RECORDING

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Miking A Singing Guitarist On The Cheap

The Big Squeeze:
Tips & Tricks For Recording Accordion

Electric Guitar Recording With Mike Barbiero
(Maroon 5, Counting Crows, Blues Traveler)

12

NEW PRODUCTS REVIEWED

ADK • AEA • Dangerous Music
elysia • Focal • JBL
Josephson Engineering
Roswell Pro Audio
TELEFUNKEN • ZYLIA

ZYLIA
ZM-1

A mic to capture the world around you—literally

REVIEW BY JON HILLMAN WITH MIKE METLAY

If you've never heard of the Polish firm ZYLIA, that will probably change in a hurry. The ZM-1 microphone array is designed for a remarkable recording application: to turn the previously difficult and fussy process of 3D recording into something anyone with a DAW can do... and do it better than a lot of the pro solutions already on the market.

What's ambisonics, again?

In the article "Audio For Virtual Reality" (June 2018) and a more detailed followup on the September 2018 Talkback page, we described *ambisonics* as essentially the "next steps" beyond Mid/Side recording. Just as M/S takes two raw mic signals and lets the user decode them into a mono center and stereo width that can be individually mixed, ambisonics uses more raw mic signals to generate more spatial information with more complex math.

From M/S we go to first-order ambisonics, with four mic capsules generating raw signals that can be decoded into loudness, side-to-side, and front-to-back, but with no height information. Second-order ambisonics takes 8 mics, and third-order takes 16; the more mics and math, the more accurate the 3D representation.

In each case, the raw data from the mic array makes no sense on its own as individual tracks; it must be decoded into a 3D sonic "image" that our ears can understand. We can decode Mid/Side with three mixer channels and a polarity flip; beyond that, the math gets complicated in a hurry, and requires specialized decoding software specific to the mic array being used.

What makes ZYLIA's offering so special is that it combines a third-order mic array with the appropriate decoding software in a package that's effectively plug-and-play and trivially easy to use. If you can set up a mic, you can record third-order ambisonics. Beyond just recording ambiences, though, the ZM-1 system can actually let you record a band with one mic just by standing the members around it... and mix each instrument individually after the fact! Mind blown, right?

The hardware

The ZM-1 microphone is a beautifully elegant sphere about 4" in diameter (about the size of a softball) and weighing about 1 pound. Its ABS plastic body houses a whopping 19 mic capsules in a spherical array, whose raw signals can be decoded into 3D audio in a variety of ways.

The mic has a built-in tripod on the bottom that's threaded for a mic stand, and a USB Micro-B connector for hookup to your DAW. The "equator" of the sphere is a bright LED ring that glows blue when connected to the software and red when recording. It's a wonderful design, as aesthetically pleasing to look at as it is to work with.

There is, however, one significant gripe with the design... our only major problem with the entire system, to be honest. A great deal of the calibration procedure (see below) relies on knowing where the "front" of the sphere is. It's marked with a painted dark-red dot, about the size of a pinhead, just below the LED ring and effectively invisible at a distance of more than a few inches. You literally cannot see where "front" is! We resisted the temptation to drill a tiny hole through the dot so the LED light would leak through and make it more visible, and we hope ZYLIA fixes this in future designs.

The software

ZYLIA's software is very well put together, and the most user-friendly approach to 3D recording on the market to date. The centerpiece is ZYLIA Studio, a standalone application where you are guided through the recording process with the ZM-1.

The process begins with calibration, essentially telling the software what your sources are and where they are positioned relative to the microphone. This step allows the software to auto-magically separate the sources for mixing later on.

The automatic calibration process consists of selecting your sources from a list of predefined instruments, and then recording

an 8-second sample of each instrument being played into the mic, one at a time. These samples are then analyzed and you are presented with a source position layout determined from that analysis—you're free to fine-tune the layout, but it is startlingly accurate based on our tests. If the layout cannot be determined, or seems problematic (e.g. sources placed too close together), the software advises you on corrective measures, or you can manually choose a setup like Duo, Quartet, etc., and then fine-tune it.

Once calibrated, you start recording by clicking on the big red button—simple! Click the same button, now blue with the familiar Stop icon, to stop.

You're presented with a nice single-waveform display of your recording, with a Play button to preview it.

