

SE ELECTRONICS RNR1

Ribbon Microphone

One of the most anticipated new studio microphones in recent times, the RNR1 has a lot of talk to live up to.

SIMON TILLBROOK takes the first production model for a studio tour.

Whenever the name Rupert Neve is brought up in conversation with regard to any piece of new equipment, expectations and interest both increase to an astonishing degree. This has always been in familiar areas such as console and dynamic processor design, but now this has shifted to a new arena... microphones.

In conjunction with Siwei Zou and SE Electronics, Mr Neve has applied his design skills to a new series of microphones, the SE Rupert Neve Signature series.

These are completely new designs from the ground up, with Siwei Zou and SE focused on the transduction and enclosure, and Rupert supplying the circuits and transformer designs to take the transducer output and deliver it to your studio system.

The Ribbon has a very low 200Ω impedance, and it is at this point that Rupert Neve's contribution comes into play. A custom hand wound input transformer steps up the level and delivers it to an amp stage of discreet single-sided circuits. From here the signal passes through another custom hand wound output transformer very similar to those that Rupert Neve was working with some 40 years ago – they have just got quite a bit smaller.

The Mechanicals

The RNR1 is a solid-state active ribbon microphone with a tight bi-directional polar pattern. The transducer is a 2.5micron aluminium ribbon that can be user tightened. SE does not recommend this, however, and I was not going to go against that advice and try it.

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The specs for the RNR1 show a frequency response of 20hz to 16Khz +/-3dB, sensitivity of -32.2dB (ref. 1v/pa +/-1dB), equivalent noise level (A-Weighted) of 15dB, and a maximum SPL >135dB. The frequency response, by the way, does not give the full picture. It comes back again higher up – read the Q&A with James Young for more on that.

The RNR1 comes supplied in a wooden presentation box with a full suspension cradle microphone mount. Lifting the RNR1 from the box it's reassuringly heavy, and close examination of the interestingly tapered body shows a high level of build quality. There's only one switch on the RNR1, and that's the high-pass filter. The suspension cradle screws solidly to the base of the RNR1 and has a good range of movement, with a nice strong screw angle clamp.

I started with a few basic tests for noise levels and pickup pattern. Inherent noise levels were exceptionally low and, as with many ribbons, there was an extremely tight figure-of-eight polar pattern. Side rejection proved virtually complete.

Into The Studio

I have a fondness for the natural clarity that a ribbon gives in the mid-range, so had high hopes for the RNR1. I took the mic on a mini tour to get a taste of performance in a variety of different spaces.

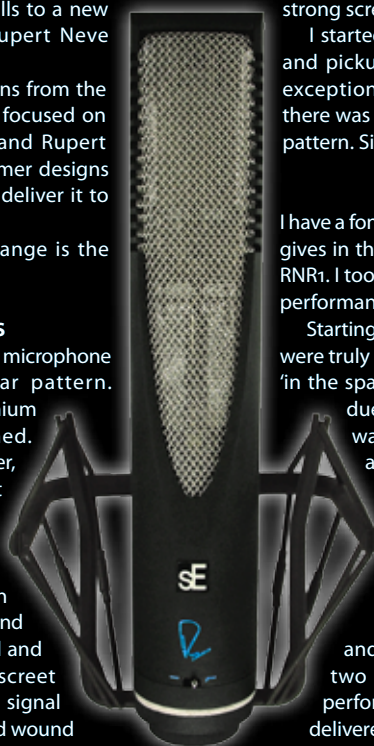
Starting with a choir in a large church, the results were truly stunning. Results were as close to being 'in the space' as I have heard. That wasn't simply due to the usual ribbon characteristics of warm lows and spacious mids, but also an added level of detail that extends right through the high frequencies. This high frequency detailing is an area that ribbons often seem to struggle with, but in the case of the RNR1, there were no problems at all.

I then took the RNR1 into the studio and placed it in various locations around two drum rooms, using the same kit and performer for reference. Once again, the RNR1 delivered an 'as if in the space' feel. Getting tight into to the kit to see how the RNR1 handled high SPL signals (with axis placement carefully chosen), the RNR1 coped happily with very close proximity indeed. This was also the case when I used the RNR1 with a variety of lead and bass guitar amplifiers in the same studio rooms.

