Mesanovic Model 2

Ribbon Microphone

An extended high-frequency response isn't something you generally expect from a ribbon mic — but that's just what this one offers.

BOB THOMAS

Thanks to advances in material, magnet and transformer technology, ribbon microphones are currently enjoying something of a renaissance. Invented in Germany in 1924 by Schottky and Gerlach, and commercialised in the US in 1931 by Harry Olson at RCA, passive ribbon microphones, in the shape of RCA's 44A and the 77A, were instant successes, outperforming the capacitor and moving-coil microphones of their day.

At heart, they are fairly basic electro-mechanical devices. A thin metal ribbon is corrugated so that its resonance and tension can be controlled and suspended in a chassis between two magnets, with its ends coupled to a step-up transformer. The sonic signature typically associated with the 'classic' ribbon microphone design — a figure-of-8 pickup pattern across both horizontal and vertical planes, a very evident proximity effect, very low distortion and a warm, detailed, smooth sound overall — comes not from deliberate design, but from the physics that underpins their operation.

The Science

Ribbon mics are pressure-gradient transducers, meaning they respond to the differences in air pressure between the front and back of the ribbon. A sound wave arriving at the front surface of a ribbon takes a finite amount of time to travel the distance around the magnet and chassis assembly to arrive at the rear ribbon surface (known as the path length). This travel-time delay causes a phase shift between the waves at the front and at the rear, creating a pressure gradient across the ribbon and forcing it to move in the magnetic field between the two magnets. This movement induces a current in the ribbon that is amplified by the step-up transformer.

Since this path length forms a larger proportion of the wavelength of higher frequencies (where wavelengths are measured in centimetres) than of low frequencies (which can be of the order of several metres), the phase shift is greater for highs than for lows, resulting in an increase in output level as the frequency rises. However, this increase is counteracted by a corresponding fall in HF output due to the ribbon's mass and inherent inertia, making it increasingly less sensitive at higher frequencies.

The net result is that, in practice, a ribbon mic will deliver a flat response up to the frequency at which the phase shift reaches 180 degrees, where the pressure differential is at maximum. Above this frequency, output reduces as the phase shift increases, with each 45-degree increase reducing output by 3dB until the shift reaches 360 degrees, at which point the pressure differential across the ribbon is zero and no movement takes place.

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£859

PROS
- Superb performance by any measure.
- Extended high-frequency response.
- Big, smooth, warm and highly detailed overall sound.

CONS
- Ribbons are susceptible to physical damage, so take care.

SUMMARY
A very fine microphone whose sonic capabilities demonstrate just how good a modern ribbon designs can be. Highly recommended.

The output level of a ribbon mic, and its high-frequency extension, ultimately depend on the strength of its magnets. Before powerful neodymium magnets came along in the 1980s, allowing shorter path lengths, the comparatively weaker ceramic and alnico magnets available meant that physically large magnets had to be used, which dictated the longer path lengths that severely restricted the high-frequency limits of early ribbon mics.

As a way to get around this restriction, in 1951 RCA's Harry Olson came up with a mechanical method of extending a ribbon mic's high-frequency response by positioning perforated metal reflector plates (now commonly known as resonator plates) on either side of the ribbon. The frequency and amount of increase in HF response depends on the thickness of the plates and the area of their surface taken up by the perforations. (If you're interested in the detail of this, check out BBC Report 1956-17.)

All this leads to the inevitable conclusion that, if you're looking for a ribbon microphone with an extended high frequency response, you'll need to find one with a thin, sensitive ribbon, a short path length and resonator plates... Just what you'll find in the Mesanovic Model 2!

The Mic

Designed and hand-assembled in Detroit MI by Deni Mesanovic, the black-bodied Model 2 arrives fully-protected in a foam-lined case. The ribbon assembly is visible (just) through the front and rear metal mesh grilles. Like all ribbon mics, the Model 2 should be kept in its case when not in use, and a black fabric bag is supplied to protect the ribbon from anything untoward while the mic is being handled or resting between takes. The ribbon certainly needs protection, being only 1.8 microns thick and only 5.4mm wide.

