

PHIL WARD

The Unity Audio range of active monitors has expanded since its launch in 2009, and now covers a wide range of prices and performance aspirations. The latest addition to the range is the compact, entry-level Mini Rock. My only other experience of a Unity Audio monitor was the Pebble and Bam Bam system that I reviewed in this magazine back in the December 2014 issue (<https://sosm.ag/pebble-bambam>). Back then, the Pebble was also Unity's entry-level monitor, so I guess it's true to say that the Mini Rock is the Pebble's replacement. I admired the Pebble and Bam Bam a great

Unity Audio Mini Rock

Active Monitors

The baby of Unity's rock-themed monitors might be small, but its low-frequency performance is seriously impressive.



deal, so let's hope the Mini Rock makes as good an impression.

Living fully up to its name, the Mini Rock is really quite small. It's not dimensionally challenged down to BBC LS3/5A or Neumann KH80 DSP levels of tiny, but it's not far off. Compact dimensions open up all sorts of potential applications in very small studio spaces, but also bring fundamental limitations of low-frequency bandwidth and maximum volume level. We'll see shortly how that pans out for the Mini Rock.

Along with living up to being called 'Mini', the monitor also feels suitably rock-like, with a satisfyingly solid feel to its conventional, black-finished, 18mm MDF panel enclosure. Relatively unusually for a compact nearfield monitor, the enclosure incorporates some tapped inserts on its rear and side panels designed for the attachment of wall-bracket or cradle-mounting hardware.

Crystalline Entity

The Mini Rock's most striking feature, however, is undoubtedly its 'crystal membrane' bass/mid driver diaphragm. The crystal membrane technology comes from German speaker company Elac, whence both the Mini Rock drive units are sourced. The crystal membrane diaphragm technique involves adhering a thin, faceted aluminium sheet to a conventional pressed-paper cone and is said to yield a lightweight yet very rigid construction, without the high-frequency and high-Q resonance effects that often go hand-in-hand with such characteristics.

From that description of the crystal membrane diaphragm you'll gather that there's little actually crystalline about it, however, light weight combined with rigidity and high inherent damping is the

holy grail of driver diaphragm materials, and there's no lack in the world of speaker design of different techniques aimed at achieving such characteristics. The crystal membrane technique is certainly one of the unusual ones and it'll be interesting to see with a FuzzMeasure analysis if it obviously displays any out-of-the-ordinary characteristics.

Mini Driver

Speaking of 'out of the ordinary', there was a time when ribbon tweeters would have fallen into that category. These days, however, especially in the active nearfield monitor sector, ribbons are not unusual at all, and Elac have a long tradition of ribbon high-frequency drivers based on Oskar Heil's folded-diaphragm 'Air Motion Transformer' concept. I covered the AMT in some depth in my review of the PreSonus R Series back in the June 2017 issue (<https://sosm.ag/presonus-r>), so I won't duplicate all that material here, but briefly, the concept behind the idea is that of a folded diaphragm that doesn't so much move as a whole but pumps with concertina-like motion. The advantage is that the effective diaphragm area in terms of acoustic radiation efficiency is significantly larger than the linear diaphragm dimensions that define high-frequency dispersion. This means that the restricted high-frequency dispersion that unfolded ribbon tweeters tend to display, due to their large diaphragm dimensions relative to radiated wavelength, is somewhat ameliorated.

Folding the ribbon is not a complete cure for restricted dispersion, however, because even folds result in a diaphragm that's significantly larger than, say, a 25mm dome. It'll be interesting, again with FuzzMeasure analysis, to see how the Mini Rock's

The Mini Rock's rear panel houses the single input (on balanced XLR), a detented input sensitivity control, and inserts for wall or bracket mounting.

high-frequency response holds up away from its central axis. Tweeter high-frequency dispersion is not everything, though, and there's no doubt that ribbon designs can have significant advantages over dome designs in terms of lower moving mass and a lack of dome break-up resonances — hence their apparently increasing popularity in nearfield monitors.

Loaded Question

Having described the Mini Rock enclosure and drivers without mentioning any kind of reflex port or auxiliary bass radiator, you've probably come to the conclusion that it is a closed-box monitor, and you'd be right. Describing the Mini Rock as simply a closed-box system would be to do it a slight disservice, however, because there's a little more sophistication going on inside its unassuming black cabinet. Said sophistication is that it borrows the internal 'aperiodic' resistive loading technique first introduced on the previously mentioned Unity Audio Pebble. Once again, I won't repeat the entire explanation of internal resistive loading but refer you back to the Pebble and Bam Bam review. I will do a short-form reprise, however.

