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Spotlight on Arctic Monkeys,
Beck, St. Vincent, Ledisi, Nathan
East, Ray Kurzweil
AND MORE

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SPOTLIGHT ON GRAMMY NOMINEES

From the Arctic Monkeys' hit "Do I Wanna Know" to Beck's five-times nominated album *Morning Phase*, from St. Vincent's eponymous release to Little Dragon's electronic *Nabuma Rubberband*, we take you into the studios with the artists, producers, and engineers who made ten of this year's biggest projects.

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ACOUSTICAL TREATMENTS

Learn how to select the right treatments to improve your studio, and then check out some of the latest off-the-shelf acoustical products.

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insight

Music's Biggest Night Gets Bigger

29 MILLION people tune in to watch the Grammy Awards, but unless they're paying close attention to the "previously awarded" titles sprinkled throughout the broadcast, most viewers are unaware that more than a dozen award categories exist.

Of course, anyone involved in music production knows that the awards handed out during the show represent just a fraction of the 83 total categories, the majority of which are announced during a pre-telecast ceremony.

Over the years, as the TV broadcast has focused more on entertainment, more award categories have moved into the pretelecast proceedings, which in turn have evolved from a somewhat humdrum afternoon to an elaborately produced, star-studded event, complete with celebrity hosts, musical performances, and appearances by top artists like Taylor Swift and the Foo Fighters. This year, the Recording Academy is further upping the ante, re-branding the telecast as "The Grammy Awards Premiere Ceremony" and promoting a live webstream at Grammy.com.

The Academy is sending a message that all Grammy awards are meaningful—not just the ones you see on TV.

To learn more about this year's nominees, read our feature beginning on page 30. And don't miss our profile of Ray Kurzweil, recipient of this year's Technical Grammy Award, on page 13. Then write to ElectronicMusician@musicplayer.com to let us know what you think of this year's Grammys.

SARAH JONES
EDITOR
sjones@musicplayer.com

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This month on emusician.com

Extended Grammy Nominee Profiles

Plus...
The DIY Advisor: Challenging Yourself in 2015
Bonus Studio Design Tips

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gadget geek

Gaff Gun

Who says you can't reinvent the wheel?

The Gaff Gun, from Seattle-based company GaffTech, is a floor tape dispenser that makes the tedious chore of laying gaffer tape a whole lot easier, by gathering and straightening cables, then rolling tape over them. Built-in interchangeable guides accommodate various cable and wire sizes; an optional FloorGuide attachment fits various styles of floor tapes. Options start at $199; see the GaffGun in action at www.gaffgun.com.

app tip FLUX:FX

Extreme signal processing courtesy of an extreme guitar master
BY MICHAEL ROSS

IT IS safe to say, Adrian Belew knows effects: For decades, the guitarist has used a variety of pedals and rack units to creatively mangle sounds for solo projects, or with David Bowie, King Crimson, Nine Inch Nails, and others. Collaborating with engineer Daniel Rowland, mobile strategists MOBGEN, and software developers Elephantcandy as NOIISE, Belew has developed FLUX:FX (http://flux.noii.se $19.99 at iTunes)—a sonic processing iPad app unlike any other. FLUX:FX specializes in real-time morphing of your audio signal through more than 30 effects, x/y pad manipulation of parameters, and sequencing that offers continually changing, hands-free parameter modulation.

1. Send your guitar signal or any sound source into the app and choose from the multitude of effects by dragging and dropping them in any order into up to five slots.

2. Use the x/y pad to engage, bypass, and/or modulate any parameters in each of the chosen effects. You can sweep filters, change bit rates, lengthen or shorten delays, and much, much more.

3. Modulate effect parameters with an envelope. Set for this mode, the attack strength of the note can determine things like reverb mix blend, fuzz amount, filter Q, etc.

4. Use one or more of the five loop effects to grab short sound bites, freeing hands to use the x/y pad. Modify the loop length and/or start point with the pad to create interesting sounds.

5. Create wild, moving sonic landscapes using the sequencing tool. It can record x/y movements as you perform them, or be step programmed.

ASK!

WHEN I POWER UP MY GEAR, I HEAR A THUMP FROM MY MONITOR SPEAKERS. WILL THAT DAMAGE THEM?

**JEAN FULSTROM
NEW YORK, NY
VIA EMAIL**

In a word, yes! Much of the gear in your studio will put out a DC current when powered up or down, and that is what you hear through your speakers. To avoid this, your monitors should be turned on last, then turned off first at the end of a session. Engineers use the acronym LOFO—last on, first off—to remember the order of power cycling.

Let's say you have a collection of synthesizers plugged into your mixer, which feeds a pair of active studio monitors. The order in which you would turn the system on is synths first, then the mixer, then the speakers. If it helps, remember that you are powering everything up in the order of the signal flow, from source to loudspeaker.

When you're finished, power down your entire system in the reverse order—monitors, mixer, synths. Typically, pro studios leave much of their gear powered up at all times, but this isn't always possible (or cost-effective) in home and personal studios.

A great way to simplify the entire process is with sequenced AC outlets, which are available on some rackmount power conditioners. When you turn on the conditioner, it powers up each set of plugs in a timed sequence with, say, 1 to 10 seconds in between. Turn off the conditioner and each set of outlets power down in the reverse order, again within sequenced intervals. That way, you will have only one power switch to deal with and you will never have to worry about that annoying (and potentially damaging) thump ever again.
THE EDITORS

On with panel switch	On after 3 seconds	On after 6 seconds
Off after 6 seconds	Off after 3 seconds	Off with panel switch
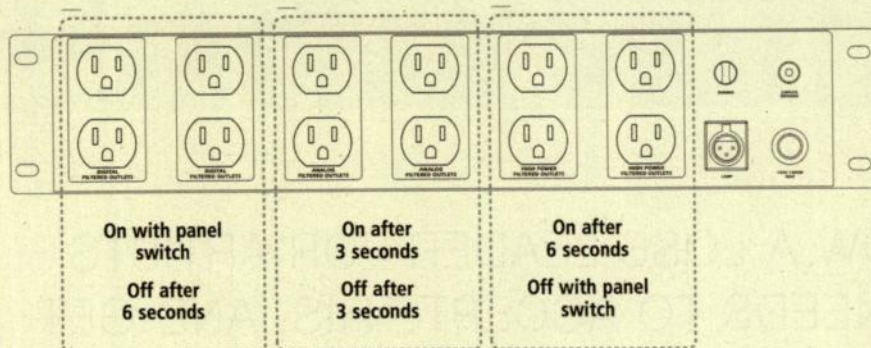
The Monster Power Pro 3500 has a 3-stage sequence of powering up its rear-panel AC outlets, so you won't damage your monitors when turning on your gear. For this to work, of course, all of your equipment is left "on" when plugged into the conditioner's outlets.

>>> Got a question about recording, gigging, or technology? Ask us! Send it to ElectronicMusician@musicplayer.com.

Cakewalk re-introduces the SONAR line with SONAR Artist, Professional, and Platinum packages. All versions include 12 months of SONAR's new membership program, which lets customers take advantage of continuous product development by downloading regular updates, new features and presets, fixes, videos, and other custom content through the new Cakewalk Command Center. Customers can still opt for "up front" purchases or a monthly payment option, but unlike traditional software subscription programs, the SONAR Membership program gives you the choice of renewing the plan after 12 months or, if you decline, keeping everything you've received during the membership period, including your full version of software.

All three tiered programs share common-core DAW functionality—including 64-bit audio; unlimited tracks, sends, and buses; 11 virtual instruments; 19 effects; and unlimited VST support—and build on features and effects as you move up the product line.

All SONAR versions feature significant enhancements: Mix Recall gives you the ability to save and compare mix scenes and swap out effects, fader positions, automation, or other parameters. A new Pattern Tool lets you "paint" MIDI data into a different location—no copy and paste required. AudioSnap is updated with new detection algorithms: Stretch a song to a new tempo, sync recordings to audio loops, tighten drums, and even convert notes to MIDI data.

REMatrix Solo, available in Professional and Platinum versions, is a zero-latency convolution reverb from Overloud/MoReVox, customized for SONAR's ProChannel module format. This single-layer version includes 100 impulse response presets and offers the ability to import custom impulse responses.

SONAR's new VocalSync function, available in the Platinum version, aligns parts to guide tracks without splitting and moving clips; the feature taps into SONAR's native Region FX technology to simplify synching multiple tracks at once.

All versions offer DSD import/export, and control bar and console view enhancements. And Cakewalk's new Command Center makes it easy to manage downloads and installations, grab new updates, and even roll back to previous software versions.

Pricing starts at $99 for SONAR Artist, $199 for SONAR Professional (includes the Artist package and adds Addictive Drums 2, Melodyne Essential, and Overloud REMatrix Solo), and $499 for SONAR Platinum (includes the Professional package and adds VocalSync, QuadCurve Analyzer, and tape and console emulation).

For dealer and availability information visit www.Cakewalk.com.

"

RECORDED MUSIC IS NOW A LOSS LEADER FOR ARTISTS' CAREERS... EVERYONE NEEDS TO ACCEPT THIS. AND GET OVER THE PRINCIPLE OF FANS "VALUING ART."

DigitalMusicNews.com columnist Ari Herstand, December 18, 2014

RAY KURZWEIL

2015 Technical Grammy Award Recipient

BY GEORGE PETERSEN

TODAY, RAY KURZWEIL'S NAME IS WELL-KNOWN IN the music industry, yet few know much about the man who founded Kurzweil Music Systems in 1982.

Once described by *Inc.* magazine as the "rightful heir to Thomas Edison," Kurzweil invented a number of firsts: text-to-speech synthesis, the CCD flatbed scanner, Omni-Font optical character recognition, and a print-to-speech reading machine for the blind. And through the latter, Kurzweil met Stevie Wonder, who encouraged him to apply computer control to acoustical instruments. As a result, he launched Kurzweil Music Systems in 1982, with Wonder serving as its musical advisor.

ENTER THE REVOLUTION

In Fall 1983, visitors crammed into a packed demo suite on the fifth floor of the New York Hilton Hotel during the New York AES convention and marveled at the Kurzweil K250. The first ROM-based sampling keyboard to successfully reproduce the full complexity of acoustic instruments, the 250 offered natural-sounding pianos, thick drums, lush strings, choirs, and more, and its 88-note, velocity-sensitive wooden keyboard provided a piano-like playing experience. And with the launch coming just months after the announcement of the MIDI spec (at the Winter NAMM show in January 1983), the K250's timing was perfect.

Weighing 95 pounds and costing almost $16,000, the 250 sounded great, and a huge 6U 250 RMX rackmount version followed. Another entry from this era was the Kurzweil MIDIboard, an 88-wood-key controller, which was similar to the K250, but sans onboard sounds.

The K250 was a perfect component for studios and musicians looking for a realistic grand piano sound, yet didn't have the space—or budget—to allow it. *Everybody* who heard the Kurzweil 250 wanted one.

One interesting followup to the K250 was the Kurzweil 150 module, which showed off the company's commitment to serious music synthesis. Housed in a huge five-rackspace chassis, the 150 was truly a monster additive synthesizer with 16-voice polyphony and 240 oscillators. It was difficult to edit from the Spartan front panel, but was editable

via an Apple IIe program. And the sounds—particularly the chimes and struck percussion—were chillingly realistic.

Kurzweil Music Systems (KMS) came to bat in 1987 with a hugely popular series of innovative—and more affordable—products, with the 76-key K1000 and the 2-rackspace variations: 1000PX Pro Expander with (piano/strings/choir/strings/horns) and the more specialized SX (string). HX (horn), and GX (guitar) modules. All were sample players, but in the company tradition, had powerful synthesis capabilities, made much easier using Kurzweil's Object Mover software for Atari and Mac computers.

CHANGES AHEAD

In 1990 KMS was sold to Young Chang (the world's largest piano maker), with Kurzweil in a consultancy role. The company launched a potent revolution with 1992's K2000 series (and later K2xxx) sampler/synths, all based around the VAST (Variable Architecture Synthesis Technology) that offered a deep set of DSP tools, eventually combined with KB3 Tone Wheel Emulation, providing lifelike Hammond B3 sounds.

Young Chang was acquired by Hyundai Development Corp. in 2006, again with Kurzweil in a key role at KMS as Chief Strategy Officer. And there, Kurzweil continued its line of world-class home digital pianos and live performance and studio keyboards. Today, the Kurzweil brand shows no sign of slowing down, especially with its flagship Forte 88-key Stage Piano with Flash-Play technology, instant program loading capabilities, and 16 GB of sounds, including German and Japanese concert grands and electric pianos reproduced in UltraHigh Definition (UHD™).

Ray Kurzweil is much more than a music innovator. He's penned five books, including the 2012 *New York Times* best seller *How to Create a Mind*, and he's been working with Google as Director of Engineering to develop machine intelligence and language understanding technologies. In terms of looking at artificial intelligence, Kurzweil coined the phrase "accelerating intelligence," referring to the rapidly accelerating advancement in the effects on biological- and machine-based technologies on modern life. A year ago, he predicted that 15 years in the future (figure around 2029), computers will have surpassed the "Turing Test"—progression to a state where they will be smarter than humans—with cognitive skills and the ability to possess human skills such as telling jokes or flirting.

With Ray Kurzweil, the only safe prediction is to expect the unexpected.

Ray Kurzweil, today.

MICHAEL LUTCH / KMS

The Kurzweil K250 represented a revolution in 1983.

GEORGE PETERSEN ARCHIVES
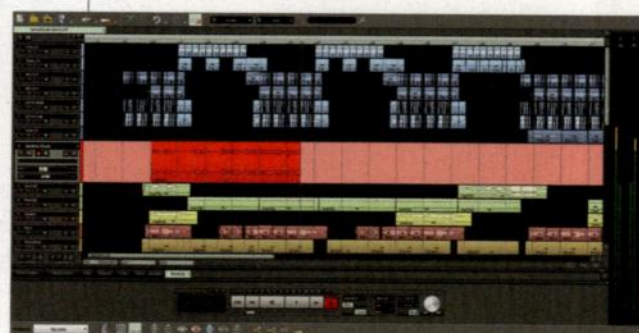
1

MOTU

MONITOR 8

Monitor mixer, headphone amplifier, USB/AVB audio interface
$995

HIGHLIGHTS 24 inputs • 12x16x8 monitor mixer • 6-channel headphone amp • audio interface supports high-speed USB 2.0 (compatible with USB 3.0 and iOS) and AVB over Ethernet • AVB connectivity streams 32 channels from networked MOTU interfaces • can be used as a standalone headphone amp and 48-channel mixer with 12 stereo buses and DSP

TARGET MARKET Live-sound and recording engineers

ANALYSIS A wi-fi-controllable mixer/interface/headphone distributor that is equally at home in the studio or onstage.

MOTU.com

2

ANTARES AUDIO TECHNOLOGIES

AUTO–TUNE 8

Pitch-correction software
$399

HIGHLIGHTS Flex-tune feature for setting the level of correction • ultralow-latency mode • editing tools are active during playback in Graphical mode • additional interface customization options • support for AAX (Native), Audio Units, and VST3

TARGET MARKET Musicians, recording engineers, and live-sound engineers

ANALYSIS The ultra-low-latency mode will be welcome by singers using Auto-Tune 8 in real time onstage or in the studio, while Flex-Tune will help them retain their nuanced phrasing.

antarestech.com

3

SAMPLE LOGIC

CYCLONE RETWISTED

Virtual instrument for Kontakt 5
$349.99; upgrade $49.99

HIGHLIGHTS Includes more than 475 new instruments; more than 850 total • dual-voice additive synth engine • Step and FX Animator sequencers • dual-filter oscillator • automatable multi-script macros • standalone version • includes 2.89GB sample library (24 bit/44.1 kHz) • support for VST, AU, RTAS, AAX

TARGET MARKET Musicians and sound designers

ANALYSIS More than a simple update, Cyclone Retwisted combines version 1 and the Glow Multi expansion pack with additional modulation capabilities, including the multi-voice Pitch section.

samplelogic.com

4

MAGIX

SAMPLITUDE PRO X2 AND PRO X2 SUITE

Windows-based digital audio workstation
$499 and $999

HIGHLIGHTS New features include multiple outputs, Elastic Audio on multiple tracks, VST3 support, free plug-in routing, VCAs, automation and arrange improvements, four virtual instruments, and zPlane time-stretching and pitch-shifting • the Suite adds Analogue Modeling Suite Plus, Cleaning and Restoration Suite, loudness metering, Independence Sampler, a full version of Vandal amp modeler, and four additional virtual instruments

TARGET MARKET Engineers and musicians

ANALYSIS A mature DAW gets a significant bump up in power.

magix.net

All prices are MSRP except as noted
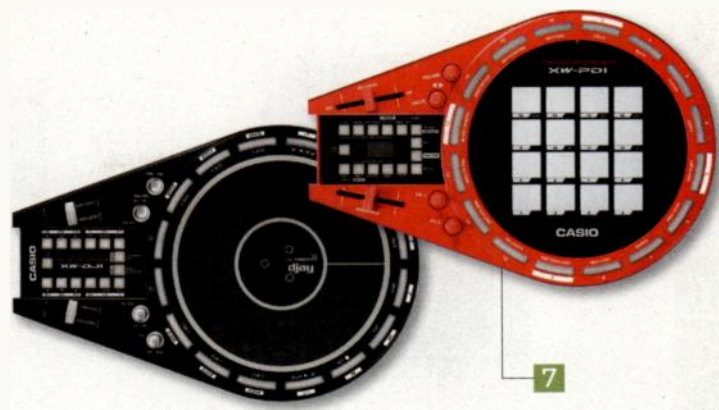
5

STEINBERG

UR12

USB audio interface
$119.99

HIGHLIGHTS 24-bit/192kHz resolution • phantom-powered Class A Yamaha-designed D-Pre mic preamp • 1/4" high-impedance instrument input • 2 RCA line outputs • 1/4" headphone jack • no-latency input monitoring • USB bus-powered • loopback capabilities for webcasting • comes with Cubase AI software • Mac/Win/iOS (Apple Camera Connection Kit required for iOS use)

TARGET MARKET Musicians who want to record on the go

ANALYSIS A highly portable interface that is tailored to singer/songwriters and traveling artists.

steinberg.net

6

ARTURIA

V COLLECTION 4

Software instrument bundle
$399

HIGHLIGHTS Software bundle featuring all of Arturia's current software instruments, including ARP2600 V, Jupiter-8 V, Analog Lab, Mini V, Modular V, Oberheim SEM V, Prophet V and VS, Matrix-12 V, Solina V, and Wurlitzer V • includes full version of Spark 2.0 drum software • utilizes Arturia Software Center license management

TARGET MARKET Keyboardists, producers, composers

ANALYSIS A simple and affordable way to stock up on Arturia's excellent stable of virtual instruments.

arturia.com

7

CASIO

XW–DJ1 DJ CONTROLLER AND XW–PD1 GROOVE CENTER

Beat-production tools
$299 and $399

HIGHLIGHTS The XW-DJI has a 7" platter, cross fader, and filter controls; works with Algoriddim djay2 iPad app • XW-PD1 includes 16 velocity-sensitive pads, 4 knobs, DSP-based effects, and the XW synthesizer sound engine, with presets in a variety of popular electronic-music genres

