

## Headphones for Listeners with Hearing Loss – An Update

**Richard Freed**

There have always been people who question whether music critics can really hear, and in some instances such a question may have to be dealt with rather seriously, as music critics—and musicians themselves—are no more immune than anyone else to actual loss of hearing. We needn't cite the world of rock and pop, in which industrial-strength amplification mounts serious assaults on the hearing of audiences who seem happy enough to put themselves in harm's way. Symphony orchestras in many parts of the world now install various sorts of acoustical partitions among their players in efforts to protect them from deafening one another during rehearsals and concerts. But there are also large numbers of individuals, of varying musical tastes, who suffer hearing loss through neither of these types of perilous exposure: it simply happens as a natural consequence of ageing, or in some instances may be a matter of heredity. In any event, it is not a humorous state of affairs for anyone in whose life music is a major factor. Some hearing aids now are designed specifically for the benefit of music-lovers, and have demonstrated varying levels of success with various individuals. One of the latest is the American-made "Lyric," which isn't even sold, but rather is offered on an annual subscription basis: it can produce truly exceptional results, but it is not adaptable to certain types of ears, and, while it can be removed by the user, it can be installed only by an audiologist or otologist trained in its applications. Among the more conventionally user-friendly options, the Vérité 9 model from the Swiss company Bernafon has delivered remarkable results for many of those fortunate enough to be directed to it. Two years ago in this space, under the heading "Hearing loss and the music lover," I discussed the use of headphones as an effective solution for listening to recorded music. In approaching the question of live events, the possibilities become so truly individualised—with so many different listeners, so many different hearing instruments, so many different experiences, so many different types of music, so many different listening environments—that it seemed pointless to offer any general observations: this problem does not lend itself to a "one size fits all" solution. When it comes to recordings, however, many of the individual differences, most particularly those involving hall acoustics and types of music, may be discounted, and the benefits enjoyed by one listener may be reasonably expected to be similarly enjoyed by many others. Specifically, the acoustical playing field may be levelled by the use of headphones. As the more conscientious manufacturers and sellers of headphones make a point of reminding us, headphones are not presented to the public as substitutes for hearing aids. For some music-lovers with certain types of hearing loss, however, headphones used with one's otherwise naked ears, can provide a way to enjoy recorded music more fully and satisfyingly than possible in listening to loudspeakers, with or without hearing aids. In comparing notes with a number of others (professional musicians definitely among them) dealing with the same problem, I was encouraged to feel that this option is a valid one, which anyone wishing to enjoy recorded music might be encouraged to try—with the caveat that this, like so many other prospective remedies for various ills and ailments, is something that cannot be assumed to provide the same results for everyone.

The Summer 2009 piece described two basic types of headphones: the conventional “over-the-ear” type associated with airline pilots, broadcasters, recording engineers et al (these are called “cans” by professional users in the US), and the “in-the-ear” type (called “buds” by non-professional users), associated with portable radios, telephones, computers, etc. My personal choices remain the three units noted in that piece: Etymotic Research’s ER-4S for the “in-the-ear” option, and both Sony’s MDR-7506 and Ultrasonics’ PRO750 among the “over-the-ears” type. All of these are relatively inexpensive, but, in both my own experience and that of more than a few other professional users, they match or surpass the performance of headphones priced much higher. Also in the 2009 piece, I suggested that a headphone amplifier can add appreciably to the pleasure of those who do all or most of their listening via headphones. In continuing to register these recommendations, I feel it would be helpful to provide some clarifying updates, in respect to both the headphones and, more particularly, the considerations of a headphone amplifier, a device occasional headphone users, and those accustomed to using headphones only with portable devices, may never have encountered.

To deal first with the headphones themselves, my recommendations remain the same as in 2009, but some further information may be helpful. Because the Sony MDR-7506 is so well known among professionals, and because the Ultrasonics line was new in 2009, I made only a very brief reference to the MDR-7506, and in so doing used past tense in a way that may have suggested that this model was no longer available. Let me offer this assurance that it does continue to be available, and many respected recording engineers and broadcasters continue to swear by it. It has a high output level and covers the entire audible range without apparent distortion, and its lightweight frame is designed to provide a good, tight seal over the ears. It also happens to be ridiculously underpriced for what it delivers: some Internet retailers in the US continue to offer the MDR-7506 for less than \$100—and for another \$20 or less it may be had with somewhat more comfortable and more durable ear pads.