When a driver is mounted in a closed box, the stiffness of the trapped air raises the driver's fundamental resonance frequency considerably and, as with any resonant system, the higher the frequency, the more damping is required to stop it ringing. Damping in a system comprising a moving-coil driver and a sealed box of air mostly comes from the action of the voice coil moving through the flux set up by the magnet. However, relying only on the voice coil and magnet for damping can leave some potential avenues for low-frequency system and driver design closed off. So with the Mini Rock (and Pebble/Bam Bam before it), some extra acoustic damping is created inside the enclosure in the form of an internal partition (which also helps stiffen the enclosure and suppress panel resonance)



that incorporates a hole of around 75mm diameter. Fitted in the hole is an air-flow control element designed to provide just the right amount of resistance to the flow of air created by movement of the bass driver diaphragm.

Unity Audio's explanation for the resistive loading technique — that it makes the enclosure volume 'look' bigger to the driver — isn't entirely accurate, however. If that were accurate, it would primarily lower the driver/box resonance frequency, but it's a neat idea nonetheless that has some advantages over entirely electromagnetic damping, not least that the damping doesn't vary with volume level and voice-coil temperature.

Moving away from the front of the Mini Rock and its drivers to its rear panel, there's the traditional connection panel and amplifier module that looks to me to be closely related to that used on the Pebble. The Class-D amplification behind the connection panel is rated at 180 Watts for each driver, and the connection facilities extend to a single balanced XLR input. An input sensitivity control is fitted that provides finely detented adjustment right down to 'off'. I found the inherent hiss from the amplifiers borderline audible at my nearfield >>

Unity Audio Mini Rock £1674

PROS

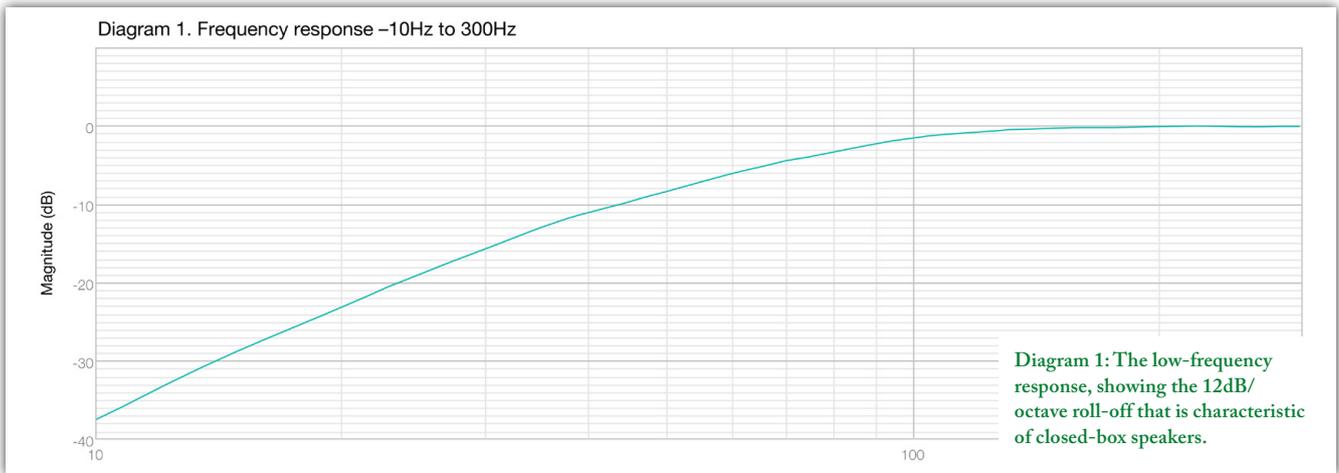
- Impressively extended closed-box bass.
- Good imaging and classy high frequencies.
- Inexpensive.

CONS

- None, once you adjust to the slightly warm tonal balance.

SUMMARY

Great bass from a small box means much of the battle is won. The Mini Rock has a slightly 'mellow' tonality but the strength of its overall performance is unarguable.



» listening distance with the sensitivity turned to maximum, but winding it back by a few detents left the Mini Rocks effectively silent when idling.

Measuring Up

I've covered a couple of technical aspects of the Mini Rock now, but before I get to describing how the monitors sound, I'll illustrate that technical stuff with a few FuzzMeasure curves. Diagram 1 illustrates the Mini Rock's low-frequency response measured using a microphone up close to negate the room effects. The curve shows the expected relatively early roll-off of a small, unequalised closed box and the expected 12dB/octave decay. It's a characteristic of closed-box speakers that, while the low-frequency roll-off starts at a relatively high frequency (the Mini Rock is already 3dB down at 80Hz), the gentle slope means that there's still useful output an octave further down. If the Mini Rock were ported, although its -3dB point might be down at say, 60Hz, the much steeper 24dB/octave decay thereafter would mean very

little useful output any further down.