TARGET MARKET Musicians and dance music producers

ANALYSIS Connect the XW-DJ1 to the audio input of the XW-PD1 to create a powerful, yet low-cost beat-production setup.

casio.com

8

SONNOX

FRAUNHOFER PRO CODEC VERSION 3

Audio encoding plug-in for DAWs
$495; no upgrade fee for existing users

HIGHLIGHTS Real-time A/B auditioning between different codecs or between the input signal and codec • 64-bit compatibility • supports wide variety of stereo, multichannel, and HD codecs, including Apple AAC iTunes+, AAC-LC multichannel, and HD-AAC • AAX, RTAS, AU, and VST plug-in support • batch processing • high-resolution display • metadata editor • standalone manager application • iLok required

TARGET MARKET Mixing and mastering engineers

ANALYSIS A welcome update to a powerful and elucidating bit of software.

sonnox.com

NEW GEAR

9

ELECTRO-HARMONIX
C9 ORGAN MACHINE
Virtual organ effects pedal
$293.73

HIGHLIGHTS Provides nine mono organ tones: Tone Wheel, Prog, Mello Flutes, Telstar, Lord Purple, Blip, Shimmer, Compact, Blimp, and Press Tone • independent wet and dry outputs with individual level controls • knobs for adding organ-style percussive click and modulation level • includes 9.6V AC adapter

TARGET MARKET Guitarists

ANALYSIS Using the same modeling setup as the B9 pedal, the C9 provides additional organ sounds based on classic rock styles and songs.

ehx.com

10

GINKO SYNTHESE
WOODEN CASE DIY KIT
Eurorack modular synth cases
€50 to €229

HIGHLIGHTS Includes wooden panels, mounting rails, screws, and nuts to hold modules • 1 to 6 rows • 84, 90, 104, or 114HP wide • available in birch plywood or MDF • includes hole for power supply connector • ships to the U.S.A. as a flat package • MDF version is easy to glue and paint • wood is Forest Stewardship Council certified

TARGET MARKET Modular synth users

ANALYSIS An easy-to-build and cost-effective Eurorack case.

ginkosynthese.com

11

BLACK LION
B12A MKII
Single-channel microphone preamp
$549 street

HIGHLIGHTS Improvements include input transformer upgrade, lower noise, and higher gain • max output level is +24dBu • high-impedance instrument input jack • +48V phantom power • 10dB pad • phase switch • output transformer • 1U 1/2-rack case • 24VAC external power supply

TARGET MARKET Recording engineers, home recordists

ANALYSIS This update provides a substantial performance boost to Black Lion Audio's API 312A-style preamp.

blacklionaudio.com

12

STUDIO ELECTRONICS
BOOMSTAR MODULAR SYSTEM
Synthesizer modules for Eurorack
$209-$269

HIGHLIGHTS 14 modules available individually or in preconfigured systems • includes 3003 (Roland-style), 4075 (ARP-style), 5089 (Moog-like), SE80, and SEM Boomstar filters, as well as oscillator and amp modules • additional modules (LFO, output, multiple, shapers) designed and manufactured by Pittsburgh Modular • through-hole construction • hand-matched transistors • discrete circuitry

TARGET MARKET Modular synthesizer users

ANALYSIS Eurorack owners now have the opportunity to add Studio Electronics' high-quality synth components in their rigs.

studioelectronics.com

All prices are MSRP except as noted

It's all about connecting with people.

That's why it's such a beautiful spiritual experience.

I basically found my identity through creating music.

AOKI

Guitar Center

ALL WE SELL IS THE
GREATEST FEELING ON EARTH

STEVE AOKI AT GUITAR CENTER

Evaton Technologies RF Nomad

The RF Nomad's CV In modulates the receiver's tuning and accepts a bipolar signal. This allows you to scan a portion of the shortwave band based on the positions of the Tuning and CV Amount controls.

What it's really like to have CV control over a shortwave radio

BY GINO ROBAIR

R adio is a popular sound source for modular users. But while Buchla and ADDAC System, with the 272e and ADDAC102 respectively, offer voltage control over the FM band, the shortwave bands have gotten little attention. Evaton Technologies recently heeded the call with an 8HP Eurorack module, the RF Nomad ($176).

If you're looking forward to sequencing easily from station to station with the RF Nomad, you're likely to be disappointed—shortwave surfing doesn't work that way. But if you like the heterodyning whistles and tones produced by ham radios as well as a colorful noise, and you would like to have those sounds under voltage control, then you've come to the right place.

The RF Nomad is a single-sideband shortwave receiver that is factory-tuned to pick up the 9.6 to 10.0MHz area of the spectrum. While that's a tiny slice of the shortwave range, the company says that offering a wider range would make it more difficult to focus in on stations. With slight adjustments behind the panel, you can, however, alter the center frequency to get a different range of the shortwave spectrum.

Unlike FM-receiver modules, the RF Nomad requires an external antenna to capture signals and comes with a 5' model that plugs into the panel's co-axial jack. However, I suggest you spend the extra $12 for the company's 25' antenna; you'll need as much wire as you can get.

The module's input RF Gain control boosts the signal from the antenna, while the Audio Gain control increases the strength of the decoded signal before the output. The CV input, which controls receiver tuning, has an attenuator and accepts bipolar signals— an LFO, EG, stepped or randomized CV, and even audio works great. For more performative control, I used a touchpad on the Make Noise Pressure Points to sweep the module's CV input to get theremin-like results. Going a step further, I used the Soundmachines LP1lightplane's CV looping capabilities to create repetitive modulation patterns.

In general, the RF Nomad's output is brimming with broadband noise, particularly when you have the RF Gain and/or Audio Gain controls set at a high level. Although the manual suggests using a bandpass filter to ferret out interesting bits from the noise, I had the best success using a notch filter (in this case, provided by a WMD Micro Hadron Collider). The trick is to then work the frequency and cutoff controls to find that sweet spot where the RF Nomad's broadband noise is lowered enough for shortwave signals to pop out. Although that can be a moving target, it's an equally exciting aspect of the RF Nomad. Once you find something you like on the radio, you can shape it by sweeping your external filter's frequency, either manually or with an LFO or stepped/randomized CV.

Unfortunately, shortwave listeners are at the mercy of several variables—location, atmospheric conditions, and the sunspot cycle, among them. Even with a 25' antenna, solidly tuning in stations on any shortwave radio can be a challenge. If the conditions are working against you, it's unlikely you'll get a recognizable station on the RF Nomad. In that case you can wrap the antenna around some home electronics and use it as an inductor to capture electronically generated sounds for processing through your modular. With an open mind (and some patience), the RF Nomad will reward you as a rich sound source. ■

SOUND SUPERIOR.

SAMSON MTR201 CONDENSER MICROPHONE

With stunning clarity, a wide dynamic range and the warmth of a gold-sputtered large diaphragm, Samson's MTR201 brings accuracy and transparency to your recordings. Whether you're looking to capture every nuance of a vocal performance or the full harmonic timbre of a grand piano, the Samson MTR201 is a superior choice.

SAMSON

Acoustic Surface Treatment
For the Home Studio

How to use diffusers, absorbers, and bass traps to help make the most of your sonic space

BY THE EDITORS

Musicians have a greater faith in the acoustical properties of everyday materials than is realistically warranted. At some point, we have all considered putting carpet, a mattress, or egg cartons on the wall to tame reflections or in a misguided attempt at soundproofing. Sure, you will notice a difference in sound to some degree using these methods, but you cannot successfully manage the overall frequency response of your studio or create a neutral listening environment by simply scavenging materials from the dumpster.
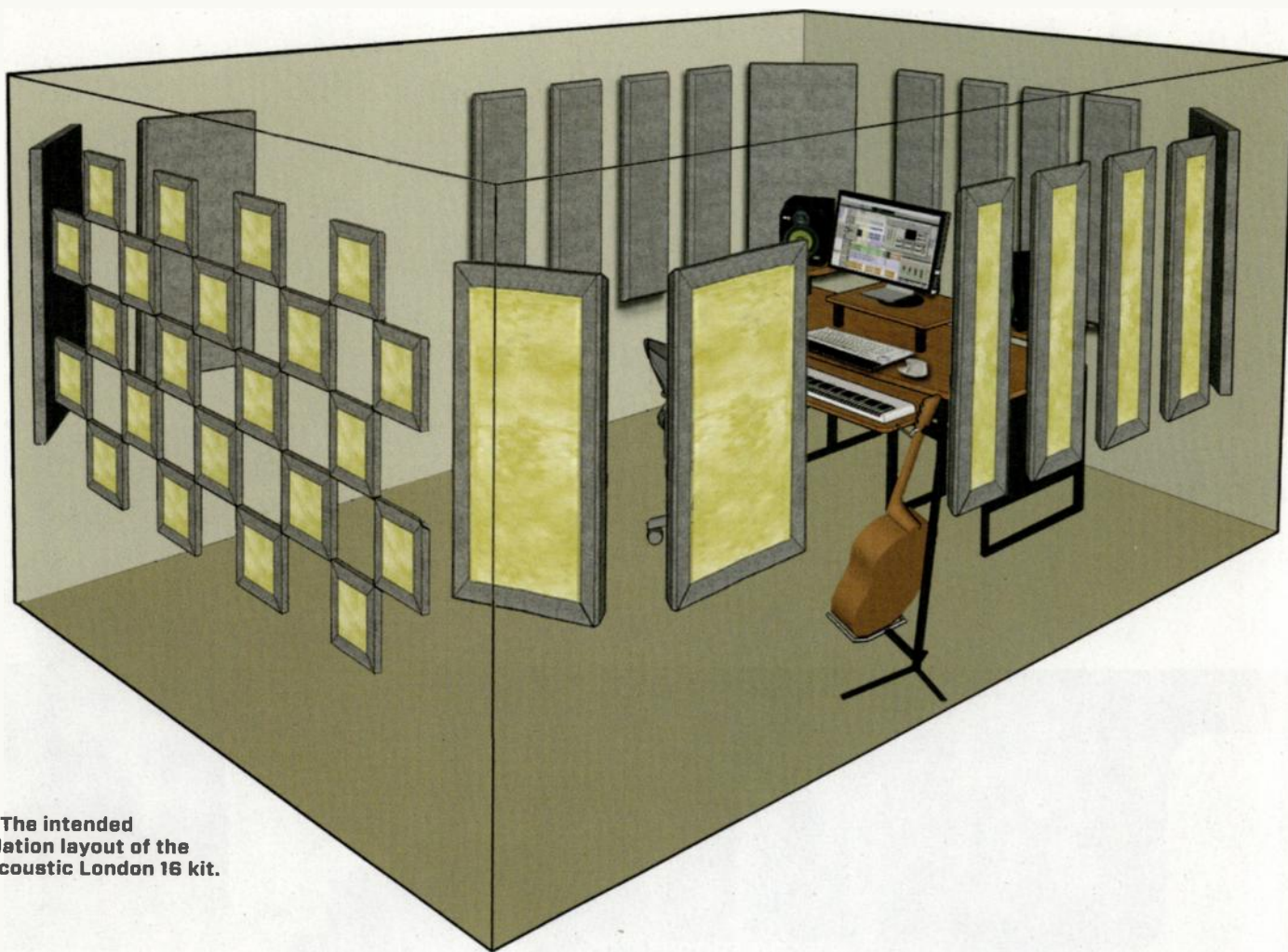
Fig. 1. The intended installation layout of the Primacoustic London 16 kit.

One way to counteract the negative effects of your room's dimensionality is by using acoustic surface treatment—paneling of different shapes, sizes, and materials that help you adjust the sonic characteristics of the space without having to resort to a major remodel.

In this article, we will focus on the three basic types of acoustic conditioning that is generally used in home and personal studios—absorption, diffusion, and bass trapping—and walk you through a few representative examples of cost-conscious, effective solutions. Dozens of companies manufacture acoustical products; see the sidebar on page 29 to learn about more options.

MANAGING EXPECTATIONS

Most home and personal studios are located in rooms that are not designed for recording and mixing: A rectangular space with parallel walls and an 8' ceiling brings with it a host of acoustical phenomena—from flutter echo and comb filtering to nodes and standing waves—that make it challenging for you to accurately judge the sound

coming from your studio monitors. Rooms that have evenly placed boundaries will display strong resonant characteristics based on the combined dimensions of the space. In addition, when walls, a ceiling, and other surfaces are near your playback system, they create early reflections that can alter your perception of the sound from your monitors, leading you to make EQ and other mixing decisions that won't translate to other listening environments.

Among the issues that various types of surface treatments can address are boundary reflections and flutter echo (through absorption and diffusion) and standing waves and bass build up (with diffusers and bass traps). However, we are not trying to create an anechoic chamber by removing all of the room's sonic characteristics: That would be an unpleasant environment in which to work. Rather, the goal is to create a studio that has a pleasing sound and a frequency response that is as flat as possible within the constraints of your budget and room dimensions.

Although some of these products may resemble

consumer-based packaging and standard building materials, acoustical foam and fiberglass products are engineered to deal with precise aspects of sound control and to achieve specific results through the choice of materials, variations in cell size and density, and from the overall shape. Moreover, the products listed here are designed to meet fire and safety standards: If you plan to bring clients into your studio or use these materials in public spaces (such as a school or house of worship) be sure the items you choose meet the appropriate codes.

A full discussion on room acoustics is beyond the scope of this article. However, the manufacturers in this roundup offer resources that you can use to determine the types of treatment you need and where to place them. In addition to the three basic categories covered below, each company makes products designed for more portable sound-control situations, such as mini vocal booths, gobos, and other types of room dividers. But keep in mind that none of these products are designed for sound proofing or isolating your stu-

OMNISPHERE
1.5

- Innovative new "Orb"
- Expanded Synthesis
- Tons of New Sounds
- Omni TR - Touch Remote App

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Fig. 2. The Acoustics First Art Diffusor Model D

Fig. 3. The Acoustics First Double Duty Diffusor

dio from the outside world. To do that *will* likely require significant changes to the structure if you're working in a standard home or office environment.

To minimize unwanted reflections in the studio, we look to absorption. Generally, absorptive materials are used to treat anomalies that occur in the mid-range and high frequencies, which have less energy than bass frequencies and are easier to deal with. The frequency band that is affected by an absorptive panel will depend on the typ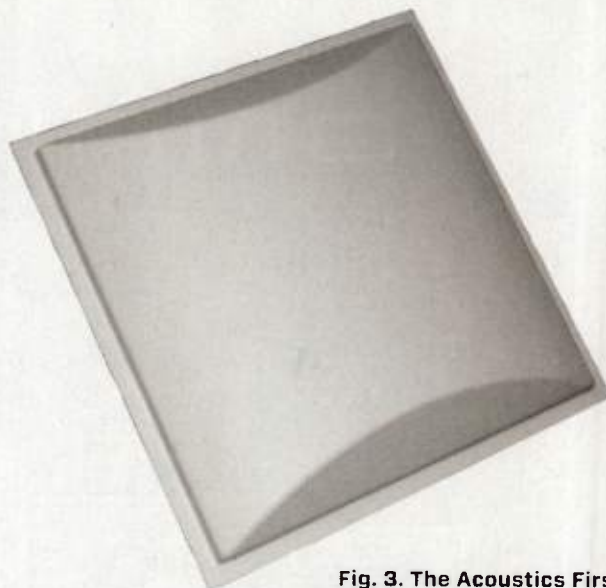e of material used, as well as its density and thickness: A thin, low-cost foam tile does not produce the same effect as a thick panel of dense, fabric-covered fiberglass.

There are many different types of absorption products that use foam and fiberglass, but there is no one-size-fits-all material. Ultimately, what you get should be based on the frequencies and areas that need treating, the size of the room you're in, and your budget.

For example, Auralex (auralex.com) offers a broad range of absorption products that are designed to meet nearly every need and price point. The main materials it uses are foam and fiberglass, effective in different ways across the frequency spectrum.

Auralex Studiofoam panels are designed for use in professional (recording studios, vocal booths) and consumer (home theater, school, house of worship) situations for mitigating early reflection, room resonance, flutter echo, and so forth. They come in a wide variety of shapes, colors, thicknesses, and panel sizes; for example, as squares with side-lengths of 1′, 2′, and 4′ in thickness from 1″ to 4″.

In addition to flat sheets of foam, the company offers several shapes and configurations that are as aesthetically pleasing as they are acoustically useful. For example, the Studiofoam Wave is a 2′x2′ tile with a wave pattern on top that measures from 1″ to 3″ in height, but with a flat back for wall mounting. The SonoFlat Grid tiles, on the other hand, provides the mid- to high-frequency absorption of the company's SonoFlat panels, but with a grid of beveled squares on the surface. To create its Sono-Lite panels, Auralex wraps flat Studiofoam panels in fabric, which yields broadband acoustic control.

ProPanel absorbers are Auralex's line of fabric-covered fiberglass panels. These products have hardened edges, are available in sizes from 2′x2′ to 4′x8′, and come in a variety of colors. The Carl Tatz Signature Series takes the ProPanel a magnitude further by providing an integrated system of custom-made panels, including the CTD Attenuation Cloud, designed to improve the sound stage by hanging above the mix position, as well as products for controlling the behavior of the mid to low frequencies.

The Auralex Roominator kits, based around the Studiofoam absorbers, include a selection of products designed to treat rooms of a particular size and dimensions. An online calculator is available at Auralex.com to help you select the kit that fits your room and it's usage: live room, home theater, control room, and so on.

The Broadway line of acoustic panels form the centerpiece of Primacoustic's (primacoustic.com) absorption products and are available in five main shapes (and from 1″ to 3″ in thickness)—24″x48″ Broadband Absorbers, 12″x48″ Control Columns, 2′x2′ Control Cubes, 1′x1′ Control Blocks, and the 2′x2′ triangular and wedge-shaped Accent Panels.

The Broadway products utilize fabric-covered fiberglass panels (of 6lbs./cu.ft. density) with resin-hardened edges for stability, and they are easily mounted using the included metal impalers. Although the panels are available in three colors—black, gray, and beige—Primacoustic also offers a line called Paintables, which have a textured latex surface, rather than the fabric wrap, that you can paint to match your environment.

The different sizes and shapes of the Broadway line provide enough variety to handle the absorption requirements of nearly any room size, allowing you to place products exactly where they are needed (rather than having only larger products that could negatively affect room response). To simplify the process of outfitting your studio, Primacoustic created the London series of treatment kits.

The materials in each kit were determined by common room sizes found in personal and home studios, while the design philosophy is based on the concept of a LEDE (live-end, dead-end) studio, where flutter and early reflections are tightly controlled at the main listening position (important for critical decision making) while the other end is more open and simulates a normal listening environment (see Figure 1). The four available kits, which include mounting hardware and screws, are: the London 8, providing 12 panels for rooms of 100 sq.ft.; the London 10 with 20 panels for rooms of 120 sq. ft.; the London 12 with 22 panels for 150 sq.ft. spaces; and the London 16, with a whopping 42 panels for rooms of 200 sq. ft.

RealTraps (realtraps.com) designed the Mini-Trap panel for either corner or surface mounting using a spacer; this situation leaves an air cavity behind the panel that effectively boosts its absorp-

tion capabilities. The panels are 3.75" thick, available in 2'x2' and 2'x4' sizes, and include mounting hardware. MiniTraps can also be mounted on the company's adjustable stands as well as a mic stand (with hardware available by request).

