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GEAR GUIDE

MICROPHONES

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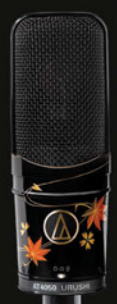

AT4050URUSHI
Multi-pattern
Condenser Microphone

AT4050/LE
Multi-pattern
Condenser Microphone

AE5400/LE
Cardioid Condenser
Vocal Microphone

50th ANNIVERSARY LIMITED EDITIONS

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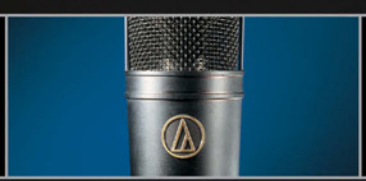

Audio-Technica celebrates its 50th anniversary with an array of limited edition introductions offering stunningly clear, high-resolution sound and elegant design. Models range from the AT4050URUSHI with hand-painted Japanese maple leaves, to the legendary ATM25 instrument mic brought back for this special occasion. Each microphone is etched with a unique serial number commemorating 50 years of passionate listening. **audio-technica.com**

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Microphones, and the pro audio culture around them, don't appear to change that much. Year in and year out, the classic mics sound the same, and indeed, that reliability is part of what's made them classics. Studio engineers will always revere a U 47 and live sound guys will always keep a spare SM57 for use in a pinch, to name check just two examples. Audio pros love the sounds they get with old favorites, in part because using a familiar mic provides a certain level of security—you know what you're going to get.

The 2012 Pro Sound News/Pro Audio Review Gear Guide: Professional Microphones provides a certain amount of security, too, because sooner or later, the day comes when familiar sounds aren't quite what you're looking for; the day when it's time for "something else." The *Gear Guide* can help you find it.

Outside the rarified garden of classic mics, it's a big world filled with dozens of microphone manufacturers, as well illustrated by the *Guide's* Directory. Some of the brands therein are known to generations of audio enthusiasts, while others are relatively new, founded only in recent years (or in one case, months). Combined, all those companies manufacture literally hundreds of different microphones for an equally wide variety of uses.

There's plenty to choose from out there, as easily proven by the Products section; in fact, there's so many options that making a choice can get overwhelming, whether you're an audio student buying his first stage microphone, or a seasoned pro looking to add something different to the studio mic locker. It's human nature to be curious about how other people have faced those choices—and more importantly, about what they chose! Luckily, this *Gear Guide* has plenty to offer in those regards.

In our separate articles on "Go-To Mics" for the studio and the stage, top pros share what they're using to mic-up raging guitar cabinets, wispy vocalists and thundering drum kits. Maybe sharing earned insight is simply hardwired into the pro-audio mentality, because in both articles, an engineer tells how another tipped him off to a new mic: Scott Frankfurt recounts how Christopher Cross introduced him to his new favorite for recording nylon-stringed acoustic guitars, while house engineer Mark Newman recalls how he discovered the vocal mics he uses to capture the Beach Boys' harmonies by chatting with Green Day's FOH man, Kevin Lemoine.

In some instances, however, learned advice can be hard to find, if only because the technologies at hand are evolving so quickly. Take USB mics—only a few years ago, they were considered just a step or two away from playthings. Now they're a market segment that's exploding—in popularity, design and quality—as numerous manufacturers have made the fledgling niche a priority in their product offerings. Our look at USB mics brings you up-to-date on the latest advancements.

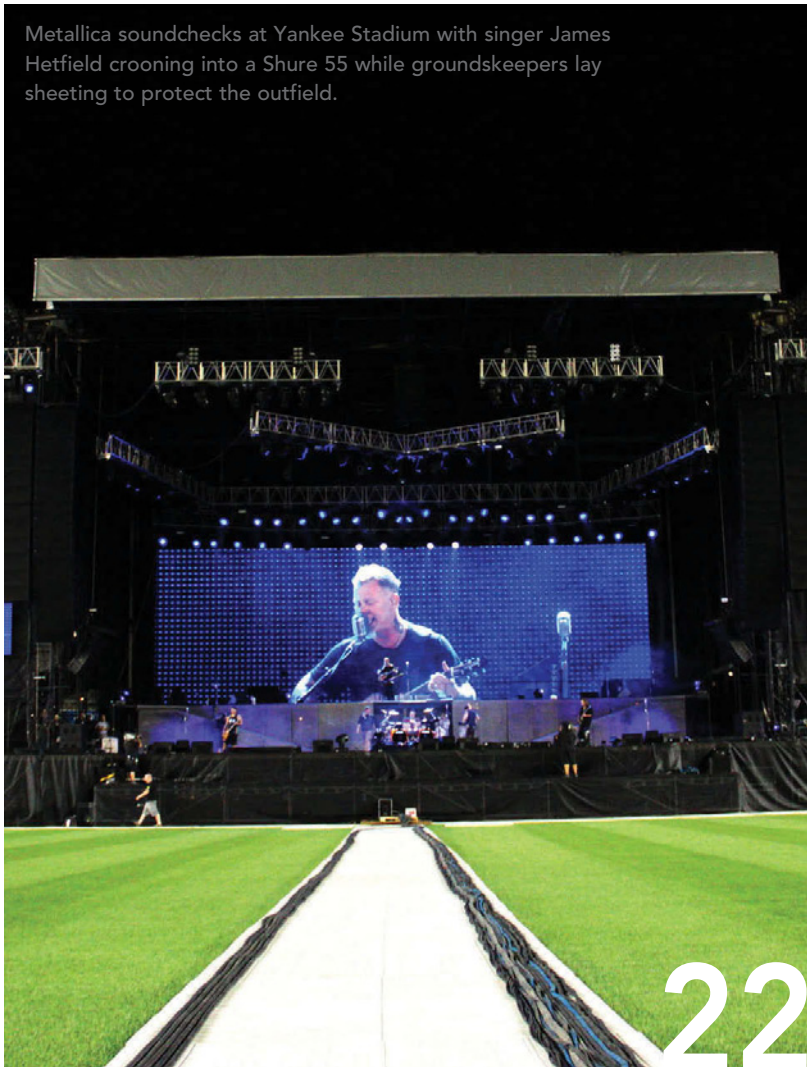
Similarly, after the firestorm of changes that have hit wireless microphone users over the last few years, it's no surprise that there's a growing call for alternative solutions that won't have the rug—or frequencies—pulled out from under them. An increasing number of mic manufacturers are now answering that call with a wide variety of new products, submitted for your perusal in our Alternative RF Solutions story.

So while microphones, and the pro audio culture around them, might not seem to change that much, in truth, they're changing all the time. The classics are classics for a reason (and you'll see their praises sung in these stories), but the next classics are out there as well, waiting to be discovered—and they're in this *Guide*, too. Whether you're looking for a new way to approach an old favorite, or double-checking that your next mic purchase will be the solution you need, you'll find what you're looking for in these pages.

A vintage Neumann U 47 condenser.

The ubiquitous Shure SM57

INSIDE



Metallica soundchecks at Yankee Stadium with singer James Hetfield crooning into a Shure 55 while groundskeepers lay sheeting to protect the outfield.

GEAR GUIDE MICROPHONE

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ALTERNATIVE RF SOLUTIONS FOR WIRELESS MICROPHONES

BY STEVE HARVEY

Until a couple of years ago, professional audio wireless systems operated in only a small portion of the radio spectrum: the UHF (ultra high frequency) band, which extends from 470 MHz to 806 MHz, or TV channels 14–69 (channel 37 is reserved for radio astronomy). Following the sale by the Federal Communications Commission (FCC) of the so-called 700 MHz band (actually 698 – 806 MHz, TV channels 52–69) in 2008, wireless audio system operators have had to learn how to get by with reduced bandwidth. More recently, the FCC set its so-called incentive auction into motion, encouraging broadcasters to voluntarily give up as much as 20 TV channels-worth of spectrum for wireless broadband use.

With the government-mandated switchover to digital TV broadcast, blocks of the 700 MHz band were sold to the large telecommunications companies for use by consumer "white space" devices—now referred to as TV Band Devices or TVBDs—and pro audio users have had to move to the lower frequencies. The FCC did make provisions in its 700 MHz band auction plan that should allow RF systems operators and consumer TV Band Devices (TVBD), expected to begin appearing on the market in 2013, to cohabitate on the available spectrum. Nonetheless, the situation has RF pro audio equipment manufacturers exploring alternative wireless technologies to cope with the new environment going forward.

The FCC has reserved a minimum of two TV channels (6 MHz each) per market exclusively for RF systems' use that are strictly off-limits to TVBDs. Further, wireless systems operators are encouraged to register with the numerous FCC-approved TV Bands Devices Database administrators nationwide, such as Spectrum Bridge and Telcordia. Those databases will be used by portable and fixed unlicensed TVBDs to identify available wireless channels at their specific geographic location. (Information on reserved channels can be found using Spectrum Bridge's "Show My White Space" online tool.)

For their part, pro audio wireless equipment manufacturers are working to squeeze as many channels as possible into each 6 MHz frequency chunk. In the meantime, manufacturers advise operators to follow best practices. Best frequency coordination and planning practices include separating microphone, in-ear and intercom systems on the spectrum to minimize interference while also making use of equipment operating in other bands, such as 2.4 GHz, wherever suitable.

Careful planning of antenna positioning and filtering, and optimizing signal-to-noise ratios, will also help maximize the number of channels that can be reliably used together. The time domain is also important—if not all systems need to operate simultaneously, then spectrum can be shared appropriately.

Audio-Technica launched its SpectraPulse Ultra Wideband digital wireless system several years ago, which operates in the 6 GHz range, well above any potentially interfering signals. At InfoComm12, the company added two new components—the chg004, a four-bay charger for SpectraPulse transmitters, and the sei001 encryption interface, which is now included with the optional encryption software available for the SpectraPulse system. Audio-Technica's SpectraPulse Ultra Wideband, the first commercial sound implementation of Ultra Wideband technology, offers secure wireless operation—14 simultaneous channels—for the installed sound market, free from RF competition, frequency coordination and TVBD issues.

Shure has long been at the forefront of advocating for the pro audio industry against any encroachment into the available RF spectrum by TVBDs. In 2008, Shure weighed the

AKG recently launched its DMS70 digital wireless system, with devices available separately or as packages that include a DSR70 Quattro (four channel) or DSR70 Dual (two channel) receiver.

