

# Audeze LCD-X & EL8

## Planar Magnetic Headphones

For these premium headphones, Audeze have revived an old but under-used driver technology — and the results are astonishing.

SAM INGLIS

**W**hen different technologies compete to fulfil the same market niche, it's not always the best one that wins.

VHS conquered Betamax, and Brunel's broad-gauge railways were torn up to make way for the standard-gauge network. There are many such examples in the world of audio, and, just occasionally, someone comes along



and revives a forgotten alternative to the dominant technology to remind us what we're missing. In this case, that someone is American headphone manufacturers Audeze (pronounced 'odyssey'), and the technology in question is a planar magnetic driver.

I've reviewed quite a few pairs of studio headphones for *Sound On Sound*, and used quite a few more. Some have employed open-backed earcups and some closed, but until now, every pair of headphones I've tried has used the same basic moving-coil dynamic transducer technology to convert electrical signals into sound waves. As described in the 'Planar Magnetic Headphones Explained' box, Audeze's headphones are based around a fundamentally different technology which, it is claimed, escapes many of the compromises inherent in conventional headphone design.

Audeze's flagship model is the LCD-X: a set of open-backed 'phones designed to

### Audeze LCD-X & EL8 £1399/£599

#### PROS

- The LCD-Xs are simply the best-sounding headphones I have ever heard, with incredible musical dynamics and a remarkably neutral frequency response.
- The open-back EL8s are not too far behind them.
- The closed-back EL8s offer very good isolation.
- All of them can be driven easily from any half-decent headphone amp.

#### CONS

- The closed-back EL8s don't have the same neutral tonality as the open-back headphones.
- Cables on the EL8s are prone to coming out unexpectedly.
- Mix and recording faults that are exaggerated on less accurate 'phones may not be so noticeable on these.

#### SUMMARY

Audeze's decision to pursue an alternative headphone technology has yielded rich rewards, especially in their flagship LCD-Xs. They won't be within everyone's reach, but make the effort to hear them if you possibly can!

be as neutral as possible and built to the highest exacting standards, with a price that reflects this. For those who can't or won't stretch to paying over a grand for a pair of headphones, however, Audeze also offer the EL8s, which are said to offer very similar sonic capabilities at a price to rival high-end open-backed dynamic headphones from the likes of Sennheiser and AKG. What's more, like the LCD-Xs, the EL8s are also available in a closed-back version. For this review, Audeze sent both the open- and closed-back EL8s as well as the open-backed LCD-Xs.

### The X Factor

From the moment you open the rock-solid, industrial-strength moulded ABS carrying case, it's immediately obvious that the LCD-Xs are no ordinary headphones. Even the cables are like no others I've seen. They are flat ribbon cables with four separate strands, which divide in a 'Y' shape to attach separately to each earcup using locking four-pin mini-XLRs. Two cables are supplied: one terminates in a standard quarter-inch jack and a further optional mini-jack adaptor cable, while the other draws its signal from a full-size four-pin XLR. I've never used a headphone amp that provides a corresponding socket, but if you have one (the Bryston BHA-1, Sennheiser HDVA 600, Aurorasound Heada and Musical Fidelity V90-BHA all do), then this arrangement allows the signal path to be fully balanced all the way to the drivers, removing any possibility of inter-channel crosstalk and modulation.

The 'phones themselves are huge, almost to the point of being slightly intimidating. They are also by some way the heaviest headphones I've ever worn, but even so, they are actually among the more comfortable, thanks to the huge, wedge-shaped cushions that surround the earcups. These are angled so as to direct the sound slightly towards the back of the ear, and are more than an inch deep at their thickest point.

I've always believed that it's worth investing in the best headphones you can afford, but even so, my experience is that the law of diminishing returns eventually sets in. As you move upmarket in the world of conventional moving-coil headphones, you get bigger boxes, fancier cables and softer earcup materials; but beyond a certain point, improvements in the actual sound of the headphones are subtle. To my ears, for instance, AKG's K702, K712 and K812 models display progressive

The EL8s are available in both open- and closed-back versions.



refinements of a 'family sound', rather than night-and-day differences.