RealTraps designed the MiniTrap to be semi-reflective at higher frequencies. However, it also offers a high-frequency version of the panel that provides better performance above 200 Hz, but with a slight trade-off on low-end absorption. For mid- to high-frequency mitigation of early reflections, RealTraps sells the MicroTrap, which are available in 2'x2' and 2'x4' sheets. At 1.25" deep, it is thinner than the MiniTrap and doesn't reach as low in terms of frequency range. However, they can be wall or stand mounted.

As you would expect, RealTraps also offers complete kits tailored to various room sizes and uses—from the Starter, Standard Room, and Mondo Room kits, to product bundles geared towards large rooms and surround configurations. In addition, the company's modular kits provide single stacked systems: The Mondo Module puts a 2'x4'x6" MondoTrap on a 2'x2'x6" MondoTrap base to create a stacked trap, whereas the Diffusor Module stacks one of the company's diffusers onto a 2'x2'x6" MondoTrap base.

In addition to its variety of foam and fabric-covered offerings, Acoustics First (acousticsfirst.com) has a slightly more portable absorption solution: The StratiQuilt line is comprised of fiberglass blankets and rolls, 1" and 2" thick, that are designed for situations where flexible and durable panel-curtains are needed. The quilted blankets are available in single- and double-faced configurations, while the rolls are available with bound and unbounded edges.

DIFFUSION

Diffusers are used to mitigate unwanted resonance and frequency build up by reflecting sound waves into multiple directions, but without reducing the acoustic energy to the degree that absorbers do. A variety of mathematical techniques are used in the design of diffusers, all of which are meant to scatter sound in natural, musically useful, and sonically pleasing ways.

Acoustics First offers a range of 2-dimensional, binary array diffusers it its Art Diffusor line. The company refers to the Art Diffusor Model D as an "organic quadratic diffuser" which is rated with a bandwidth from 599 Hz to above 16 kHz (see Figure 2). The panels are 23.625" square and made from Class A thermoplastic. Other products in the Art Diffusor line include the Model C (thermoplastic) 4-octave diffuser, the Model E (expanded polystyrene) and Model W (wood) 5-octave diffusers, and the Model F (thermoplastic) low-profile diffuser.

However, a particularly interesting product is its Double Duty Diffusor, a 7"-deep, barrel-shaped (polycylindrical) product that can be used to scat-

ter higher frequencies while trapping low ones (see Figure 3). The center frequency that is greatly affected will depend on the size of the diffuser: The sizes available range from 2'x2' to 4'x8', the latter of which is rated with maximum absorption at 63 Hz. Made of white thermoplastic, Double Duty Diffusors can be ordered with fabric covering and lined with 1.5" fiberglass to mitigate resonance and add absorption.

RealTraps offers two models of its 24"x48" quadratic residue diffuser—Near and Far; the one you pick will be based on its installed location in relation to the primary listening position. The diffusion wells in the Far model are 6" deep, and the unit is intended for mounting at a distance of 6'or more from the listener, while the Near model is for smaller rooms and has diffusion wells that are 3" deep. According to the manufacturer, the Real-Traps Diffuser is designed to go from diffusion to absorption from 400 to 800 Hz.

As with its absorptive products, Auralex offers several different diffuser lines. The Q'Fusor is a polystyrene product averaging 3" in depth that handles frequencies down to 800Hz, whereas the company's ProFusor-II puts a similar structure in 2'x2' and 2'x4' fabric-wrapped frames.

One particularly lightweight solution is the T'Fusor Sound Diffusor, thermoplastic tiles (23.75"x23.75"x6") which are engineered for easy installation with pins, nails, tacks, or ceiling drops. The QuadFusor (23.75"x23.75"x6") and smaller MiniFusor (12"x12"x5") are equally easy to mount, but have an open cavity that can be filled with foam or fiberglass to increase absorption.

At the higher end is the Auralex Sustain line of lightweight and elegant looking bamboo diffusers, designed for ceiling or wall mounting. The QuadraTec is a quadratic-style diffuser sold as a nested pair of 23.75"x23.75"x4.1" panels—like a positive and negative image—intended to be used within the same installation (see Figure 4). The Peak Pyramid diffuser panel is similarly sized but features an uneven polyhedral surface that can be filled with absorptive material to help with bass trapping.

Grids are also part of the Auralex arsenal of Sustain diffusers. The WaveLens is a 23.75"x23.75"x3" panel consisting of a 7x7 grid of open squares, whereas the grid in the similarly sized WavePrism is filled with tiles at varying heights. The Wave6 kit contains a set of six WaveLens diffusers, and includes the appropriate hardware connectors.

Primacoustic offers an 8x8 open-grid diffuser called the Radiator. Made from Baltic birch plywood and using dovetail joints, the Radiator is engineered with an effective frequency range from 565 Hz to 2.2 kHz. Sized just under 2' square (23.74"x23.74"x3"), it mounts easily into T-bar drop ceilings.

The Razorblade is Primacoustic's quadratic

Fig. 4. The Auralex Sustain bamboo QuadraTec diffuser

Fig. 5. The Primacoustic FlexiFuser

diffuser, which is designed to work from 425 Hz to 5.5 kHz and provide both spatial and time-based dispersion. The 24"x48"x8" diffuser does this with 17 narrow (1.25") wells, and a combination of MDF slats and a Baltic birch plywood frame.

A unique product in this roundup is the Primacoustic FlexiFuser, a 24"x48" diffuser with adjustable slats behind which sits a 2"-thick high-density fiberglass acoustic panel for absorption (see Figure 5). You can position the slats to reflect sound away from sensitive areas, while lower frequencies are picked up by the acoustic panel. Because the fiberglass panel is slightly offset from the wall, low-end frequency absorption is further extended.

Evening out bass response is one of the trickiest aspects of room tuning. Here, the objective is to increase low-end punch and definition as well as achieve a level of accuracy in bass response that allow your mixes to translate to other playback environments.

Because low frequencies accumulate in corners, treatment manufacturers often create products that extend from the points where the walls and ceiling meet. When a bass trap leaves an air gap behind the panel, efficiency is increased without eating up additional space in the studio.
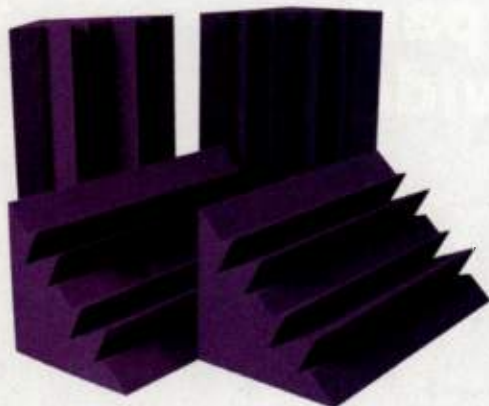
Fig. 6. Auralex LENRD line of bass traps

Among the offerings from Auralex for evening out low frequencies are the M224 ProPanels, custom-made 2'x4' fabric-wrapped panels of 2'-thick fiberglass with beveled edges for corner hanging. Similarly, the 24"x24"x3" SonoLite bass-trap panels are designed for corner placement but utilize the company's Studiofoam technology to control low frequencies.

For much of its Studiofoam line of bass traps, Auralex uses the acronym LENRD (Low-End Node Reduction Device). These include the standard 1'x1'x2' LENRD corner wedges, the 2'x2'x2' MegaLENRD, the 1'x1'x2' DST-LENRD stepped wedges, and the MetroLENRD to fill out the company's Metro line of products (see Figure 6).

In terms of simple solutions, Auralex offers the SonoColumn, a 4' fluted, foam wedge that fits into corners (and can be stacked as well as capped with the company's SonoCollar accessory) and the Cornerfill and Cornerfill Cube, rectangular and square sections of acoustic foam that can be used to finish off or connect between other acoustic treatment materials.

Designed to be both an affordable and highly configurable treatment, the Venus Bass Traps are 2'x4'x12" tiles with deep wedges that can be mounted flat or in corners. These combine well with other Auralex products, such as the Cornerfill.

Fig. 7. The Primacoustic MaxTrap

Auralex also offers a kit of bass products: ATOM 12 combines a dozen LENRD bass traps with four 12" Cornerfill Cubes to provide a complete bass-management solution.

Acoustics First also offers a variety of foam products for taming low frequency build up, including the PhaseFOAM Box B, Max Wedges, and the Bermuda Triangle Trap. Designed for greater low-end coverage in wall, corner, and ceiling installations, the fabric-wrapped Geometrix Broadband Bass Trap utilizes a 1" 6-7 PCF fiberglass core with a 0.25"-thick 1 PCF blanket. The trap is available in half- and quarter-round shapes.

Primacoustic's broadband bass traps include MaxTrap (see Figure 7), designed for use in corners, and FullTrap, made for flat surfaces. Both have a sealed enclosure containing a diaphragmatic resonator, which mitigates low-end build up, and are faced with the company's 24"x48"x3" Broadway panel to deal with issues in the higher frequency spectrum, such as resonance and flutter echo. The manufacturer rates the MaxTrap's effective absorption to 100 Hz, and the FullTrap down to 125 Hz.

Primacoustic has other solutions for taming low frequencies, both of which are lower in price and require less space. The wedge-shaped Australis is a solid 12"x36" block of high-density (1.7lbs./ cu.ft.), open-cell polyurethane acoustic foam designed for placement in corners or laterally where the ceiling meets the wall. When mounted, the front face of the Australis spans 17" and treats frequencies from 75 to 200 Hz.

The Primacoustic Cumulus is a triangular bass trap that requires less space because it is designed to fit into the corners of a room where the walls meet the ceiling, yet it treats frequencies down to 100 Hz. Made with 2"-thick high-density (6 lb/cu.ft.) fiberglass, each side of a Cumulus trap is 24" long and reverse beveled so that it mounts flush into the corner.

When installed, Cumulus creates an air cavity that extends out from the corner—perfect for capturing low-mid build up. The company also recommends using Cumulus tiles in vocal booths, where frequencies between 200 and 300 Hz can be problematic when recording.

The RealTraps MegaTrap is a triangular bass trap designed for stacking in room corners. With 2' sides that meet the walls, and a 34" face, they are made using the company's proprietary limp-mass membrane, fabric covered, and available with a 0.25"-thick Masonite top. ■

Acoustic Treatment Manufacturers

Acoustic Sciences (acousticsciences.com)
Acoustic Systems (acousticsystems.com)
Acoustics First (acousticsfirst.com)
Acoustimac (acoustimac.com)
Auralex (auralex.com)
ClearSonic (clearsonic.com)
Delta H Design (deltahdesign.com)
ESR (zainea.com)
GIK Acoustics (gikacoustics.com)
Golden Acoustics (goldenacoustics.com)
Gretch–Ken Industries (soundsuckers.com)
Hill Acoustic Design (hillacousticdesign.com)
Illbruck (illbruck–sonex.com)
Markertek (markertek.com)
MBI Products Company (mbiproducts.com)
MSR StudioPanel (studio–panel.com)
Netwell Noise Control (controlnoise.com)
Primacoustic (primacoustic.com)
RealTraps (realtraps.com)
RPG Diffusor Systems (rpginc.com)
Silent Source (silentsource.com)
Sound Control Room (soundcontrolroom.com)
Taytrix (taytrix.com)
Vibrant Technologies (vibrantech.com)
Wenger Corporation (wengercorp.com)

Spotlight on Grammy Nominees

We Take You Inside the Sessions

BY BARBARA SCHULTZ AND SARAH JONES

EVERY MONTH, *ELECTRONIC MUSICIAN* REVEALS TECHNOLOGY AND TIPS FOR IMPROVING YOUR MUSIC. AND IN GRAMMY SEASON, OUR USUAL APPROACH GETS REVVED UP BIG TIME, TO BRING YOU THE SONIC SECRETS BEHIND SOME OF THE MOST CELEBRATED PRODUCTIONS OF THE YEAR.

Here, we give you an insider's view of 10 nominated projects in various categories, from Alternative Rock to Dance/Electronica to Metal. Ever wonder what's in Beck's vocal-recording chain, or what makes Jay Joyce's productions so extraordinary? These profiles will give you a better appreciation of this year's nominees, and tips you might use on your next project.

PETER HAPAK

ALBUM OF THE YEAR, BEST ROCK PERFORMANCE, BEST ROCK SONG, BEST ROCK ALBUM, BEST ENGINEERED ALBUM NON-CLASSICAL
BECK: *MORNING PHASE* AND THE SONG "BLUE MOON"

Beck's latest includes parts recorded in numerous studios worldwide; much of the basic band tracking and string parts were done with engineer Darrell Thorpe in various locations. But the facility most used on the project was the artist's home studio, where Beck recorded to Pro Tools with engineer David "Elevator" Greenbaum. The facility, which includes two control rooms and one live room, is fitted with a custom console and loads of vintage mic preamps, EQs, compressors, and effects.

"It provided a convenience and comfort that commercial studios don't always give you," says engineer Greenbaum. "Most of the time there were overdubs of guitars, percussion, vocals, or various other instruments going on in one room, and editing going on simultaneously in the other."

Greenbaum reveals some of the pieces and approach behind the album's lovely, airy vocal parts: "Beck's vocals were all recorded with a U47; however, the rest of the chain would vary song to song," the engineer says. "Before beginning work on the album, we did a massive series of blind tests of a bunch of different consoles and mic pre's.

"This process had a really big influence on what gear we used for the album. I highly recommend any engineer do this with the gear they are using or considering using. The results can be very surprising. Our minds project a lot onto what we are hearing based on preconceived notions about each piece of gear. By blind testing, you can negate this and therefore get a much more honest and accurate picture of the color and nuances of your gear, leading to better, more musical decision making when deciding on a vocal chain, or anything else.

"Though there was a lot of the best gear on the planet used on this record, the real magic bullet was Beck's meticulousness. His attention to detail combined with impeccably good taste are the biggest contributors to what made this album sound the way it does."
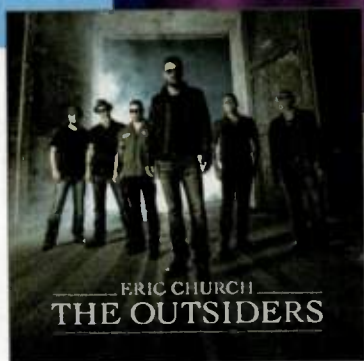
Producer
Jay Joyce

PRODUCER OF THE YEAR, NON-CLASSICAL
JAY JOYCE

Joyce is recognized for diverse projects this year, ranging from Sleeper Agent's *About Last Night* to Cage The Elephant's *Melophobia*, Amos Lee's *Mountains of Sorrow, Rivers of Song*, and Eric Church's *The Outsiders*. And just as he cannot be pinned to a single music genre, Joyce tends to take on a variety of roles in the studio, from producing to engineering to playing. "Every record is different. For the punk record I just finished with FID-LAR, I was a totally different guy from the one I was during the previous project with Halestorm," he says.

"Some of my creative responsibilities are discussed before we get into recording. The artist may need songs and wants to write in the studio with me, or he doesn't have a band and I'm playing multiple instruments. Some records require so much attention and concentration instrumentally or structurally that I leave it up to my engineer Jason Hall to handle the whole recording side of things. He's been working with me for a long, long time, and we barely have to talk when we're in the studio."

To Joyce, capturing the magic of the moment will always be take precedence over tweaking gear. "I can't tolerate the 'hit your snare again' and 'Hmm, should we run it through the Banana Eater 4000 or maybe the new Ball Grinder 410c I was reading about in Ball Sniffer Magazine?' You gotta get out of the way or get out. All that matters is going to be gone in about five seconds, and if we don't get it, we're going to spend the whole day making it sound like we did. Someone once told me they'd shot out 50 mic preamps...50! I care a lot about the sound, and I spend long hours experimenting with things and breaking stuff, but I have to remember that if there's nothing good to record, then who cares?"

When asked to talk about sone of his favorite sessions, Joyce recalls recording Eric Church's beautifully spare "A Man Who Was Gonna Die Young" from *The Outsiders*. "[My engineer] Jason Hall and I had been messing around with sounds before Eric got there. We were busy getting the tape machine up to par (I have an old MCI tape machine that I love, but it's a bit finicky), and when Eric arrived, he started talking about the song. I said "Why don't you plug in that Gretsch and play it for me?" I had just moved into my church studio, which was a big change from the confines of my old place Tragedy/Tragedy. So Eric began singing, his voice echoing through the church sanctuary, and Jason reached over and hit Record on the tape machine. We were really just making sure the machine was running smoothly, but when he finished singing, I think we all realized something amazing had just happened. I quickly suggested trying a few more takes, and it was obvious with each pass that whatever went on that first time was really incredible. If you listen to the recording on the album, you can actually hear that we didn't get the beginning of the song, and you can hear the assistants moving sh—t around in the background. It was pure magic. But hmm, which mic pre did we use?"

ERIC CHURCH
THE OUTSIDERS

"I care a lot about sound, and I spend long hours experimenting with things and breaking stuff, but I have to remember that if there's nothing good to record, then who cares?"
—Jay Joyce

> "Chris Gero and I took a white board and put down about 50 tunes that we both liked. Some of those songs were especially close to my heart. 'Can't Find My Way Home,' I used to play with Eric Clapton onstage."
>
> —Nathan East
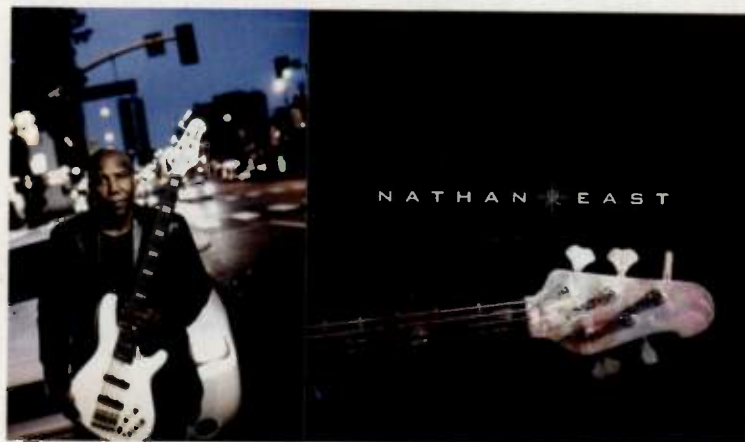
BEST CONTEMPORARY INSTRUMENTAL ALBUM
NATHAN EAST: *NATHAN EAST*

The first solo album from beloved session bass player Nathan East comprises fresh interpretations of 13 of East's favorite tunes, featuring a few guest stars: Michael McDonald on "Moondance," Sara Bareilles on "I Can Let Go Now," and Eric Clapton on "Can't Find My Way Home."

[Producer/label exec] Chris Gero and I took a white board and put down about 50 tunes that we both liked," says East, whose career is the subject of a Hulu documentary. "Some of those songs were especially close to my heart. 'Can't Find My Way Back Home,' I used to play with Eric Clapton onstage."

But one of the sweetest moments is East's cover of "Yesterday," which starts: "Are you ready, Dad?" "Ready, Son." Nathan East and young Noah East play a tender, beautiful bass-and-piano duet that would tug the heartstrings, even if the listener didn't know the relationship.

"Your heart is just torn wide open, and it's just surreal, it's magic, and it's everything," East says about recording with Noah. "Since music is such a spiritual thing, it awakens a lot of spirit in your body."