When previewing, you're actually hearing a 24-bit/48 kHz stereo mix generated by two of the mics on opposite sides of the sphere, a binaural-style setup similar to that of the old Schoeps KFM 6. Depending on your setup, this great-sounding preview mix might be enough for your needs, in which case you're one click away from exporting that stereo file.

If you need to dig deeper, you have a few options. You can easily export the 19-channel raw WAV file itself—which will be *much* larger than what you're used to working with, so keep that in mind—if

you need access for editing or specific processing in your DAW (and you really know what you're doing). Or, you can choose to separate the recording within ZYLIA Studio, where you're presented with a simple mixing interface. Each source you set up during the calibration phase has its own level and pan controls, and you have an overall level control as well. Once you're satisfied with your mix, one click will export the final stereo file.

While it might be unfamiliar, this process has been made exceedingly simple. Anyone, even those with little recording experience, will be able to create excellent recordings with the ZM-1 and ZYLIA Studio software, which are sold together as the ZYLIA STANDARD Set. But wait, there's more!

Go PRO

In addition to the mic and ZYLIA Studio standalone app, the ZYLIA PRO Set adds ZYLIA Studio PRO, a VST/AU/AAX plug-in for your DAW that provides far more flexibility in how you might work with the ZM-1. The plug-in workflow supports the creation of up to 24 virtual microphone sources. Each source can be positioned left to right and front to back (azimuth) relative to the ZM-1 via a simple display, with unique elevation and polar pattern width. Each virtual microphone has discrete processing parameters including separation mode and level (these affect how the algorithm separates the physical input sources to derive your virtual source), and output channel.

The output channel determines the output within your DAW, which will be handled slightly differently depending on your DAW (note: some DAWs may not support plug-in multichannel output routing as is required here). From there, you simply record to those channels as though the ZM-1's virtual sources are real, physical input sources.

Admittedly, this sounds a lot like wizardry, and you would be forgiven to approach all of this with a healthy dose of skepticism. The reality is that the ZM-1 with ZYLIA Studio Pro offers up the most sophisticated approach to recording I've seen in a long while. The possibilities opened up with this solution are profound, and touch on almost every area of recording.

For instance, while recording voiceovers for a VR experience recently, I had five actors in frantic conversation—the end result needed to be fairly well-separated tracks that could be positioned at runtime via spatial processing, since the player's perspective was to be one of the people involved in that conversation. ZYLIA would have saved me a lot of trouble—set the ZM-1 in the middle of the ring of actors, set up 5 virtual sources to tracks in my DAW,

and hit Record! Based on my testing, the separation this provides would easily have been good enough right out of the gate, and my pipeline would be far less complex… in other words, far fewer hours spent processing and editing.

Another fascinating use is environmental sound design. The ability to support 3rd-order ambisonics natively (19 discrete channels) means that a 3D Foley stage is not out of the question for fixed perspective content, and creating holographic environmental beds is made dead simple. ZYLIA's PRO Set includes an Ambisonics Converter that supports first, second, and third-order, as well as FuMa and ambiX formats. The capability provided actually outstrips what most game engines can support, due to a lack of true n-channel WAV file support—the bottom line is that ZYLIA is ahead of the curve!

Final thoughts

After lots of recording and listening tests, with music, speech, and sound design, the sound quality of the ZM-1 exceeds our expectations. After all, given its price point and the fact that it includes 19 separate microphones and very sophisticated software, you might not assume much… but frankly, it sounds wonderful.

While it won't replace your coveted large-diaphragms and ribbons, it's clearly not designed to. To our ears, the ZM-1 sounds like a high-quality small-diaphragm condenser, producing very natural and open recordings. There are no obvious peaks or valleys along the frequency spectrum, and it handles high SPL like a champ. With very low levels you may struggle a bit in post to separate signal from noise, but generally speaking this is a minor issue.

The ZM-1 looks really different, maybe even a little gimmicky, but the fact is, it's a really powerful solution punching way above its weight class. I would gladly bring the ZM-1 to any coffee house or jazz club, and there would be no excuse to not record every band rehearsal. Personally, I'm most excited about the new approaches to sound design made possible with this technology, and I look forward to making it a permanent part of my tool box. ⤶

PRICES: *STANDARD Set, $599; PRO Set, $949*
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