With this in mind, I was expecting mentally to write off the Audeze LCD-Xs as a luxury: good, no doubt, but unlikely to justify the considerable extra cost compared with a good pair of standard headphones. Then I listened to them.

### No Hype

To call the LCD-Xs good would be an understatement on a par with describing the Beatles as popular, or Picasso as handy with a paintbrush. Because they're not good. They're amazing. And they are also very different from any pair of moving-coil headphones I've tried.

Dynamic headphones almost always have a sound of their own, a tonality that they superimpose over whatever is being played back. Very often, for instance, even expensive open-backed studio 'phones

will subtly boost the bass and the high frequencies, and push the mids back ever so slightly. The LCD-Xs don't do that. They are as near to ruthlessly flat as any monitoring system I have ever heard. So much so that the experience of listening to them is initially a little disconcerting, simply because we are so unused to hearing completely unhyped sound from a pair of headphones. It's also a revelation to hear bass that is this deep yet this even, effortless and articulate.

From the point of view of frequency response, in fact, the closest thing I've heard to the LCD-Xs is a lesser pair of headphones with a 'calibrated' corrective EQ applied using Sonarworks' Reference plug-in. But that is to tell only half of the story, and perhaps the less significant half, because what's really remarkable about the LCD-Xs are things that can't be compensated for by any software plug-in. For one thing, although listening on headphones will never >>

» feel exactly like listening on loudspeakers, the LCD-Xs present a very believable and involving stereo panorama. It's very easy to distinguish sources panned only a few degrees apart, yet there is none of the artificial width you get in some high-end dynamic headphones.

Even more striking is the way in which these headphones present musical dynamics. There's an effortlessness and power to the transient response that simply makes other headphones sound two-dimensional by comparison, and drums have the sort of punch and depth that you usually get only from large speaker systems.

Among the benefits that are claimed for the planar magnetic design are that they present an easy load for headphone amps, and that they have a much lower level of distortion than you'd find in a typical moving-coil headphone. I suspect that these factors, in conjunction with the excellent transient response, are responsible for a quality that I've never heard in any other pair of headphones. With almost all monitor systems of any stripe, the more you turn up the volume, the more the artifacts of the monitoring tend to become apparent; to some extent, the subjective impression of loudness is created or enhanced by the increasingly obvious distortion and non-linearity of the speakers or headphones.

When I've heard good source material on a really high-end monitoring system, of the sort you might find in a top mastering suite, I've been struck most of all by the difference in how playback sounds at high levels. As you turn the volume up, you have the impression of hearing further into the music, but many of the normal cues that tell us 'this is loud' are absent. Well, it's the same with the LCD-Xs. You can absolutely crank the level on your headphone amp and, provided the amp itself is up to the mark, all you get is a deeper and more engaging listening experience. Nothing crunches, or honks, or sizzles; instead, the music is just delivered to your ears with more authority and power. It's as though the musicians themselves are playing louder, not the recording.

Talking of headphone amps, I tried the LCD-Xs on a number of different systems, and the only one I felt wasn't doing them justice was the one built into my MacBook, which seemed unable to deliver the bottom octave. Pretty much everything with a quarter-inch jack socket drove the LCD-Xs just fine, and if I were relying on them for sessions, I wouldn't feel the need to carry a special headphone amp around with me.

Their price and sheer size aside, the

## Planar Magnetic Headphones Explained

The vast majority of studio headphones are, in effect, miniature loudspeakers, constructed in the same way as moving-coil dynamic microphone capsules — often, in fact, on the same machines. A coil of thin copper wire is attached to a diaphragm moulded from a rigid, lightweight material and suspended within the field produced by a fixed magnet. When the fluctuating electrical current from the headphone amplifier is passed through the coil, force is produced, and the diaphragm moves back and forth, causing the air to vibrate.

