

Mike Jasper's Big-Ass Shootout of Small-Diaphragm Condenser Mics

Using One Collings C10 Guitar through a Millennia Preamp and Lavry Blue Converters in a Small Recording Studio in the Oak Hill Neighborhood of Austin, Texas

I've been lucky enough to buy some great new and vintage equipment over the years, thanks to an inheritance from an uncle who left me a tidy little sum after his death. "Did you get enough money to live on for the rest of your life?" a friend asked. "Maybe," I said. "But I've got to kill myself in five years." Look, I hate my-uncle-died-and-left-me-money guy just as much as you do, but at least when I became that guy, I didn't go out and blow it on a Porsche. No, instead I blew it on Neumanns. At one point, I owned five KM 84s because I was trying to find two identical mics without paying an arm and a leg for a matched pair. After buying and selling nine of them, I still couldn't find two that sounded the same, although I found three or four that were damn good. And while I preferred the sound of the KM 84 to the KM 184, it still wasn't the Holy Grail of acoustic guitar mics I had hoped it would be.

One day, I finished recording an acoustic guitar part with my favorite mic for the job, a Neumann Gefell UM 70/MV 692 large-diaphragm mic, and I thought to myself, do I even need a small-diaphragm mic? A few weeks later, a classical guitarist recorded at my studio, and he was very fast - lots of notes, lots of transients. So the answer turned out to be. "Yes, I do need a small-diaphragm mic." But which one? Thus the search began on a cold, fateful day in November 2008. I decided to buy, record and listen to as many small-diaphragm mics as possible. After all, how many could there be? Thirty? Forty? (I'm up to 84 - not counting dynamics - and I still have a list of 20 mics I'd like to hear some day - not counting tubes and ribbons.)

I realized early on that if I wanted to do this at a reasonable pace, I should probably play the guitar part myself on my Collings C10 and do the recording in my studio through a simple chain of a Millennia HV-3 preamp to Lavry Blue converters to a Pro Tools session at 24-bit, 44.1 kHz. I played a 30-second tune that started off picked and ended up strummed and always with the same Fender medium pick. To keep things simple, I kept the test mono so I'd only have to find one mic per model. The test went well all in all, but I would do some things differently if I had the chance to do it over. First, I'd make it 45 seconds and throw in some finger picking. Second, I'd use a click track to keep the tempo consistent. Finally, I'd use a damn guitar tuner from the beginning. Truth is, I recorded about 16 mics before I realized that this project could become an article for *Tape Op*.

Once I had an official assignment, I started borrowing mics from other studios in the area. I'd drive many miles to borrow them and bring them back the same day, sometimes as far away as Dripping Springs, Texas. Then *Tape Op* and I got manufacturers on board. Companies were now sending me mics to test, and sometimes the

mics were on the more expensive side - such as Sennheiser, DPA, Sanken and Josephson models. I logged on to online pro audio forums and asked for suggestions of more mics to audition, and the ideas kept rolling in. I decided against valve mics early on, as small-diaphragm tube mics make me cry - they take up too much space and shipping power supplies is expensive. I also cut out ribbon mics because I was sure I'd break them by accidentally turning on phantom power (if vintage or miswired), and although I included dynamic mics originally, I decided to pull the plug on those and focus on condensers alone.

Along with suggestions for mics came critiques of my testing methods. "Your room is treated with Auralex. Wouldn't a lively, wood-floored room be better?" Maybe, but I've recorded a lot of acoustic guitars in my studio, and people seem to love the sound. "Shouldn't you record every mic at the same distance from the guitar?" No, I don't think so. Just as the acoustic guitar has a sweet spot, so does a microphone. In the real world, you're going to place the mic where it sounds best. "But it's not fair to pit omnis against cardioids?" Hey, that's how I roll. If I could get a better acoustic sound using steroids, I'd do it. "Will this test be meaningful?" Good question, and I think I have a good answer. Gear shootouts are always meaningful to the person conducting the shootout. After all, I got to listen to 84 SDCs in five months.