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pros and cons of wireless technology currently or potentially operating in other available frequency ranges, including the so-called 900 MHz band, 2.4 GHz, Ultra-Wideband (UWB), and the 470 – 512 MHz and 944 – 952 MHz ranges, on the company's web site: http://shure.custhelp.com/app/answers/detail/a_id/3602/~/the-truth-about-wireless-mic-technology

Sennheiser, too, has been making incremental improvements to its existing products, such as the 5000 Series transmitter, which now offers a low intermodulation mode, and the AB 3700 antenna booster, which offers increased immunity to other high-powered signals through improved linearity.

During 2011, Shure launched two new RF systems, Axient and ULX Digital, respectively supporting up to 15 and 14 systems in a single 6 MHz TV channel. For comparison, an analog FM system can typically handle eight to 10.

At InfoComm12, Shure announced that two new models, the ULXD4D dual-channel and ULXD4Q quad-channel digital receivers, will be available summer 2012. Both offer a selectable High Density mode that enables up to 47 ULX-D systems in one 6 MHz chunk, also optimizing the system's output power and digital RF filtering to reduce its spectral footprint from 350 kHz to 125 kHz with no loss of sound quality. Both receivers are also equipped with Dante digital audio networking. In Standard mode, up to 17 ULX-D systems can now operate in 6 MHz.

A number of companies offer RF mics products in the worldwide license-free 2.4 GHz ISM band, including AKG, which launched its DMS70 digital wireless system this year (reviewed in *PSN*, June, 2012). The system devices are available separately or as packages that include a DSR70 Quattro (four channel) or DSR70 Dual (two channel) receiver. The system features bidirectional communication between the transmitter and receiver, and provides "intelligent" operation via digital diversity from the receiver and transmitter side.

Shipping since May are the Line 6 XD-V55 digital wireless handheld, lavaliere and headset microphone systems, which offer 24-bit, 10 Hz–20 kHz, compander-free performance. The new product offerings utilize the same fourth-generation digital wireless platform as the company's flagship XD-V75 and support 12 channels operating over a 300-foot range.

The Line 6 XD-V55 digital wireless handheld microphone system offers 24-bit, 10 Hz–20 kHz, compander-free performance.

In early June, Cambridge Consultants, a UK-based contract design and development house firm, announced a new technology platform built on Digital Enhanced Cordless Telecommunications (DECT). The company exhibited at InfoComm12, looking to attract manufacturing licensees for its single-chip solution.

DECT is the basis for license-free cordless telephones worldwide, explained Tim Whittaker, system architect, Cambridge Consultants. "There are about half a billion DECT devices reckoned to be in use at any time; sales of DECT telephones are around 100 million a year." Sales on that scale means that the chip, ordered in substantial quantities, costs just a couple of dollars, he noted. "That can be a complete audio subsystem, so that's quite attractive."

Unique to Cambridge Consultants is the use of DECT to broadcast from one frequency-agile central unit to multiple receivers for distribution. DECT, which operates in the 1.9 GHZ spectrum, is frequency agile. It uses 12 time slots in each direction per radio channel; in the U.S., there are five radio channels available, thus the system supports 60 time slot pairs or 60 duplex pairs. In the rest of the world, there are 10 radio spectrum slots, supporting 120 channels.

Outdoors, DECT can reach over 100m (109 yards), but one barrier to using the platform indoors has been what is referred to as the Euston Station Problem, which is named for the London railway hub. "When you have a big enough volume of enclosed space," said Whittaker, "then the DECT radio waves will bounce about. It's effectively reverberation."

Cambridge Consultants has developed a solution. "In a mobile phone, they solved the problem by essentially signal processing and feeding in the inverse of the reverberation—sort of echo cancellation," said Whittaker. "All we've done, at low cost, is implement something similar in a DECT receiver."

Cambridge Consultants' platform utilizes an industry-standard multimedia codec—CELT (Constrained Energy Lapped Transform)—that offers low latency. "We shoehorned CELT into this very low-cost chip, which took a lot of effort; if not unique it's certainly unusual," he observed.

Bandwidth is 20 Hz to 15 kHz currently. "The top end is a simple tradeoff of the amount of signal processing you can do. If you spend more and get a bigger DSP, then you can process more samples per second. The reason we chose 15k was that 32 ksps was pretty much the fastest decode that we could manage within this $2 DECT chip, which has a radio receiver and DSP core. We were keen to keep our bill of materials right down. A 32k sample was the maximum we could deal with. I think it equates to what most pro-sumer/low-end pro radio mics do. They go to 12k, 13k, and there's not too

Shure's new ULXD124Q quad channel digital receivers—seen here with a Beta87A—offer a selectable High Density mode that enables up to 47 ULX-D systems in one 6 MHz chunk.

much voice energy above 12k."

The new chip is just the first step. "Within the organization, we've got some interesting solutions we're beginning to work up in the next year or two, redeploying some of the technologies from 3G and WiMax," shares Whittaker. "Obviously those guys are perfectly capable of running huge channel densities within one space. The problem with conventional radio mics is that you tend to run into massive inefficiencies as a result of intermodulation. One of the Holy Grails is to get an intermod-free or intermod-tolerant system, which can achieve the spectral density required without giving an unacceptable latency."

One company that has adopted license-free DECT technology is Revolabs (working with Cambridge Consultants, according to Whittaker). In addition to its family of wireless mic solutions for business presentations, audio and video conferencing, and the like, the company also offers two adaptors for more pro audio applications.

The Revolabs XLR adapter allows any dynamic handheld mic to be transformed for wireless use with the company's HD and Fusion systems. The Revolabs Countryman microphone adapter eliminates the need for a belt pack and, in the U.S., allows up to 32 (40 in the rest of the world) of the popular broadcast lavaliere mics to be used with the Revolabs HD wireless microphone system.

USB MICS COME OF AGE

Audio-Technica's new AT2005USB cardioid dynamic USB/XLR microphone is designed for recording instruments and vocals.

BY STEVE HARVEY

How quickly they grow up. Once considered suitable for little else but podcasting and teleconference calls, USB microphones have most definitely come of age.

There are still plenty of options when it comes to USB mics for podcasting, of course. And there's nothing wrong with podcasting mics: Many are of a suitable quality for voice and instrument recording on the road or in budget production setups.

But as the market has grown, and as more of pro audio mic manufacturers have started to produce USB microphones, increasing numbers of models have become available that are capable of equal, if not better, performance than some analog mics.

USB microphones are an attractive proposition in this era of free and inexpensive software applications such as Audacity and GarageBand. Typically costing less than analog equivalents, they plug directly into a computer without the need for a converter, interface, preamp or mixer, or phantom power or batteries. At one end of the scale, they are helping to democratize music production; at the opposite end, they offer professional musicians a portable solution that allows them to make high-quality recordings on a bus or in a hotel room.

There is one caveat: Although typically plug-and-play, not every USB microphone supports all recording software, drivers and operating systems—so be sure to check before purchase.

Apogee Electronics, well known for its high-end converters, previously released JAM, a compact USB interface for connecting guitar and bass instruments into an iPhone or iPad. Now the company has launched MiC by Apogee, which it touts as "the most compact studio-quality USB microphone available for iPad, iPhone and Mac," and ideal for use with GarageBand.

Like JAM, MiC incorporates the company's proprietary PureDIGITAL converter technology and offers 44.1/48 kHz, 24-bit, analog-to-digital conversion. A rotary knob on the side controls the input level. A bi-color LED on the front of the mic displays status and input level monitoring.

Launched at this year's NAMM Show, Audio-Technica's new AT2005USB cardioid dynamic USB/XLR microphone is designed for recording instruments and vocals. It operates at 44.1 or 48 kHz sampling rates at 16 bits, and offers a frequency response of 50 Hz to 15 kHz.

For added versatility, the AT2005USB features both USB and XLR connections, and ships with both types of cables. Further, the mic includes a headphone output with volume control.

The new AT2005USB joined Audio-Technica's previously available AT2020 USB condenser microphone, which operates at 44.1 kHz/16-bit and is intended for home studio recording, field recording, podcasting and voiceover use. The low-mass diaphragm, reportedly custom-engineered for extended frequency response and superior transient response, offers a cardioid pickup pattern and a frequency response of 20 Hz – 16 kHz.

Blue Microphones advertises its Snowball as the first professional USB mic. It may well have been, although manufacturers such as MXL, Rode, Samson and sE Electronics also launched pro USB mics for home studio recording around the same time in 2006. Regardless of who was first, Snowball's unique appearance caused quite a stir when it was introduced. The mic is a dual-capsule design and includes a three-pattern switch that selectes cardioid, cardioid with -10dB pad and omni operation.

Blue Microphones recently announced that its Snowball and Snowflake USB mics now work with Apple's iPad. Yeti and Yeti Pro require more power, so they must be connected to Apple's camera connection kit through a powered USB hub when used with an iPad.

Yeti Pro, launched at the beginning of 2011, is purported to be the world's first

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USB microphone to combine 24 bit/192 kHz digital recording resolution, and features a frequency response of 20 Hz – 20 kHz.

In addition to the USB connection, Yeti Pro also includes an analog XLR output fed by a separate analog circuit. The mic uniquely houses three 14mm proprietary condenser capsules and offers four different pattern settings (cardioid, bidirectional, omnidirectional, stereo). A built-in headphone amplifier provides zero-latency monitoring. Yeti Pro also features controls for headphone volume, pattern selection, mute and gain.

MXL offers over a dozen choices of USB microphones, including goosenecks and boundary mics for teleconference and corporate applications.

The MXL USB.009 cardioid condenser is, according to the company, the first mic to support 24-bit/96kHz recording (patent pending), and features a large (32mm) diaphragm. Onboard controls include a gain knob and zero-latency headphone output with mix control.

Not content with breaking the 44.1/48k sampling rate barrier with the USB.009, MXL's patented UR-1 is the first USB ribbon microphone. Like many ribbon mics, it offers a figure-8 pattern; unlike most, it includes a headphone jack for zero-latency monitoring.

The MXL USB.009 cardioid condenser is, according to the company, the first mic to support 24-bit/96kHz recording, and features a large (32mm) diaphragm.

