

# Audix Microphones

## Made With Drummers In Mind

by Mark Parsons

**W**ilsonville, Oregon, is a clean and green little city of approximately 15,000 that sits on "The I-5," as Left-Coast residents universally call the main thoroughfare that stretches from Canada to Mexico. Located within a few hundred yards of the interstate is a manufacturer that has gone from "interesting little company" to "big player" status in what seems like a very short time—although in reality they've been working hard at their craft for two decades.

The story of Audix today is essentially the story of Cliff Castle and Fred Bigeh. Cliff is vice president of sales & marketing, and Fred is director of product design & manufacturing. Between the two of them, they have perhaps the perfect combination of skills necessary to design, manufacture, and market technical products to an entertainment-driven industry.

### History

"I went into college on an athletic scholarship and came out a musician," Cliff Castle says with a laugh. After leaving school, Cliff went on the road for ten years as a bass player. Then he met Fred Bigeh, who had a broadcast engineering education and a serious penchant for acoustics and electronics. They decided to go into business together, and initially they were the exclusive US distributors for Audix Japan. The first "pro-quality" product they brought into this country was the OM-1 dynamic vocal mic, which was introduced in 1985. This was soon followed by the OM-2. Both of these mic's were originally developed and built in Japan. A few years later, Cliff and Fred acquired the

## AN AUDIX ARRAY

Here's a look at a select list of Audix mic's and accessories that have drumset applications.

**D1:** Hypercardioid dynamic, for snare, bongos, and similar drums. Features a slight midrange boost.

**D2:** Hypercardioid dynamic, for toms, congas, and similar drums. Features a slight mid-bass boost.

**D4:** Hypercardioid dynamic, for floor toms and kick drums. Features an extended low-end response.

**D6:** Large cardioid dynamic for kick drums. Features a massive low-end response with enhanced attack characteristics.

**ADX-51:** Pre-polarized cardioid small-diaphragm condenser, for overheads, hi-hats, and cymbals.

**Fusion-Series drum packs:** Drum packs featuring Audix's value-priced Fusion mic's. (Shown: the Fusion 6 drum pack.)

**F12:** Value-priced cardioid dynamic mic for kick and floor toms.

**DP-Series:** Drum packs featuring Audix's pro drum mic's. (Shown: the DP Elite.)

**F10:** Value-priced cardioid dynamic mic for snare and toms.

**SCX-25A:** Large-diaphragm cardioid condenser with integral capsule suspension and small body footprint. For drum overheads and room mic's.

**SCX-One:** Small-diaphragm condenser (available in cardioid, hypercardioid, and omni versions). For overheads, hi-hats, and cymbals.

**F15:** Value-priced cardioid pre-polarized condenser, for overheads, cymbals, and hi-hats.



**D-Flex:** Drum mic universal mount.



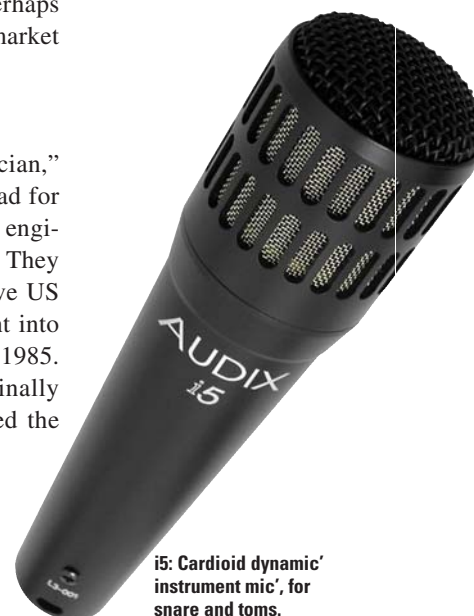
**D-Vice:** Drum mic mount made to mount onto drum rims.



**Micro-D:** Miniature pre-polarized hypercardioid condenser clip-on mic for snare and toms, with integrated D-Vice rim mount. (Cardioid version also available.)



**D-Clamp:** Drum mic mount can attach to congas and similar drums.



**i5:** Cardioid dynamic instrument mic for snare and toms.



rights to the company name, and they started designing and manufacturing microphones in California's Bay Area.

"It was more difficult than we thought it would be," Cliff says. "We put all of our profits back into developing the company, because if you don't have a solid product with R&D behind it, then you won't make it in the long haul. We weren't driving nice cars back then, that's for sure."