For convenience, I divided the mics into price categories based on the lowest quotes found on the Internet, and I put the name and studio after the mic if it was supplied to me by one of the heroic souls who made this shootout possible.

\$300 or less - AKG C 1000 S; Audio-Technica Pro 37R (Eastside Flash, Flashpoint Recording), AT4021, AT4041, and ATM450; Avantone CK-1 (Mark Donovan, Austin to Boston Recording); Avenson ST0-2 (Stuart Sullivan, Wire Recording); CAD GXL1200; Kel Audio HM-1; MXL 604 and V67N; Naiant X-M with and without transformer option; Oktava MK-012; RØDE NT5 (Britton Beisenhertz, Ramble Creek Recording); Samson C02 (Daniel Gill, Reicher Recording); SE Electronics SE1 (Pat Manske, The Zone Recording) and SE3; Shure SM137; and Studio Projects C4 (singer-songwriter Mark Viator).

The standouts were the MXL V67N (\$129), the Naiant X-M omni with transformer (\$69), and the surprising AT4021 (\$249). I say surprising because it easily surpassed higher-numbered AT models including the 4041 and the now-defunct AT4031. It was not only competitive with the 4051a, the noise specs were some of the best of any mic in any price class.

\$300 to \$500 - AKG BlueLine 391/393 set (Tim Britton, Pied Piper Productions); Audio-Technica AT4051a (Donovan); Beyerdynamic MC 930 (independent engineer Danny Stapleton); Crown CM-700; Josephson C42 (Viator); JZ BT-201; Peluso CEMC6; Sennheiser e 914; Shure SM81 (Kelly Donnelly, Studio Plush) and KSM141; and Violet Design Gold-Finger.

The Gold-Finger (\$325) was a standout in this category, with a clear, vibrant high end, and I liked the strummed sound of the KSM141 (\$399) as well as the AT4051a (\$499), while the MC 930 (\$499) sounds sweet when picked. I'll also give honorable mention to the e 914 (\$399), an unusual-sounding mic with a rich and full-bodied sound, as well as the SM81 (\$350), a very familiar-sounding mic - almost nostalgic. One note about the new AT4051b - according to the folks at Audio-Technica, it sounds sonically identical to the AT4051a.

\$500 to \$700 - 3 Zigma CHI SDC; AKG C 451 B reissue; CharterOak M900; DPA 4099; Milab VM-44 Classic (Fletcher of Mercenary Audio's personal mic); and T.H.E. KA-04.

Let's talk about the DPA first. This unusual mic clamps on to your guitar (or violin, mandolin, or other acoustic instrument) so no matter where you wiggle and squirm, the mic will be pointing in the right spot. It's not a bad idea if you record yourself, but it takes a long time to find just the right spot, which would make it a tad complicated for recording others. But DPA is definitely on the right track. Standouts here were the M900 with cardioid capsule (\$519), VM-44 (\$729), and the 3 Zigma CHI with hypercardioid capsule (\$678). The 3 Zigma CHI has the best noise specs of any mic costing less than \$1000, and the KA-04 (\$675) really excelled when strummed.

\$700 to \$1000 - AKG C 480 B (classical guitarist Stephen Bright); Earthworks TC30 omni (Manske); Neumann KM 184 (Michael Joly of OktavaMod); and Earthworks SR30, Mercenary KM-69, Microtech Gefell M 300, Milab DC-96, and Neve MC49 (all from Fletcher).

The higher up you go in price range, the harder it is to find mics that won't work. That said, my favorites were the MC49 (\$939), KM-69 (\$950), DC-96B (\$908), and M 300 (\$925). The Swedish-made DC-96B and the M 300 both have a unique sound which some describe as mellow. The KM-69 has one of the nicest picked sounds I've heard but lost me a bit when strummed. The Russian-made MC49 sounded great overall, with a full commanding sound, but was a tad murky in the mids. I'll also give an honorable mention to the SR30 (\$900). It isn't right for me, but if you like big midrange (such as the KM 84), you'll really like this mic. And did I leave out the AKG C 480 B (\$799)? I shouldn't as it's an outstanding mic with lots of clarity in the low mids.