MXL also offers Mic Mate Pro, an XLR-to-USB adapter that converts any existing mic into a plug-and-play computer mic.

RØDE offers a radio broadcast quality (48 kHz/18 bit) dynamic, end-address USB microphone, the Podcaster. In addition to the applications suggested by its name, the mic can be combined with the iPad camera connection kit and a powered USB hub for use with an iPad running GarageBand or other recording apps. The mic includes the expected zero latency monitoring output.

At one end of the scale, USB mics are helping to democratize music production; at the opposite end, they offer professional musicians a portable solution that allows them to make high-quality recordings on a bus or in a hotel room.

One of the first to market with a USB mic, Samson now offers an entire range. The company pitches its C01U USB cardioid condenser microphone with 19mm diaphragm for users of PC or Mac DAW software, and bundles it with Cakewalk's Sonar LE. In common with the majority of USB mics, operation is at 44.1 kHz/16 bits.

Samson's G-Track is a unique solution—a USB supercardioid condenser microphone with a built-in interface and mixer. With G-Track, users can record a vocal, or two mono instruments via the line/instrument input, or a mix of one mono instrument and vocal; separate input and output gain controls are provided.

Another of those companies early to the USB market, sE Electronics, offers its USB2200a, which adds a USB output to its existing analog sE2200a and also retains the XLR output. In addition to the simultaneous analog/USB feeds, it features zero-latency headphone monitoring, mix control playback/record path, 10dB pad and bass cut.

USB mics can generate more noise than their analog equivalents due to the circuit transforming of 5V USB power to energize the capsule. SE solves this by using a proprietary chip that also enables automatic configuration with any software host.

Shure also makes a XLR-to-USB adapter, the X2u, housing built-in, zero-latency headphone monitoring plus monitor mix controls to balance microphone and playback audio. The adapter supports up to 48 kHz/16 bit operation.

Shure entered the fray in 2009 with two USB microphones: the PG27USB side-address condenser microphone, intended for a wide variety of acoustic, amplified and vocal sound sources, and the PG42-USB side-address condenser microphone, which Shure specifically engineered for lead vocal reproduction. Both operate at up to 48 kHz/16 bits and include onboard mic gain and monitor mic controls with zero-latency headphone monitoring.

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GO-TO STUDIO MICS

Ready To Record

Scott Frankfurt, VP of design at Spectrasonics, uses his home-based studio for various commercial bookings and finds he's "a huge fan" of the Blue Bottle microphone.

BY STEVE HARVEY

In the current environment of generally smaller recording budgets, it's more important than ever for recording engineers to get a good, even great, sound as quickly as possible. As a result, engineers will typically reach for their go-to mics first, changing them out only if one or more of the many variables—the player, the instrument, the music, the studio environment—really calls for it.

Ben Fowler, an independent engineer based in Nashville since 1996 who previously spent a decade at New York's legendary Power Station, frequently gets to work at studios such as Ocean Way Nashville and Blackbird that have some of the finest microphone collections in the world. With any vocalist, he says, "At the start of the session, we'll do a quick shootout of maybe three mics. I'm really careful; I've seen people wear out vocalists when they do shootouts. I'm pretty quick to make the decision."

First choice will typically be a Neumann U 67 or AKG C12, he says. "I also really like the Sony 800. It's got everything to me—a certain clarity without being spitty. Or I sometimes put up my Audio-Technica AT4060, which I've had for years."

Paul Horabin, an English ex-pat who several years ago set up ReadyMix Music, a small commercial studio in North Hollywood, CA, with his wife, singer-songwriter Sarah Taylor, typically reaches for his Pearlman TM-2 tube mic. As he notes, being able to change the character of the mic in combination with a choice of preamps and equalizers allows a single go-to mic to be very versatile.

"The high-end filter—it's got a low-pass—helps [the TM-2] become two differ-

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ent mics. Then, going through either my API or Millennia [mic preamps] changes its character again. It's got a high output, so I have an A-Designs ATTY on the front end of the API so that I can back it down a bit, rather than pad the API, because that changes the tone so much. Then, if you go through my Malcolm Toft board, there's that EQ, or I've got the [API] 550A," he explains

There are other vocal mic choices available at ReadyMix. "Between the Pearlman, with the color that the tube gives, and an AKG 414 or Shure SM7, I'm done," he says.

Scott Frankfurt, VP of design at Spectrasonics since 2003, recently opened up his home-based studio in Woodland Hills, CA, to commercial bookings, and continues to use the facility for his sampling and design work as well as music production projects.

"You don't want talent waiting around while you try 50 different microphones," he cautions. "The important thing is not to bore talent when they're excited about playing. But it's necessary to learn and get a vocabulary in your head of what things

"I'm trying to think of [my recordings] in terms of the music I listened to [growing up] and the quality of the sounds in that music."

— Paul Horabin

Paul Horabin, who runs ReadyMix Music, a small commercial studio in North Hollywood, CA, typically reaches for his Pearlman TM-2 tube mic.

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LINE 6

"With the combination of generally knowing what works and the great players, it does come together pretty quickly."

— Ben Fowler

Ben Fowler, an independent engineer based in Nashville since 1996, often picks a Neumann U 67 or AKG C12 as his first choice.

sound like and what they do."

Frankfurt continues, "I am a huge fan of Blue Microphones; I love the Blue Bottle. I did a huge shootout; it's great in L.A. because you can rent every microphone on the planet, line them up and listen to them. I had vocals primarily in mind, but I was completely unaware of how useful that system would be for me over the years. I can't believe how versatile it has been, because of the capsules."

Because the Blue Bottle uses a system of interchangeable mic capsules, he observes, "What I love about it is that while I'm cracking a joke, I can change three capsules and the singer doesn't even have to take their headphones off. In five minutes, I've heard three beautiful tones and they're enjoying the process."

That said, Frankfurt does have a go-to capsule for singers. "I'll reach for B6 first, the capsule that has awesome openness but also a lot of body and character and things that emotionally connect with me almost every time, male or female. But some singers are so bright sounding naturally, or there's sibilance—then I'll reach for a much darker sounding capsule: the B7. It has more of a vintage 251 kind of a rolled-off tone, and is beautiful in the upper mid. If someone really has more edge in his tone, sometimes going with that capsule is just wonderful."

There is a third option, he continues: "Going in the opposite direction, the B0 is far brighter than the B6; it's definitely that super intelligibility-type of sound.

"So I hear three large diaphragm tube mics without moving any mic stands around. On every single project, I've benefited from the value, the pure audio chain and the versatility, so I'm a huge fan."

Frankfurt is also a fan of the Neumann M 149. "I find that on a certain vocalist, it's great. I tend to pick the Blue for a female vocalist almost every time; for a male vocalist, I'd say half the time. But I like the 149 a lot. If you use it in cardioid, there's no question it's a monster signal. I also like the big Sony [C800-G]. It might just be that it's so hot; it's the loudest mic."

There is another option, he adds. "I have a quirky microphone choice that's kind of rare—the Sanken CU-41, a Japanese condenser mic that has a small diaphragm on top of a bigger one. It has a really unique tone; Christopher Cross turned me on to it, and it's been surprising how fun that is to use. Nowadays I tend to put it on something like a nylon guitar, or something that needs fidelity but you don't want it to get too 'furry.'"

Acoustic guitars are at the core of Nashville music, Fowler reports. "It's often acoustic guitar-driven, and acoustic is a very important part of many of our tracks. For years, I've been using Audio-Technica AT4051s on acoustic. Those…are the perfect acoustic guitar mic, because they're full, clear, but they don't ever build up and get boomy like so many other mics when you get up close to acoustic guitars. I've had fantastic luck with them and lots of good compliments."

Fowler likes to have options in the mix, so he will often record a lot of tracks. "I'll maybe put a [Neumann] U 67 in there, too. So I may have two 4051s and a U 67 right in the center of that."

But as Fowler also notes, Nashville is somewhat unique: "The players are so good that their touch makes anybody look like a genius when they record in Nashville. All of our players are the best in the world, cream of the crop, so we're lucky. If you've got a guy that's got great instruments and great touch, it's not very hard to get a great sound."

For acoustic guitar, says Horabin, "I generally start with the Shure KSM141 cardioid on the twelfth fret and see how that feels with the guitar and what we're going for. If it's not going to be a big mix, I'll probably use the Pearlman as a room mic, or the [AKG] 414. I'll leave the TM-2 in the booth and open the door. Or I'll use the Pearlman as a close mic down on the body. Between those three mics, I've got it covered."

"The workhorse mics for me on acoustic guitars are the [Neumann] KM184s," says Frankfurt. "I use them a lot for small-room sounds, medium-room sounds and I've used them as overheads. I tend to like those mics with a dark pre, like a Neve or a more character-oriented pre, as opposed to a super high-fidelity pre. For alternative rock, I can't believe how friendly the combination of the Vintec Audio Neve 1272

sound with those mics is.

"The 184 and 1272 combination is working great for me for overheads, underheads, rooms, and I like the 184 occasionally in a super clean pre if I want that really transparent, intimate thing. I'll put those in the Millennia and they sound amazing, but it's a fidelity sound, not a rich, warm thing," he says.

"On electric guitar," Frankfurt continues, "since the first time I put up a Royer 121 on a guitar cabinet, I haven't gone back. There's something about the way the guys are cranking out their tones today—they're even brighter than they used to be. My antidote is the Royer; I've never been disappointed."

Frankfurt reports that he's been getting great results with reamping. "I'll close mic the cabinet, then feed that back into the room and mic it with 184s or, believe it or not, these really inexpensive MXLs. I want the live playing to excite the room and I want to get some of that instead of pulling up yet another digital plug-in."

Neumann M 149s make good room mics, too, he adds: "My space almost isn't big enough to use them in a pair, but if it's a mono source, I haven't found too many reasons not to like that microphone."

Fowler and Horabin both favor the Shure SM 57 on guitar cabinets. "It's hard for me to beat a 57, and a Sennheiser 421. Some days, one may be spectacular by itself, but often I blend them together," says Fowler.

As for bass guitar, he says, "I take the bass direct, but I like having a cabinet. It's either an Electro-Voice RE20 or a [Neumann] U 47 fet. Audio-Technica has a dual-element—the 2500."