Finally, it was back into the main studio for a series of acoustic stringed and percussive instruments. I spent several hours working with numerous setups here. Positions, preamps, gain levels – all kept delivering wonderfully natural results.

During my training, I was always taught about the importance of spaces and the contribution to the sonic and dynamic characteristics of sound, something that has proved to be very important with my work in general. Using the RNR1 has both reinforced and, in some ways, rejuvenated the way I think about this.

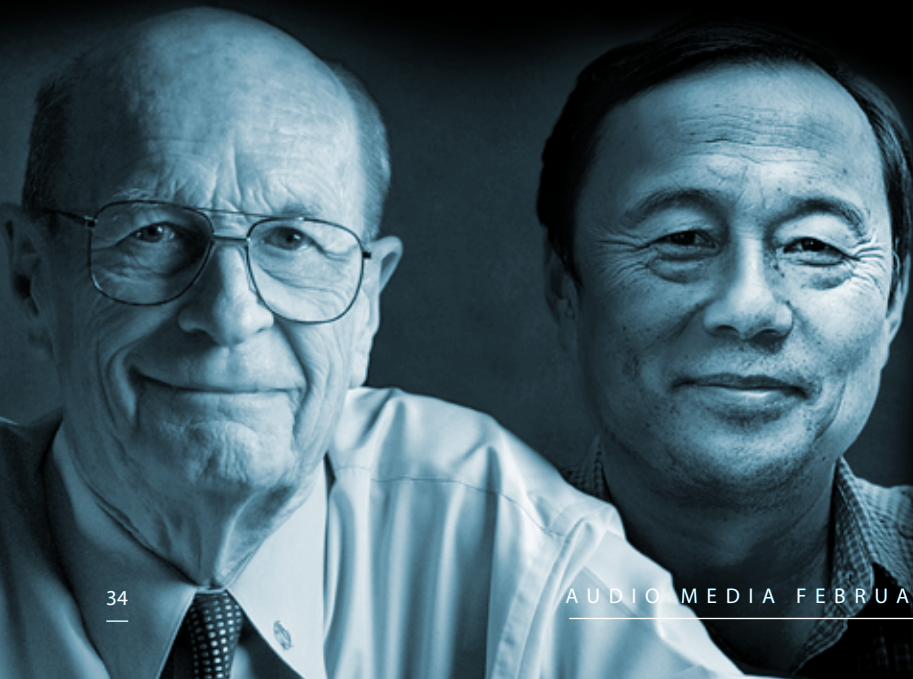
I put the RNR1 up alongside a number of well-known large diaphragm condenser and ribbon microphones from a range of manufacturers, and then invited colleagues to assess in a blind test. I felt confident from my own experience that the RNR1 would stand up against this very stiff competition. When it came to which best represented the natural sound in the room, the RNR1 was universally identified as the preferred choice by all. The surprising thing was how quickly all settled on this choice, commenting on the sense of space and high-end clarity.



THE REVIEWER

SIMON TILLBROOK is the Principal Music Tutor at Islington Music Workshop in London. The rest of his time is spent as a freelance engineer, mainly in the USA.

Rupert Neve and Siwei Zou.



BEHIND THE SOUND

PAUL MAC quizzes SE Electronics' James Young on the RNR1 and its road to creation.



Conclusion

The word that constantly comes up when you listen and talk about the RNR1 is natural. The fact that the RNR1 has excited me about recording spaces to such a degree is real testament to the quality of this microphone – the high frequency clarity and presence is stunning.

This is not a cheap mic, though it is good value. I would have no qualms about spending the asking price, as units that might be considered comparable (depending on your criteria) still cost a lot more – many of the mics I used for comparison would fall into this category.



The team behind the SE RNR1 (L-R): Josh Thomas, James Young, Siwei Zou, Rupert Neve, Mitch Carey (bottom right), Phil Smith.

More than this though, Rupert Neve and Siwei Zou are collaborating on several other microphones to join this Rupert Neve Signature range and, if the RNR1 is an example of what to expect, there is every reason to get excited about what's in store. **AM**

INFORMATION

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PM: Why is this microphone so special?

