

## **R-121 Ribbon Microphone by Steve Albini**

The Royer microphone couldn't have come at a better time. With every electronic company in christendom exploiting the availability of Chinese condenser mic capsules (and entire microphones) for OEM or rebranding, the market is absolutely flooded with nearly identical condenser mics. Their variability in quality and reliability is leaving many recording enthusiasts looking for other options. Ribbon mics offer exceptional midrange detail, low self-noise and excellent transient response, and are a perfect antidote to the overly-crispy sound of many cheap condenser mics. Unfortunately, with the exception of Beyer and Coles (whose venerable microphones are still made as they once were), most microphone manufacturers have abandoned the technology, which requires precise manufacturing and mechanical assembly, in favor of dynamic moving-coil mics (which are simpler to make) and condenser mics, which can be knocked together from off-the-shelf capsules and preassembled circuit boards.

Enter Royer. The R121 takes advantage of modern, tight-tolerance machining technologies to make its housings and modern, high-field-strength magnetic materials to make its magnets. The result is a "classic" ribbon mic in a very compact housing.

When I first started experimenting with the R121, I put it up next to one of Electrical Audio's STC 4038 mics (the nearly-identical forerunner of the Coles 4038) on a guitar amplifier (at a distance of about 14 inches), and I was shocked at how similar they sounded. Apart from the slightly-higher output of the 121, I literally couldn't tell them apart by ear. That told me the frequency response and transient response were very similar, as these two things are usually obvious in direct comparisons like this. Following a hunch, I sent the outputs of the two microphones to the X and Y axes of our oscilloscope, and the display compounded my observation -- there was only a trivial difference in the phase response between the two, and only at high frequencies. I have often seen the outputs of two of the same model microphone with less correlation.

I tried similar comparisons on string instruments and saxophones, two other sounds that benefit from a ribbon mic's smoothness, and the result was the same -- either mic sounded good, and they sounded uncannily similar.

There are significant differences between the two mics though, and that would determine which is more suited to the job at hand. By nature, ribbon mics are bidirectional. Other polar patterns are possible using acoustic baffling, but most ribbon mics remain figure-of-eight. The acoustic "shadow" of a bidirectional microphone at short working distances causes a bass boost. This is a very useful trait, as it allows for a thin or raspy sound source to be thickened by placing the mic closer to it. In this respect, older, larger microphones have more flexibility, and a more pronounced bass-boost, since their size exaggerates this "shadow."

This bass boost comes at a price, however. The ribbon element inside the microphone is delicate, and at close working distances, a breath of wind or a strong low note can excite the ribbon to the point of breaking, or flatten-out its corrugations, or cause it to contact the internal screening of the mic. All of these are audible as nasty distortion artefacts, and the worst of them can take the mic down for repairs.

The Royer is designed to accommodate these large excursions, by a very clever trick: Its ribbon is not centered within the screening of the magnetic armature, as was standard in older microphones, but is offset to the front, to allow the ribbon to move in a larger rear-ward excursion without damage. That's a brilliant little bit of engineering.

Though it has an effect on the proximity effect, the small size of the R-121 has advantages. Though the Audio-Technica shockmount supplied with the mic is a good one, it is held securely in almost any resilient cylindrical mic clip (Beyer, AKG...) for an even smaller profile.

The R121 has a relatively high output level (for a ribbon mic), which is not likely to be an issue when recording amplified music, but is helpful for acoustic instruments.

One recording chore that almost always exasperates me is recording screechy female vocals. You know the kind -- every word ends with "YAAH," and is pitched to cut glass. While trying-out the Royer 121, I had something of an epiphany. "This sound she is making with her mouth," I thought, "is quite a bit like a distorted electric guitar..." The wheels of insight turn slowly, but they turn. I tried a ribbon mic on the vocal, and the things about it that improved guitar recording -- excellent detail without harshness, smooth treble response -- made this particular screeching hellcat sound the best she ever has.

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