> **"I've seen people wear out vocalists when they do shootouts. I'm pretty quick to make the decision."**
>
> **— Ben Fowler**

"If there are going to be a few guitar parts, then a 57 will cover it," agrees Horabin. "But if I have a feeling it's going to turn into a wall of guitars, then I'll throw up a ribbon as well. I find that between the two, and flipping the phase on the ribbon as and when you want, you can really tone-shape and get them all to fit together. It

gives you a whole lot of options."

Horabin's ribbon of choice? "Primarily a Cascade Fat Head," he says. I've got a Shinybox [46MXC] with the Cinemag transformer in it. A couple of times, I've used the Royer 122. It's funny; you like what you know—I'm happy with the Fat Head. I prefer the Royer for a room mic."

He adds, "It would be great to try an RCA 44. I could rent one, but I guess I'm not really that curious to find out how much I would like a mic that I really, really can't afford!"

According to Fowler, "I've been using the Audio-Technica AT4047 on cabinets with great success recently. It's instantly got a pretty cool tone; it's really full without me doing much, if any, EQ. Sometimes somebody will really want to use a ribbon, and I'll use either a Royer or AT4081s."

On drums, Fowler says, "I tend to start with the same stuff and modify a little bit as we go. I'm pretty much always happy with the EV RE20 on the kick; that's just my sound. I usually have a [Neumann] 47 fet outside. For snares, I use either a 57 or sometimes I use the Audio-Technica ATM650. I always like big Neumann mics on the overheads that are gushy and rich—obviously with good mic pres and compression."

Speaking prior to a session at Ocean Way Nashville, Fowler adds, "In this room, I put up [Neumann] M 50s for the room, which are extremely expensive mics, but I do it because I can! We have those to capture the bigger sound of the room. Up close, I have a stereo AT4050 for a tighter picture of the whole kit."

Sennheiser 421s are Fowler's go-to tom mics. "But if the guy has really low cymbals, I have some small Audio-Technica ATM23s or 25s or little Sennheiser e604s. It depends how much room there is to work with a mic inside the kit."

As for Horabin's drum technique, "I fluctuate between using the Fat Heads as overheads or the [Shure] KSM141s. It's two completely different pictures of the kit, so it depends on the vibe you're going for. Everything else on the kit I leave the same: Beta 52 in the bass drum, 57s galore, SM 7 on floor tom, 414 on hi-hat. If I'm using the 141s, maybe I'll throw a Fat Head up as a mono room mic."

Frankfurt, who took up drums as a teen after studying piano, shares, "I've used the AKG D 112 inside and the D12 outside of the kick drum. I rarely have to switch that out. Occasionally I'll got to just one mic, if it's Abe [Laboriel] Jr's giant battlefield kick drum, but for the typical 20-inch kick drum, that tends to work and gives you both the punch and manageability."

He continues, "How can you not love a 57 on the snare?" Sennheiser MK421 mics typically capture the toms. "It depends on the drummer and the kit, but I have resorted to the Audio-Technica clip-on condensers. Or sometimes someone will walk in with the strangest little roto-tom or non-standard drum; it's super versatile for that."

The hi-hat mic varies, says Frankfurt, depending on the musician's playing style. "If the drummer is a real splashy hi-hat guy, I'll put the Sanken on. If it's a tastier guy who knows how to use his hi-hat, I love an AKG C451, but I'll usually reach for an Audio-Technica AT4051. It has the roll-off built in and gets the job done nicely."

As Horabin observes, "The music we grew up listening to wasn't made with perfect microphones that had the perfect representation of what was in front of them. They colored everything a certain way. We grew up listening to vinyl where everything had been recorded to tape. But it was beautiful and it sounded like music." When recording, he says, "I'm trying to think of it in terms of the music I listened to and the quality of the sounds in that music."

To capture the upright piano at ReadyMix, he says, "Again, it harkens back to when music used to sound better to me. I'll take the front off the piano and take the front off the bottom as well, sometimes. I'll stereo mic with the KSMs—more and more, I've been backing off the distance a bit, then I put a ribbon underneath. That gives you a choice of sounds. I like the character of the ribbon, but I also like how it fills a hole in the sound."

For the Hammond organ's Leslie cabinet, he continues, "I'll either use the TM-2, or a KSM each side and use the TM-2 as a room mic."

Horabin will usually put a ribbon mic on trumpet, and the Pearlman TM-2 on trombone or sax. "I've tried other things," he says. "It might be because it's a tube mic, or it might be because it's my only tube mic. But it's musical."

Fowler rarely gets to work with brass, he says. "Often I'll put ribbon mics on those. I've been known to use old RCA mics in that world, or U 87s, U 47s, but I don't get to record that as often as I'd like to."

Of course, observes Fowler, "If I'm at home recording, my mic selection is a lot more limited than it would be if I'm at Ocean Way or Blackbird. We're spoiled here in Nashville, with the studios and rental companies having great collections."

Not that there is any time for experimentation these days, typically. "Because we do move fast, you've got to be productive and you can't experiment and shootout mics the whole day like the old days," says Fowler. "So I do pick things that are reliable. I have my go-to mics that I know pair with which mic pres. I try to get it up and running quickly. With the combination of generally knowing what works and the great players, it does come together pretty quickly."

"You don't want talent waiting around while you try 50 different microphones. The important thing is not to bore talent when they're excited about playing."

— Scott Frankfurt

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GO-TO LIVE MICS

Live And Kicking

BY CLIVE YOUNG

There's an old saying that quality is revealed "when the rubber hits the road"—and when it comes to live sound mics, what they're like when they hit the road is a very big deal. Are they durable? Can they be easily replaced? And, of course, do they sound good? Live sound pros weigh these questions every time they prep for a tour, so we turned to a slew of top engineers to see what they've been using to capture a variety of acts in concert.

After years of rising popularity, The Black Keys have exploded, becoming the indie story of 2012. Along for the ride as the band played its first arena tour was longtime FOH engineer Jason Tarulli, who has known the act since it was playing local clubs. Tarulli noted that all the band's vocal mics are Shure SM58s, excepting the bassist, who's on a Beta 58. Otherwise, SM57s can be found across the stage.

"For a live sound, I'm always going to rely on an SM57," he opined. "There isn't a single thing you can't use that mic for; in a pinch, just put a 57 on it, and it'll be fine. Coming up in small clubs, you have to work with what's given to you—you just have to roll with it. It's important not to get reliant, making sure your favorite mic is there every day. It's nice, but you can't always count on that. But in the situation now, we've gotten an endorsement from Shure, so most of our microphones are from them, and they've been great."

With that in mind, every Black Keys guitar amp is captured with a combination of Palmer DIs and SM57s, except for Dan Auerbach's Victoria amp, which gets an SM7. Meanwhile, the bass rig is outfitted with a Sennheiser 421. The drums also utilize Shure mics, with SM81s for overheads, Beta57s on and under the snare, and a Beta 91 in the kick drum. "We also use an Audix D6 in the kick drum as well, and Sennheiser e904s on the toms." Rounding out Tarulli's love of 57s, the mic is also placed on a rock and roll staple: drummer Pat Carney's cowbell.

The beat is the heart of the show when it comes to a Rihanna concert, helping keep audiences on their feet and dancing throughout the evening. Journeyman FOH engineer Sean "Sully" Sullivan creates the mix with music sourced from a variety of microphones onstage. Rihanna's singing is captured a Sennheiser e965 capsule on a G3 SKM wireless transmitter, while background vocals are heard via Shure wireless mics with Heil RC 35 capsules. Meanwhile, guitarist Nuno Bettencourt's six-strings are picked up via a Shure SM57 and a Heil PR 40, the drums are all Heil PR mics (excepting the Shure VP88s for overheads), and Radial JDI direct boxes nab everything else.

MARC SCHILLER/CREATIVE COMMONS

Rihanna's singing was captured a Sennheiser e965 capsule on a G3 SKM wireless transmitter on her most recent tour.

Sully's favorite mic, however, is the Heil PR 30: "You could mic the whole stage with it and have a great sounding show. I've put them on everything and gotten good results; it's like my new Shure 57, you know? I got turned onto them in the beginning of '07—a friend of mine asked me if I'd do ZZ Top for him because he was going to do something else. I was like, 'Are you kidding? Of course I'll go mix ZZ Top!' He said, 'Look, they like what I'm doing, so don't go in there and change it all up. Use what I'm using and do it how I'm doing it.' Fine with me. He had Heil mics on a bunch of stuff, and just by pushing faders and listening to them, I discovered, 'OK, these things are actually pretty cool.' So I've been using them pretty much since Bob Heil launched them or shortly thereafter; they're great."

Sometimes, part of an FOH engineer's job is to make a favorite microphone that's not necessarily best suited for a heavy-duty concert environment work anyway. "We have some Shure 55 vocal mics that we use," said "Big Mick" Hughes, FOH

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engineer for Metallica since the late 1980s. "James [Hetfield, singer] really likes the way they look and I understand that—I think they look fantastic, too—so I sort it out with a substantial amount of EQ and compression." Elsewhere on Metallica's stage, the drum kit is surrounded predominantly by Audio-Technica mics, such as ATM350s on overheads and toms, while the kick is captured via an Audix D6 and a Shure SM91a, and the snare is heard via a combination of Earthworks and A-T mics. The crucial guitar sounds are grabbed via Audio-Technica AE2500 dual-element mics, while Countryman and Radial DIs entwine with bassist Robert Trujillo's wireless system and bass amp respectively to create the bass sound.

Less loud but just as legendary are The Beach Boys, whose touring work ethic is extraordinary, playing 130-plus shows a year while carrying no gear whatsoever. Consoles, PAs, backline, even drum kits? All picked up locally. The one exception to the rule is their microphones, which makes sense, given the band's trademark harmonies.

"My buddy Kevin Lemoine was mixing Green Day a few years ago," FOH engineer Mark Newman recalled. "I went to see his show and asked what he was using on the vocals. He said, 'I love these mics—they're Telefunken M80s.' I called up the company, they sent us some out and we haven't looked back. The M80 gets the guys singing on their mics, because they need to be up close to it, but they sound great as a result. The drummer has a Crown Audio C-311A headset, which works very well. For Mike Love, we use a Shure Beta58; he has a unique singing style where there's not a lot of output and sometimes he holds it 2-3 inches away from his mouth. That requires a lot of gain, so I use a Shure DFR11EQ. It's a feedback eliminator, and unlike some other models over the past years, this one is very transparent, sounds great, notches just the frequency that's the problem and lets your EQ stay relatively flat on the channel. I can't do a show without it."