One of the payoffs of this "take the long view" approach was the development of VLM (Very Low Mass) technology. Some of the aspects are proprietary, but the gist is that by lowering the mass of the moving parts of a dynamic microphone you can get a condenser-like response from it, yet still have the ruggedness and low-end beef of a good dynamic.

In 1991, Cliff and Fred moved Audix operations to the current location near Portland, Oregon. There, they set about developing more models in the OM series, as well as other types of mic's. With the advent of the OM-3 and OM-5, things started to gather momentum. Portland is only a couple of hours away from Seattle, and when the Northwest music scene took off, many of the artists realized that there was a local company making world-class microphones.

### Out Into The World

"On one of my trips to LA in the early '90s," Cliff Castle recalls, "I met with Dave Rat, who owns Rat Sound—one of the large touring sound companies. He was working with many of the big Seattle bands, as well as with The Red Hot Chili Peppers. We let him try our newest mic' at the time—the OM-7—and he flipped. After extensive testing with his monitor rig, he found that it outperformed his other stage mic's in terms of sound quality and gain-before-feedback. He started using our mic's for lead vocals with all these groups."

Cliff grins, adding, "We knew we were

getting somewhere when the cover of *Time* magazine in October of '93 was a shot of Eddie Vedder singing into an Audix mic'!"

By the mid-'90s, Audix was firmly established as a manufacturer, with the ability to design and build prototypes quickly. This allowed them to experiment with application-specific microphones, which led to the debut of the D series. This was perhaps the first time any manufacturer had come out with an entire line of microphones designed from the begin-



Bass player-turned-microphone manufacturer Cliff Castle

ning as drum-specific mic's. (More about them later.) At the same time, Audix also developed several large- and small-diaphragm condenser microphones, as well as their highly successful Micro-series.

### Design And Prototypes

As we started our tour of the Audix production facility, they were in the process of turning out a batch of D6 bodies. One of the production rooms contained a pallet of raw 2" aluminum bar

stock on one side, and hundreds of gleaming new D-6 bodies on the other. The interesting thing is what happens in between.

Dave Weesner, Audix's director of machinery, works on the physical design of a microphone, from the initial computer drafting to the production process. As Dave walked us through the design and manufacturing process, it was apparent that the employee philosophy at Audix is "total involvement." Many of their technicians are cross-trained in several aspects of production, which gives them a real sense of involvement with the products they're making.

The design process begins with a drawing. Says Dave, "It could be anything from a quick sketch to a fairly elaborate drawing. Usually there are several variations for any given microphone idea. One of the nice things about having our entire process in-house is that we can turn concepts into prototypes right away. So when we have an idea—or several variations on an idea—we can build them all."

But before machine meets metal to make a microphone, Dave has to tell the machines what to do. First he creates a detailed computer drawing of the mic' body, and then he uses some elaborate software to turn the drawing into a set of instructions for the CNC (computer numerical controlled) machines that actually make the mic' bodies. Once this is done, the prototype process can continue.

Once Audix has created several different prototypes, how do they decide which version ultimately makes it to the production line? By a process known as beta testing. The mic's go out to various engineers and artists who use them and report back with their opinions. As an example, the D6 was tested by the sound engineers for bands such as Blink-182, Pearl Jam, The Red Hot Chili Peppers, Galactic, and

# OM-5

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# Audix



Dave Weesner (left) supervises Audix's machining operations. Fred Bigeh (right) is director of product design & manufacturing.



The Audix manufacturing facility looks more like a science lab than a factory.

Tower Of Power. It's still the kick mic' of choice for several of those test groups.

After the mic's are put through the wringer by the beta testers, they go into production. That's where we came in, watching bars of solid aluminum being turned into D6 bodies. And how does this happen? Mostly through the magic of CNC.

## Manufacturing

On a standard milling machine, the part is fixed and the tools turn. On the machine that makes the Audix D6 bodies,

both the part *and* the tools rotate, with movement possible in all directions. There are sixty tools housed inside, which the machine can change automatically in order to drill, cut, grind, mill, and shave all in one complex operation. This allows the machine to turn out a completed D6 body every few minutes.

Audix considered outsourcing the production of this mic' body to a precision machine shop. But the cost of just the body alone would be higher than the current dealer cost of the complete microphone.



A D6 microphone body starts out as aluminum bar stock... and comes out of the CNC machine as a finished product.

