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Audio-Technica AT5040

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BY PAUL VNUK JR.

The AT5040 is a brand new microphone in the Audio-Technica universe, one that is specifically tailored for top-flight vocal recording. Positioned as the flagship in a new 50 Series line, it arrived with a splash at the 2012 AES show in San Francisco and has been making waves ever since; I was very pleased to obtain a production model and put it through its paces at my studio.

The AT5040 is one of the few microphones in recent years that can truly be said to contain new cutting-edge technology and design principles. Perhaps most notably, it does away with the common circular diaphragm in favor of a rectangular one. Now, rectangular diaphragms are nothing new; prominent European manufacturers selling mics with rectangular diaphragms include Pearl Microphone Laboratory, whose mics we've reviewed a number of times in recent years, and Milab, most recently seen in our June 2012 issue, when we reviewed the DC-96B and DC-96C. However, the AT5040 takes this idea a step further by combining four rectangular diaphragms into one large "super-diaphragm". Intrigued yet?

When I was first shown this microphone at AES, I was told that the AT5040 was designed with no limitations in mind and zero restrictions of cost or materials. The only end goal was "purity of sound"... and I can give you a little spoiler about my conclusions by saying that that word—*purity*—truly does the best job of describing each and every aspect of this mic.



Technica's main facility in Japan and is up to A-T's established quality of fit and finish in every way.

Are four diaphragms better than one?

As mentioned, the real marvel of this microphone is its four combined and internally shock-mounted/completely isolated diaphragms. See the photo of the mic's innards for a closer look at this fascinating design. The two most obvious questions that arise here are, "Why a rectangular diaphragm?" and "Why use four diaphragms in an array?"

To answer the first question I will refer to my Milab DC-96 review, where the merits of a rectangular diaphragm are discussed in detail as promoted by Milab and Pearl for decades: "It disperses the extreme midrange resonance peaks inherent in circular capsules, and it allows for an exceptionally neutral off-axis response". A circular diaphragm, when excited, vibrates like a drum head, and there are certain modes that resonate very strongly; a rectangular diaphragm damps down these resonances in a simple and effective way.

The answer to the second query is even easier: the array offers increased surface area. It's similar in principle to how a 4 x 10" bass cabinet offers some sonic advantages over a single 15" speaker, with a tighter, better projection due to greater combined surface area. There's a limit to how large you can make a single mic diaphragm, but this array lets you combine several diaphragms for a much larger usable size.

Audio-Technica AT5040 Studio Vocal Microphone

New technology and new aesthetics leads to a remarkable new vocal mic



Simplicity and elegance

The mic itself has a 6.5" long body with a diameter of 2.25". Interestingly only 2.5" of its length is dedicated to that part of the body which houses the electronics; the rest of the mic is the large multi-diaphragm capsule assembly. At first glance, the mic looks to me to be closer in appearance to a modern ribbon mic than your typical large-diaphragm condenser.

Cosmetically its aluminum and brass body is dressed in dark satin gray with a champagne-colored aluminum windscreen, whose layers of mesh have been fused together to lessen body resonance.

The AT5040 comes as part of a standard kit in a quality molded plastic foam-lined briefcase with one of the most interesting and well-designed shockmounts I have seen in my life (see the sidebar). It is hand-assembled at Audio-

Each individual diaphragm is 2 microns thick. I didn't take the mic apart, but each individual diaphragm appears to be approximately 1" tall by 0.5" wide. At a rough estimate, then, the combined diaphragm has twice as much surface area as the 1" circular variety found in most modern large-diaphragm condenser mics.

You also get the advantage of increased sensitivity. This is best illustrated by comparing the fast and crisp transient response found in most small-diaphragm pencil condensers with 1/2" or smaller capsules to the average LDC, which tends to capture a full tone but is often slower when it comes to transients. This design gives the AT5040 the best of both worlds, and I can concur this is one of the "fastest" large-diaphragm mics I have used.

One more matter of interest: Unlike most modern LDCs, the AT5040's quad-capsules have a fixed-charge backplate, making this a permanently-polarized (or "electret") condenser. At one time electret-based microphones carried the stigma of being a cheaper-quality design, but this has been long debunked by exceptional permanently-polarized mics from companies like Earthworks, DPA, and Shure (specifically the KSM32).

