

Royer Labs SF-1

A warmer, flatter ribbon with superb lows and extended high end

By Myles Boisen

Royer Labs is a small company dedicated to reviving ribbon microphones for the digital-recording era. I reviewed the company's flagship mic, the R-121 for the May 1999 issue of EM, and was so impressed that I purchased one for my studio. Since then, the mic has acquired most-favored status at the studio for a number of applications, especially miking guitar amps and brass instruments. My colleagues were impressed, too, and honored the R-121 with an Editor's Choice award in 2000.

The inspiration for the SF-1 came from the Speiden SF-12, a stereo coincident ribbon mic originally hand built by Bob Speiden but now manufactured by Royer. The SF-1 is the mono version of the SF-12 - if you sawed an SF-12 in half and doubled the electronics, you would basically have two SF-1s!

The SF-12 and SF-1 have a thinner ribbon than the R-121 (1.8 micron as compared to the 121's 2.5 micron), and different magnet structure. According to the manufacturer, these design aspects contribute to superior transient response (something ribbon mics are already prized for) and improved high-frequency response, albeit with increased fragility of the ribbon element itself. Of course, all ribbon microphones need to be shielded from powerful blasts of air and generally handled with care. The SF-1's output level is comparable to that of other ribbon mics, requiring 15 to 20 dB more gain than an average condenser microphone.

Like its predecessors, the SF-1 comes in a beautifully crafted wood box with a nylon mic clip and a lifetime warranty to the original owner (repair or replace at Royer's option). The mic body is fashioned from ingot iron and has a matte black finish. Optional accessories include the Audio-Technica AT-84 shock mount (\$72), which Royer supplied for this review, PS-100 metal-mesh pop filter (\$47.50), and Sonosax SX-M2 stereo mic preamp (\$1,250), which Royer also supplied for this review. Royer sells this preamp as an accessory item because of its high gain and low noise characteristics. The SX-M2 is a well-built, portable, and compact unit not much larger than a Sony Walkman. It provides up to 76 dB of gain and can be powered either by

battery or DC current. The SX-M2's performance lived up to its impressive specs, exhibiting very low noise and a bit smoother sound than my main test preamps.

Line Up

To get a sense of the SF-1's sonic character, I did some comparison testing. I set up a three-mic cluster: the SF-1, a Royer R-121, and alternately a Coles 4038 ribbon mic and an Oktava MC 012 small-diaphragm cardioid condenser. I used BLUE Kiwi microphone cables and Focusrite Green preamps and recorded to a Sony PCM-800 8-track digital recorder.

First, I performed a standard loudspeaker test. Although the R-121 worked some magic on the bass end of my boom box source, the SF-1 was more faithful to the source on a selection of mixes. The SF-1 highlighted ambience and percussive details pleasantly; after a few listening passes, I rated the SF-1 tracks the best of the group.

Frequency charts posted by the manufacturer show the SF-1's response deviating less than 3 dB between 40 Hz to 15 kHz; the response is flatter than the R-121's, which a comparison of the two charts makes clear (see Fig. 1). Some EQ sweeps confirmed the flatness of the SF-1's frequency response—it was easy to hear the effects of boosting in sweeps throughout the bass and treble ranges, and there were no evident weak or dead spots. However, I did notice—both in this test and on instrument tracks—what seemed a bump in the SF-1's response around 200 Hz.

Next I compared the SF-1's off-axis response to that of the other mics by positioning the boom box several feet away at about a 90 degree angle to the side of the mic cluster. Impressively, the SF-1 retained solid low-end characteristics that were lost on the R-121 and the small condenser. Both these mics also emphasized unusual timbres in the source, indicating a less-than-flat response, and sounded thin or diffuse.

Last, I compared the two SF-1s to hear how similar they sounded. For the sake of thoroughness, I used three different solid-state preamps: the Sonosax SX-M2, a Focusrite Green, and a Sytek MPX-4. I perceived only a very minor difference in the high end "air" between the two SF-1s. Other than that, the two microphones sounded identical and perfectly matched.