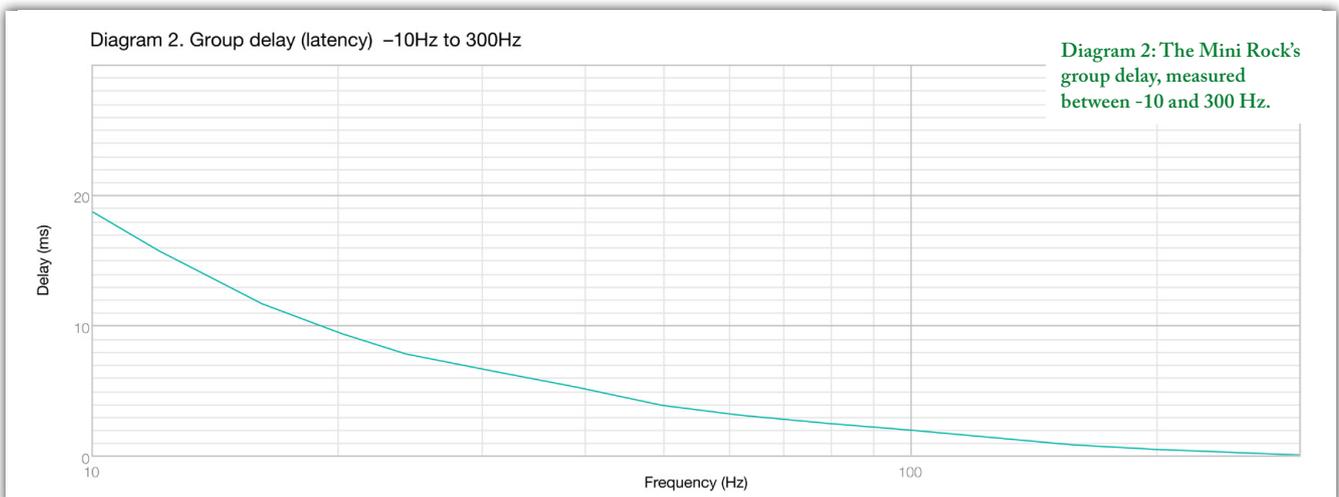
Diagram 2 illustrates a second characteristic feature of the Mini Rock and similar closed-box monitors — minimal group delay. We're all used by now to the idea of latency within a recording chain and the term 'group delay' is the technical term for latency that varies with frequency as a result of the phase response of a filter. The electroacoustics of a closed-box speaker creates a high-pass filter and, as with any such system, group delay increases with decreasing frequency. The Mini Rock group delay measures around 4ms at 50Hz, which, in the grand scheme of things, is very low. For comparison, I did a little research on published specifications and reliable technical reviews of a few ported monitors of a similar size and they typically demonstrate group delay at between twice and four times that of the Mini Rock. The Mini Rock's closed-box bass loading is primarily responsible for its minimal group delay, but its novel resistive bass loading technique also contributes.

The final illustration of the Mini Rock's

low-frequency performance is the step response shown in Diagram 3. The step response reveals how a monitor responds to an instantaneous change. You can see in Diagram 3 that the Mini Rock output jumps then falls and overshoots before returning to zero. The overshoot is typical of all moving-coil speakers, but what isn't so typical is how quickly the Mini Rock settles following the overshoot. The step response of the majority of monitors, especially if ported, will display multiple overshoots and take tens of milliseconds to settle.

The second technical aspect I mentioned earlier was the tendency of ribbon tweeters to display restricted high-frequency dispersion compared with typical dome tweeters. Diagram 4 illustrates the Mini Rock's frequency response, measured both on the perpendicular forward axis and at 30 degrees horizontally. As expected, this reveals that the output of the ribbon tweeter does fall away relatively quickly off-axis. It's around 11dB down at 20kHz where a typical dome tweeter will be probably 4 or 5 dB better off. Having said that, however, the