Another hard-touring band, albeit in a radically different genre, is Phish. While not as ceaselessly active on the concert trail as a decade ago, the jamband stalwarts still mount challenging tours every year with equally challenging musical excursions.

"We don't necessarily endorse anybody," said FOH engineer Gerry Brown. "We try and pick what's right." That, and they continually experiment with new mic combinations. While the band's guitars had long been on Royer R-121L mono ribbon live microphones, they've been replaced—by Royer SF-24L stereo ribbon mics, which are traditionally used as drum overheads. "We switched just to try it and we actually prefer it; me and the band's recording guy really likes it, so we've stuck with that," said Brown.

Mike Love, lead singer for the Beach Boys, sings into a Shure Beta 58 nightly, while the rest of the band is heard via Telefunken M80s.

Vocal mics have also been changed in recent times, moving from Telefunken M80s to M81s, and keyboards are heard via Radial J48 DIs. Drums are captured via a Shure Beta52a and Beta91A on the kick drum, Neumann KM 184s on the snare, and a mixture of KM 184s, an Earthworks DP30/C and Sennheiser MD 421s on the toms. "As for the overheads, we're playing with that," said Brown. "It was the Royer SF-24L, but we're now trying other things; the back side of the ribbons was starting to get a bit too much."

While the sleek New Wave of Duran Duran is a million miles away from Phish, the acts' audio teams share at least one quality in that they prefer to employ a wide variety of microphones. The British act's engineers—Andrew "Snake" Newton at the FOH desk and Charlie "Chopper" Bradley on monitors at stageside—happily admit to using "all the usual stuff."

Chopper explained, "We don't stick to one brand; we just use whatever we think is best for each application, so there's Shure Beta 58 radio mics, 56s on guitars and snare drums, AKG 414s on overheads. Nothing mad, nothing crazy—I don't see any point in getting some crazy, expensive ribbon microphone and..." Snake jumped in, "... and then it gets dropped when you're in South America and your whole show goes to hell as a result. A 57 or a 56 is going to sound great on the guitar cabinet, so unless there's something wrong with the sound that you're hearing, why do you need something that's radically different and usually hideously expensive? And irreplaceable when it goes wrong on the road?"

Seasoned engineers often have their own preferences for certain kinds of voices. For instance, longtime Elton John and Gloria Estefan engineer Mark Dowdle put the cast of *Glee* on Shure KSM9s and Crown CM-311A headsets when it toured last summer, explaining, "There's a lot of movement going on between what talent's doing when, where and how. Wireless is imperative." On the other side of the exuberance scale is Bryan Ferry, whose recent US tour found FOH engineer Nick Warren placing the languid crooner on an Audio-Technica AT4053 vocal mic.

While engineers love to put favorite microphones on the artist du jour, sometimes vocalists can be, well, vocal about their mics, as Jonathan Loeser, FOH engineer for Olivia Newton-John, recalled: "With Olivia, we use Shure 87s and I really prefer the 58. We tried to change it, and she said, 'Who won't let us use those microphones we like?!' It became, 'Well, no one won't let us use the microphones…[sigh]… okay, I guess we can go back to the other ones.'" Perhaps unsurprisingly, the person on the mic often gets the final word.

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ART M-Four Large Diaphragm Tube Condenser Mic

The ART M-Four condenser microphone is a multi-pattern tube design that delivers nine different polar pattern settings for versatility of application. The microphone's chassis is tooled zinc/aluminum alloy with a dent-resistant, stainless-steel wire-mesh windscreen to protect the dual gold-sputtered diaphragms and integrated 12AX7 vacuum tube pre-amp. An external, heavy-duty cradle mount suspension is provided to protect from vibration and handling noise.

The ART M-Four's polar patterns are selectable from the front panel of the external power supply unit. The ART M-Four has three gradient stages between each of the common omnidirectional, cardioid and figure-8 patterns positions, providing the artist and recording engineer a wider tone pallet. On the mic body, a -10 dB pad and LF roll-off filter can be independently selected.

ART | artproaudio.com

Audio-Technica SpectraPulse Components

Audio-Technica has introduced two new components for its SpectraPulse Ultra Wideband (UWB) Wireless Microphone System: the new chg004 four-bay charger for SpectraPulse transmitters and the sei001 encryption interface.

The chg004 offers four charging bays that hold either mtu101 Microphone Transmitters or mtu201 XLR Desk Stand Transmitters; the unit is also designed to charge up to two mtu301 Body-Pack Transmitters. A dozen supplied rechargeable AA Nickel Metal Hydride (NiMH) batteries are charged within the SpectraPulse transmitters. The chg004 monitors cell voltage and automatically stops charging if problems are detected or if alkaline (non-rechargeable) or damaged batteries are installed.

For immunity to eavesdropping, SpectraPulse systems are available with optional sep128 encryption software that meets the AES 128-bit encryption standard developed by the U.S. government for securing sensitive material. The sep128 software now comes equipped with the sei001 encryption interface—a one-bay encryption station for SpectraPulse transmitters.

Audio-Technica | audio-technica.com

beyerdynamic Opus 900 Wireless System

beyerdynamic has introduced the Opus 900 wireless system, featuring "flexibility, reliability and affordability," according to the maker. Transmitter options include the DM 960 S, DM 960 B and the DM 969 S dynamic transmitters (the latter shown here); the EM 981 S and the CM 930 B condenser transmitters; and the TS 900 M and TS 900 C pocket transmitters with re-chargeable contacts. Both the TS 900 M and TS 900 C are outfitted with ACT infrared interface for frequency setting, LCD for selected channel, group and battery status (five-stage), gain control, silent on/off switch and four-pin mini-XLR input connector.

Three receivers, offering 99 pre-programmed frequencies, are available for the Opus 900 system; the NE 900 S single channel, NE 900 D dual channel and the NE 900 Q quad channel receiver. Both the NE 900 D and NE 900 Q are housed in a standard 1U/19-inch rackmount and feature an integrated antenna splitter, while the NE 900 S is housed in a 1U/9.5-inch rackmount chassis.

beyerdynamic | north-america.beyerdynamic.com

Blue Microphones Spark Digital, iPad and USB Microphone

Building on the platform of the Blue Microphone analog Spark microphone, Blue calls Spark Digital "the first professional recording option for the iPad mobile platform." Spark Digital also offers USB connectivity.

Spark Digital features the same studio-grade condenser capsule and hand-tuned components as the original, analog Spark. Blue cites a range of applications for Spark Digital, including vocal and instrument recording and location use. Spark Digital features a zero-latency headphone out for direct monitoring, volume and gain control and instant mute. The 'Focus' control offers two sonic options within the single housing.

Spark Digital comes with a proprietary angle-adjustable desk stand with built-in shockmount. For each platform connection (USB and iPad), Spark Digital includes a y-cable with an attached, extended female headphone jack for direct monitoring. Spark Digital is plug-and-play, with driverless installation on iPad, iPad 2 and both PC and Mac. The mic comes with an exclusive

Cloud Production Bundle which includes a 25GB storage and transfer account for six months from Gobbler, along with a six-month Pro Account from SoundCloud.

Blue Microphones | bluemic.com

CharterOak's H1000 Large Diaphragm Condenser

CharterOak's H1000 microphone was conceived as a dedicated vocal microphone to "appeal to engineers with vintage tastes, who also want high headroom, clarity and detail." The microphone comes fitted with a 6dB per octave low end roll off starting at 100Hz and a 110dB attenuator. The microphone's large body size is a result of large components used in the design, such as the microphone's Lundahl transformer and 400V polypropylene film capacitors. The microphone is said to be free of unwanted body resonance as a result of the use of new powder coatings that solve the problem.

CharterOak Acoustic Devices | charteroakacoustics.com

DPA d:vote Instrument Microphones

The DPA d:vote range of instrument microphones are designed for live performance settings "requiring high-quality, discreet mics that are effortless to change." Building on the designs of the DPA 4099 instrument clip mic series, d:vote features an enhanced shock mount and available cables in heavy duty 2.2 mm (0.087 in) and 1.55 mm (0.061 in) diameter versions, which can be detached from the end of the gooseneck. Further flexibility is available through an extension unit for the gooseneck supplied with the mic, which lengthens its neck by 50 percent.

The d:vote condenser mics feature supercardioid polar patterns for "highly uniform off-axis frequency response and superior gain before feedback." The d:vote MicroDot connector and more than 35 DPA adapters were developed to ensure compatibility with various wireless systems. The product can also be used as a standard 48V phantom-powered microphone via its supplied XLR connector.

DPA Microphones | dpamicrophones.com

Galaxy Audio Carbon Boom Microphones

Galaxy Audio has released its new Carbon Boom Microphone (CBM) Series, developed for applications such as choirs, orchestral- and theatrical productions. The carbon shafts of the microphones were conceived to make them rigid and lightweight, yet portable and with an easily positioned element. The CBM series has two element choices—the CBM5 and the CBM3. The CBM5 has a 1/2" gold plated element and the CBM3 consists of three interchangeable elements (Omni, Cardioid, and Super Cardioid). Both the CBM3 and CBM5 also include a 24" stand or a 67" microphone stand. The Carbon Boom Microphone series is also available as a dual microphone unit.

Galaxy Audio | www.galaxyaudio.com

Electro-Voice RE320 Dynamic Microphone

Drawing from its venerable RE20 and the RE27N/D Broadcast Group mics, Electro-Voice has developed the RE320. Key features include EV's Variable-D proximity control technology; a patented humbucking coil for reputedly noiseless operation; and a high-output neodymium magnet structure capsule. Variable D is Electro-Voice's solution to the tonal changes associated with the proximity effect found in other directional microphones, and it is said to provide balanced and uniform frequency response up to 180° off-axis.

Though originally designed for broadcast voice, the RE20 has also found common use as a kick-drum microphone. In recognition of this, a response curve switch has been added to the RE320 to choose between the standard voicing or to engage a set of filters with peaks and dips in the frequency response commonly associated with a kick-drum application.

