels. But if one-in, one-out is unhealthy (and it is!), what's an artist to do? There are several ways to approach this issue, rang-



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ing from clever and low-tech to sophisticated and high-tech. Let's take a look.

## USING MICROPHONES ON THE CROWD

To get crowd noise into the mix, many monitor engineers simply mic the audience and add it into the in-ear mix. Microphones can be set up on lighting trusses, out at the house mix position, or wherever. Typically, these are turned down during songs and brought up in between, allowing the band to "connect" with the audience.

This solution answers the issue of isolation from the fans, but has a couple disadvantages. It puts an extra burden on the monitor engineer, who now has to "mix" the crowd microphones throughout the show, and eats up precious inputs at the monitor desk. And obviously, it's impossible to mic an entire audience in a way that mimics what musicians

would hear naturally. A stereo pair of microphones only retains natural direction cues if the artist is facing the right way, and even then the distance cues are wrong. In addition, using microphones on a crowd does not help to allow conversation on stage.

The Dave Matthews Band addressed that issue when they went to personal monitors. Monitor engineer Ian Kuhn put lavalier microphones on the performers to enable onstage communication between numbers. But adding extra wireless channels just for that purpose is very gear-intensive, and certainly not economical. However, it does allow conversation within the band, something that Kuhn notes is critical to the band's stage show.

## AMBIENT EARPHONES

Some manufacturers have attempted to solve the ambience issue by offering an ambient earphone option.



There are two types: passive and active, generally available in custom-fit versions only.

Passive ambient earphones are essentially the same models sold for full isolation, but altered by drilling a "port" into the plastic shell to let a limited amount of ambient sound to enter the ears acoustically. Inside the port is a fixed 12 dB filter to limit the amount of ambience coming through. Of course, the louder the stage, the more ambience leaks in, competing with the monitor mix, which must

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then be adjusted (louder) to suit conditions. On very loud stages, such level could prove harmful, so a plug is provided to close the port in situations where the ambience is too loud, or not desired.

While the passive ambient porting approach is effective in terms of allowing artists to hear stage ambience, it essentially eliminates the primary benefit of isolating earphones. By adding an ambience port, the noise floor of the listening

environment is raised (and thus, the S/N ratio is reduced) by the same amount. Which means that the in-ear mix needs to be louder in order to be heard as effectively as without ambience. As a result, artists using passive ambient earphones can hear the crowd, the stage, and each other, but without the control needed for different stage situations, and without the benefits of true isolation.

Active ambient earphones take a more technical approach. Tiny custom

microphones are embedded within the earphones themselves, positioned to create a true binaural listening field. The output from these mics is added to the IEM mix in a bodypack. This is a tricky business, requiring special microphones and circuitry to avoid distortion and provide the same natural sound quality one would hear without earphones.

From a performance perspective, this is the best of both worlds. Full isolation is retained, allowing the artist to “dial in” as much or as little ambience as needed. A simple switch on the bodypack allows the performer to choose between “full ambient” and “perform” modes. Typically used between songs, full ambient mode is, essentially, like listening without earphones, so performers can speak naturally among themselves, hear the crowd reaction, etc. In “perform” mode, ambience is reduced (or eliminated, if desired), so the artist gets the precise combination of monitor mix and stage ambience he prefers. There’s no need to remove earpieces between songs, and no reason to engage in the (literally) deafening practice of one ear in, one ear out.

Early adopters of active ambient technology include music directors, who need to communicate with band members on the fly, and guitarists, who often need to hear their amplifiers acoustically as they utilize effects and feedback.

The goal is to provide artists with all the benefit of an isolating system, plus the ability to communicate on stage and hear those adoring fans. Which approach to ambient listening is right for your band? Obviously, it depends on the resources at hand. Using microphones on a crowd is a limited approach, but works with the tools at hand. Adding additional communication microphones to the artists is an improvement, but very complicated to implement. Passive ambience is an imperfect solution, but may be right for some artists. The clear gold standard in terms of problem solving is an active ambient IEM system. The price may be high, but those who are using them say they are worth every penny. ■

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