That duet was recorded in Ocean Way Nashville. Other sessions took place in Yamaha's studio in Franklin, Tenn., and in Ocean Way Hollywood, where East has logged thousands of hours over the years, recording with Clapton, Phil Collins, Kenny Rogers, and many other luminaries.

For all of the sessions, East brought his TC Electronic Blacksmith amp and Radial Firefly DI. "It has two inputs, so I can use my electric upright or my electric bass simultaneously and set up individual tones and levels," he says.

East's main instrument is his signature Yamaha BBNE2 bass. "We also have a six-string version of that bass that I use for solos and high-register stuff," he says.

East has been working with Yamaha for more than 30 years, and on other people's albums even longer. His first solo record is a long-held dream finally realized.

"I'm completely honored that it was recognized," East says. "The first call I received [after nominations were announced] was from Chris Gero, and then my phone blew up with messages. That was really a special day, after all the work we put into the record."

BEST ROCK PERFORMANCE
ARCTIC MONKEYS: "DO I WANNA KNOW" FROM THE ALBUM *AM*

The opening track on the Arctic Monkeys' fifth studio album, *AM*, fascinates with a roomy sound, where simple but unusual beats and voice are judiciously blown up with fantastic distortion and vocal harmonics.

The band made their album with producer/engineer James Ford—who also worked on the albums *Favourite Worst Nightmare*, *Humbug*, and *Suck It and See*—in Sage & Sound Recording Studios (L.A.), beginning by capturing ideas and demos to a 4-track cassette recorder that singer/guitarist Alex Turner had received as a birthday gift. They then expanded upon some those early ideas, and built tracks piece by piece.

"We've always gone for a big, live sound," says drummer Matt Helders. "We wanted people to know that we sat there and played it, from start to finish ... If we can't do it live, why put it on a record? Now that we've gotten more comfortable and better at being a studio band, we relaxed that. We thought it more important to make a good sounding record than hold on to the idea that we should have to be able to play it live."

"We focused a lot on percussion, lots of claps, tambourines, and strangely-miked drum setups," says Ford. "The percussion was generally recorded with a Coles 4038 ribbon microphone, but often there was a trash microphone in the room going through a cassette four-track or a Roland Space Echo through an amp or even through guitar pedals. Sometimes the simple backbone of a beat was done with a traditional drum setup and overdubbed with a random setup in the middle of the room, like [Helders] playing a bass drum with sticks and an old military snare."

Ford captured vocals to a Neumann U67 mic through a Neve or BAE pre and a UA 1176 or Empirical Labs Distressor. He notes that the approach the Monkeys took on this album was definitely a departure from their previous albums: "There were definitely more vocal layers than normal, with important parts tracked in octaves," he says. "[Turner] would take the lead and generally double his voice the octave up in falsetto. [Helders] would also track this octave up and do any high backing vocals and [O'Malley] would generally track the octave down with his nice, rich baritone."

L502 5-Channel Mixer

L802 8-Channel Mixer

FRONT AND CENTER

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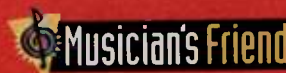
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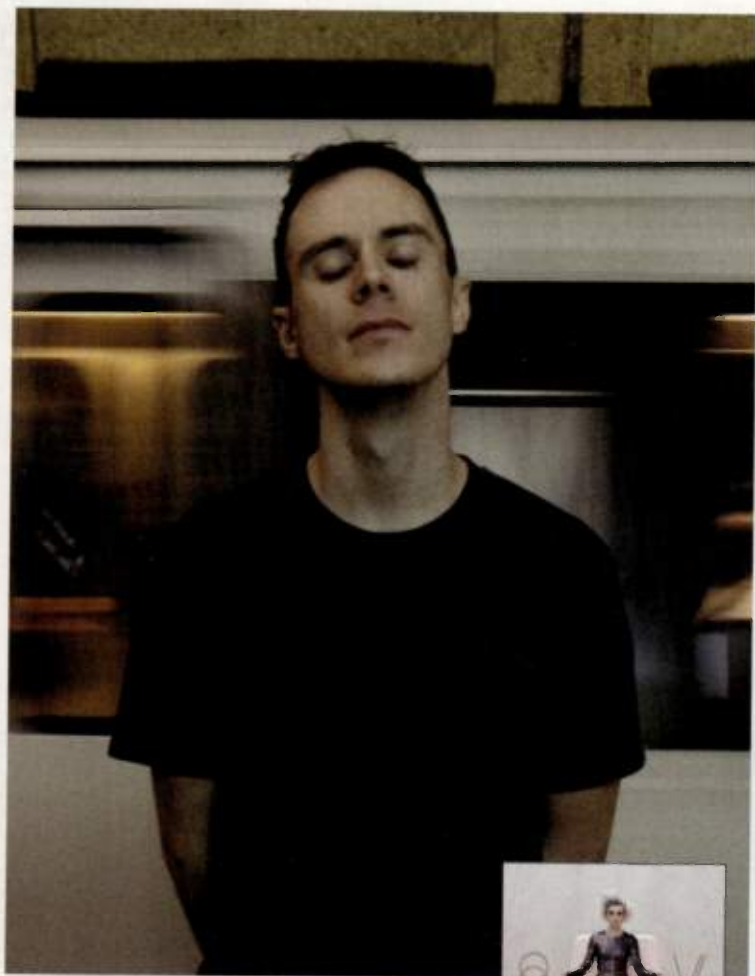
BEST ALTERNATIVE ROCK ALBUM
ST. VINCENT: *ST. VINCENT*

Producer, engineer, and musician John Congleton connected with Annie Clark through their work with a Polyphonic Spree project, and has since collaborated with Clark on four of her albums as St. Vincent: *Actor, Strange Mercy, Love This Giant,* and 2014's *St. Vincent.*

Congleton says that on *St. Vincent,* Clark upped the songwriting ante. "Simply put, the songs were more in a written form from day one of recording, whereas there was a lot of putting songs together [in the studio] on *Strange Mercy.* Upwards of about a half a year before we started recording, she was sending me songs."

Capturing the essence of the performance was critical for both Congleton and Clark. "I just don't believe in perfect sounds, so I don't look for them; I just go with what feels right in the moment," he says. "I like to work as fast as possible and operate on a visceral level. Luckily, Annie feels the same, so we get along well in that capacity.

"I came up learning real, honest-to-god engineering chops, and I certainly can capture anything completely literal, but there are a lot of people who can do that. And after doing this for so many years, what really impresses me is a sound or a vibe I've never heard before, or an impassioned performance... and none of those things seem to come out of grinding away at something."

With his work on so many dark-ish, richly layered albums—St. Vincent, Amanda Palmer, Antony and the Johnsons, Polyphonic Spree, to name a few—it might be tempting to label Congleton as having a particular sonic style, an idea that he rejects. "I suppose it's cool, but never let that overtake the job at hand; otherwise it's just vanity. I would prefer that the talk of a sonic footprint of a producer be more of a discussion of music journalists, geeks, rock bios, and people who choose to care about such things; otherwise you might be getting the way of what's important."

BEST COUNTRY ALBUM, BEST ENGINEERED ALBUM NON-CLASSICAL
LEE ANN WOMACK: *THE WAY I'M LIVIN'*

This warm, heartfelt album from Grammy, ACM, and CMA Award-winning artist Lee Ann Womack was recorded with the same team that has contributed to Miranda Lambert's recent successes: producer Frank Liddell (also Womack's husband), producer/musician Glenn Worf, and producer/engineer Chuck Ainlay.

Working in the Frontstage studio at Soundstage, Nashville, Ainlay captured Womack's band live to Nuendo at 96k/24-bit; Womack sang a scratch vocal during tracking.

"With a singer like that, that's so important, because the musicians feed off of her," Ainlay says. "The musicians are not just reading chord charts. They're responding to the singer, and as soon as Lee Ann started singing, the whole level of the playing field gets raised; the whole thing would come to life."

Ainlay's vocal chain for Womack was a Neumann U67 through a Martek MSS10 mic pre and just a touch of Tube-Tech CL-1A compression.

"She has so much dynamic capability and control," Ainlay says. "She's one of the greatest female country singers ever. Her pitch is amazing. With her, it's really about trying not to get in the way.

"In fact, after we tracked the vocals, Frank said, 'It feels like there's a bit of a veil on her vocal,'" Ainlay continues. "So I said, 'Well, let me take the windscreen away.' It was just one of those sheer nylon-stocking-type windscreens, but we pulled that away, and it was like a little bit of a curtain was lifted. It's a minuscule thing, but it sounded more open and it made her more reachable, like she's right there in front of the speakers."
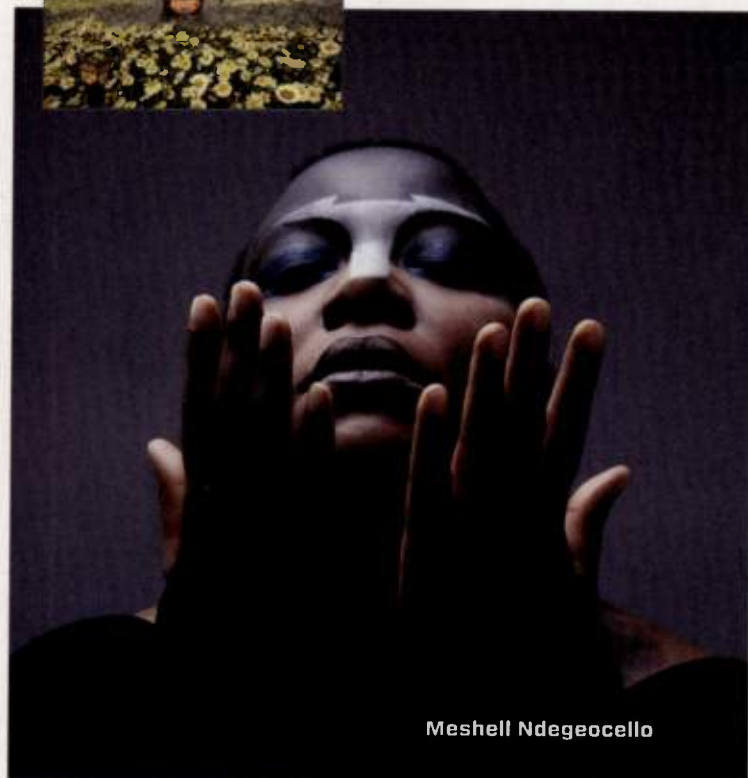
Meshell Ndegeocello

BEST BLUES ALBUM
RUTHIE FOSTER: *PROMISE OF A BRAND NEW DAY*

This soulful nominee was produced by artist Meshell Ndegeocello, who is also nominated in the Best Jazz Instrumental Album category, for Jason Moran's *All Rise: A Joyful Elegy for Fats Waller*, which she co-produced with Don Was. On Foster's release, Ndegeocello not only served as producer, but also played all of the bass parts live on the floor with a band of musicians she selected for the album.

"We recorded the music first so Ruthie could come in, hear the track, and just let loose vocally," Ndegeocello says. "I wanted her to be able to think about just her instrument, owning the lyrics and the vocals, and give that her full attention. Her voice is overwhelming and she can do so many things with it; I just wanted to her to be free to let whatever was going to come, come."

The musicians Ndegeocello brought into the project are players that she has enjoyed working with on her own albums: "[Guitarist] Chris Bruce is the kind of musician I envy and love to work with," Ndegeocello says. "He can play anything, anytime, and anywhere and can find that one angle, the sentiment behind the sentiment, that gives his tone the kind of dimension and feeling that make it richer than others. He did that for Ruthie, without ever overpowering anyone else. He is as steeped in the blues as the rest of us, but his sensibility is modern, which is why I asked him and Doyle [Bramhall II] to be on the album."

Having a comfortable working relationship with the musicians is also helpful to anyone doing double-duty as producer and musician. "I love to play and I love to produce, but I am sometimes [too] distracted by one to fully enjoy the other," Ndegeocello says. "The rewards are just in being able to feel in it and out of it, to tweak out on the inside and then tweak out on the outside. It helps me understand where I am headed when I know the notes that well."

BEST METAL PERFORMANCE
MASTODON: "HIGH ROAD" FROM THE ALBUM *ONCE MORE 'ROUND THE SUN*

Produced by Nick Raskulinecz (Alice in Chains, Rush), Mastodon's latest album was recorded to Pro Tools mainly by engineer Nathan Yarborough in Rock Falcon Studios (Franklin, Tenn.). Additional engineering was provided by Tom Tapley, Jon Albritton, and Noah Landis.

"Rock Falcon is part of a larger facility that's about 30 miles south of Nashville, out in the woods," Yarborough says. "Nick and I took over a room down there about a year-and-a-half ago."

Yarborough works exclusively with Raskulinecz these days and says that one of the producer's strong suits is the way he digs into pre-production with his artists: "I think the biggest thing is him getting in there with the band, working on songs from the ground up," Yarborough says. "He's involved in the arrangements, looking at the smallest details and helping to construct songs."

Raskulinecz tracked most of Mastodon's vocal takes privately—with just himself and bandmates Brent Hinds, Troy Sanders, and Bränn Dailor in the studio. Yarborough tracked most of the instrument parts, however, including Hinds' and Bill Kelliher's guitar parts.

"We usually start with their primary amp and then we'll add a couple supplemental amps to it with a splitter," Yarborough says. "They're usually playing a two or three different amps at a time, and I single-mic each cabinet. On this session, I think we used mainly [Neumann] FET 47s, [Shure] SM7s, and maybe [Sennheiser MD] 421s."

On Dailor's drums, Yarborough close-miked each piece of the kit, and placed pairs of [Neumann] U87s and Coles 4038s as room mics. "We're able to get good sounds out of the main tracking room, off the control room," Yarborough says. "It's not too live, but it's live in the right ways. Because the walls are not too far away, I feel we get sounds from the toms and snare drum that you can't get from a bigger room."

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> I am looking for someone who can capture my dynamics, diction, and treat my vocals like they are present with the music. So many of today's producers are into covering up vocals with production. I am not to be covered. I'm a real singer!
> —Ledisi

BEST R&B PERFORMANCE
LEDISI: "LIKE THIS" FROM THE ALBUM *THE TRUTH*

According to singer/songwriter Ledisi, *The Truth*, her most personal album to date, represents the culmination of positive changes in her journey toward self-discovery, and with her new attitude came a new songwriting process.

For "Like This," which she wrote with longtime collaborator Rex Rideout, she listened to a track he had started, wrote a melody down, told him to turn on the mic, and sang the whole song. "He was shocked! Usually I talk about what I want, but with this album I let everything come to me," she says. "*The Truth* was so personal and painful to get out, I barely spoke about what I wanted; I just said, turn on the mic…I found freedom and strength going through my painful process and that's what I wanted to express. I am so grateful the songwriters and producers I chose went there with me. I gained a new attitude and a new audience because of it."

For capturing those powerhouse vocal tracks, Ledisi likes to work with Neumann microphones ("they really help me get an amazing performance") and engineers who are adept at isolating her vocals from her movement in the room. "I've recently started to learn how to stand in front of the mic and I've gotten better at pulling back…In a vocal session, I am looking for someone who can capture my dynamics, diction, and treat my vocals like they are present with the music. So many of today's producers are into covering up vocals with production. I am not to be covered. I'm a real singer! [laughs] I can hold my own. It's a shared moment."

BEST DANCE/ELECTRONIC ALBUM
LITTLE DRAGON: *NABUMA RUBBERBAND*

Swedish arthouse electronic quartet Little Dragon move toward a mainstream sound on their soul-tinged fourth album, *Nabuma Rubberband*. To create a more radio-friendly aesthetic this time around, the band, who often mix their own projects, brought in engineer Jaycen Joshua.

"It was interesting to try someone external, to let go of the music," says bassist/keyboardist Fredrik Wallin. "That was tricky in the beginning because it's so precious to us, and we produce and mix at the same time, so it's part of the song's character. You have to trust that the song and production has its own life and it's going to come through, even if someone else, someone that has more of a focus and that's what they do, works on it. And it definitely came through."

Nabuma Rubberband also features the Gothenburg Symphony Orchestra's string section. Production sometimes started with Cubase HALion synth strings; when scoring for live strings, however, the band worked to clarify their intentions. "It was the phrasing," says keyboardist Hakan Wirenstrand. "We had to communicate a lot. They knew they were in a different situation than their normal setting, and they were up for it. We've got the notes and the right time signature, but then there is glissando and staccato, all these things that make it musical.

"Most classical musicians are used to getting as much dynamic directions," adds Wallin. "We haven't worked in the classical field much but after a while we made our point by being more descriptive, explaining, singing of the melodies, and playing the original." ■

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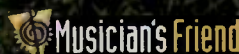
PANDA

PERSONAL GROWTH AND AN INTENSE ATTENTION TO DETAIL IN THE STUDIO INFORM *PANDA BEAR MEETS THE GRIM REAPER*, THE FIFTH SOLO ALBUM, ANIMAL COLLECTIVE'S NOAH LENNOX.

BEAR

BY TONY WARE

NOAH LENNOX IS DYING FOR SOME REBIRTH.

"I feel the way I work now is just an extension of how I recorded in the first place, which was with a Tascam 488 [Portastudio] cassette recorder ... I'm still trying to track another one down," reflects Lennox, speaking via phone from his home in Lisbon, Portugal.

Lennox is discussing *Panda Bear Meets the Grim Reaper*, his fifth solo album recorded as Panda Bear (a name he also uses as one-fourth of the critically acclaimed psychedelic pop quartet Animal Collective). Despite the title, however, *PBVSGR* (as it was previewed online) is not an overtly harrowing or morbid album.
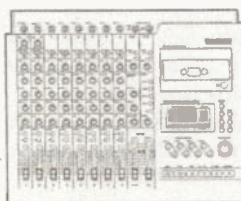
PBVSGR is a record that examines the sometimes rough, but rewarding transition between endings and beginnings, embodied by self-made breakbeats and constantly changing beds of sound. While it doesn't directly feature any of Lennox's old-school outboard gear, *PBVSGR* is invigorated by its composer's long-time love of sample-based hip-hop and his well-established ability to direct controlled chaos into a dense, melodic chorale.

"The techniques I learned with that Tascam have fed into my software process," explains Lennox. "Whether I'm using Ableton Live or Pro Tools ... I feel I use the software as a glorified 4- or 8-track recorder. I'm not reaping all the benefits of the software, in that I don't do much automatic syncing, etc. I like to automate parameters, but a lot of the time I'll work caveman-style, dragging clips around and stuff like that. I like the results when there's a human touch, when things aren't exact."

Indeed, humanity sits at the heart of *PBVSGR*. Topically, Lennox says he "made a concerted effort to expand the scope of the songs to be more global. Everyone is struggling on different wavelengths, so even though the songs were inspired by things I experienced, I worked really hard this time to craft the words and messages to where it didn't seem like a microscope look at what I'm going through."

Sonically, *PBVSGR* approaches production like a game of Battleship, with a series of calculated choices laced with random chance. Supplementing Lennox's work is input from English musician Pete "Sonic Boom" Kember, the co-founder of Spacemen 3 who is also known for his production work with MGMT, as well as on 2011's more minimal Panda Bear album *Tomboy*. While previously Lennox worked in isolation, recording somewhat nomadically then sending the results to be mixed, he opted to make *PBVSGR* in a proper studio (Namouche in Lisbon) with Kember present for the whole process, an intentional departure from his last full-length.