Strings Attached

For perspective, I left the mic cluster intact for the instrument tests. First up was an acoustic guitar strummed and finger picked at close range. The SF-1 sounded flatter than the R-121, but overall less flattering: though the high end was slightly clearer, the bass notes sounded indistinct. The two Royer mics were comparable in terms of self-noise (very low) and preamp gain

required (about +55 dB). If I had to choose between the two on acoustic guitar, I would pick the R-121's tangy flavor over the relatively blandness Neutrality of the SF-1. But of the three mics in the cluster, the Oktava 012 condenser mic was my favorite in this application.

On a bright, close-miked, acoustic slide-guitar part, the high end on the SF-1 was closer in character to that of the Oktava 012's. But here I found the ribbon mic's softer sound to be an advantage, despite the upper range sounding duller and the lows somewhat boomy and unfocused. Interestingly, with both mics strapped into the AT-84 suspension shock mounts, the SF-1 proved more immune to foot stomping and stand-borne vibration than the R-121.

At a distance of two feet the SF-1 provided a full low end and realistic highs on an assortment of guitar styles. A cut at 220 Hz took out a slight boominess in the sound, and allowed my inexpensive Hyundai guitar to sound much richer than it did through the other mics. Not surprisingly, in the high end above 8 kHz, there was still no comparison with the crisp timbre of the Oktava condenser.

On a session involving a Martin "Backpacker" model mandolin, the SF-1 added a warm, supportive character. The performer, guitarist Michael Bizar, praised the microphone's qualities, and I agreed that the SF-1 warmed up this instrument very nicely.

Electrifying

As mentioned previously, the R-121 has become a first-pick microphone for recording electric guitar at Guerrilla, so I was anxious to see if the SF-1 could match or perhaps even beat it. It didn't. Positioned about two feet from a cranked Fender tube amp with two 12-inch speakers, the SF-1 conveyed a hollow midrange and too much low-end mud. A 4 dB boost at 2.5 kHz brought the SF-1 closer to the character of the R-121, but the SF-1 still didn't have the presence and "ready to rock" tone that have made the R-121 so popular among guitarists and engineers alike.

Likewise, on a mellow amplified jazz guitar, the SF-1 was murky sounding compared to the other ribbons. In this application, its extended high end brought out some amp noise, but no special qualities. As much as I appreciate the SF-1's virtues as a flat and extremely warm mic, for electric guitar I usually want a mic with some attitude. The SF-1 has a neutral and somewhat meek (can you kill somewhat meek?. Or call it "mild") quality that makes the R-121 and Coles 4038 seem aggressive in comparison.

On the other hand, in a session with guitarist John Shiurba, the SF-1 worked wonders on a small, solid-state Vox guitar amp. It managed to add punch and authority, yet smooth out rough edges

on the challenging array of textures Shiurba created. I also tried the SF-1 directly on another of Shiurba's guitars—an unamplified hollow body—as he played along in the same room with other musicians. This time, the mic provided incisive high-end detail. Also, the mic's off-axis pickup, which was readily apparent when I brought up the acoustic instrument track in the ensemble setting, was remarkably uncolored. Commonly in multiple-mic sessions, bleed from condenser mics creates muddiness, unwanted room sound, and narrow-band coloration throughout the frequency range. But in this case, the leakage was not a problem, especially after I equalized some "thump" out of the guitar with a 4 dB cut at 200 Hz.

I experimented with the Royer SF-1 on two different keyboard-and-amp rigs (solid state) as the players ran the gamut of samples, synth patches, and industrial noise. During both tracking and mixing, I was very impressed by the SF-1's immediacy, as well as its sympathetic treatment of pure synth tones, high-resonance peaks, and low-end material in the 40 to 80 Hz range. I didn't compare any other mics during this session, and I didn't feel compelled to either! Under demanding conditions, the SF-1 reproduced diverse, full-frequency sources perfectly with no harshness or dulling. In the mix, the tracks needed very minimal EQ—just a touch of 4 to 8 kHz sweetening or the occasional low- or upper-midrange cut around 1 kHz.

Brass instruments are a traditional favorite for ribbon miking. I tried the SF-1 on trumpet and got great results. Despite some raspiness in the high end, the SF-1 gave the trumpet a bigger sound and an enhanced sense of low-end air movement as compared to the R-121 and Coles 4038 ribbon mics. On open horn, the 4038 had less fizz, but the SF-1 displayed a touch more warmth. And on Harmon-muted trumpet, the SF-1's overall response was a real boon, supplying clear, high-harmonic richness and an authoritative low end.