What's inside stays out of the way

The AT5040 is a transformerless design with a pair of matching linear amplifier circuits which use all-discrete components and through-hole circuit board design. Each circuit feeds two of the diaphragms, and since the power load is spread out between the two it results in a lower operating noise floor.

Also worth noting: there is no equalization present in either circuit. All of the sound and tuning of the mic happens at the capsule level. Similarly, the mic features no pads, filters, switches or added functions of any kind—again, think *purity*.

Specs and graphs

The AT5040 has a fixed cardioid polar pattern, a 20 – 20,000 Hz frequency response, an open circuit sensitivity of –25 dB (56.2 mV) re 1V at 1 Pa, a 50 ohm impedance, a max SPL of 142 dB, a self-noise level of a mere 5 dBA, and 137 dB dynamic range. As is commonly the case with high-end electret condenser mics, it still requires 48V phantom power to operate.

Looking at its frequency graph, three areas jump out: a low-end bump between 20 and 80 Hz, a strong mid rise from 1.5 to 4 kHz, and a smaller high-end plateau from 8 to just above 10 kHz. All of this, particularly the pronounced mid peak, fits perfectly in line with this mic's intended use as a vocal mic. While it does have a touch of 10 kHz sparkle, it is nowhere near as bright as many modern condensers that sit high in the 8 to 15 kHz range.

In the sweet spot

A rectangular diaphragm has the advantage of an extremely linear off-axis response, and this is one of the first things I noticed about the AT5040. Moving from the rear and around the mic, its off-axis rejection is smooth and linear but equally pronounced and quick.

This gives the AT5040 a very narrow sweet spot. The upside of this is a very focused and present sound devoid of extraneous noise and sonic clutter in the soundfield; the downside is that a singer must remain in said sweet spot, making this mic a tad troublesome for those singers who like to bob and weave to the music.

When other sources are positioned off-axis this mic is very successful at ignoring them, making this a great choice for those who like to track live with a band in one room as well as for those who prefer to track while listening to monitor speakers and not use headphones. Yes, there is some bleed, but I found the volume of the off-axis source to drop 60 to 70% in volume, ending up roughly equal to much of the overly loud headphone bleed that often creeps into vocal tracking sessions... in other words, manageable.

Plosives, pops and spits

The AT5040 is a very clean and clear mic, and it has a strong output. On loud instruments and even some very loud singers, I would recommend an inline pad or a mic pre/console with a pad that is pre input rather than post; otherwise clipping of your mic preamps could occur.

Interestingly I found that despite this microphone's low bass bump which lives in a range we typically filter out, the AT5040 does not have as strong a low-end proximity effect as I was expecting. I found I had to get right up on the mic with lips almost on the grille to get a deep chesty DJ or Barry White tone.

In my tracking sessions, I did find that the mic was quite prone to popped "P's"

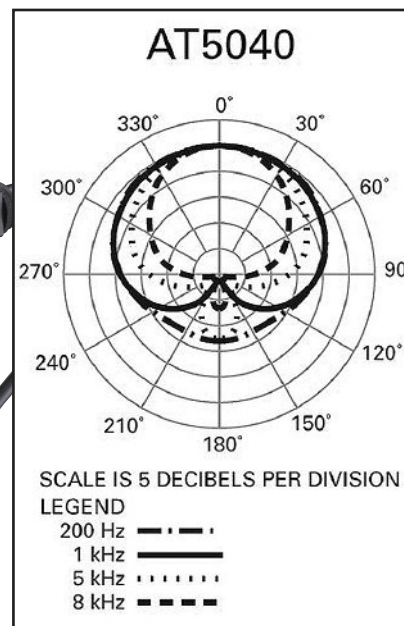
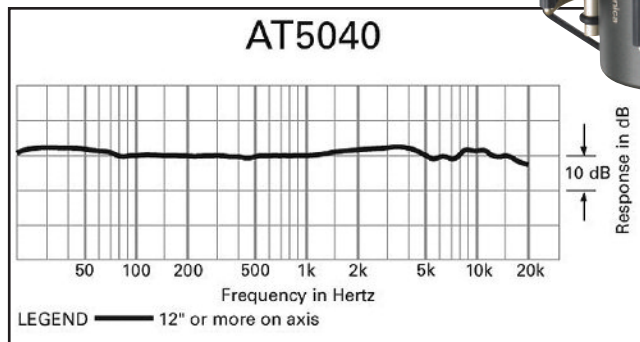
and "S's"; I found the ensuing effect similar to what you'll get from many classic small-diaphragm mics like the Neumann KM84 or the Shure SM81, where a blast of breath can cause the signal in the mic's head amp to clip and "fart out" for a second. This problem is easily solved with even a cheap nylon pop filter, but it is still something to be aware of when using the AT5040.