"Noah and I both share the philosophy that there's no point making the same record twice ... and *Tomboy* is a really special collection," says Kember from his Rugby, Warwickshire-based studio, New Atlantis. "It's got that sort of *Pet Sounds* deal, where it takes a little whirl to get to know and feel the flow, but ultimately once you're arrived 'with it,' it's a stunning collection of songs.

"We knew we were going into a proper studio to do the meat of the work," he continues. "Noah had made pretty high-quality demos, and we went with those as the initial cores and built up, but creating every part and layer."

For those preliminary drafts Lennox worked on his laptop in Ableton Live 9 and Pro Tools 10 and various plug-ins including Waves, u-he's uh-bik efx, and Universal Audio suites. In addition, some early tracking was done in his personal stu-

Miosotis Garage

dio, Miosotis Garage, through the Studiomaster 162BPX compact rack mixer and Universal Audio Apollo interface.

Instruments and other gear used on *PBVSGR* include the Jomox Xbase 999 drum synthesizer, Yamaha TX81Z rackmount FM synth, Minimoog Voyager analog performance synth, Elektron Octatrack performance sampler, Teenage Engineering OP-1 portable workstation, Roland SP-555 sampler, Mode Machines x0xb0x bassline synthesizer, and EarthQuaker Devices Disaster Transport Sr. dual delay/reverb/modulation pedal.

"The previous three Panda Bear records are often just two elements—drums and guitar—plus his vocals," says Kember. "On this we wanted to take each song around the block a couple of times and try more things like bass parts, which didn't exist until we hit Namouche. We tried whenever we could see the space and Noah had ideas for parts."

The genesis of most of the tracks is a creatively chopped drum section, the kind of pattern that would inspire Lennox to put a synth part and vocal melody as a foundation, as opposed to past albums' guitar-generated structures. Then, rough edges established, Lennox would accentuate the fringes. "There's one plug-in, the Little Labs Voice of God, that's part of the Universal Audio stuff; and on pretty much every kick and bass, I used it," says Lennox, who cites Madlib's alter-ego Quasimoto as getting him into sampling rhythmic phrases. Parts were then patched together by Lennox from a combination of Internet-sourced hits and personally generated percussion.

"Noah's got pretty golden ears for a break or a sample," says Kember. "Noah's vibe was for the extra time it would take to re-record those parts for the small fidelity increase, he'd prefer to jam the OG, so I accepted that and did work backing out the breaks with 'trick' sounds and electro 'shadows' to keep the low-end bass-drum zone tight and clear—mostly by inserting a bird-chirp syrinx-y thing [found in several drum machine soundsets], sort of split in parallel with any blurry beats. It's one of those things you only notice when it's gone."

As for the light and shadows, so to speak, those were generated by the wealth of analog equipment and "attendant mood dialers" found at Namouche, including Neve 1073 and 1078 preamps for tracking EQ and boost; Neve 2254-A, UREI 1178, and dbx 165a limiters for changing sound perspectives, and three sets of ears open to experimentation.

"I set up a working protocol with the engineer, Joaquim Monte, and Noah, and we tweaked or built the system according to what we wanted to achieve," says Kember. "Both Noah and 'Quim are at the top of their game, so it was kinda just one of those sick situations where everyone was totally buzzed and dialed in the whole time, on an equal mission to reach the Goldilocks zone."

It may sound obtuse, but the "Goldilocks zone"—the quest to try anything till it's "just right"—was integral to the production of *PBVSGR*. For example, while tracking vocals, the setup for several songs included Neumann U47, U67, and U87 mics, in an effort to capture Lennox at full tilt and more upfront than on previous records.

Eventually the U67 got the majority of the spotlight, followed by some U87, but too many tracks were being eaten up using all three during overdub runs.

"I have trouble getting into the sound of my voice with just a single take, while on the other hand I like a pretty exact double so things don't sound flappy and sloppy," says Lennox, who has been doubling vocals since his friend suggested it around the first Animal Collective release, 2000's *Spirit They're Gone, Spirit They've Vanished*. "And I don't copy and paste a take; I redo them, but tightly. There's no plug-in or effect that really sounds as good as just doing a second vocal. There's a specific type of imperfection to that method that produces a result better than any exact process." Kember does admit, however, that having as many as 15 stacked voices did create some "horning" that required careful shifts in the mix.

Once past the basics, much of the work—with both hardware and in-the-box processing—was dedicated to finding the frequency spot where everything would sing. "Noah and I both really wanted to use an almost surreal palette to try to do something pop in an un-pop way," says Kember.

"Coloring in the outlines" would come from many sources, including running material through modular synths (the EMS Synthi AKS and the Fenix II), vocoders (a Digitech S100 and an Electrix Warp Factory red face), and guitar effects, including the previously mentioned EarthQuaker module, an Organizer polyphonic octave shifter and Arpanoid arpeggiator, a Behringer Chorus Space-C, and a Boss RRV-10 micro-rack digital delay, in addition to uhbik and SoundToys plug-ins. Tweaking controls in real time added a further, ever-prevalent human element, and the result was a "sound like they're flipping whipped cream out in their wake," according to Kember.

"Noah wanted to get away from traditional vocal ambiances, so we tried to use as many stealth-type reverbs as possible," says Kember, who admits to a love of using things out of context. "I believe no use of equipment is bad if it doesn't break it. I like to test & torture stuff to see what it can bring, where its weaknesses & strengths lie."

The ultimate goal was to establish "subtle airbrushing underneath," he says. "Faked out—but believable—false-light-point sources to chrome sounds out. Tears in the fabric to let other sounds come through. Literally 'echoes' of a sound made of anything but reverb or echo. Shadows of sound. Ghosts. Outlines. Pre-sounds. Post-sounds. Attendant sounds—like both transparent and chrome, looking at the same time to create further dimensions of sound from the basic elements."

For example, Electrix Warp Factory was used both to "make sounds speak" and to cross-modulate non-vocal sources. "It lets you reduce the filter order from 24 filters down to one ... lets you shift the formant widely ... and has a built-in saw oscillator and a white-noise generator," says Kember. "Plus, it does the 'pause stuffing' deal, where it inserts the fricatives and sibilance from the original signal. We used it a lot, often not with a vocal input."

Lennox liked the "thicker, fatter energy" that was possible with the shifting signal chains, and how the combination of electric and direct sounds had their own "natural" spaces" as well as physically impossible interactions.

Feeding this interaction, molded through several months of mixing, were "carriages" of abstract sounds Kember describes as "swimming" in parallel with the vocals, but that weren't created from the vocals. A judicious use of ducking coupled with the saturation control of limiting allowed maximum vocals and maximum music without clash, ensuring clarity for quieter parts throughout "the soup," as Lennox describes it.

"Noah sees music in color(s)," says Kember. "He makes it look easy, but we sweated blood to get this firmly into a zone where we felt it could breathe.

Panda Bear Meets the Grim Reaper stands as 52 blissful, insistent minutes of creamy washes that complement overdriven swirls, oscillating around unsettled and firmly anchored elements, resulting in a richly resonant presence. It's an album about personal growth, and it showcases technical development. "What really went into this album was an intense attention to detail, and not in a clinical, ugly way," says Lennox. "I've just worked with so many people that put so much care into everything and it's rubbed off on me." ■

D'ANGELO AND THE VANGUARD
BLACK MESSIAH
RCA

Fifteen years after *Voodoo*, D'Angelo returns with music that encapsulates the history of R&B while rattling the present with a nod to the future. *Black Messiah* sounds like an inspired collaboration between Sly Stone, the Isley Brothers, and Prince, aided by Questlove, Pino Palladino, and James Gadson, and with lyrics by D'Angelo, Q-Tip, and Kendra Foster. Between righteous grooves and grooving beats, this sounds like a studio party. "We should all aspire to be a Black Messiah," D'Dangelo says. "It's about people rising up in Ferguson and in Egypt and in Occupy Wall Street and everyplace where a community has had enough and decides to make change happen."
KEN MICALLEF

RHIANNON GIDDENS
TOMORROW IS MY TURN
NONESUCH

Carolina Chocolate Drops co-founder Rhiannon Giddens is one of the few artists with the pipes and sensitivity to nail a new perspective on the Patsy Cline gem "She's Got You." For her first solo album, Giddens features material popularized by several iconic female artists: Cline, Nina Simone, Dolly Parton to name a few. These new interpretations more than measure up, with gritty, soulful folk-blues arrangements shepherded by producer T Bone Burnett, highlighting Giddens' bottomless emotional and technical depth as a singer.
BARBARA SCHULTZ

THE SOFT MOON
DEEPER
CAPTURED TRACKS

It's time for a black celebration, because Luis Vasquez has put his inner demons to music again. *Deeper* alternates between goth dirges dripping with pulsing synth drones, whining guitar, and spare piano and head-nodding dark waves with heavily chorused bass and driving machine beats that will make fans of early '80s Cure weep for joy, or smile for misery—however they do it. If you're a moody one or just in the mood, *Deeper* does dark right.
MARKKUS ROVITO

JAMES BROWN
GET ON UP: ORIGINAL SOUNDTRACK
UME

With the DVD release of the biopic *Get on Up* comes renewed effort to promote the Godfather of Soul's catalog. Anyone who doesn't already own a collection of James Brown hits *and* a concert album, such as the iconic 1962 *James Brown Live at the Apollo,* could be perfectly happy opting for this soundtrack album, which assembles remastered studio hits with stellar live performances mainly from the '60s—including the supercharged Apollo version of "Night Train."
BARBARA SCHULTZ

JOSÉ GONZÁLEZ
VESTIGES AND CLAWS
MUTE

José González turns inwards once again with his third solo album, *Vestiges and Claws*. Wholly self-produced, González's instantly recognizable resonant vocals take center stage alongside his hollow guitar plucks, which are buffered by understated percussion and barely detectable harmonies. Spare but impactful, González's patented brand of progressive folk oscillates between more and less percussive. He hits his stride on the soothing earworm, "Stories We Build, Stories We Tell," and the upward swings of "Leaf Off/The Cave."
LILY MOAYERI

ÉTIENNE DE CRÉCY
SUPER DISCOUNT 3
ULTRA MUSIC

Two-decade electronic music veteran and leading French DJ/producer Étienne de Crécy circles back on his discography and influences to inject Super Discount 3 with a timeless quality of genre-blending. Tinged with '70s and '80s grooves, '90s early-morning rave vibes and modern festival jump-alongs, the album comes together as electro-funk house that is the spiritual descendent to Giorgio Moroder-style synth disco. Guest vocalists from De La Soul and Citizens! also steal the show on highlights "WTF" and "Sunset."
MARKKUS ROVITO

BUTCH WALKER
AFRAID OF GHOSTS
DANGERBIRD

Butch Walker's *Afraid of Ghosts* listens just as a memoir reads. The notoriously private artist unfurls a constellation of carefully crafted stanzas and hauntingly insightful lyrics that resonate deeply. Walker's musicianship is highlighted by his typical, yet more subdued guitar rifts, soft vocals, and just a hint of country twang, which is perhaps homage to his southern roots. Produced by Ryan Adams here, Walker displays a new tenderness and yet another departure from his punk rock, hair-band days.
KRISTINA SUTTON

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Fig. 1. The Satellite Thunderbolt allows for much higher plug-in counts than its FireWire counterparts.

UNIVERSAL AUDIO

UAD-2 Satellite Thunderbolt

LIFE IN THE FAST LANE FOR UAD-2 PLATFORM PLUG-IN USERS

BY MIKE LEVINE

Mike Levine is a musician, producer, and music journalist based in the New York City area.

STRENGTHS
Thunderbolt bandwidth allows for larger plug-in counts. Other UAD-2 hardware can be seamlessly used in tandem. Available with a range of plug-in bundles. Fanless, silent operation.

LIMITATIONS
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uaudio.com

From its first incarnation, Universal Audio's Satellite line was designed to add portability and system flexibility to the UAD-2 platform. Users who wanted to run UAD-2 plug-ins were no longer limited to PCIe cards in their desktop computers.

When Apple replaced FireWire 800 with the faster, higher-bandwidth Thunderbolt format for data transfer, Universal Audio responded with Thunderbolt versions of the Satellite, offering the capacity to run more plug-ins simultaneously than the FireWire models.

The UAD-2 Satellite Thunderbolt (see Figure 1) is available in either Quad or Octo models, which feature 4 and 8 processors, respectively. Unlike the FireWire Satellite models, however, Universal Audio does not offer 2-processor Duo configurations for Thunderbolt.

The UAD-2 Satellite Thunderbolt units are available with several bundled plug-in packages. The lowest-cost units are the Core bundles, which include the Analog Basics Bundle containing eight plug-ins. The Custom Bundles feature the Analog Basics Bundle, but let you choose three additional UAD plug-ins of your choice. If you're feeling really flush, you can opt for the Octo Ultimate Bundle, which comes with 79 plug-ins.

Universal Audio lent me an Octo Satellite Thunderbolt to review, and included some of the latest plug-ins, three of which will also be covered in this review—Neve 1073, Manley Variable Mu, and Thermionic Culture Vulture.

LAUNCHING THE SATELLITE

The UAD-2 Satellite Thunderbolt is a tabletop unit housed in a sleek matte-black metal box that is wider and taller, but less deep, than the silver-colored FireWire versions. On the front panel, the word Host glows white when the unit is connected and flashes red when its not. Like the other Satellite products, the unit doesn't have a fan so it functions silently.

The rear panel (see Figure 2) sports a power switch, a snap-in receptacle for the two-piece (line-lump) external power supply, and a pair of Thunderbolt ports; the second port allows you to daisy-chain up to five other Thunderbolt peripherals. The air vents on the back are sized to fit Kensington security products, which is handy for installations where theft could be an issue. As with Universal Audio's Apollo products, you have to supply your own Thunderbolt cable.

The only documentation in the box is a card (which the company refers to as a "coaster") that points you to the Satellite start-up page at uaudio.com. Once you download the required software, you can watch a video that lays out the setup instructions. Although many of the nine steps are self-evident, some steps have to be completed in a particular sequence. The UAD-2 Satellite Thunderbolt is not a complex device to setup, but having to refer back to the video is time-consuming, and the task would be a lot easier if the steps were printed in one location, in a paper-based startup guide in the box (or a similar PDF on the website) with the steps printed out in order.

NAVIGATION

According to Universal Audio, the difference between Thunderbolt and FireWire, in terms of the number of UAD-2 plug-ins you can instantiate, is

UAD-2 **Satellite**

Fig. 3. The new Neve 1073 plug-in is a modeled replica of the original unit.

Fig. 2. The rear-panel of the unit features a power switch, power adapter input, and Thunderbolt ports.

significant: Under FireWire, the maximum number of plug-ins you can have open is 55, whereas with Thunderbolt, a much higher number is possible, depending of course on how DSP-hungry the plug-ins are and how much DSP power is in your Satellite. I tested the Satellite Thunderbolt Octo using a 2013 MacBook Pro.

I began by opening 60 mono tracks and put an 1176LN (Legacy) plug-in on each; this used up only 34 percent of my DSP. Next I tried 75 tracks, each with a mono 1176LN and mono Cooper Time Cube plug-in, which required 84 percent—that's 150 UAD plug-ins opened simultaneously.

Some plug-ins, such as the new Neve 1073 or Thermionic Culture Vulture (both covered later in this review), require more DSP, so the total number you can instantiate will vary. Past UAD systems required a very judicious use of the plug-ins to avoid maxing out your DSP. But even with Universal Audio's Quad Satellite Thunderbolt processor, you should easily be able to exceed the 55 plug-in limit of FireWire.

JOIN TOGETHER

Users of Apollo systems or FireWire Satellites can use them in tandem with the Thunderbolt Satellite to create an even more powerful UAD-2 system. Apollo owners may need to purchase the optional Thunderbolt card from Universal Audio in order to do this.

To see what it was like to combine systems, I connected my Satellite FireWire Quad into my MacBook Pro's second Thunderbolt port, using a FireWire 800 to Thunderbolt adapter. Once connected, I restarted the UAD Meter and Control Panel application, and it showed both units as active. The DSP power of the two Satellites was now seamlessly combined. I tried the same mono 1176LN and Cooper Time Cube combination on 75 tracks, and the DSP meter read only 57 percent (as opposed to the 84 percent reading from the Satellite Thunderbolt alone). I then added a mono Dangerous BAX EQ to each channel, which resulted in a total of 225 UAD plug-ins open simultaneously but with a 74 percent reading on the DSP meter.

SATELLITE IN ORBIT

Overall, I found the Satellite Thunderbolt to be quite an impressive piece of hardware. It's not cheap, but it is quite powerful. And the ability to use it to expand another piece of UAD-2 hardware opens up a lot of possibilities for those with existing systems.

Now, let's look at some of the latest UAD-2 plug-in emulations of classic hardware.

NEVE 1073

The Neve 1073 console mic preamp/EQ has achieved legendary status in the audio world, and this is the second UAD-2 emulation of it. (The previous version is now dubbed Neve 1073 Legacy.) The new Neve 1073 plug-in (see Figure 3) has a larger display than the previous incarnation and a vertical orientation with a nice-looking, woodgrain frame. More importantly, Universal Audio says it is a complete end-to-end model of the circuitry of the unit, which was pulled from a Neve 8014 console.

If you have an Apollo interface, you can use the Neve 1073 as an actual mic preamp, thanks to the UAD Unison technology. If not, you can insert it on a channel like any other plug-in and still get the benefit of its great sound and EQ.

The Input Gain can accommodate the mic and line inputs. The mic range is mainly on the left side and line-level range on the right. Switching between them takes a little getting used to: You can't switch from Line to Mic by "turning" from one range to the other. Instead, click on the gain number displays on of one or the other, or on the words Mic or Line.

Fig. 4. The Thermionic Culture Vulture plug-in can give you everything from subtle breakup to full-on distortion.

Fig. 5. The Manley Variable MU replicates the smooth sounding tube compressor and adds a wet/dry control for parallel compression.

If you're inserting the plug-in on a track, the Line range offers everything from clean to crunchy sounds, depending on the settings of the Input Gain control and the Level control, a large virtual slider on the right side of the interface. Setting it in the Mic range while using it as a standard insert will provide a variety of distorted timbres because you're overloading the input to varying degrees.

Below the Mic/Line gain knob is the High Shelf knob, which lets you add or subtract 18 dB at a fixed-frequency shelf of 12 kHz. Turning the knob clockwise from its default 6 o'clock position gives you the "Neve sheen," a glassy, high-end sparkle that sounds fantastic when used in moderation. Between its contribution to the signal and the sweet crunchiness you can get from the gain controls, the Neve 1073 adds a pleasant shininess to all sorts of tracks. I tried it on drum kit, guitar, and vocals, and was thrilled with the results.

For additional tone shaping, the semi-parametric Midrange Band and low-shelving EQ are impressively smooth sounding and have a definite console EQ vibe. The EQ can be switched in and out, and a phase switch is included.

I have rarely been as impressed with the sound of a plug-in the way I am with the new Neve 1073 emulation. It seems like everything it touches turns to sonic gold, and it's going to be a go-to plug-in for me. The only downside is that it requires a lot of DSP power. Based on the readout of

my UAD Meter and Control Panel app readout, the effect uses more than three times as much power as the Neve 1073 Legacy plug in.