Electro-Voice | www.electrovoice.com

Heil PR 35 Handheld Dynamic Microphone

Heil Sound has upgraded its PR 35 handheld dynamic microphone. Changes include a new chassis, resulting in cosmetic differences with the old model, but reportedly internal improvements have also been made. Rear rejection is now said to be -42 dB with the upgrade. A concealed, two-position, roll-off switch replaces the former thumb switch.

The PR 35 ships with three interchangeable colored trim collars that can be mixed and matched. It is priced the same as its predecessor. The PR 35 was first introduced in 2008 and has since been used by artists such as Joe Walsh, Charlie Daniels, Stevie Wonder and others.

Heil Sound | heilsound.com

Lectrosonics Venue V5.1 Firmware

Lectrosonics now offers Version 5.1 firmware for its Venue Wideband modular receiver system. The V5.1 firmware adds the capability of a "TalkBack" function compatible with the newly introduced HH handheld transmitter.

When the transmitter is set to TalkBack mode and the multi-function button on the HH transmitter is pressed, the audio will switch to a different, predetermined, XLR on the back panel of the receiver. This affords real-time communication between talent, director, monitor engineer or other band members, for instance. The TalkBack functionality, requires at least one empty slot (and, thus, an associated, unused XLR) on the Venue receiver mainframe. The latest version of the Venue firmware can be downloaded and installed by users via USB, from the Lectrosonics website.

Lectrosonics | lectrosonics.com

Line 6 XD-V55 Digital Wireless Microphone Systems

Line 6 is now shipping the XD-V55 digital wireless handheld, lavaliere and headset microphone systems. The X-V55 systems represent the fourth generation of Line 6's digital wireless platform, offering 24-bit, 10 Hz to 20 kHz, compander-free operation. In addition to the native performance of the systems' microphone capsules, the X-V55 includes modeling technology to mimic the performance of four of the world's most popular wired microphones.

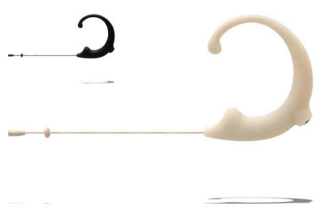
XD-V55 systems operate in the 2.4GHz band, which is license-free worldwide. Line 6's Encoded DCL (Digital Channel Lock) technology is said to prevent reception of any audio interference from other 2.4 GHz devices. The systems allow for up to 12 channels in a given location with a 300-foot operating range.

Line 6 | line6.com

Mogan Elite Omni Earset Microphone

Hosa Technology is now shipping the Mogan Elite Omni Earset Microphone, the newest addition to the Mogan Microphones brand of subminiature microphones. Designed to deliver "full-frequency vocal reproduction for the most discerning presenter," the Mogan Elite earset microphone has applications in broadcast, theater, worship and other spoken work or vocalist use.

The microphone boasts a moisture-resistant, 2.5 mm Omni-directional capsule with -45 dB nominal sensitivity that is designed to be positioned farther from one's mouth than many competing products, and deliver



20 Hz – 20 kHz frequency response and high gain before feedback. The earset is available in beige or black, and comes with a foam windscreen and a single mic clip.

The microphone's earpiece is reportedly designed to be worn comfortably for extended periods, with a fleshy ear cushion concealing its fully adjustable, sprung-steel (stainless) mechanism for a "natural" feel. It can be worn on either ear.

The new Mogan Microphones interchangeable cable system enables one to connect the microphone to most popular wireless transmitters, including models from Shure, AKG, Sennheiser and Audio-Technica. Each microphone ships with a detachable, Kevlar-reinforced cable with a hardwired connector.

Mogan | moganmicrophones.com

Shure Dual, Quad ULX-D Receivers

Shure has extended its ULX-D Digital Wireless Microphone System with new multi-channel receivers, a High Density mode that enables 47 systems to operate in six MHz of spectrum, and integrated Dante digital audio networking for direct connection to Dante-equipped consoles and system networks. The ULXD4D dual-channel digital receiver and ULXD4Q quad-channel digital receiver pack two or four channels of wireless into one rack space, with individual gain controls, LED meters and XLR outputs for each channel.

Selecting High Density mode allows up to 47 ULX-D channels to operate with a working range up to 30 meters in 6 MHz

Mojave MA-301fet Condenser Microphone

Mojave Audio has premiered its MA-301fet condenser microphone. Based upon the MA-201fet designed by David Royer, the MA-301fet adds features such as a 3-position—cardioid, omnidirectional and figure-eight (bi-directional)—pickup pattern selector, a -15 dB pad and a switchable bass roll-off.

The mic is targeted for vocals, voiceover and broadcast, electric guitar, piano, acoustic instruments, both drum overheads and room mics (drum ambience), and high SPL sources such as kick drums and bass guitar amps. The mic features a 3 micron, 1-inch gold-sputtered, dual-diaphragm design and a military grade FET in the preamplifier with a Jensen output transformer. Max handling is rated at 135 dB SPL (with pad).

Mojave Audio | Mojaveaudio.com

Neumann KK 204 / KK 205 Capsules For Sennheiser 2000 Series

Neumann's KK 204 (cardioid) and KK 205 (supercardioid) microphone capsules were developed to offer the characteristics of Neumann's wired KMS 104/105 stage microphones to users of the Sennheiser 2000 series of wireless handheld transmitters. The polar patterns are said to be uniform over the entire frequency range and to provide excellent resistance to feedback. Further, Neumann reports particular attention during development on the damping of pop sounds and handling noise, and on low self noise and wide dynamic range.

Like the SKM 2000 transmitter, each capsule is available in both nickel and black finishes. While said to be road ready, Neumann reports that the internal components are easily serviced if necessary.

Sennheiser | sennheiserusa.com

sE Electronics sE2200a II Cardioid

The sE2200a II C is a cardioid-only version of the sE Electronics sE2200a II and compliments the recently launched sE2200a II Multi-Pattern which has cardioid, figure of 8 and omni polar patterns. The sE2200a has reportedly been the UK's bestselling large diaphragm condenser mic, so why change it?

The sE2200a II Multi-Pattern, with cardioid, figure-8 and omni polar patterns, was launched in early 2012 to replace sE's Z3300a. Both models of the second generation of sE Electronics 2200a feature the same custom, hand-crafted, 1" gold-sputtered diaphragm as the first generation sE2200a, but are finished in the new sE black, rubberized coating. The sE2200a II C is accompanied by the new sE universal shockmount.

Specs for the sE220a II C include a rated frequency response of 20 Hz to 20 kHz and signal handling of 135 dB SPL. The mic operates on standard 48 VDC phantom power.

sE Electronics | seelectronics.com

of clear spectrum (equal to one U.S. television channel). High Density mode optimizes the system by running transmitters at low power and reduced modulation bandwidth, enabling ULX-D systems to be tuned to frequencies that are much closer together with no reduction in fidelity. With High Density mode off, up to 17 ULX-D systems can operate in 6 MHz with full operating range.

Shure | shure.com

Telefunken C12 Stereo Set

Telefunken Elektroakustik has introduced matched stereo sets of its C12 large diaphragm tube microphone, featuring a custom dual power supply, capable of powering both microphones at one time, and a locking flight case that will carry both sets of microphones, cables, their wooden boxes and the dual power supply.

The C12 features the new CK12 capsule (built in the USA from the original manufacturer's technical specifications), a Haufe (manufacturer of the original) output transformer built to match the original, and a microphone-grade 6072a tube as found in the original system. The Telefunken C12 Stereo Set was conceived to allow recording engineers to employ a variety of stereo recording techniques, including X/Y coincidental pairs, A/B spaced pairs, Blumlein pairs and the M/S technique. The custom M 910S dual-microphone power supply offers nine polar patterns for each microphone, making the options of stereo microphone techniques nearly infinite.

Internal components in each of the two Telefunken C12 microphones are said to be hand-selected, allowing as close a match as is possible between each system. Capsules are tuned to each other; transformers and tubes are tested for matched gain and frequency response.

Telefunken Elektroakustik | t-funk.com

ADK
ADK was established in 1997 by recording engineer/vintage-mic collector, Larry Villella, in order to replicate the sonic attributes of vintage European microphones. The ADK microphone design approach includes optimization to match spectrum analysis and computer modeling of the response curves of Villella's favorite microphones.

adkmicrophones.com

AEA
Audio Engineering Associates' (AEA) Wes Dooley drew upon his 40 years of experience and passion for ribbon microphones when he reintroduced the AEA R44 (based on the RCA 44) back in 1998. Since then, AEA has introduced mic preamps specifically for ribbon use alongside other ribbon microphones, including the A440 active version of the 44 mic.

wesdooley.com

AKG
Founded in Vienna in 1947, AKG has grown to become one of the principal microphone manufacturers with a product range that spans all areas of professional audio—the Blue Line range of modular mics, lavaliers, instrument, live recording and others.

akg.com

AMT
Applied Microphone Technology has been manufacturing microphones for near two decades, and takes the approach of producing microphones for specific instruments. A recent addition is the i series with inline preamps.

appliedmic.com

ART
Applied Research and Technology was founded in 1984, aiming to provide new audio products designed with the needs of the musician in mind. The company's offerings range from a full line of vacuum tube preamplifiers and compressors to Graphic Equalizers to "cool, little, useful tools" designed for stage and studio.

artproaudio.com

AUDIO-TECHNICA
Audio-Technica began back in 1962 in Tokyo's Shinjuku-Ko district manufacturing stereo phono cartridges, making this their 60th anniversary year. The company's range of microphones includes wired and wireless models for applications in live, broadcast, studio, commercial and industrial.

audio-technica.com

AUDIX
Starting life back in 1984 in Redwood, CA, Audix moved to Oregon in 1991 where it established a manufacturing facility. The company focuses on simple, elegant designs with microphones covering applications in corporate, live, broadcast and studio.

audixusa.com

AVANTONE
Avantone transducers are manufactured by Avant Electronics, which is owned by Ken and Sue Avant. Along with premium studio monitors, the Avant mic line includes ribbon, FET and tube models.

avantonepro.com

AVLEX
Based in Kansas City, MO, Avlex offers solutions principally for presentation and theater applications. Other audio applications are covered with microphone ranges with different brand names, such as MiPro for location and broadcast use, and Superlux for more studio-specific uses.