JY: The difference between ribbons and condensers in general is that ribbon microphones sound more natural. In the frequency range in which they work, which is usually 20Hz to, say, 7-8kHz, they are perhaps the best microphones in the world. The big problem is that you've either got to augment them with a decent condenser microphone to get back the top end that's missing or you have to be very selective about the sources you use them for. Other ribbons roll off the top end completely rather than shelving it, so you can't just EQ it back in.

Rupert Neve's idea was basically to extend the frequency range of the microphone. He's done this in two ways – neither are new technologies, but we've used those existing technologies in a novel way. First, he's created a circuit board that reveals the frequencies that are normally missing from the ribbon microphone. The standard performance of our ribbon is 20Hz to 16kHz.

After that 16kHz there is a small shelf down – significant enough to notice that the top end drops away. The top end is still there though, and that's the first important bit – he's taken the capsule and said there's no reason it shouldn't work at high frequencies. It's a bit of metal vibrating, and all the information is in there.

He's then created a lot of headroom using expensive hand-wound transformers – an input and an output transformer. Where this becomes really important is with the noise floor, and also the ability to dial back in the frequencies that are there, but are slightly shelved down.

From 16k onwards the RNR1 is shelved down slightly, but then it comes back up again at about 20kHz and carries on to about 25kHz – that's important.

Because there's an enormous amount of headroom you can use a lot of gain, and you can actually EQ the ribbon completely flat without adding any significant noise. So if the standard performance up to 16k isn't enough, you can EQ it up so that part of the response performs exactly like a condenser with no problem at all.

What we've ended up with is a microphone that sounds like a ribbon microphone – so you get that incredible naturalness and harmonic detail in the recording – but across the whole frequency spectrum. The result is ridiculous; it sounds like you're actually in the room with the person performing. We've had a lot of feedback from some major recording studios already and they were really wowed with it.

PM: The harmonics are key then?

JY: What you're getting with a ribbon microphone is a more detailed harmonic response – that makes the output more real. Condensers tend to hype things – compress the data, if you like.

Rupert's thing is that the way people listen to audio is not simply 20Hz to 20kHz. Yes, if somebody plays a tone at 22kHz, you can't hear it, but it will affect lower frequencies. Our response, up to 25kHz, means that it's having a massive effect on all of the mid-range frequencies up to around 12.5kHz. So all those really important 'air' frequencies benefit too. You're getting a more natural room sound because, regardless of whether you can hear it, it's adding even more than the mid-range stuff you would normally get from a ribbon.

I used the production model for the first time very recently. Everybody's jaws were on the floor. I had spoken to people about what the aim was, and having heard the prototype I had a certain expectations. If you close your eyes you cannot tell that the person playing is in a different room – it's a bizarre experience.

PM: Could you say more about the initial approach from Rupert?

JY: A number of years ago Rupert approached quite a few manufacturers with ideas on how to dramatically improve the performance of ribbon mics – and other mics as well (we've got a pencil mic, a tube mic, and a condenser coming).

A combination of things contributed: Personal criteria – people he wanted to work with. Business criteria – the money. And third, and as it turned out, probably the most important thing was who is really capable of doing this and making it work.

It wasn't a slam dunk, otherwise it would have taken a lot less than three years to get to this point. The nice thing about our relationship though, and the really comforting thing about what we've done, is that he followed his passion rather than his wallet on this. A bigger company could have offered him a lot more financially than we could. What we've given him is the best partnership.

THE RIBBON CHALLENGE

The History Behind SE's New Ribbon Mic

Like so many electromechanical devices, both moving coil and ribbon transducers were invented by Werner von Siemens in about 1880. As there was no such thing as an amplifier, the fact that you got a small electric current out of a moving metal ribbon activated by sound was regarded as an interesting curiosity, but of no practical use. In 1930, an engineer called Harry Olsen working at RCA took another look at the ribbon loudspeaker that had been developed just a few years earlier, and used the same principle to develop the world's first practical ribbon microphone. By 1931 the square shaped RCA 44A was launched, which was replaced by the legendary 77 series.