The Model 2 features an extremely short path length that, combined with custom-engineered front and rear resonator plates, is designed to produce an extended high-frequency response. The output transformer is a custom toroidal design from Samar Audio Design, a company that specialises in microphone transformers and whose standard range contains several models specifically designed to partner 1.8-micron ribbons.

The resonator plates produce a broad +3dB boost at 12kHz that pushes the -3dB point in the Model 2's frequency response out to 20kHz. This extension is coupled with an almost ruler-flat response between 20Hz and 10kHz.

Despite the fragility of the ribbon itself, the Model 2 has multiple layers of blast protection that allow it to cope with sources of up to 140dB SPL, although areas of high air movement — like bass cabs or kick drums — should really be avoided. As with all passive ribbon microphones, phantom power is another no-no, as are any sudden shocks (don't drop it) and blowing on the ribbon.

Model Behaviour

I started out by comparing the Model 2 with my venerable B&O BM5 (20Hz to 13kHz) and, frankly, the poor old BM5 was left floundering in the dust on every measure. I love my BM5 for what it does but in terms of absolute frequency response, detail, quality and overall performance there was absolutely no comparison. The Mesanovic Model 2 left it standing, sounding, in comparison, more like a very good capacitor microphone.

"The Mesanovic Model 2 is a very fine microphone..."

That got me thinking, so I switched my trusty AKG C414 ULS to its figure-8 setting. The Model 2 sounded so similar to the 414 (apart from the increased brightness boost around 12kHz) that I just had to compare the published frequency response plots of both microphones. This led to the discovery that both mics had -3dB points at 20kHz and both went down to 20Hz. Obviously, I then had to try to match one to the other, and a bit of EQ accomplished that reasonably well.

To my ears, classic ribbon microphones, like my BM5, sound full, highly detailed, and smooth without being dull. These mics can really flatter sources such as voices and reed instruments, and can make great drum overheads and room mics. They're also well-suited to use on guitar cabinets, where their inherent qualities can counteract the harshness that you can get from some speakers. Acoustic guitars, banjos, mandolins and so on are also prime targets for the ribbon treatment.

Alternatives

The ribbon microphone market is nothing if not competitive these days, and you'll find some excellent alternatives from **AEA**, **Coles**, **Peluso**, **Royer**, **SE Electronics**, **Shure**, **Rode**, **Audio-Technica** and **Sontronics**.

The Model 2 does all the above, but adds an extension in the high frequencies that is unaccustomed — in my ribbon-mic experience at least — and which brings out an increase in detail and 'air' that I found really, really welcome. Overall, to my ears, the Mesanovic Model 2 sounds big, smooth, full of body, and its high-frequency extension and lack of self-noise, coupled with the extremely low distortion inherent in a ribbon microphone, seemed to enable it to somehow delineate more precisely a source's presence in the recorded soundfield in comparison to the results from my BM5.

The comparison with my 414 is a bit more complex, and centres round the character of the two microphones rather than in the differences in their performance. Whilst the Model 2 is no slouch when it comes to transient response, the 414 feels faster in that department and ends up sounding a bit cleaner and clearer to my ears, although perhaps not as clearly defined overall. Each mic has its own advantages and it is impossible to say that one is better than the other — they're simply different, and one will work better on some sources than on the other.

Conclusion

The Mesanovic Model 2 is a very fine microphone that stands comparison with any capacitor or dynamic that I can think of. Its performance is exemplary by any standards, making it suitable for almost all studio situations. Good microphones are never cheap but, if you're thinking about investing in a new microphone, the Mesanovic Model 2 should be high up on your audition list. I'll be coming at it the other way round — I've auditioned it and I'll doubtless be looking to invest in one once my bank account recovers from the festive season.

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