Shake, Rattle, and Roll

The SF-1 improves markedly on the R-121's already formidable capabilities as a percussion mic. On tambourine, the R-121 sounded dull and crunchy in comparison and the small-diaphragm condenser a bit too bright and piercing. The SF-1 rendered the tambourine in a detailed and surprisingly listenable way; indeed, it sounded superior to any ribbon mic I've tried in this application.

On shaker, though the Oktava 012 was my favorite, the SF-1 offered obvious improvements in high-end pickup and transparency over the R-121. Yet on jingling keys, miked from two feet away, the SF-1 proved much more accurate than the condenser microphone. Interestingly, when I moved the keys to a distance of about one foot from the mic cluster, the SF-1 sounded almost identical to the Oktava 012. For this source sound, I found the condenser's slight high-end

advantage to be a sonic disadvantage, as it provided too much stimulation to my middle-aged cilia! The SF-1 is truly the first ribbon mic I have ever considered for delicate high-end percussion duties, and I looked forward to trying it on drums.

Fortunately, fellow engineer Karen Stackpole happened to be reviewing a new Ayotte drum set for *Onstage* (EM's sister publication), so I was able to evaluate the SF-1 pair in X-Y coincident and split-overhead configurations. At approximately seven feet above the floor, both the X-Y and spaced arrangements of the SF-1 pair under-represented the cymbals and sounded too tubby. Compared to the Oktava 012 X-Y pair, the SF-1 grabbed a great snare sound and painted a much more robust and immediate picture of the drum portion of the kit. But even with EQ, the cymbal sound was just too dull.

Remembering my experience with the key test, I moved the split overhead SF-1s in closer - nearly on top of the left and right cymbal clusters - so that no cymbal was more than 3 feet from the mics. Suddenly, the sound of the drums snapped into focus: not only was there much more detail from the cymbals, but a remarkable combination of punch and clarity emerged from the floor tom and snare, as well. With a little high-end boost, this setup could provide a very big and distinctive sound for jazz or funk recording.

I also experimented with the SF-1 as a mono drum overhead, comparing it to a single Oktava 012. Placed above the center of the kit and about five feet from the floor, the SF-1 picked up viable cymbal sounds and captured a huge snare tone that sounded much truer than what the condenser captured.

When raised two feet higher, the single SF-1 produced a sound that was surprisingly comparable to the Oktava 012. With a high-frequency shelving boost of +3 dB and a broad, low-end cut of 3 dB at 200 Hz, the SF-1 nearly matched the crispness of the small diaphragm mic, but provided a butt-kicking low end, to boot. It took a little getting used to, but toward the end of the listening session I really began to like the full sound emerging from the SF-1, and I made a note to experiment with it further in upcoming sessions.

During the listening evaluation, Stackpole noted that the SF-1 sounded "better and brighter when the mics got closer, and they did seem to give the drums some beef." Though in the end Stackpole preferred the drum sound as captured by the small-diaphragm condenser pair, she remarked that "the Royers are definitely usable-not a bad sound, just darker."

New Voice

As a frequent and enthusiastic user of the Royer R-121, I approached this review with great curiosity. Could the SF-1 actually improve upon the upper high-end response of the R-121? The answer is an unequivocal and resounding yes. Is the SF-1 a great ribbon microphone? Once again, the answer is yes. As I learned from tests for this review, there are things the SF-1 does better than other ribbon mics (including the R-121); but not surprisingly, there are also things it doesn't do as well.

I was very impressed by the SF-1's potential as a percussion and drum mic. With proper placement and a few EQ nudges, its clarity rivaled a small-diaphragm condenser mic that I regularly employ. The SF-1 also sounded wonderful on trumpet, and I would expect it to perform as well or better on other members of the brass family. In addition, I was literally moved by the superb bass response and punch of the SF-1-it reproduced powerful low-end air movement in a way that only a few high-end condensers can.

With this new entry into the underpopulated world of studio-grade ribbon microphones, Royer has created yet another distinctive, versatile, and great-sounding microphone. It's a great complement to the R-121, but the Royer Labs SF-1 also has a voice and capabilities all its own.

BIO:

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