avlex.com

AZDEN
Azden has more than 40 years of experience utilizing CAD and SMT technology to create a number of standard and wireless transduction solutions. Originally an OEM manufacturer for many brands, the last 15 years has seen Azden raise its own brand identity.

azdencorp.com

BEHRINGER
Uli Behringer founded his eponymous company in 1989 in Germany. Since then, Behringer has grown to have offices in 10 countries, including its own Asian factory, and has created its own parent company, Music Group. Behringer offers a range of general-purpose dynamic and condenser microphones.

behringer.com

BEYERDYNAMIC
beyerdynamic was founded back in 1924. Developments in a number of audio areas continue, and beyerdynamic condenser, ribbon and general dynamic microphones still form the backbone of many mic collections.

beyerdynamic.com

BLUE
Blue Microphones began in 1995 by founders Skipper Wise and Martin Saulespurens. With experience gleaned from years of repairing and improving classic microphones, Blue focuses its designs to deliver the best possible reproduction of specific vocal or instrument types.

bluemic.com

BOCK AUDIO DESIGNS
From 1996 to 2006, former studio tech David Bock ran Soundelux Microphones. He then opted to start his own company where he continues to develop his own hand-built, high-performance designs.

bockaudiodesigns.com

BRAUNER
Dirk Brauner was developing ideas with tube microphone circuits back in 1993 when he founded Brauner Microphones, creating a limited number of handcrafted microphones based on his VM1 design. The Brauner line includes a variety of condenser microphone models, with either tube or FET internal circuitry.

brauner-microphones.com

CAD AUDIO
CAD Audio, in business for over 75 years, lays claim to introducing the first studio condensers to offer high-end performance at affordable prices in the late 1980s. CAD Audio manufactures a variety of visually distinct condenser, tube, ribbon and instrument-specific microphones for the studio and live markets, and, under its Astatic brand, for installation applications.

cadmics.com

CASCADE
U.S.-based Cascade produces a wide variety of mic types, but is best known for its range of ribbon microphones and the retro styling of many of its designs, including the Fat Head II.

cascademicrophones.com

CHARTEROAK ACOUSTICS

Founded by producer/engineer Michael Deming in Connecticut in 2002, CharterOak manufactures tube and solid-state microphones, which are assembled and inspected by hand, with each being studio-tested before shipping to the customer.

charteroakacoustics.com

COLES ELECTROACOUSTICS

Coles Electroacoustics has manufactured its BBC-designed ribbon microphones in the U.K. for over 30 years. Originally designed for radio and television broadcast, the company's ribbon mics have become primary tools of choice throughout the sound recording industry.

coleselectroacoustics.com (distributed in U.S. by Independent Audio)

CORE SOUND

Core Sound was founded in 1990 by electrical engineer Len Moskowitz to serve the professional and hobbyist digital audio community and discriminating musicians. Core's offerings include binaural models, the "Stealthy" stereo cardioid pair for field recording, and the TetraMic single-point Ambisonic soundfield microphone.

core-sound.com

COUNTRYMAN ASSOCIATES

With more than 30 years of experience, Countryman Associates manufactures microphones for a variety of live applications, including theater, presentation and live music. The range consists of a number of mini and micro microphones, including its popular headworn models.

countryman.com

CROWN

Known for its innovative PZM designs, Crown boundary layer microphones are now distributed by sister Harman Pro company, AKG Acoustics.

crownaudio.com

DIGITAL REFERENCE

Digital Reference, based in Thousand Oaks, CA, offers a wide selection of wired microphones and wireless mic systems. Digital Reference cites affordability, high performance and high reliability as the common factors in each of its designs.

digital-reference.com

DPA

In 1994, Danish manufacturer Brüel & Kjær spun off its pro audio division and outsourced sales and service of its 4000 series microphones to the former employees that designed them, under the name Danish Pro Audio. DPA has continued and extended the line, which includes mini, compact, large-diaphragm, reference test microphones, underwater microphones and surround microphones.

dpamicrophones.com

EARTHWORKS

Formed in New Hampshire by David Blackmer, inventor and founder of dbx, Earthworks Audio has specialized in wide-bandwidth, low-noise electret pencil microphones in omni and directional versions. The Earthworks line also includes its PianoMic system.

earthworksaudio.com

ELECTRO-VOICE

Electro-voice has been developing pro audio products, principally in the area of sound reinforcement, for 80 years. The venerable RE series are among EV's microphone models, a line that includes both standard and wireless microphone products for live, studio, install and broadcast applications.

electrovoice.com

EQUATION AUDIO

Armed with the intellectual property of noted mic guru Fred Cameron, and comprised of key members of the team behind the original CAD Equitek line, Equation Audio's mic lines include the Alpha drum mic series, the Dominion series of handheld condenser and dynamic microphones, and the F.20 large-diaphragm condenser mic.

equationaudio.com

FOSTEX

Founded by the Foster Electronic Company in Tokyo back in 1973, Fostex has established itself in location recording and broadcast audio, designing and manufacturing recorders, loudspeakers, headphones and a number of microphones for these applications.

fostex.com

HHB COMMUNICATIONS

HHB, in collaboration with Sennheiser, entered the microphone market with a range of recording microphones aimed at audio journalists and field recordists. HHB's FlashMic line includes omni and cardioid models.

hhb.co.uk

HEIL SOUND

The origins of the Heil Sound date back to the 1950s when a young organist, Bob Heil, began to dissect the sounds around him. Moving into design and the manufacturing, Heil Sound became renowned for groundbreaking, early sound reinforcement systems. Returning to pro audio in recent years, Heil has introduced a series of dynamic microphones that have quickly found loyal adherents on the stage and in the studio.

heilsound.com

HOLOPHONE

Musician and sound designer Michael Godfrey founded Holophone in Toronto, Canada in 1994, looking to deliver realistic listening experiences with recorded multichannel audio. The company has a number of products that accommodate surround applications.

holophone.com

JOEMEEK

Referencing many of the experiments made by Joe Meek in the early to mid 1960s, Joemeek continues to provide solutions in a number of areas of project and pro audio, including a range of small- and large-diaphragm condenser and dynamic microphones.

joemeek.com

JOSEPHSON ENGINEERING

Since 1998, Josephson Engineering, as well as producing and supplying capsules to other microphone manufacturers, has produced its own range of high-performance microphones for studio, location, live and instrument-specific applications.

josephson.com

JTS MICROPHONES
For near three decades, JTS has been investing large amounts of resources into microphone research and development of a line that includes both wired and wireless microphones optimized for affordability, performance and reliability.

jts.com.tw

JZ MICROPHONES
Over the past decade, Latvian manufacturing company, Scruples, ventured into the pro audio market with a number of products, including microphones under the Violet brand. Scruples created a spin-off company, JZ Microphones, that has been established to concentrate on microphone development with technical innovation and unique aesthetics.

jzmic.com

KEL AUDIO
Canadian mic maker KEL Audio specializes in microphones with unique sonic signatures, conceived to enhance sound sources. Condenser models, each with a specific character, currently comprise the value-priced, high-performance line.

kelaudio.com

LAWSON
Founded by Gene Lawson in 1979, and now handcrafted in Nashville, TN, Lawson Microphones has a range of high-end tube and FET offerings, taking the best characteristics of legendary classics and re-creating them with superior quality components for a lifetime of reliable service.

lawsonmicrophones.com

LAUTEN AUDIO
Lauten Audio was founded by Brian Loudenslager and is based in San Jose, CA. It is a high-end manufacturer, focusing on microphones that target both professional and amateur recordists. The company released its first product, the Horizon tube microphone, in October 2006.

lautenaudio.com

LECTROSONICS
Since 1971, Lectrosonics' wireless microphone systems and audio processing products have been used in mission-critical applications including broadcast and stage. Innovations from the Rio Rancho, NM-based company include its hybrid digital technology, blending digital precision with traditional wireless transmission techniques. Lectrosonics's offerings include a handheld transmitter as part of its hybrid digital line, accommodating a variety of thread-on capsules from other manufacturers.

lectrosonics.com

LINE 6
Line 6 is a manufacturer of digital modeling guitars, amplifiers and related electronic equipment. The company was founded in the mid-1990s and is based in Calabasas, CA. In 2008, Line 6 acquired X2 Digital Wireless, which entered the company into the digital wireless market with products for guitar, bass, vocals and wind instruments, in musician and professional packages.

line6.com

M-AUDIO
Formed in 1988, and now part of the Avid Technologies family, M-Audio is focused on computer-based products and on providing solutions to mobile musicians. The M-Audio microphone selection includes a number of units including the lollipop, large-diaphragm condenser, Luna.

m-audio.com

MANLEY LABORATORIES
Since 1989, and now located in Chino, CA, Manley Laboratories has focused on the development of a number of products based on tube designs. Among these are the range of Manley tube microphones, which include the 2-channel, multi-pattern Stereo Reference Gold mic.

manleylabs.com

MERCENARY
Based in Foxboro, MA, Mercenary Audio not only distributes gear from many other companies, but it also manufactures its own products, including the KM-69 small-diaphragm condenser microphone.

mercenary.com

MICROTECH GEFELL
With German roots tracing to the late 1920s, Microtech Gefell has been in continuous production of fine microphone products since 1943. The product line includes studio condenser, handheld dynamic and instrumentation/measurement microphones.

microtechgefell.de

MICW
The MicW microphone line ranges from handheld vocal mics to compact, desktop, shotgun and boundary models for recording, live and conference audio applications. Though only recently becoming available in the U.S., MicW is the recording microphone subsidiary of Beijing-based BWSA Tech Ltd., which has been manufacturing precision test and measurement microphones for the domestic Chinese markets for over 12 years.

mic-w.com

MIKTEK AUDIO
Miktek claims inspiration from the iconic mics of the past in developing capsules and unique circuits designed to capture that elusive, classic sound. Incorporating premium, precision-matched, high-quality components, Miktek designs have achieved acclaim by some of the world's most renowned recording engineers. All Miktek microphones are hand-built in Nashville, TN.

miktekaudio.com

MILAB
The Milab story begins in 1941 when Rune Rosander produced crystal, and then subsequently carbon and dynamic microphones. In the late 1960s, the rectangular capsule and double-sided rectangular capsule were developed and are still part of production today. The name Milab (Microphone Laboratories) came into being in 1970.