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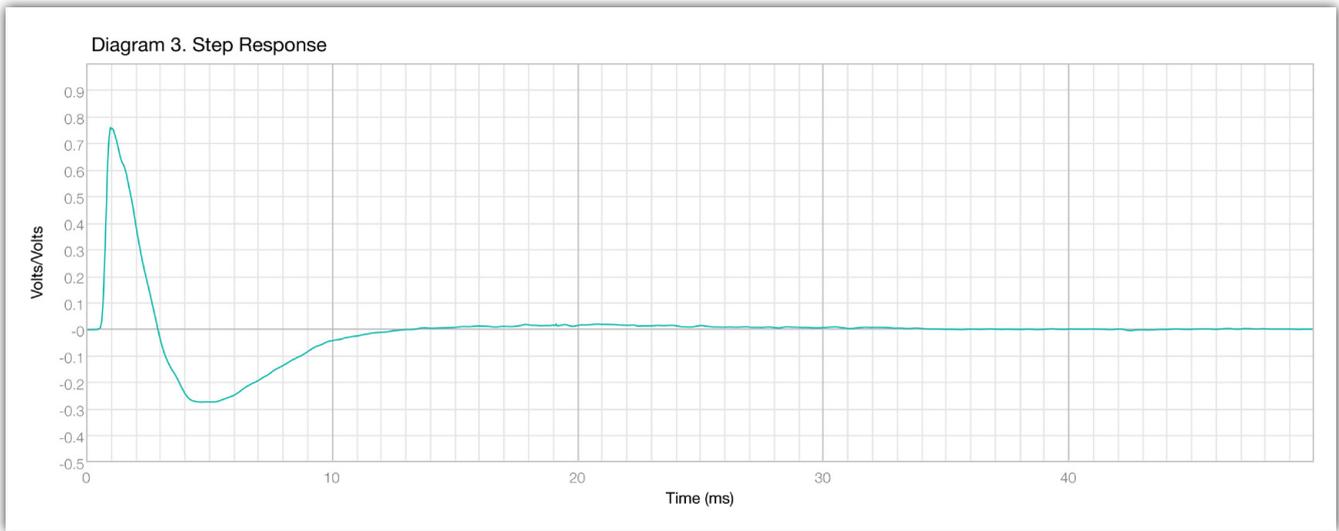


Diagram 3: A step-response plot of the Mini Rock, showing its unusually fast recovery time.

» high frequencies in question are north of 10kHz so the significance of a few dB at that elevated frequency is somewhat academic, especially as, below 10kHz at 30 degrees, the response of the Mini Rock tweeter holds up pretty well.

The Diagram 4 curve also reveals that the Mini Rock bass/mid driver is well behaved at the upper end of its range where many become ragged. The driver also shows no sign of becoming overly directional and there's little evidence of the dispersion discontinuity that sometimes arises in two-way speakers when bass/mid hands over to tweeter — at least not at 30-degrees off-axis. In terms of these measurements, the Elac crystal membrane appears successful. Perhaps a more significant character of the Mini Rock revealed by Diagram 4, however, is the general shape

of its frequency response above 200Hz. There's a mildly recessed region between 2kHz and 10kHz that suggests the monitor will display a relatively warm subjective tonal balance. And that brings me neatly on to some thoughts on how the Mini Rock performs subjectively.