By the mid-60s, the ribbon mic was almost completely replaced by the condenser, with its more modern, crisp sound. Only two major manufacturers, Coles and Beyerdynamic, continued the manufacture of high quality ribbon mics. But with the coming of the digital age, the condenser microphone was criticised by many for being too harsh and interest returned to the ribbon, and manufacturers such as AEA and Royer entered the market using proven existing designs.

The ribbon mic is hardly hi-tech, so today there are literally dozens of brands out there. There are even enthusiasts who go to all the trouble of making their own, although the results are seldom convincing. My earlier attempts as a boy gave listeners the impression that my DIY ribbon mic had been eaten by the cat. The main problem for the would-be builder, is the very, very low output and impedance of the ribbon. The conventional method of overcoming this is to feed an audio transformer with an extremely low input impedance and a step-up ratio of about 30:1.

Although the inertia of the ribbon is lower than for moving coil membranes, the filter effect of the early transformers had the unfortunate effect of reducing higher frequencies, which in turn has given the ribbon mic the reputation for having a warm sound if you like them, or just for being dull if you do not. Even with a transformer, not every pre-amp was especially kind to the signal, so older models needed extremely sensitive and low noise pre-amps.

Myths

Many myths have built up around the ribbon mic, such as they are extremely delicate, have to be stored upright, cannot take loud noises or puffs of wind, and must under no circumstances have phantom power switched across them.

These things may have been true for early designs, but better ribbon materials and more powerful magnets have extended their range and today, modern ribbon mics can be every bit as robust as any other microphone types. However, the filter effect of the transformer, combined with a marked increase of load impedance with frequency, means that it is rare to find a ribbon mic that doesn't lose steam at higher frequencies.

The main methods to combat this effect, are to combine more powerful magnets with better ribbon materials, and carefully matching the pre-amp and the transformer.

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Transient Response

One quality of good ribbon mics is not a myth. They have an excellent response rate to transients. In plain English, that means that they tend to follow those minute changes in air pressure that we call 'sound' better than other types of microphone. This ability gives them the quality that we call 'transparency' or 'air'. For this reason, the ribbon is usually favoured for harsher sounds, such as brass and drum overheads.

This excellent transient response makes the ribbon mic the ideal partner for a Rupert Neve designed pre-amp.

For many years, Neve has been telling anybody who is prepared to listen, that although we may not be able to hear much past 18kHz, we do hear the effects of any anomalies or distortion above our hearing range. To this end, he got together with SE Electronics to launch a series of microphones, of which the RNR1 is the first and later models will include a valve pre-amp.

The High End Market

Although Manager Siwei Zou is convinced of the robustness of the design, SE is giving up to three free ribbon replacements for the life of the microphone. The RNR1 features two transformers, one going in to the mic-pre and one to send. The impedance of the input transformer is extremely low, around 200Ω, which is followed by a simple two-stage amp of classic Rupert Neve design, powered by the 48V phantom supply. The result is a ribbon mic that goes all the way to 20kHz with a slight drop after 16kHz.


SE is not the only manufacturer to be looking at high end ribbons. Companies like AEA and Royer continue to work on and improve classical designs, and Coles have just launched the 4040, which uses two

neodymium-iron-boron magnets facing one another to create a very strong magnetic field around the ribbon, reduce stray magnetic fields, and extend the range to 20kHz. A stereo version is to be launched this year.

Manufacturers of high quality ribbon mics report good sales figures that defy the present financial crisis. Colin Beanland, who is about to retire as Manager of Coles, stated, "We are selling everything we can make."

SE has 120 employees, and 4,000 microphones are hand-built every month. James Young of Sonic Distribution and SE Electronics says, "We are now the top brand for condenser mics in the UK, and in the top three across Europe. We are very excited by this cooperation with Rupert Neve, and very much hope to be able to match that kind of success in the ribbon microphone market."

A New Ribbon For A New Age

The crisper sound of the condenser microphone may have been just right for reel-to-reel tape, but the advent of digital has given us some rather brittle and harsh sounding recordings that can be accused of lacking depth and detail. A good ribbon mic may be just what the doctor ordered, and the entry of Rupert Neve into this market can only be a good thing. 

ANDREW GRAEME follows the length of the ribbon mic to its very beginnings.