Audix makes lots of prototypes before settling on a final design. All of these i5 prototypes led to the finished version shown in the product sidebar.

## Electronic QC

Marc Wilson handles quality control for Audix, which involves electronic testing of finished products. Every microphone is checked before being etched with its brand and model information and then shipped. The test consists of a comparison analysis, in which the finished mic' is compared to a known reference, and the resulting frequency response is analyzed on a computer screen. The product being tested must be within very close tolerances of the reference in order to pass this stage.

There is also a similar test for phase, as well as a vocal test (primarily to check the mic's proximity and polar pattern). Additionally, Audix has developed an automated station where microphones can be tested and then laser-engraved, all by robot. From there, the mic's are packed and shipped.

## What's Inside?

All of the above explains the design and production of the physical product. But what about the internals, and most importantly, the *sound*? For that, we met with the other leading light of Audix, Fred Bigeh. You might expect the director of product design & manufacturing at a major mic' manufacturer to be a "suit &

tie" guy behind a desk. Fred is wearing jeans, a T-shirt, and running shoes. (Both he and Cliff Castle are runners.)

Considering the way Fred conducts his business, those running shoes are a practical choice. During our visit he was bouncing around the facility from department to department, checking on things and "talking tech" with the staff. From listening to him discuss acoustics and microphones, it's clear that this is a man who spends a large part of his waking hours thinking about new mic' designs and better ways to manufacture them.

Fred led us on a whirlwind tour of the steps involved in creating a mic' capsule from scratch. We looked at coil winders, magnetizers, and some very high-tech robotic machinery (of Audix's proprietary design) that can assemble a capsule with extreme precision and minimal added mass. To ensure that every step along the way is optimized, Audix employs measuring equipment usually found only in laboratories. They also have an anechoic chamber (a completely non-reverberant room) where they perform detailed acoustic tests on their new designs.

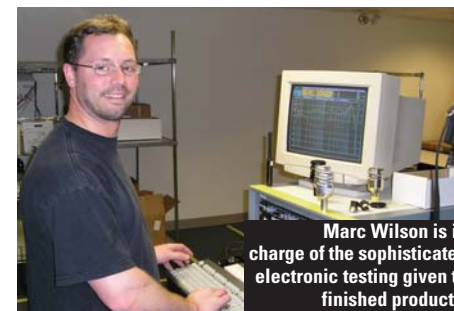
Before a product goes out into the field for beta testing, it gets a thorough workout in Audix's 5,000-sq. ft. sound room.

Imagine a complete recording studio that's set up in a room the size of a large club, and that also features a full-size stage complete with drumkit, mic's, monitors, instruments, amps, and a professional PA system.

## Products

When it comes to microphones, Audix pretty much covers the field, both on stage and in the studio. They offer vocal and instrument mic's, in dynamic and condenser versions. Of special interest to drummers is the fact that over half of the mic's in Audix's lineup are either drum-specific or have drumset applications.

The drum-related lines include the D



Marc Wilson is in charge of the sophisticated electronic testing given to finished products.

Additionally, Audix offers half a dozen "drum packs" featuring their D series pro mic's and their Fusion series affordable mic's. Also available are three innovative drum-specific mic' mounting systems: the D-Vice, D-Clamp, and D-Flex mounts.

## Future Plans

So, what's new from Audix, and what's coming up around the bend? "For drummers," replies Cliff Castle, "we recently released the i5, and we've been getting very good feedback on it. And we're re-formatting our drum packs to give drummers better options when it comes to buying one set of mic's for the entire drumset. We've also made some modifications to our SCX-25, which is a great overhead mic'. The updated SCX-25A is just now starting to ship."

Audix has also just released the CX-112, an updated version of their large studio condenser, and they've got some new miniature mic's in the works. And although they don't want to say too much just yet, keep your eyes open for some very high-end condenser products from



Audix mic's are put to practical tests on the company's sound stage.

series (five professional dynamics designed for drums), the i5 dynamic instrument mic', the SCX-1 and SCX-25 small and large professional condensers, the Micro-D clip-on condensers for drums, the Fusion Series (value-priced drum mic's), the ADX-51 (electret small-diaphragm condenser), and the CX-111 (large-diaphragm studio condenser). (See the sidebar for details on these mic's.)

them in the not-too-distant future.

"We're always pushing the envelope," says Cliff, smiling. "We love creating new designs and making new products. Fred and I are constantly on the lookout for a new challenge."