Like virtually all other audio devices, headphones require a period of “burning-in” to perform up to specs. The Ultrasonics PRO750, whose “list price” is \$409, appears to require a somewhat longer “burn-in” than other headphones I have used: it is impressive right out of the box, but after about two hundred hours of use it is even more satisfying, and for long sessions of listening it is exceptional in respect to physical comfort. The seal is not as snug as with the MDR-7506, but overall this is an excellent instrument, a little warmer than the MDR-7506 if not quite as impressive at the upper end. (This makes itself felt not only in delivery the sound of such instruments as triangles and piccolos, but also, and conspicuously, with such instruments as castanets and marimbas. Ultrasonics’ ten-foot connecting cable is detachable, and a second one, coiled, is part of the package. Etymotic’s ER-4S continues to command top honours among “in-the-ear” models. Listeners who find the more traditional “over-the-ear” ’phones burdensome or stressful to wear, need not feel this virtually weightless option requires any compromise in respect to sonic realism; the full range is present in splendid balance. The ER-4S comes with a variety of ear-tips, the most effective for most listeners being the flanged three-tier cone type, which goes deepest into the ear canal and provides the tightest seal. The “suggested retail price” is \$330 US, but Internet dealers have been selling the ER-4S for about \$220. Like most “in-the-ear” ’phones, these come with the smaller connecting plug (3.5mm

instead of 6.3mm) and a short connecting cable (five feet), but a good, solid adaptor for the larger jacks is provided, and extension cables are not hard to come by. I had Kimber cable make one for me with the 6.3mm male end and the 3.5mm female, but I've enjoyed good results with an inexpensive Radio Shack extension cable (3.5mm at both ends, requiring a 6.3mm adaptor for connecting to a preamplifier's headphone jack or to most headphone amplifiers. (Some of those, however, come with output jacks in both sizes, and computers, of course, offer only the 3.5mm jacks.)

### **Benefits of a headphone amplifier**

Many music-lovers and audiophiles, even those accustomed to assembling their own systems, have never heard of headphone amplifiers, let alone actually used one. While I encouraged the use of a headphone amplifier in my earlier piece, this important subject definitely calls for a broader discussion; it is, in fact, the main reason for revisiting the subject of headphones at this time.

To be sure, the headphones I've just described will perform well if plugged into the headphone jack on a system's preamplifier, but that jack tends to have a low output, requiring a big boost in the gain for most headphones. I get much better results if I plug the headphones directly into a CD player with its own jack and level control—but fewer and fewer “high-end” CD players have headphone jacks now, and even if you have one, this option would limit your listening to the CDs you can play on that particular player: you would not be able to listen with your headphones to a different CD player, to one with SACD or HDCD, or to what comes from an “outboard” DAC, or your tuner, or your LPs. Moreover, a headphone amp does not simply make the music louder, but can simply enable your headphones to give you a richer, fuller, more complete listening experience. My 2009 piece mentioned this, but did not take the discussion beyond a report on a single miniature unit, designed primarily for use with portable devices. The Xin Feng “Reference” headphone amplifier is truly a wonder: it takes up hardly any space, as it is designed to fit into a shirt pocket, and it is definitely worth its price (\$285 US) and more for the improvement it affords in listening with any type of headphones. But it is not the only option, and listeners who spend a *lot* of time with their music, and listen exclusively or mostly indoors, may benefit from a bigger unit that can handle a stronger signal and function as a part of the basic audio system, without the additional cables and adaptors required to use the mini-amp, without the reliance on batteries, without concern about possibly overloading the unit with too strong a signal—and, to be perfectly clear, for the still fuller, more sumptuous sound provided by a bigger unit, powered by the same AC power source as the rest of the system. I would not rule out the “Reference” from consideration, because it is an amazing performer for its size and price, and an excellent one even if we ignore such considerations, but I do feel that headphone users ought to acquaint themselves with more options—just as they may choose between “in-the-ear” headphones and the traditional “cans.”

When/if you get round to shopping for a headphone amplifier, do take note of the specs, and in particular the impedance, for matching with your chosen headphones, just as power amplifiers and loudspeakers must be matched. If this match-up requirement isn't met, the sound delivered to you is likely to be compromised and one or both units may be damaged.