THERMIONIC CULTURE VULTURE

The hardware version of this effect from the British company Thermionic Culture is an outboard tube-distortion processor that lets you dial up anything from subtle crunch to utter mayhem, with plenty of control. Universal Audio modeled this esteemed unit and added additional controls.

The Culture Vulture plug-in (see Figure 4) is a 2-channel processor that can be opened in mono, mono-to-stereo, or stereo instantiations (depending on the source track, of course). In stereo mode, with the Link/Ctrl toggle set to Link, the settings in one channel are mirrored in the other. Flipping the switch to Control mode lets you independently control each side, allowing you to create some wonderful stereo effects.

I set up the Culture Vulture plug-in on a stereo drum loop, put it in Control mode, and dialed up separate distortion settings on each side, which resulted in a very big sound. I tried the same configuration with a mono guitar track with a mono-to-stereo instantiation and was again able to obtain a big, wide sound. (See "Big Stereo from Mono" sidebar below.)

The Culture Vulture offers three types of distortion that can be independently set for the left and right channels, depending on the plug-in's configuration. The Drive control governs the amount of distortion, and the Overdrive switch adds a 20dB boost to give an extra push to the distortion setting you've dialed in. On the hardware unit, the Bias control regulates the current sent through the 6AS6 tube, and its effect is displayed in the meter for that channel. The plug-in's Bias control simulates this effect and its meter movement: Lower settings yield cleaner sounds. A Filter switch for rolling off high-end from the distortion, and an Output Level knob round out each channel's control set.

Universal Audio added a global Mix control that gives you an additional way to vary the amount of distortion, allowing you to change the ratio of clean to distorted sound. I found it to be particularly useful. For example, on a drum kit, you can set up a heavy distortion using the Culture

QUICK TIP: BIG STEREO FROM MONO
Here is a simple way you can use the Thermionic Culture Vulture plug-in to create a huge sounding stereo track from a mono source. Insert a mono-to-stereo instance of the Culture Vulture on the track you are processing. Next, move the Control/Link switch to Control to unlink the two channels. Set one of the channels of the plug-in to the T (Triode) distortion type and the other to P1 (Pentode 1).

With the track playing, adjust the drive controls to taste (you can also engage the Overdrive switch on one side), but make sure that the left and right channels have different amounts of distortion on them and that each side has a different character. If they sound unbalanced, use the Output Level knobs to set the left and right channels to an even level.

Vulture's other controls, but dial it back for a subtler effect. Nice touch.

Overall, the Thermionic Culture Vulture is warm and rich sounding, easy to control, and very flexible; it sounds great for subtle or intense distortion.

MANLEY VARIABLE MU

The UAD-2 Variable Mu, which is described in the manual as developed "under Manley Labs' rigorous scrutiny," models Manley's popular Class A, dual-channel tube compressor (see Figure 5). The result is a transparent dynamics processor that can be used on the stereo bus, on individual elements, and switched between Stereo and Mid-Side modes.

The Variable Mu plug-in can be used as a mono, mono-to-stereo, or stereo instance. The Controls/Link toggle switch lets you unlink the two channels putting you in dual-mono mode. When in Mid-Side mode, the mid signal is controlled on the left side of the compressor and the sides on the right.

Like the original hardware version, the Variable Mu plug-in has a Dual Input knob, which controls the input level going to both channels, rather than offering separate controls for right and left. Each channel has controls for Thresh-

old, Attack, and Recovery (a three-position release parameter). Each channel can be toggled between compression and limiting, and even set separate thresholds for each of the channels, depending on the settings of the Sidechain/Link and Controls/Link switches. Universal Audio added a Dry/Wet knob, which facilitates parallel compression. Two large meters display gain reduction.

I used the Variable Mu plug-in on a variety of sources—vocals, bass, kick drum, drum overheads, and on the stereo bus—and was impressed with its smooth-sounding compression: It improved virtually everything I used it on. The combination of excellent sound quality and flex-

ible controls make it, like the hardware version, a very desirable dynamics processor.

SPEED AND POWER

All told, the Satellite Thunderbolt provides a higher-bandwidth solution for the UAD-2 plug-in platform, allowing you to run significantly more instantiations than you could on its predecessors.

Universal Audio continues the UAD-2 tradition of releasing officially certified models that painstakingly re-create the functions and sound of the original units. Although the new plug-ins require a lot of DSP to run, the Satellite Thunderbolt is more than up to the task. ∎

> Universal Audio's Thunderbolt provides a higher-bandwidth solution for the UAD-2 plug-in platform, allowing users to run significantly more instantiations than they could on its predecessors.

Fig. 1. Pepper's front-panel controls include buttons to engage insert paths for pedals and pro gear.

metal chassis

1/4" instrument input

Two grounding switches

LITTLE LABS

Pepper
DI, RE–AMPER, AND INSTRUMENT UTILITY BOX

BY MIKE LEVINE

STRENGTHS
Excellent sound quality. All analog circuitry, including vintage-style transformers. Dual insert circuits allow blending of effects pedals with balanced pro gear. Re-amping capabilities. Two ground-lift switches. Adjustable input impedance. Two instruments can be blended.

LIMITATIONS
Complicated to use. Manual assumes prior technical knowledge. Back-panel output jacks are too close together to handle larger-than-average 1/4" plugs.

$660
littlelabs.com

L ittle Labs has a well-deserved reputation for making quality pro audio gear, much of which falls into the utility category—helper boxes that solve common problems, provide connectivity, or offer high-quality I/O. The all-analog Pepper fills all three categories.

Billed as a "Swiss Army knife of interface creativity," Pepper is remarkably versatile: It can be used as a DI, re-amper, audio blender, and impedance matcher, among other things, and it offers pro-quality inputs designed for guitar, bass, and other electric instruments.

Pepper's metal chassis is similar in size to a standard DI box, but deeper. The unit is powered by a hefty external 16V power supply that is about three times the size of a typical wall wart and connects to your AC outlet with the included IEC cable. The end that plugs into Pepper has an outer ring that can be tightened so that the cable can't be pulled out, which is sure to be handy in live performance applications.

The front-panel layout is dense—two jacks, seven buttons, and three knobs, all in a tight space (see Figure 1). The manual assumes a certain amount of technical knowledge on the reader's part, and many home-recordists may find it a little hard to follow. The best description of what Pepper does and how to use it comes from a text-based video on the Little Labs site.

8 MILLION WAYS TO DI
Once you start using Pepper, the design structure becomes clearer. For example, with a 1/4" instrument input and output on the front panel, and a mic-level XLR output on the back, you have a straightforward DI setup: Plug into the instrument input, then connect the XLR output to your interface or mic preamp.

As with many functions on this unit, there's more than one option. You can also output your DI signal from the rear-panel Exp TRS Out to a balanced TRS 1/4" input. (This output can also be used for connecting to other Little Labs boxes such as the PCP Instrument Distro guitar splitter.) The Exp TRS output is transformerless, unlike the XLR (see Figure 2).

To compare its DI sound to my usual direct-guitar recording chain (which includes an FMR Audio Really Nice Preamp), I tracked guitar and bass through Pepper, alternating between its XLR and Exp TRS outputs. I also tracked similar parts without Pepper into my preamp's instrument input. When I A/B'ed the results, I found that the tracks recorded through Pepper sounded subtly richer and fuller.

TAKE A LOAD OFF TELE
Pepper's front-panel Load Off switch changes the input impedance to 10 megohms, which is essentially no load. When it is disengaged, the default setting is 1 megohm, although this can be adjusted using the tiny Load Adjust trim pot on the rear panel.

Bass guitars with passive pickups tend to sound better with no load, and passive guitars sound good with a load. I was able to confirm these assertions by testing the input with a Fender Strat and P-Bass. The Strat did sound a bit improved with the load on (at the default setting), and the P-Bass sounded better with it off.

INTRODUCING THE RESIDENT AUDIO T4

The world's only four-channel bus-powered Thunderbolt™ interface.
Twice as fast as USB 3.0 and 20 times faster than USB 2.0,
the T4 is the most advanced, near-zero latency audio interface ever.

residentaudio.com

Fig. 2. Back-panel I/Os include XLR and balanced 1/4" outputs.

INSERT CABLE, PRESS HERE

Some of the most exciting aspects of Pepper are its unusual routing options, most notably the two insert paths, Pdl Insert and Pro Insert. These inserts make it possible to connect effects pedals into the signal path through the Pdl Insert and outboard studio effects through the Pro Insert, or both simultaneously.

Each insert has corresponding 1/4" input and output jacks on the back panel, and on/off switches on the front. (The insert circuits can also be engaged using an external TRS footswitch, sold separately). The Pdl Insert jacks are compatible with high-impedance, instrument-level signals through 1/4" TS guitar cables, whereas the Pro Insert jacks

handle line-level balanced signals through 1/4" TRS cables.

For example, you could have, say, a Tube Screamer and wah-wah connected to the Pdl Insert path and then pass it through an LA-2A or other processor with balanced TRS I/O. Or, you could use Pepper's inserts and balanced I/O to make a high-impedance stompbox into a pro-level processor—very cool!

The Inst Thru knob controls the amount of dry signal going to the output. The Pro Send and Pro Return controls let you further adjust balances between them. You can instantly cut the Insert returns out of the circuit by using the Return Cut button on the front panel.

BACK TO THE AMP

Re-amping is easy with this device. Connect a 1/4" TRS output from your interface to Pepper's Pro TRS input, and then connect the front-panel instrument output to your amp (see Quick Tip below). Because you're hooking together multiple pieces of gear when re-amping, you're likely to have ground-loop issues. Pepper has two clever ground-lift buttons, DI Earth and Inst Earth, which are designed to eliminate hum; they are quite effective.

Pepper's flexible architecture enables it to take on other duties, such as connecting and mixing two instruments together. Plug one source through the Instrument input and the other in the Pedal TS In jack, then set the level of the former with the Instrument Thru knob and the latter with the Pro Return knob.

But rather than use each function on its own, the designer, Jonathan Little, intends Pepper to be a "central hub of connectivity." For example, studio musicians or engineers can hook up pedals and a recording device simultaneously using the inserts, while a live player can properly interface pedals and pro-level gear at a gig, taking advantage of transformer isolation between amps and front-of-house mic connections.

HOT PEPPER

Pepper has a unique and impressive feature set and pristine sound quality. Considering its price, it might be overkill if you're looking for a simple DI or re-amper. But if you want to take advantage of its unique functionality for interfacing your pro gear and pedal effects—in the studio or onstage—Pepper is a worthy investment. ■

Quick Tip:
Setting up Pepper for Re-amping

To set up for re-amping quickly, connect a TRS cable from an output on your audio interface to Pepper's Pro TRS input. Next, connect the front-panel instrument output on Pepper to your amp. (If you're using any effects pedals, connect them between the Pepper and your amp). In your DAW, set the track you're re-amping to the same output as the one connected to Pepper. Mike your amp and send it through your audio interface to a new channel that is set to record. When you start the DAW's transport, the old track will play back through Pepper and into your amp, and the mic will record it from the amp onto the new track.

Basic re-amping
configuration
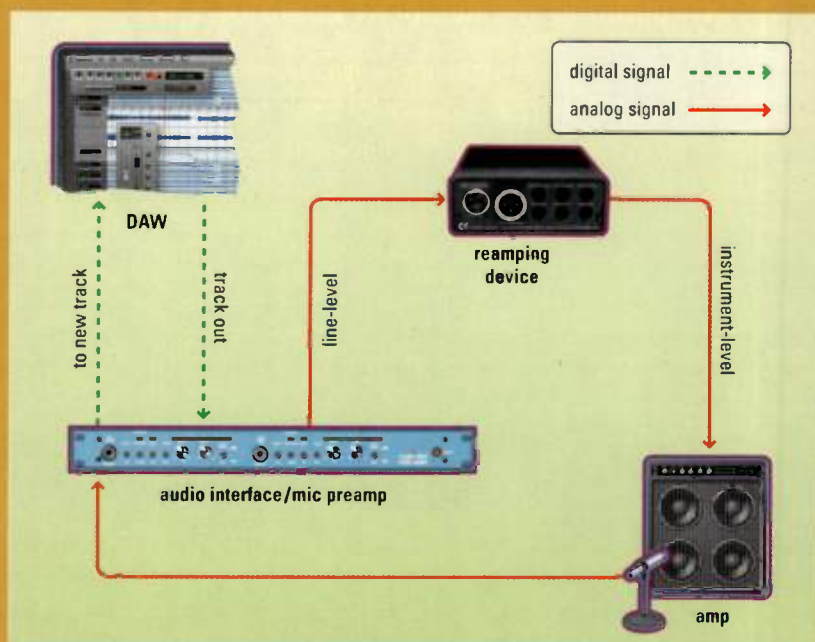
apollo | expanded

Build Your **Studio**

Why buy an interface, when you can build a studio — with "mix and match" functionality between **Apollo**, **Apollo 16**, **Apollo Twin**, and **UAD-2 Satellite Thunderbolt**.

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Unison technology lets Apollo preamps sound and behave like the world's most coveted tube & solid state designs — from **Neve**, **API**, and **UA**.

Track and Mix with 90+ **UAD Plug-Ins**

nly Apollo lets you record in real time through the latest UAD plug-ins like **Manley** **Variable Mu**, **Antares® Auto-Tune Live**, **AMS® RMX16 Digital Reverb**, and more.
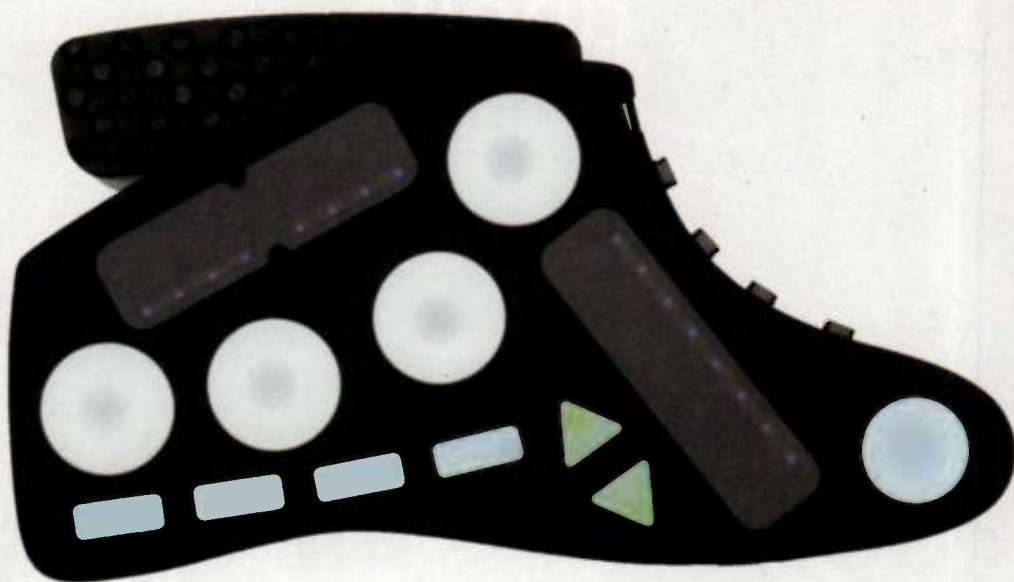
One system. Many players

The Apollo interface put classic analog sound into recording studios worldwide. Now it's expanding into a full Thunderbo system.

Learn more at uaudio.com/apoll

UNIVERSAL AUDI

The Guitar Wing puts a wealth of MIDI controls conveniently at your fingertips.

LIVID INSTRUMENTS

Guitar Wing
BLUETOOTH MIDI CONTROLLER FOR THE GUITARIST

BY MARTY CUTLER

Former *Electronic Musician* editor Marty Cutler regularly writes reviews and articles, while working on a book of digital guitar applications and honing his progressive bluegrass chops.

STRENGTHS
Easily attaches to most electric guitars and basses. Versatile. Lots of downloadable resources to adapt to many music software apps. Brilliantly ergonomic.

LIMITATIONS
Power switch is difficult to engage.

$189
lividinstruments.com

As more and more of the guitarist's rack goes virtual, there is a greater need for something to control it all. MIDI-controlled effects offer unprecedented ways to alter guitar performance, and programs such as Native Instruments Guitar Rig can be used to build elaborate guitar-processing setups, with almost every knob and button accessible via Control Change messages. Modern DAW software apps typically include a wealth of guitar-oriented plug-ins, in addition to sophisticated recording and mixing capabilities— all crying out for MIDI control. On top of that, tons of synthesizer plug-ins are just waiting to be played from your four- or six-string axe.

Guitarists, like most humans, have a limited number of appendages to handle all of the opportunities to alter, modulate, and automate. Pedals are fine, but they are generally lacking in the precision afforded by our fingers. Clearly, we need a controller that we can use with our hands, that minimally intrudes on our instrument and technique.

The Livid Instruments Guitar Wing brings the finer control of a keyboard controller to your electric guitar. What's more, it is a Bluetooth device, eliminating the need for a wired connection with your computer: The package includes a USB-type receiver.

Guitar Wing fits onto the lower horn of your electric guitar or bass by means of a plastic, rubber-covered clamp attached to the bottom of the control surface (see Figure 1). The included spacers can be used to accommodate guitars with different dimensions, and you can adjust the angle of the wing to one of three positions.

The unit fit snugly on my Epiphone Genesis.

WING COMMANDER

Guitar Wing's surface is covered with pads, buttons, and channels that serve as touch faders. With the exception of four switches on the side of the unit, all controls are illuminated, color coded, and animated to indicate activity. A micro-USB port—strictly for charging the unit's Lithium Ion battery—sits on the side next to the power switch. The power switch feels stiff and unyielding, and with its knurled edge lying flat against the side of the wing, it makes it difficult to toggle. An easy-to-grasp, protruding switch would make it easier to access, especially in live performance.

By default, all control objects (with the exception of the accelerometer) send MIDI Note On messages, and the pads can send a combination of notes and Control Change (CC) messages. Guitar Wing's accelerometer enables motion control, sending independent messages over X, Y, and Z axes; you are free to send CCs, Pitch Bend, Aftertouch, or no message, if your movements require no extraneous output.

A WING AND A PLAYER

Livid supports Guitar Wing with a host of useful apps as well as downloadable templates and installers for many popular DAW and standalone programs, including Apple Logic and Mainstage, Bitwig Studio, Native Instruments Guitar Rig, and Propellerhead Reason, among others. Ableton

Fig. 1. The Guitar Wing attaches to the lower horn of your electric guitar or bass. Spacers are included to fit the device onto instruments of various sizes.

Fig. 2. The standalone version of the WingFX software offers a great preset for any solo guitarist performing with loops. The screen shows each button, switch, and fader's assigned function to keep you from getting lost.

Live is particularly well supported, with controls for the transport and tracks as well as scripts for Max for Live and other effects plug-ins.

The feature that I find to be most significant is the ability to remotely control transport, track arming, recording, location, and all of the core DAW features that go into the recording process. If you've ever tried to type in commands or manipulate a control surface while wearing finger picks, you'll know what I'm talking about.

The Logic X recording and location features worked like a charm. I could quickly create and locate to markers, set up the click track, set up punch points, control the channel volume from one of the fader strips, move to the next channel, enable playback and pause—all using the last couple of digits on my picking hand.