\$1000 to \$1500 - Earthworks QTC40; Josephson e22s (Steve Hudson, 5am Studios); Microtech Gefell M 296 (Randall Squires, The Still Recording); Neumann KM 130 omni (Squires); Neumann KM 143 (Douglas Ferguson, The Still); and Sennheiser MKH 8020 and 8050.

All are great mics, but on acoustic guitar, I like the M 296 (\$1450), the KM 130 (\$1350), and the MKH 8020 (\$1200) best - all omni mics.

\$1500 or higher - DPA 4006-TL and 4011-TL; Josephson c617 Set; Neumann TLM 50 Set (Squires); Sanken CO-100K; Schoeps CMC5 with MK5 omni capsule (Squires); and Schoeps CMC6 with MK4 cardioid capsule (singer-songwriter Hank Alrich).

The c617 Set is a combination of the Microtech Gefell MK-221 measurement capsule with the Josephson 617 amplifier body. Any of these mics would be excellent for tracking classical music or any live event, but with a focus on acoustic guitar, my favorites were the c617 (\$1825), the CO-100K (\$2685), and the omni CMC5 (\$1715). All of them just sound right.

Vintage (any mic no longer made) - AKG C 451 EB; Audio-Technica AT4031; B&K 4011 (Ferguson); Neumann KM 83, KM 84, KM 85, and KM 86 (Bright); Neumann KM 88 (Hudson); Neumann Gefell M 70 and M 94; Schoeps CMT 30 FNU M934b and CMT 30 FNU M934c (dual omni/cardioid); Schoeps CMT 30 FNU MK241 and CMT 341 (both hypercardioids, furnished by Bright); a rare Schoeps Strasser-branded CM64 in full cardioid mode; and Sony C-535p (independent engineer Eric Nelson).

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My favorite? The \$400 C-535p. It's got a nice compressed sound to it with just the right amount of high end. I also thought the unsung Neumann KM 83 omni (about \$1000) sounded a tad sweeter than a KM 84 (\$900), but the most underrated vintage mics of all have to be the Schoeps. You can get them for half the price of vintage Neumanns.

Modified mics - Michael Joly of OktavaMod, Jim Williams of Audio Upgrades, and Mark Fouxman (known as Marik on audio forums) all make excellent modifications of existing mics. Fouxman and Joly do mods of the MXL 603/604 mics, and both their mods sound quite good for about \$300 (including cost of the original mic). Joly and Fouxman also make mods of the Oktava MK-012 in the \$100 range, not including the mic. Williams, Fouxman, and Joly only have one mod in common, the MCA SP-1 upgrade. All three sound much better than the original, and if you already own the mic, it would definitely be worth your while to spend the extra \$100 or so. My favorite upgrade is the Williams mod of the AKG C 460 B. You can find a used C 460 B with a CK-61 cardioid capsule on eBay for about \$300. Add the \$150 mod and you've got a microphone that many say rivals Schoeps for less than \$500.

My fifteen top picks - No one asked, but I'll offer my fifteen favorites based on price and performance, although the listening panel (see below) will likely have a much different take. I like the Audio-Technica AT4021, Shure KSM141, Beyerdynamic MC 930, CharterOak M900, Milab VM44, Milab DC-96B, Mercenary KM-69, Violet Design Gold-Finger, Neva-ton MC49, Microtech Gefell M 296, Josephson c617 Set, T.H.E. KA-04, and Sanken CO-100K. In vintage, I'll take the Sony C-535p, and my mod goes to the Williams AKG C 460 B. (But if you ask me tomorrow, I might change my mind.)