However, just as there are other transducers that can convert sound into electrical energy, so too are there other ways of designing headphones. In serious hi-fi circles, many people swear by electrostatic designs, which are similar in some ways to capacitor microphones. An electrical charge is applied to a thin, metallised membrane suspended between perforated metal grids or plates. When the amplified audio signal is passed through the plates, the membrane is alternately attracted to one and then the other, moving in and out and thus generating sound.

In theory, electrostatic headphones share some of the advantages that capacitor microphones have over moving-coil designs. Because the electrostatic diaphragm is not burdened by the mass of the voice coil, it can be thinner, less stiff and more responsive to transients; and because it is driven evenly over its entire surface rather than from the central ring where the coil is attached, it is less prone to distortion. Unlike capacitor microphones, however, electrostatic headphones have never troubled the mass markets, as they tend to be expensive and require special headphone amps capable of delivering hundreds of Volts to the drivers (which isn't as scary as that sounds: the currents involved are minuscule).

Planar magnetic headphones are in some ways a hybrid concept, sharing features with both moving-coil and electrostatic designs, and employing a similar principle to ribbon loudspeakers. Like an electrostatic design,

a planar magnetic driver is based around a very thin, flat diaphragm, but like a dynamic design, this is set in motion by electromagnetic induction rather than electrostatic force. Instead of a voice coil, the diaphragm has very thin, flat wire ribbons running through it. On either side of the diaphragm, mirrored arrays of magnets are arranged so as to produce a consistent magnetic flux across its whole area.

Yamaha introduced a range of planar magnetic — or, as they were called, 'orthodynamic' — headphones back in the mid-'70s. Along with contemporaneous models from companies like Wharfedale and Fostex, these still have a cult following, but have always remained a minority choice. However, Fostex kept the faith, and their catalogue still includes 'isodynamic' models such as the TH500RP. Fostex also developed an analogous microphone technology, employed in their 'printed ribbon' mics from the late '70s and early '80s.

Two of the down sides of early planar magnetic designs were their bulkiness and relatively low sensitivity. The latter problem, and to a certain extent the former, have been overcome in the Audezes and other modern models by the use of high-strength rare-earth magnets. And in principle, planar magnetic designs offer numerous advantages over conventional dynamic and electrostatic headphones. Not only can they be driven from a standard headphone amp, but they are in some ways easier to drive than moving-coil designs, because they present a load which is free from frequency-specific inductive peaks. The diaphragm is sufficiently lightweight to have an excellent transient response, yet broad enough to produce a planar waveform rather than a spherical one. In other words, compared to the much smaller moving-coil driver, it presents the sound more like a distant source such as a loudspeaker. At the same time, its relatively large size means it can shift enough air to create impressive bass response with minimal distortion.

only negative I can think of is really to do with the failings of other playback systems. Because the LCD-Xs don't over-emphasise the high frequencies, they make it possible occasionally to overlook issues that might be problematic on less neutral systems. I found this with a recording I'd made using a ribbon mic on a quiet source, where hiss that was not really objectionable with the LCD-Xs, or on my NS10s, was much more prominent when I swapped to a cheaper pair of headphones. In short, though, the Audeze LCD-Xs are the best headphones I have ever heard, and not by a small margin. The part of my brain that once considered the idea of spending £1500 on a pair of headphones

utter madness is now wondering what else I might be able to sacrifice in order to keep them!

### Rebel ELs

In case I haven't been clear, then, Audeze have set the bar very high indeed with the LCD-Xs. What, then, of the somewhat more affordable EL8 models?

First impressions are very positive. Whilst you don't get the hard case that could survive being thrown from a light aircraft, the construction of the 'phones themselves is equally classy in appearance, with a smart, slightly 'hi-fi' wood-effect band around the earcups. Both are also significantly smaller

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» and lighter than the LCD-Xs, and very comfortable for long periods of use.

You don't get the four-pin XLR, but both pairs still come with distinctive flat ribbon cables, albeit straighter, shorter and thinner than those supplied with the LCD-Xs. These terminate in flat ('Zync') connectors of a type I've not seen before, which slot into the base of each earcup. Unfortunately, said connectors are held in place only by friction, of which there isn't quite enough to do the job securely. I found that with both the open- and closed-back EL8s, these would sometimes creep out of their sockets over time, causing the sound to drop out on one side. Obviously it's a matter of seconds to push them back in, but it's annoying if it happens at a crucial moment.