WINGING IT

For near-instant gratification, Livid offers WingFX, a standalone and plug-in app that is useful for playing audio loops, overdubbing parts, processing guitar, and altering pitch on-the-fly, among other features (see Figure 2). Engaging the software's help button clearly labels every control. In the default preset, the four rectangular buttons loop audio files and let you browse for new material on-the-fly.

You might want to do some file organizing in advance, because the browser has no file-audition feature. Buttons toggle a host of built-in effects, including distortion, bit crushing, delay, reverb, and motion-controlled wah-wah, which is fun to use. Anything you want to manipulate with the DAW's plug-ins is easily accomplished with the MIDI Learn features.

Guitar Wing makes an irresistible pairing with Fishman's wireless TriplePlay MIDI guitar. It was

Fig. 3. I've combined two screens of the Guitar Wing Editor showing assignments for the pad, as well as setting up control using the motion sensor (indicated by a trident-like icon). Notice that each axis of the motion sensor has an independent menu.

hard to tear myself away from using my guitar as a complete MIDI controller to play an Arturia Matrix 12 V soft synth. One of the Guitar Wing fader strips divides into two separate functions, so I taught one half to alter filter frequency in a soft synth and the other half to alter resonance, all while using the TriplePlay to hit rich chords. Possibilities abound for audio and MIDI recording using the Guitar Wing.

The Guitar Wing Editor is in beta, but it is surprisingly stable, well implemented, and readily available (see Figure 3). The user interface provides a graphic representation of each of the gadget's control features. Clicking on one provides a window with drop-down menus of MIDI messages and color-coding options for the selected button, switch, or fader's on/off state, and the physi-

cal button immediately reflects the change. Global amenities include file saving and loading, factory resets, and toggling the editor between advanced and basic parameters.

The main problem I had with the system had to do with pairing the Wing with its receiver, which was occasionally problematic and often required the separate Guitar Wing Connect utility app. By the time you read this, the editor and the WingFX will have that capacity built in.

WINGS OVER THE WORLD

Nonetheless, the Livid Instruments Guitar Wing is just what every 21st Century guitar and bass player needs; a versatile, ergonomic, and, most importantly, easily played controller for all the things you can do with strings and a computer. ∎

Fig. 1. Although the GUIs in Vintage Vault visually resemble the front panels of the instruments that were sampled, they all feature every parameter that UVIWorkstation makes available.

UVI

Vintage Vault

DOZENS OF SYNTHS AND DRUM MACHINES AT YOUR BECK AND CALL

BY GEARY YELTON

This year marks three decades since Geary Yelton first reviewed a synthesizer in the pages of *Electronic Musician*. He has a lot to be grateful for, and he knows it.

STRENGTHS
Terrific assortment of useful, inspiring, and well-executed sounds. Excellent balance of well-known instruments and hard-to-find classics. Very good filter modeling. Good bargain.

LIMITATIONS
Requires ample disk space to install entire bundle. Bypasses filters on source instruments. Saving edits to presets not intuitive. Inflexible modulation routing.

$499 download or USB flash drive
uvi.net

Many electronic musicians rely on virtual instruments only because we lack the financial resources to acquire and maintain roomfuls of vintage hardware. Instead, we settle for software running on our computers. Soft synths emulate classic keyboards by modeling their sound and behavior, whereas samplers play sounds recorded from the original instruments.

Paris-based soundware maker UVI has long been a dependable purveyor of high-quality sampler content, ranging from the plunk, rattle, and squeak of a children's toy museum to the jazzy stylings of a 1930s Gypsy swing band. UVI's largest library is a synth collection that gives you a lot more bang for the buck than all the others. Vintage Vault comprises samples of more than 40 hardware synths and 80 drum machines—the complete contents of 15 current UVI products for less than the price of the two of them purchased separately.

Like all UVI soundware, Vintage Vault is formatted for its sophisticated sample player, UVIWorkstation. The Mac- and Windows-compatible software is free to download and runs either standalone or as an AAX, AU, or VST plug-in. UVIWorkstation is multitimbral, meaning you can load multiple sample libraries at the same time and play them on separate MIDI channels.

UVI sampled each source instrument's oscillators with the filters wide open, allowing UVIWorkstation's filters, envelopes, and modulators to do all the heavy lifting during playback. The result is that Vintage Vault functions and sounds much like a real synth. You can convincingly tweak most parameters in real time, either manually or with modulators, and save any parameter changes you make. UVIWorkstation also handles step se-

quencing, arpeggiation, and effects processing for all instruments.

SYNTH APPEAL
Each library's GUI matches the look and feel of the sampled synth it contains while providing controls for all UVIWorkstation parameters, even if some of those parameters were missing from the original instrument (see Figure 1). As with most synth sample libraries, the product names have been changed to more or less resemble the names of their source instruments, some more closely than others. For example, the Minimoog library is called Ultra Mini, Sequential Circuits Prophet VS is Vector Pro, and NED Synclavier is The Beast.

UVI recorded most of the samples as 24-bit, 96kHz WAV files, converted them to 16/44.1, compressed them to lossless FLAC, and then converted them to UFS format to ensure maximum audio quality with minimum file size. You can order the entire package on a USB flash drive or download 15 separate files varying in size from 53 MB to 17.38 GB, which decompress into 21 UFS files. The complete download is about 65GB. You can authorize Vintage Vault for as many as three computers using your iLok account, but no dongle is necessary.

To save any parameter changes you make in the standalone version of UVIWorkstation, you can't just save the current preset. You must save the en-
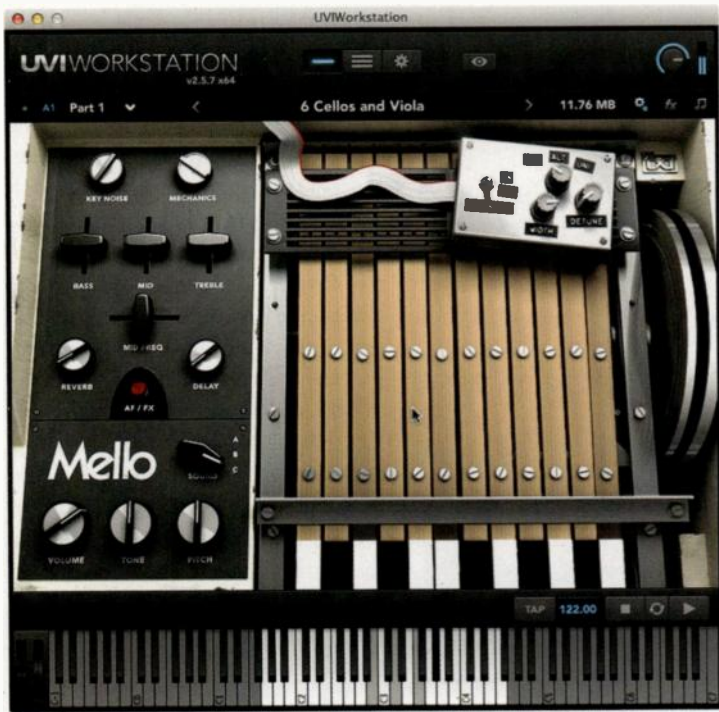
Fig. 2. Just as on a real Mellotron, a three-position switch lets you select from three sounds in each of the 12 presets. The "virtual modification" on the upper-right extends the instrument's pitch range and alters the stereo signal.

Fig. 3. Use UVIWorkstation's browser to open libraries, instruments, and presets. Once they're open, some instruments also have menus for selecting presets without going through the browser.

tire multi, which includes as many as four parts with all their presets, parameter values, effects assignments, and so on. Saving a multi instead of a preset isn't a problem, but it caught me by surprise because the procedure wasn't immediately obvious. When you're running a plug-in in your DAW, however, saving your project file should save any parameter changes you've made.

STUCK IN THE '70S

Ultra Mini is based on samples of two formidable analog monosynths, one launched in 1971 and the other in 2010—the Minimoog Model D and the Minimoog Voyager XL. The Minimoog has had an undeniable impact on the sound of modern music, and Ultra Mini represents the breadth of its sounds quite well. Although only the oscillators were sampled to create this library, UVIWorkstation's modeled filters do a commendable job of emulating Moog's analog filters. Ultra Mini gives you 422 presets in monophonic, polyphonic, and lite versions.

Introduced in the mid-1960s, the Mellotron used recording tape to play back the sounds of acoustic instruments. It was best known for the string ensemble, flute, and choir sounds it contributed to the music of the Beatles and progressive rock bands like the Moody Blues, Yes, and King Crimson. The 12 presets in UVI's Mello library contributes all the Mellotron's signature sounds and more. UVIWorkstation lets you access param-

eters the original didn't offer, including controls that affect the stereo image (see Figure 2).

String Machines is a collection of 16 presets sampled from 11 instruments, most of them paraphonic synthesizers from the 1970s. In addition to old standards like the ARP/Solina String Ensemble, Crumar Performer, and Roland RS-505, the library features less popular synths like the Logan String Melody, Eko Stradivarius, and Excelsior K4. Frankly, I was surprised at how different some of these instruments sound. If you want string-like pads that don't sound like everyone else's, start here.

KEEPING THE '80S ALIVE

Vintage Legends may be the star of the show. At $349, this bundle of six libraries is also the most expensive when purchased on its own. Some of the included instruments are relatively rare: Energy (Digital Keyboards Synergy), Synthox (Elka Synthex), Kroma (Rhodes Chroma), U1250 (Kurzweil K250), FMX1 (Yamaha DX1), and CS-M (Yamaha CS-70M, CS-40M, and CS-20M). All except Energy were previously available as separate products.

FMX1 gives you all the DX-style mallet percussion, electric pianos, and plucky basses you'd expect, along with other distinctive sounds (see Figure 3). It can't duplicate the interaction between operators you'd get from a real DX1, but Velocity layering provides a good imitation. Although most of Yamaha's CS series has been ignored in favor of

the mighty CS-80, the CS-M library proves that its siblings are also capable of wonderful analog timbres with a lot of character and versatility.

Energy delivers sounds typical of a 32-oscillator additive synthesizer. A few presets add a touch of Wendy Carlos to your music, with its best sounds ranging from lovely and delicate to big and powerful. If you're looking for a variety of timbres that stand out from the pack, you should check out Synthox, too.

Digital Synsations is a similar assortment, but it features late-'80s synths you're more likely to find in someone's stage rig. DS1 gets its waveforms from a Korg M1; DS77, a Yamaha SY77; DS90s, a Roland D50; and DSX, an Ensoniq VFX. The waves stored in those instruments were short, looped samples supplemented by other forms of synthesis. Though the sounds are relatively primitive by today's standards, more than 500 Digital Synsations presets capture the spirit of the era in the best light possible.

UVX-3P concentrates on the JX-3P, Roland's first MIDI synth. Some synthesists love it, but I've always thought its digitally controlled oscillators (DCOs) sounded cold and brittle. The DCOs in Roland's Super JX-10 were a noticeable improvement, and you can hear the difference in the UVX-10P library, which also features the MKS-70 (a rackmount version of the JX-10) and its predecessor, the JX-8P.

Vector Pro covers two synths that pioneered

vector synthesis. Vector synths use joysticks or modulators to animate sounds by crossfading the oscillators. In terms of gigabytes, this library is the largest in Vintage Vault. It spotlights Sequential Circuits' groundbreaking Prophet VS and Yamaha's less consequential follow-up, the SY-22. A third selection is Vector Pro VX, a dual-layer synth that expands on the Prophet VS's capabilities. Some of the 560 presets let you pan between waveforms with your mod controller, and others impart motion using slow envelopes and undulating LFOs. Conspicuous in their absence are sounds from Korg's Wavestation series, which helped advance vector synthesis far beyond its beginnings.

In the '80s, the pricey Fairlight CMI was the digital workstation of choice for well-heeled recording studios. It was also the first digital sampler. Darklight IIx comprises samples from the 1983 version, the Fairlight Series IIx. All the sounds—many of them short, one-shot samples stretched across the keyboard with no multisampling or layering—were taken from the original instrument's content, complete with artifacts from digital audio's dark ages. Darklight IIx is presented in three contexts: Page P, a straightforward synth; Page B, a unique drum-loop player; and Page U, a 3-part, 3-track step sequencer.

The Beast is built around samples recorded from three editions of the Fairlight's American competitor, New England Digital's Synclavier II. The Synclavier was an even more expensive digital synthesizer that tamed FM synthesis before Yamaha and pioneered multitrack sequencing. Although the GUI looks every bit as primitive as the original, it offers all the same sound-shaping parameters as UVI's other libraries. Not surprisingly, Beast FM II specializes in FM sounds. Beast Terminal furnishes samples from the Synclavier library, and Beast Box uses both FM and sampled sounds to produce drum hits and patterns.

WaveRunner traces the evolution of German wavetable synthesizers, beginning with 1978's PPG Wavecomputer 360 up until 2002's Waldorf Rack Attack. You also get the better-known PPG Wave 2.0 and 2.3 and Waldorf Microwave XT (see Figure 4). You may have played software emula-

Fig. 4 One of the instruments sampled for WaveRunner is the Waldorf Microwave XT. Almost two decades later, it still sounds remarkable, modern and evocative.

Fig. 5. UVI's Beat Box Anthology furnishes samples from 80 source instruments, including the Roland TR-808.

tions of the Wave before, but to my ears, most of WaveRunner's 685 presets sound far superior.

SAMPLERS AND DRUM MACHINES

Emulation One and Emulation II are unusual because they supply samples made popular by samplers. Emulation One concentrates on E-mu's Emulator, the first affordable 8-bit sampler. Emulation II focuses on its successor, the 12-bit Emulator II. Both libraries throw in samples from

E-mu's percussive sample player, the Drumulator. You'll recognize a surprising number of the presets from all three instruments as sounds that helped defined pop music in the '80s. Most of the timbres have a gritty quality that now sound nostalgic.

Beat Box Anthology furnishes samples from 80 rhythm boxes, drum machines, and electronic drums—283 presets in all. Source instruments encompass all the usual suspects, including the Roland TR808 and CR-8000, Casio RZ-1, Yamaha RX8, LinnDrum LM-2, and Alesis HR-16, to name only a few. It also features a substantial number of hard-to-find, lesser-known classics such as the Amdek RMK-100, Elka Wilgamat, Godwin DrumMaker 45, MPC The Kit, Tama TechStar TAM500, Ted Digisound, and Wersi Wersimatic WM 24. Whatever kind of electronic drum sound you need, you'll certainly find it here.

Beat Box Anthology divides its presets into Kits, Loops, and Sounds. Kits give you a collection of different drum hits mapped across the keyboard to comprise all of a device's sounds, whereas Loops give you patterns you can slice or stretch. The Sounds category gives you single hits mapped to middle C, which you can transpose by playing any other note.

CHEAPER BY THE DOZEN

Most of the presets in Vintage Vault are imbued with a living, breathing, 3-dimensional quality that's often missing from sampled synth libraries. Playing any of these instruments feels more like playing a real synthesizer than you'd probably expect. Each synth may look different, but because they all share UVIWorkstation's particular assortment of parameters, learning to use one of them makes it easier to use all of them.

If you want to inject some vintage vibe into your playing, Vintage Vault may be just what you need. If it's your job to supply synth effects and random electronic sounds for studio sessions, consider it your magic bag of tricks. If you're in a band that plays hit songs from the late 20th century, load up your laptop and stop schlepping around so many instruments. And if you can't find $500 worth of useful timbres in this collection, then either you're deaf or electronic music just isn't your thing. ∎

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Fig. 1. Bazille's Synth Page harbors most (but not all) of its sound-shaping tools.

Bazille

A MODULAR DIGITAL SYNTHESIZER THAT TAKES FM TO NEW HEIGHTS

BY MARTY CUTLER

STRENGTHS
Tremendously deep oscillator section with multiple synthesis types. Rich modulation capabilities. Scalable GUI with antialiasing text. Multichannel MIDI support.

LIMITATIONS
Browser could benefit from a search engine.

$129
u-he.com

Yamaha's DX7 digital FM synth was one of the most popular synths of all time. Signaling a radical departure from the warmer, but often less detailed and unstable analog synthesizers of the day, its crisp, bell-like tones and glassy electric piano emulations saturated the airwaves. The instrument was not without its drawbacks, however; sounds were often thin and brittle, its programming architecture oblique and confusing, and real-time modulation was relatively primitive. As a result, the instrument's popularity gave way to sample-playback and analog-modeled instruments.

In the software domain, however, there has been a renaissance in FM synthesizers. Software developer u-he recently released Bazille (pronounced bat-zill-la), which takes the concept of digital FM synthesis and runs with it, departing from the DX7 paradigm on many counts, most significantly, producing sounds of tremendous depth and real-time malleability. But wait, there's more: Each of Bazille's oscillators can also deploy phase distortion, a process similar to FM that allows you to create more complex modulating waveforms, and consequently, more complex sonorities.

Bazille is a download from the u-he website containing AAX, VST, and AU versions, but no standalone version. I tested Bazille in hosts supporting all three plug-in formats.

FACE THE INTERFACE

If you are an experienced DX7 wrangler, you may need to reset your conceptions a bit. Bazille is a modular synthesizer and takes a tip from u-he's earlier synth, ACE—primarily, the ability to drag patch cables from virtually any output to any input.

Bazille is studded with inputs (silver colored) and outputs (red). Similarly, Bazille's four-oscillator architecture might lead you to expect more pallid sounds on the order of Yamaha's FB-01. But a closer look at the oscillators—and the formidable modulation, filters, and additional processing that surround them—will change your mind.

The top left of Bazille's Header section accesses the three main working areas. The Synth page presents most of the programming interface (see Figure 1). An oscilloscope sits in the center of it all, instantly reflecting any changes to the resulting waveform in real time. You can independently zoom in on the display's time and frequency domains to zero in on waveform details.

The oscillator is rich in modulation options. For example, the Phase-Modulation section lets you patch in another oscillator for audio-rate frequency modulation. The PM knob has settings for altering output level and frequency, and a knob to alter the phase of the modulating waveform. By dragging a patch cord from the oscillator output to its input you can cause an oscillator to modulate itself. It's remarkable how rich a single oscillator can sound, and this is just the start.

The phase distortion (PD) section has a knob (and an input) for regulating the amount of PD modulation, and another to adjust the amount

Fig. 2. A close-up of the of the Fractalize effect on a sawtooth wave. Note the repetition of the waveform in decreasing size (amplitude) within an overarching sawtooth-wave shape.

Fig. 3. More than just a simple location for quick adjustments, the Tweaks and Effects page also holds the plug-in's formidable Mapping Generators.

manually. At its default setting, the knob can move between a cosine wave (an inverted sine) and a sawtooth wave, but two pull-down menus let you choose other waveforms; selecting two different waves will cause them to alternate. The selector menu lets you choose one of the two Mapping Generators or the default cosine wave as modulator.

FRACTALIZED FAIRY TALES

One of Bazille's other unique features is the Fractalize section, which crams multiple cy-

cles of the waveform in decreasing amplitude into cycles of a superimposed waveform of your choosing. When you sweep the amount, the effect is somewhat of a cross between resonance and oscillator sync (see Figure 2).

In addition, it features an oscillator volume knob with input and output jacks, and of course you can send these directly to the output or one of Bazille's half-dozen filter types. Tones become complex and interesting here, and you'd be tempted to deploy the synth as a subtractive instrument, with no interaction between the os-

cillators, but that would be akin to ordering a hot dog at a gourmet restaurant.