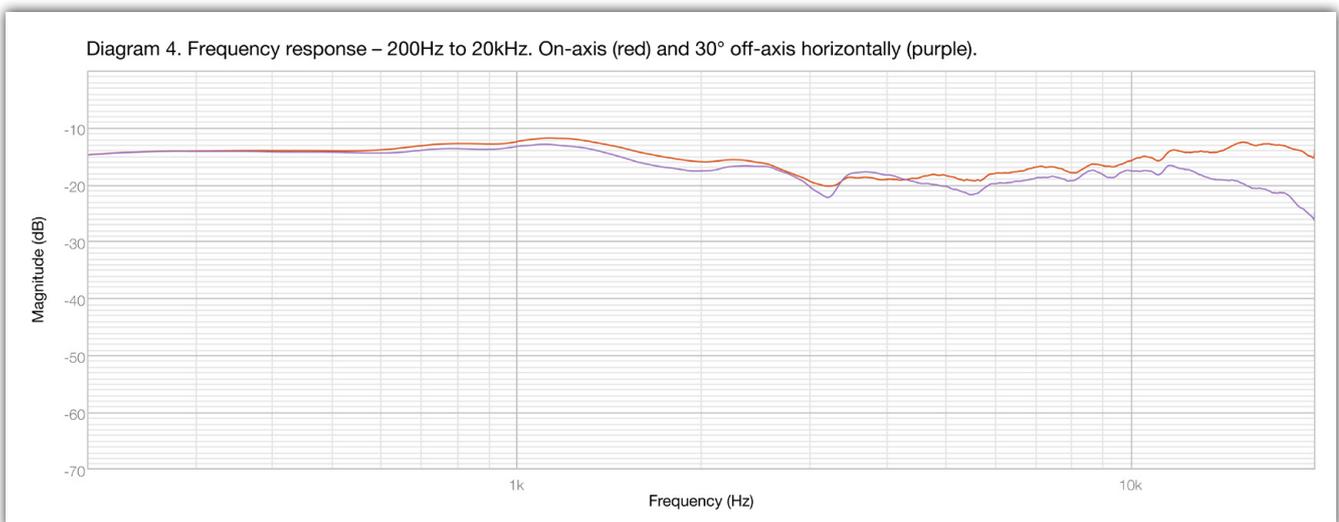
Rocking Out

Firstly, it was apparent from the off, on a range of CD, streamed and Pro Tools session material that the Mini Rock does indeed have a slightly warm balance, at least to my ears. It's much more BBC than NS-10, and looking back, I wrote something similar in 2014 about the Pebble. As with the Pebble, the Mini Rock is not a monitor that shouts 'detail!' to draw attention to itself; it's rather more subtle than that and, like a great piece of music that passes you by the first time, its qualities become apparent more as you become attuned to its tonal balance (if anybody says 'running

in' I won't be responsible for my actions). And one of those qualities that becomes apparent is the exceptional way the Mini Rock plays bass.

Unity's approach to low frequencies with the Mini Rock appears to be to prioritise time-domain performance over bandwidth specifications, and I think that decision is a great success. Bearing in mind its compact dimensions, there seems subjectively no lack of low-frequency bandwidth from the Mini Rock, but more than that, it reproduces kick drums and bass instruments with the satisfying certainty of timing and pitch that are the unmistakable signatures of closed-box loading. The bass not only extends lower than the Mini Rock's enclosure size would suggest, it also retains its qualities up to surprisingly high volume

Diagram 4: The Mini Rock's frequency response between 200Hz and 20kHz. On-axis is shown in red; the purple trace shows the response 30 degrees off-axis horizontally.



Alternatives

At first glance the Mini Rock is really not short on competition in terms of price. However, if you factor-in the closed-box bass its niche becomes a small one. The **Quested SR6 MkIII** also offers closed-box loading at around the same price but that's pretty much the only other similarly priced mainstream option. Looking more widely at more conventional non-closed-box options, the **Focal Shape** series, **Dynaudio Lyd** series, the **HEDD** range, and the **Neumann KH120** are worth considering.

levels. Of course, as with all small speakers, the maximum volume level before things start to get ragged is relatively modest, but for nearfield listening I never felt constrained in volume terms by the Mini Rock.

The timing and pitch factors of nearfield monitor low-frequency performance so often come second in the race for extended low-frequency bandwidth, and it's always refreshing when a monitor comes to sit either side of my DAW that clearly has higher ideals in mind. The Mini Rock falls into the refreshing category. I might be straying into cliché territory here, but so much of music relies on bass instruments,

both percussive and harmonic, for foundation, and once a monitor displays a secure handle on these elements, as does the Mini Rock, I think a good proportion of the monitoring job is done. This idea is even reflected in the way a lot of us mix contemporary music: we get the kick drum and bass guitar balance right first, then build the rest of the track on it. The Mini Rock gets the bass right and builds the rest of its performance on that.

So if the Mini Rock bass is so right, what about the rest of the audio band? I've already mentioned the warm balance that results from a slight dip in the upper mid-range, but I think it's an entirely innocuous tonal characteristic (although I perhaps wouldn't be writing that if the bass wasn't so good). There's a distinctly positive side to the balance too, as it results in a monitor that's very easy to live with and use for extended periods.

The fundamental quality of the Mini Rock's mid-range in terms of clarity and coloration is easily competitive with best monitors of similar size and aspirations, and at high frequencies the characteristic

ribbon-tweeter quality of detail and finesse without any exaggeration is all present and correct. The Mini Rock stereo imagery is very strong too. Although the tonal balance means upper mid-range images seem to my ears to be thrown slightly behind the speaker plane rather than up-front and 'in yer face', there's no lack of depth and focus. Good performance from the drivers and cabinet in the time domain, combined with a well-handled crossover and dispersion control, are the key to this.

It's sum-up time. The Mini Rock is a really well-judged package at a competitive price. Its tonal balance isn't quite neutral, but its fundamental performance, bass especially, means that this is really no more than an academic quirk. Take time and learn the balance, and I've no doubt the Mini Rock will reward prodigiously. It's a very capable little monitor with really great bass. ■■■

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