A sound all its own

So with the technicalities and practicalities behind us, it's time to ask: how does it sound? I have over a dozen different large-diaphragm mic flavors in my collection, including mics large and small, costly and relatively affordable, from companies like



BeezNeez, Brauner, Lauten, Shure, Peluso, Milab, Telefunken, MXL... and this mic sounds like none of them. That is quite a feat! It is not classic, vintage, Neumannesque, shiny and bright... none of it.



What the AT5040 has is a laser-focused, forward, yet sweet and clean sound. When Audio-Technica labeled this a premium vocal microphone, they were not kidding! When I ran my first vocal session with it I was instantly impressed with its forward clarity, but do admit it took me some time to get used to its sound and what to do with it. When I say it gives vocals a laser-like focus, it's not that I mean the sound has a hard edge to it; rather it is a sound that is right there, front and center with no apologies.

Over a few months I used the AT5040 on both male and female vocals including gospel, hard rock, spoken word, rap, and jazz crooning, as well as a three-piece vocal folk trio. Note that with said trio I had to track each voice separately, as this is not a good mic for multi-part backing vocals due its tight sweet spot.

Overall what this mic does to the human voice is a thing of beauty. Normally most vocal mic reviews have the phrase "singer-specific" somewhere in the review, but this mic is perhaps the complete opposite. Out of all my sessions, only one singer gave me a moment of doubt, a singer that I work with often who could be Neil Young's vocal doppelgänger. During tracking I wondered if a mid-forward mic plus a mid-forward singer may be just a touch too much mid-forward? But during mixdown I was surprised at how easy it was to place the voice in the mix and use some eq to sweeten the vocal take. (That's "sweeten", not "fix"... there's a difference.)

The only vocal area where this mic was not a clear winner was for spoken word spots; it cut through nicely, but just did not have that low-chest announcer voice I prefer.

One more note: the female singers I tried the mic with had very controlled lovely voices and translated beautifully. I did not have the "pleasure" of trying this mic with a raucous female screecher or a male or female heavy metal screamer, so I do not know how it would fare in those situations.

Singer-specific? No! Instrument-specific...

Here is where the tables get turned! Instead of this mic being one for lots of instrument applications and only usable for specific singers, I found it was lovely for many different vocalists but only useful on specific instruments. I found the AT5040 too middy and forward for drum overheads, front of kit, or most common instrument situations, with one and a half exceptions.

One: it makes a very nice electric guitar amp mic, where it brings the mids cleanly forward with a nice hefty punch, although on a screaming guitar amp an inline pad is essential. And a half: acoustic guitar, where it is very fussy about the particular guitar, the playing

style, and the mic position, but when the three align it can place a nicely strummed rhythm part effortlessly in the mix.

Conclusions

The more I use the AT5040, the more I like it. It does fall into the gear camp of "high fidelity" rather than "vibe", but it is not a sterile or clinical mic by any means. As I got used to this mic, I really came to believe that Audio-Technica succeeded in its goal of sonic purity, but in a really sweet-sounding way. Again, rather than vocal-specific, I found the AT5040 was more vocal-inclusive... a mic that could make almost any singing voice come magically alive.

At a price of \$2999 it sits on the same top shelf as the best mics from Neumann, Telefunken, Brauner, and the like, and it sits there darn proudly. ➡

Price: \$2999

More from: Audio-Technica,
www.audio-technica.com

The AT8480 shockmount

Audio-Technica has always made custom shock mounts to go with specific models of their microphones, but the new AT8480 is in a whole new league. The AT8480 is a front loaded suspension-style shockmount. It is an all-aluminum design that makes use of a dual moving cradle, springs and magnets to snap and hold the mic firmly in place with a simple locking mechanism. Bottom line: unlike many clamp-style mounts, once the AT5040 is snapped in place in this mount, it's not going anywhere!—PV