As with the headphones themselves, there are headphone amps priced in the thousands, but many listeners may find themselves more than happy with something priced much lower. The headphone amp I bought last year is PS Audio's GCHA, made in Colorado USA; it was reduced from its original price of \$999 US to \$499 because the company was discontinuing it. Why such an excellent performer was dropped, I cannot imagine, but I'm delighted to have got hold of one at so modest a price, and happy to report that, while manufacture ceased several months ago, there seem to be enough units still available—for both US current and the higher voltage used in the UK and Continental Europe—to make it a realistic recommendation for now.

The GCHA is not very large—8.5 inches wide, 14 inches deep, 2.75 inches high—but it is heavy, because it has a large and powerful transformer. It is easy to install, and using it is simplicity itself. On the back are both XLR and RCA input jacks, a USB port, and a power switch, while the front panel has a single full-size (6.3mm) headphone jack, a gain control, and an indicator light. The GCHA is designed for headphones with an impedance of 16 ohms or higher. (All the headphones I've mentioned here meet this requirement, as do most other "serious" models.) This has made a very significant improvement in my enjoyment of LPs as well as CDs, and every other sound source in my system. The Etymotic "in-the-ear" headphones, which I had always liked, really came into full bloom when I connected them to the fully "burnt-in" GCHA, and the convention types showed a similar improvement.

In the designation GCHA, the first two initials represent PS Audio's "gain cell technology," which is said to eliminate the attenuation in conventional volume controls that can degrade the audio signal. This really seems to do what is claimed for it, keeping the sound clean and keeping noise out of the line. The USB port, already mentioned, is an indication that this headphone amp, like so many "high-end" audio devices now, is equipped for use with a computer and can perform functions which only recently were never associated with audio systems. I myself have yet to investigate these possibilities, and may never get round to them, but I feel I'm getting a very full money's-worth in just using it as part of my audio system, with its conventional sound sources.

The GCHA is by no means the only headphone amplifier worth considering—and, as I've already mentioned, it is actually not being made any more—but it is illustrative of what a headphone amp can do for the serious listener, and demonstrates that this important function needn't be ruled out because of the cost.

In general, full-size, AC-powered headphone amplifiers thrive on a very strong input signal from the sound source (PS Audio states that "if the preamp's volume is too low, the GCHA will not receive enough signal to work with"), and may be connected to a preamplifier either at its "pre-out" (outputs carrying signal from the preamplifier to the power amp, which then carries it to the loudspeakers; loudness level adjusted by a control on the preamplifier as well as one on the headphone amp) or at the "tape out" (a "line out" option, carrying the signal from the preamp to a tape recorder or computer; loudness adjustable only by the volume control on the headphone amp). Manufacturers of certain other, conspicuously more expensive headphone amps favor the latter option because the "tape out" is consistently at a high level, while "pre-out" adds the line stage and its gain, meaning that the signal from the headphone amp then passes through two attenuation states. (The GCHA user's manual does not mention these options, but appears to be based

on the “pre-out”; PS Audio, however, advises that this is not a consideration in using the GCHA because its “gain cell technology” responds equally well to either connection.) In choosing between those two options for connecting a headphone amplifier to an existing audio system, one might be guided by addressing a certain “social” consideration. Since using the headphone jack on a preamplifier cuts off the feed to the speakers, a listener using headphones with that connection will be listening alone, while the use of a headphone amplifier can make it possible for a visitor to listen to the speakers while the host listens through headphones—and in this sense the “tape out” connection affords a certain advantage over the “pre-out.” The latter option may require that, for optimal results via headphones, the level on the preamplifier be set higher than the visitor finds comfortable, while the “line-out” option allows the two listeners to adjust the loudness to their individual comfort levels—the headphone listener using the gain control on the headphone amp while the speaker listener uses the one on the preamp. But of course, if the preamp has only a single “pre-out” connection and it goes to the power amp, then the only option for the headphone connection is the “tape out.” In any event, whichever headphone amplifier you decide to buy, and whichever way you choose to connect it, you will find it makes a very worthwhile difference. Do be guided by the instructions in the user’s manual, and if they are less than clear, check with your dealer or the manufacturer of your headphone amplifier. And do remember that listening with headphones may create the real possibility of further damage to already damaged ears in yielding to the temptation of the gloriously full sound that can be experienced at excessively loud playback settings. It can be glorious enough at safer levels.