21-member listening panel chooses top SDC mics - To make this shootout as inclusive as possible, I assembled a panel of audio engineers, producers, musicians, home recordists and songwriters to listen blindly to acoustic guitar samples recorded with 60 different models of small-diaphragm condenser mics. I gave them ten days to listen to the recordings and relay their top-15 picks via email. The people I asked to participate in this test hail from as far away as France, upstate New York and northern California. While most are working engineers or producers of some stripe, one person is a lyricist and two others are self-proclaimed amateur engineers. Two were women. (I know. I can't believe I got that many women involved in an audio project.)

Participants included Richie Monroe of Bardwire Productions; Daniel Gil of Reicher Recording; Douglas Ferguson and Randall Squires of The Still Recording Studio; Tim Britton of Pied Piper Productions; lyricist Susan Hunt; Mark Wurfl of Wurfl Productions; Matthew McGlynn of RecordingHacks; amateur engineer Didier Brest; John Harvey and Mary Podio of Top Hat Recording; Doug Joyce of Animix Productions; singer-songwriter Ehren Ebbage; Nathan Roussu of HV Studio; songwriter and engineer Alan Bachman; independent engineer Adam Tews; Palmer Wilkins of Millwright Sound; Jeff Hiatt and Rob Shaffer of Turtle Studios; Britton Beisenherz of Ramble Creek Recording; and attorney, musician, and home recordist Henri Minette.

The 21-member panel listened to sixty-one, 30-second sound files in all because the vintage Neumann KM 84 was entered twice - my own mic and a friend's. Only one panel member picked both KM 84s, but then he also picked the KM 83 and the KM 184. Dude likes the Neumann KM-series a lot. Every mic was picked at least once, but I'm not going to divulge the full list because I whittled the 84 mics down to 60 for the

listening panel, and I'm afraid the manufacturers whose mics were excluded will send their goons after me. It happens.

Some panel members took issue with some parts of the process. One person thought the recordings had too much bass, but I flatly disagree. Two people said there was an annoying tone around 1.2 kHz in many of the files, and they were right. Beats me where that came from - probably a harmonic caused by the room, the guitar, or both. Finally, one engineer wondered why the files were stereo interleaved when each guitar sample was originally recorded in mono. I have a good answer for that - because I'm an idiot. When it came time to bounce them to 16-bit from 24, habit took over, and I selected "Stereo Interleaved" in Pro Tools.

But I'm burying the lead - let's get to the mics the panel thought were the best. There were 19 top picks overall as only five mics received eight or more votes, but 14 mics garnered seven. And the winners are (in alphabetical order): AKG C 451 EB, Audio-Technica AT4021, B&K 4011, Beyerdynamic MC 930, CharterOak M900, DPA 4099, Jim Williams-modded AKG C 460 B, Mark Fouxman-modded Oktava MK-012, Mercenary Audio KM-69, Milab DC-96B, Milab VM44, Neumann KM 184 (that's right, I wrote it), Neva-ton MC49, RØDE NT5, Sanken CO-100K, Schoeps CMC/MK5 omni, Shure KSM141, Sony C-535p, and Violet Design Gold-Finger.

So what did we learn from this? First, there are just a truckload of SDC mics out there. Second, you will likely need different mics for different guitars, overheads, and live recordings. Third, manufacturers should never tout their own products at online forums - even if you're right, it's wrong. Fourth, omnis and hypercardioids can work great, but sometimes they're just terrible - there's really no hard and fast rule, no matter what kind of room you have. Fifth, there is really no reason to spend a lot of money on vintage SDC mics unless they're tube, and I'm not even sure it's true then; I'll get back to you on that - maybe. Sixth, if you want to meet every member of the lunatic fringe who's ever lurked on an audio forum, do a shootout. And finally, if you want to become a member of that same lunatic fringe yourself, do a shootout.

-Mike Jasper, proaudiobay.com

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