milabusa.com

MOGAN
Founded in 2011 as a division of Hosa Technology, Mogan Microphones specializes in subminiature microphones for the music, theatrical, broadcast, House of Worship and presentation markets. Drawing from Hosa's experience as a provider of connectivity solutions, Mogan microphones can be readily fitted for use with wireless systems from the world's leading manufacturers.

moganmicrophones.com

MOJAVE AUDIO
David Royer established Mojave Audio in his garage in Fullerton, CA in 1985. Known for his ribbon microphone designs with Royer Labs, Mojave Audio is the outlet for David Royer's tube and Fet condenser microphone designs.

mojaveaudio.com

MOJO
Mojo Pro Audio's digital wireless body pack introduces features and performance for ENG/EFP, studio, live production and house-of-worship applications. It incorporates stereo transmission for simultaneous operation of two microphones and also offers a single receiver channel for headphone monitors or IFB. Mojo's wireless technology is fully digital, offering uncompressed 48 kHz/24-bit operation, a dynamic range in excess of 140 dB and a signal-to-noise ratio of better than 100 dB. Mojo's protocol uses IP wireless networking for worldwide license-free operation.

mojoproaudio.com

MXL
MXL Microphones are designed and manufactured by U.S.-based manufacturers, Marshall Electronics, in El Segundo, CA. The brand has a variety of standard microphone types aimed at offering premium performance to the expanding "cost-effective" market.

mxlmics.com

NADY SYSTEMS
Founded by John Nady in 1976, Nady Systems was, and remains, at the forefront of wireless mic design. Nady was among the first to address the issues of noise reduction in wireless systems. The company has branched out and now includes a comprehensive range of studio condenser, ribbon, instrument-specific and USB microphones.

nady.com

NEUMANN
With roots going back to Berlin in 1928, Neumann has been involved in the design and manufacture of a wide range of audio products, but it is with microphones that the name is most associated. Neumann microphones include legendary models still hand-manufactured with traditional techniques, refined by modern science. Neumann became part of the Sennheiser group in 1991. Innovation continues with current designs such as the direct-to-digital Solution-D series.

neumann.com

NEVATON
Nevaton is a Russian microphone manufacturer with roots dating back to 1947, when an acoustic laboratory established itself at the Leningrad (now St. Petersburg) optical and mechanical association (LOMO). The company's product catalog includes stereo microphones; small-, medium- and large-diaphragm condenser mics; boundary layer shotgun microphones; and miniature microphones.

nevatonusa.com

OKTAVA
The Russian-made Oktava microphone line includes a wide range of small- and large-diaphragm condenser microphones (including models with interchangeable capsules). Handheld condenser mics and tube condenser mics are also in the line, along with ribbon models.

oktavausa.com

PEARL
In 1941, Rune Rosander established Pearl, which was the first microphone manufacturing company in Sweden, and remained the sole Swedish microphone manufacturer for the next 40 years. The company's early stereo microphone, TL 4, led to more than 20 other models developed over the past several decades.

pearl.se (distributed in U.S. by Independent Audio)

PEAVEY
After graduating college in 1965, Hartley Peavey started his company using the logo he came up with while doodling in his notebook. With products spanning the entire audio world, Peavey microphones feature units for use in the studio and on stage, including wireless systems.

peavey.com

PSC
Since 1976, Professional Sound Corporation (PSC) has been a manufacturer and distributor of professional audio products for the film and video industries. Within its product range are a noise-canceling headset and mini lavalier microphones.

professionalsound.com

REVOLABS
Revolabs, Inc. is a provider of wireless audio solutions for unified communications, enterprise collaboration, and professional audio applications across a range of markets. The company's wireless conferencing and microphone systems are utilized across the globe for a variety of applications, from webcasts and video conferencing to podcasts and broadcasting. The company is headquartered in Sudbury, MA.

revolabs.com

RØDE
Røde came into existence after Henry and Astrid Freeman emigrated from Sweden to Australia in 1967. Its background in audio product development within its own Freeman Group of companies led to the development and release of the first Røde microphone in 1990. The company's range has grown with tube and conventional microphones for mainly studio and broadcast use.

rodemic.com

ROYER LABS
Formed in 1998 to bring David Royer's ribbon designs to the world, Royer produces a wide range of ribbons that include phantom-powered and tube models, as well as roadworthy, ruggedized models.

royerlabs.com

SAMSON
Samson began in 1980, designing and producing wireless microphone systems. Since then, the company has diversified into a number of areas including conventional, ribbon and USB microphones.

samsontech.com

SANKEN
Sanken Microphones is based in Tokyo and has focused since 1926 on producing high performance, original condenser and dynamic microphone designs for studio, broadcast and live use.

sanken-mic.com

SCHOEPS
Founded in 1948, the company has specialized in the design and manufacture of condenser microphones. The Schoeps range now includes condenser solutions for all manner of studio, broadcast, live and location scenarios, as well as surround applications.

schoeps.de

SE ELECTRONICS
sE Electronics was founded by Siwei Zou, a classical musician from Shanghai. Through years of education and experience in both China and the U.S., his designs began to be developed in Shanghai in 2003. The product line includes the Rupert Neve Signature line and a range of other ribbon and tube and solid-state condenser microphones.

seelectronics.com

SENNHEISER
Sennheiser has been delivering pro audio for more than 50 years, filling many microphone cabinets, whether it is for music, broadcast, post, live or location applications. The Germany-based company has its U.S. headquarters in Old Lyme, CT, where it distributes standard-setting wired microphones and wireless microphone systems.

sennheiserusa.com

SHURE
Founded in Chicago, IL by Sidney Shure in 1925 to sell radio parts, the company produced its first microphone in 1932. Shure now boasts a collection of wired and wireless microphones, including the SM58. Innovation continues with the KSM series of high-performance studio microphones, and a full line of performance, broadcast, install and performance mics.

shure.com

SONODORE
Sonodore microphones and microphone preamplifiers are manufactured in Holland by Rens Heijnis Audio Electronics. Producer/engineer Bert van der Wolf of Northstar Recordings has been involved in the development of these recording tools from its conception in the early '90s, and has been using them in his own recordings for many years. Sonodore microphones are known for high-resolution, accurate and transparent performance.

sonodore.com

SONTRONICS
Designed and developed in the U.K. and handcrafted in Shanghai, Sontronics produces a full line of affordable but high-quality dynamic, tube and Fet condenser and ribbon designs. Sontronics has such confidence in its microphones that each is sold with a lifetime warranty for the original purchaser.

sontronicsusa.com

SONY
Sony has a long history when it comes to microphones, and its current range (which includes nearly 100 different models) reflects Sony's continued involvement in all pro audio arenas. Recent innovation has been focused on Sony's fully digital wireless microphone systems.

pro.sony.com

SOUNDFIELD
Based in the U.K. and formed in 1993, Soundfield manufactures and continues to develop its multi-capsule, tetrahedral design for both enhanced stereo and multichannel applications.

soundfield.com (distributed in the U.S. by TransAudio Group)

STERLING AUDIO
Sterling Audio employs several advanced technologies in its large-diaphragm condenser mics. One of the features is the exclusive Disk Resonator system, developed to compensate for the 14-kHz frequency roll-off that is inherent in large-diaphragm mics. Sterling's designs, which include ultra-thin diaphragms and long, lossless line-driving capability, also reflect its continuing working relationship with tube guru and mic designer, Aspen Pittman.

sterlingaudio.net

STUDIO PROJECTS
From the B, C and CS Series, Studio Projects microphones are designed and engineered by Brent Casey for high performance and value. The Studio Projects line of condenser microphones has been extended with the LSM (Little Square Mic), a large-diaphragm microphone with both XLR and USB outputs.

studioprojectsusa.com

TELEFUNKEN | USA
Telefunken | USA was incorporated in early 2001 to provide restoration services and build reproductions of vintage Telefunken microphones. In addition to faithful recreations, Telefunken has taken advantage of modern materials and techniques to develop new condenser and dynamic designs for studio and stage.

telefunkenusa.com

T.H.E.
Based in Connecticut, Taylor Hohendahl Engineering produces microphones designed to include state-of-the-art electronic circuitry and premium transducers for accuracy and transparency. The range includes reference condensers, modular mics and a binaural sphere.

theaudio.com

TRINNOV AUDIO
Located in France, Trinnov Audio specializes in the digital processing of acoustic fields. The company has produced the SRP surround array of microphones, to be used with high-resolution DSP technology.

trinnov.com

VIOLET DESIGN
Violet has been developing and manufacturing in Latvia since 2003, where it produces a combination of tube, solid-state, large- and small-diaphragm condensers. Quality and consistency, as well as visual appeal, are cited by Violet as key to its product development and manufacture.

violetusa.com

ZAXCOM
Known primarily for its Deva location recorders and digital, uncompressed, 2.4 GHz wireless microphone systems, Zaxcom recently introduced the ZFR800 handheld digital recording mic to the field recording and broadcast journalism markets.

zaxcom.com

"The top choice for musicians, actors, and presenters"

—Músico Pro

Clarity. Re-Defined.

Your audience is hanging on every word. Don't disappoint them. When you step onto the stage, make certain you're wearing a Mogan Elite earset microphone—the new benchmark for exemplary audio quality and world-class comfort. Delivering clear, natural sounding vocal performance with an adjustable ear cushion that's never distracting, the Elite earset lets you focus on what's important: the show. This is vocal clarity re-defined. This is Mogan.

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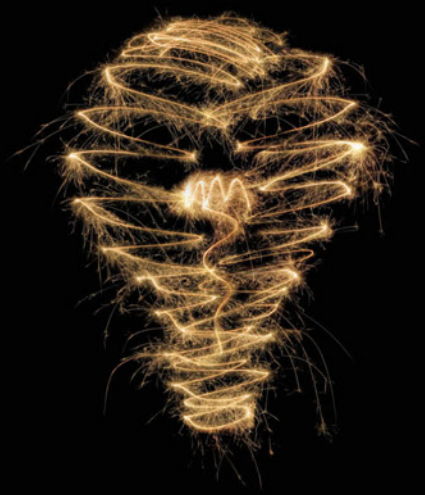

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