With the open-backed EL8s, it seems that Audeze's aim has been to match the performance of the flagship LCD-Xs as closely as they can within the restrictions imposed by the lower cost. And there is indeed a considerable similarity in the sound of the two models. The EL8s have an impressively neutral tonality, detailed yet not exaggerated presentation of transients, and a rewarding sense of musical dynamics. In fact, apart from a marginally brighter mid-range and a fractionally less confident and full bass, I'd be hard put to pinpoint exactly how they differ from the LCD-Xs. Yet differ they do, and although the EL8s are still very fine headphones, they don't quite succeed as often or as spectacularly in creating the illusion that there is nothing between the music and the listener. Perhaps because they don't have the LCD-Xs' massive wedge-shaped earcups to position the drivers further away from the ear, they don't produce the same amazing sense of openness. You know that you're listening to music on headphones — but they're headphones that compare favourably to even the best dynamic 'phones, and if you're thinking of spending this sort of sum on a pair of headphones for mixing, they have to go on your list to audition.

### Closed For Business

The planar magnetic driver is a native dipole — the loudspeaker equivalent of a figure-of-eight mic — which moves equal amounts of air on either side. This being the case, it's perhaps unsurprising that many planar magnetic headphones are open-back designs, as creating a closed-back version involves finding a way of preventing the signal from the back of the diaphragm escaping into free air without allowing it to interfere destructively with the wanted

Each earcup on the LCD-X has a four-pin mini-XLR socket for attaching the cable. With the right headphone amp, the input signal will remain balanced right up to the driver, eliminating crosstalk and inter-channel modulation.



signal from the inside. I don't know how Audeze have achieved this, but the closed-back EL8s certainly meet the first part of the challenge. They offer very good isolation, and are in fact significantly better at keeping external sound out than most of the moving-coil 'phones I've used, while being more comfortable than 'phones like the Sennheiser HD25-II or Focal Spirit Professional, which do offer better-than-average isolation.

However, this isolation comes at the cost of the neutrality of Audeze's open-backed 'phones. While the open-backed EL8s get pretty close to the remarkably flat frequency response of the LCD-Xs, the closed-back versions don't, with the most obvious deviation from neutrality being a significant peak somewhere in the 3kHz region. This is the opposite of the 'hyped' frequency response that you get with most high-end dynamic headphones, which tend to exaggerate the high frequencies and the bass at the expense of the mid-range, and requires a bit of reorientation if your ears are used to that familiar 'smile curve' sound. On first listen, in fact, the closed-back EL8s can seem tinny or even trashy rather than smooth and classy, but once you get used to this slightly aggressive sound, you realise that they retain many of the useful qualities of their siblings. The presentation of dynamics is once again excellent, and although the upper-mid boost tends to

emphasise any distortion in the source, you can be confident that the EL8s themselves aren't adding to it. They aren't as pleasant to listen to as either the open-backed Audeze 'phones or some high-end dynamic models, but given the importance of the mid-range in recording and mixing, it's arguably more useful to have that area prominently represented than to be seduced by exaggerated 10kHz 'air' or 40Hz sub-bass.

### A Different Plane

All in all, then, this trio of models from Audeze make a powerful case for the benefits of planar magnetic technology. The closed-back EL8s offer excellent isolation, and despite their somewhat pinched tonality, do offer the core benefits of clean sound and superb transient response. The open-back EL8s add to this mix a frequency response that is as flat as any dynamic headphones I've ever heard, making them a compelling choice for mixing duties. And as for the flagship LCD-Xs — well, they are in a class of their own. If the idea of spending a four-figure sum on a pair of headphones seems ridiculous to you, these might just change your mind. ■■■

**E** LCD-X £1399, EL8 £599 (either version).  
Prices include VAT.

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