PEAK TWEAKING

Technically speaking, in addition to relatively minor tweaking tools such as voice allocation, glide, and tuning controls, the Tweaks and FX page holds fairly significant components of the instrument's sound-shaping apparatus that would have been prohibitive to shoehorn onto the Synth page (see Figure 3). Here, you'll find a pair of Mapping Generators, which can serve as auxiliary LFOs or as alternate waveforms for Bazille's phase-distortion engine, envelope- and ramp-generator controls, and parameters for the output-stage filter. Below that lie controls for Bazille's four effects processors—distortion, spring reverb, delay, and phase shifter, which has a setting for flanging effects. I would have appreciated chorus as well, but each oscillator affords plenty of opportunities to thicken sounds and create natural beating.

Arguably, the Oscillator section is at the heart of Bazille's rich and wonderful complexity, but a ton more features distinguish the instrument, including an eight-snapshot, sixteen-step modulation sequencer, a pair of Lag Generators, four ADSR envelope generators, a pair of CV inputs that accept any of Bazille's sources, white and pink noise generators, four multiplexers to multiply and distribute modulation sources and destinations—the list goes on.

The factory presets run the gamut from familiar, nasal FM-type tones; to cloudy, rich, and enveloping pads; to raunchy; to animated effects and drones, and harmonics-spitting leads. It's hard to conceive of anything that this synth can't do.

If this all sounds a bit elaborate, it is: Bazille is a complex synthesizer capable of complex sounds—but don't let that put you off. For all of its complexity, Bazille is logically and elegantly arranged, and best of all, its GUI is scalable: You can make a section of the instrument occupy the full screen, switch text aliasing on and off, and adjust the instrument's brightness. If you've ever beaten your eyes into astigmatism over a fixed-size display with tiny controls and parameters, you'll be singing Bazille's praises for a long time.

GET PATCHIN'!

Bazille is the rich offspring of multiple synthesis types and, as such, it invites discovery and experimentation. Despite its seeming complexity, it will draw you in, inviting everyone from modular and FM neophytes to jaded professionals into its deep sound-creation engine. I can't think of a better reason to own it. ∎

EHX

Clockworks Rhythm Generator

The creative pulse of your hardware setup

BY GINO ROBAIR

CLOCKWORKS
RHYTHM GENERATOR/SYNTHESIZER
electro-harmonix

ELECTRO-HARMONIX recently reissued Clockworks ($220.30 street), a four-channel pulse generator that is designed for triggering and synchronizing electronic instruments and is fully analog like the '70s-era original. Each channel has an independent 1/4" output and selectable pulse divider based on the internal clock or an externally generated source. The divisions range from a pulse on every beat to a pulse every eighth beat. Want to hear to 3 against 4, 5, and 7? Now's your chance.

Each channel has two sliders; one for setting clock division and the other for setting output level (0 to +10V). Use the level controls as you would a mixer's faders to bring parts in and out, while building rhythmic complexity with the divisor control. An LED above the corresponding channel blinks in time with its clock division. Additional faders set the master tempo and output level of the internal clock. A single 1/4" jack does double-duty as pulse output when you use the internal clock or pulse input when accepting an external signal.

The internal clock's tempo range goes from 50 to 2,400 BPM (that's 40 Hz!). The device can track an external clock up to about 65 Hz before things get unstable—but even that area is musically useful. External clocking using randomized pulses adds further polyrhythmic potential.

Clockworks is housed in a rugged metal case, and the 18VDC power supply is included. The device pairs nicely as master or slave with EHX's 8-Step Program sequencer and drives anything that accepts pulses—hardware drum machines, synths, and effects pedals—and keeps them all in sync.

Best of all, Clockworks is simple to use and surprisingly playable: Rather than take a set-it-and-forget-it approach, alter the divisors during playback to get unusual syncopations. Clockworks isn't just a timing hub; it's an instrument. ∎

EASTWEST

Hollywood Orchestral Percussion

A highly customizable collection of highly realistic instruments

BY MARTY CUTLER

MANY ORCHESTRAL libraries are imbued with processing to make them sound larger than life. But when it comes to sonics, one size rarely fits all. EastWest addresses this issue in the Hollywood Orchestral Percussion collection ($598 on hard drive; $499 download) by providing realistic, live-sounding instruments with a studio-oriented degree of customization that is well-suited to film scoring.

Hollywood Orchestral Percussion (HOP) loads into Play 4, EastWest's 32- and 64-bit sample-playback instrument (standalone/VST/AU/AAX). I tested the

Diamond Edition on the provided USB3 drive: The library is ready to play after authorization. EastWest recommends connecting it to a USB3 port, though it worked fine with my USB2 port.

The included Combo Kits are great for orchestrators in a hurry. Although they don't offer the flexibility of individual instruments, everything is kept on a single MIDI channel or track. The other folders—Cymbals, Drums, Metals, and Wood—hold single instruments, useful for building custom kits where each instrument has its own track and MIDI channel.

The Cymbals folder includes pairs and suspended instruments, with rolls and crescendos dominating the latter group. The Drums folder holds snares, bass drums, tambourines, toms, and timpani. A keyswitched combination accesses multiple articulations, such as flams, rolls, and crescendos without loading them individually.

In addition to crotales, finger cymbals, a mark tree, and vibraphones, the highlight of the Metals folder is an aggregation of hits on brake drum and anvils. The Wood folder has marimba, xylophone, wood blocks, claves, and much more.

All of the instruments have a sweet, natural ambience. Opening additional mic positions on the vibes and marimba, in particular, added great depth to the instruments. You can further enhance the sound using the Spaces convolution reverb and Stereo Doubler effects.

The range of sounds in Hollywood Orchestral Percussion is comprehensive, and the documentation is excellent, providing useful orchestration strategies. If you are looking to build a library of orchestral percussion, this is an excellent place to start. ∎

Using In-Ear Monitors

How to solve sonic issues—and help preserve your hearing—by ditching your wedges

BY STEVE LA CERRA

Steve La Cerra is an independent audio engineer based in NY. In addition to being an *Electronic Musician* contributor, he mixes front-of-house for Blue Öyster Cult and teaches audio at Mercy College Dobbs Ferry campus.

Ready to take your band's live sound to the next level? Take a major step in the right direction by reducing or eliminating your stage monitors. There are plenty of reasons to make the change: Loud wedge monitors create significant audio issues that are counterproductive to good sound; such problems include increased feedback, and sound spilling into the audience, making it difficult to control the house mix. Other problems include creating phase issues with the house speakers, generating "cross talk" that enables one musician to hear another's monitor mix, and increasing the chances of hearing fatigue.

Onstage

Switching from wedges to ear mixes can reduce or solve many of these issues, and may even help preserve your hearing. In-ear monitors (IEMs) give performers control over their mix volume, and an ear mix remains consistent even when the performer moves around the stage. Here's what you need to know before you stick it in your ear.

EAR BUDS ARE FOR KIDS

In-Ear Monitor Rule Number One: Leave the ear buds at home. Let's review the entire point of using IEMs: Stage monitors, backline, and drums combine to create a fair (in some cases, insane) amount of volume onstage. The idea here is first to shut this external noise out from your ears, and then "bleed in" a controlled amount of what you need to create music. When in-ears are successful, the amount of isolation from ambient sound exceeds the amount of signal you'll add into the earpieces to hear your mix—so the overall volume level at your ear is lower than if you were using wedges. Suppose you put on a pair of ear buds. Most ear buds offer poor, if any, isolation from outside noise, so you'd need to raise the volume of the buds to overcome the stage sound. The resulting

volume at the ear is almost certainly unsafe and does long-term hearing damage.

You must use earpieces that effectively seal your ears from outside noise. *Ear buds need not apply.* Fortunately "good isolation" does not necessarily equate to "very expensive." I've used ear pieces priced in the stratosphere that offer only moderate isolation, and I've used generic earphones that provide excellent isolation. The most important thing is that your personal monitors do the job for *you.*

GENERIC VERSUS PRESCRIPTION

Earphones can be divided roughly into two categories: generic and custom-fit. Generic earpieces run the price range from around $50 up to north of a thousand bucks a pair. Expect to pay at least $100 for earphones that will not be sonically disappointing, and won't fall apart after a few gigs. The two-to-four-hundred-dollar-per-pair price range is probably the "sweet spot" where you'll find a significant increase in quality as you climb the ladder, but spending more yields diminishing returns.

Most generic-fit earpieces (See Figure 1) come with removable foam, rubber, or flanged ear tips

Fig. 1. Generic-fit IEMs from Etymotic Research

that fit over the nozzle end and can be easily removed simply by pulling them off — so try a variety of tips until you find the ones that work best for you. (They run abut two to three dollars a pair.)

Fig. 2a. Triple-flange silicon ear tips

Fig. 2b. Foam ear tips
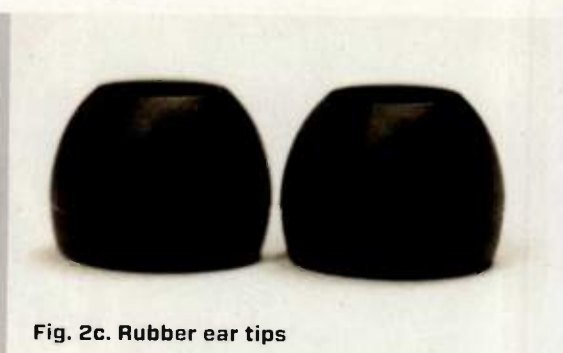
Fig. 2c. Rubber ear tips

I've had great luck with the triple-flange silicone ear tips (see Figure 2a), but for other people, foam (Figure 2b) or rubber (Figure 2c) tips might work better. Be aware that if you sweat a lot, foam tips can absorb moisture and fall out of your ear. Some manufacturers include a small "kit" of ear tips with their earpieces so you can try different options, and a plethora of aftermarket ear tips are available in various materials, shapes, and sizes. In addition to ensuring maximum isolation from outside sound, a proper fit maintains good bass response; look for an attenuation spec of at least 20 dB, preferably closer to 30 dB.

A feature worth looking for (and one that can be difficult to find in lower-priced earphones) is a replaceable filter. As you might imagine, your ears generate a lot of gunk (ick!) and you don't want it clogging up the port through which the driver delivers sound. Periodically changing the filters ensures that nothing blocks sound coming out of the earphones. If the earpiece does not employ filters you may find that over time, sound quality suffers and for this reason some manufacturers supply a tool for cleaning the nozzle. A detachable cable is another useful feature, which lets you change a damaged cable without sending the "cans" in for repair.

The next level of ear monitors features custom-molded earpieces made to fit *your* ears (See Figure 3), promising an airtight seal. Custom molds start with a visit to an audiologist, who will take impressions of your ears. Many manufacturers of custom earpieces can recommend an audiologist in your area and it's probably a good idea to go with the recommendation. Expect to pay somewhere between $100 and $200 for the visit to the audiologist and anywhere from $300 and up for the earphones. Typically the audiologist sends the impressions directly to the manufacturer, they build the earpieces and send them back to you. The process takes a few weeks so if you're leaving on a world tour, allow enough time for delivery. The impressions used to create the earpieces generally have a lifespan of a year or two because A) they can shrink, and B) the shape of your inner ears can change, influenced by things like having a wisdom tooth removed.

Custom earpieces can be constructed from hard plastic, soft rubber, or silicone. My first set of custom ear cans were the soft type and provided very good isolation. My second set was made from hard plastic and I felt the isolation was not as good as with the soft molds. I initially thought

Switching from wedges to ear mixes can solve many issues and may even preserve your hearing. IEMs give performers control over their mix volume, and an ear mix remains consistent when the performer moves around the stage.

that the hard plastic molds would be uncomfortable when worn for long periods of time but that proved not to be the case at all (and I even fell asleep more than once with them in my ears — though I promise it wasn't in the middle of a gig). Bottom line: I can't tell you whether soft or hard molds will be more comfortable for you; you'll have to try them. Most manufacturers have demo versions of their phones that can be auditioned using generic ear tips, so you'll be able to test-drive before you buy.

Fig. 3. Sensaphonics 3D Active Ambient™ IEMs feature built-in microphones for ambient pickup that can be combined with the monitor mix.

Fig. 4. Custom earpieces from Ultimate Ears

Fig. 5. JH Audio's Ambient FR features an "Ambient Bore" to bleed in stage sound.
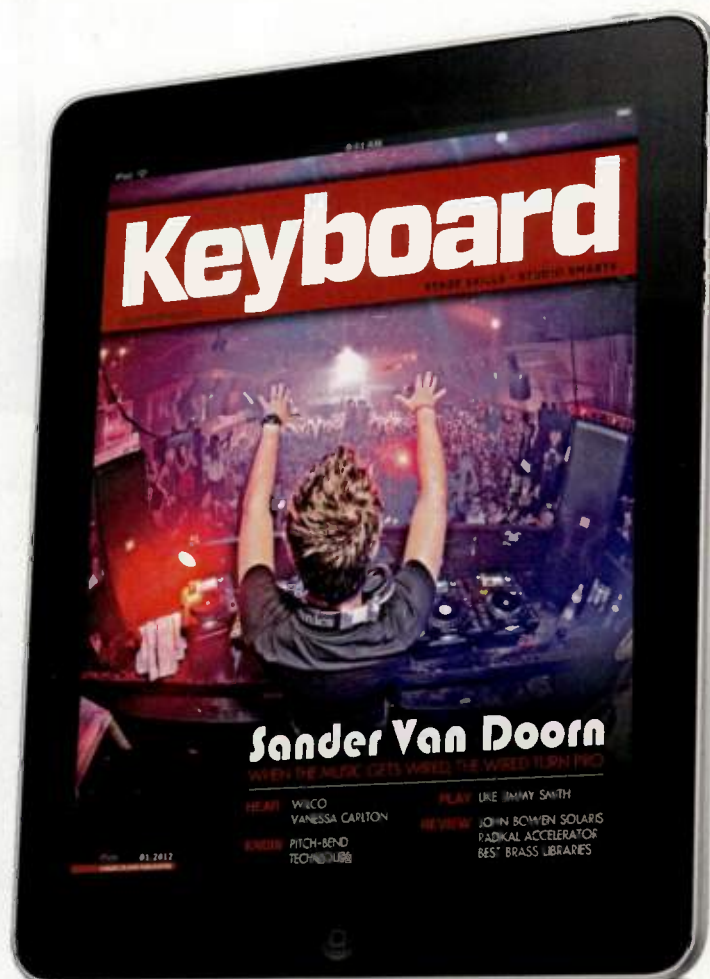
THE DRIVER DEBATE

Two varieties of driver technology are used in earphones: dynamic and balanced armature. A dynamic driver operates much like a miniaturized loudspeaker, whereby a moving coil of wire is suspended in a magnetic field. When electricity (audio) is applied to the coil, the coil moves. The coil is attached to some sort of diaphragm that sets air in motion, creating a sound wave. A balanced armature employs similar components, but the coil

and magnet are fixed. The coil surrounds a long, pivoting arm. When audio signal is applied to the coil, it magnetizes the arm and the arm vibrates. Attached to the arm is a drive rod, which in turn is attached to a diaphragm. The arm transfers vibration to the drive rod, which excites the diaphragm, creating sound.

Both technologies have advantages and disadvantages. Dynamic drivers tend to be very durable and less expensive. They produce pleasant

midrange and better bass response, but are less efficient than balanced armatures. A dynamic driver may require "venting" to extend the low-frequency response—which opposes our original requirement of isolation from outside noise. Dynamic drivers may not offer as much detail as a well-designed balanced armature system, and the drivers tend to be larger.

Balanced armature (BA) drivers generally offer a faster transient response and resolve more detail in the high-frequency range. They typically have a more narrow frequency range than dynamics, but can be tuned for specific frequency regions — thus the need for multiple drivers in a full-range system. As a result, BA designs tend to be more costly because earpieces contain more components such as low-, mid-, and high-frequency drivers, plus the requisite crossover to mesh the drivers' output. The multidriver approach often used with balanced armatures also yields the ability to deliver slightly higher SPLs. Personally I think I'd be more concerned with whether or not I like the sound of the driver, rather than worrying about the technology behind it.

THE SOUNDS OF SILENCE

Now that your ears are plugged, you'll notice that most of the room sound has disappeared—including the audience and chit-chat from your bandmates. This can be disturbing the first time you experience it, but there are remedies. One solution is to place a microphone near the edge of the stage, pointing toward the audience. Adding this sound into your ear mix provides a sense of the venue space. (You'll also be able to hear what your hecklers are saying.) Another possibility is placing an omnidirectional microphone onstage (perhaps on the edge of the drum riser) and bleeding that into the ear mix. Be aware that adding these microphones increases the possibility of phase cancellation and delay due to the distance between the mics. For example, let's say you have the snare mic in your ear mix, and you also have an audience mic ten feet away from the snare mic. Any snare that leaks into the audience mic will be heard roughly 10 milliseconds later than the close snare mic—a delay amount that most musicians can easily hear.

To combat these issues, some manufacturers have developed earpieces that mix ambient sound with the monitor mix. The concept was pioneered by Sensaphonics with its 3D Active Ambient™ IEM system which incorporates miniature microphones in the earpieces (see Figure 4), and allows a user to add those feeds to the monitor mix while still maintaining isolation from the din. It's a much more elegant solution than removing an earphone between every song. JH Audio offers the Ambient FR (see Figure 5), which provides an

Fig. 6. Audio-Technica's M2 system features an auxiliary input that accepts an external miniature microphone for ambient pickup.

It would be nice if your ear mix were in stereo, but the least expensive IEM systems function in mono. That's not such a bad thing; this configuration may actually work better if your mixing console is not equipped with multiple stereo aux sends.

"Ambient Bore" in each earphone to bleed in stage sound. The beltpack for Audio-Technica's M2 system (see Figure 6) features an auxiliary input that accepts an external miniature microphone for ambient pickup. Ambient sound reaching the ears will also be influenced by the band's stage volume and (perhaps more profoundly) the nature of the pickup pattern on the vocal mics. Not all directional mics exhibit the same amount of rejection (even when they employ the same pattern), and under the circumstances, a bit of stage sound leaking into the vocal mics might not be a bad thing.

Some musicians miss the kick in the butt they get from wedges, which is difficult to duplicate using ear monitors. A subwoofer or a wedge onstage can be used to reproduce the low-frequency thump that IEMs can't generate, but beware that

this setup can start a volume war. Seated musicians can try a "butt thumper"—a transducer that bolts to a drum or keyboard throne and produces vibrations that simulate low-frequency audio.

GOING WIRELESS

Most musicians will prefer wireless IEM systems, the exceptions being drummers and possibly keyboard players. There's no doubt that wireless IEMs are more convenient but if you're financially-challenged and stay put onstage, you can go wired, which cuts out the cost of the receiver pack and gives you the benefit of audio over wire, which is more robust and will not be subject to RFI. Most of the RF concepts we discussed in our Wireless 101 Master Class (in the September 2013 issue) hold true for wireless personal monitor systems, so revisit that article for an in-depth look at RF issues.

MIX IT UP

Moving to IEMs will require time for a proper soundcheck. If you've got a dedicated monitor engineer, bless you. Have the ME run discrete mixes for everyone in the band... Okay, back to reality. Many club bands don't have a front-of-house engineer, let alone a monitor tech. That said, you have a few ways to approach creating monitor mixes. The tried and true approach is patching an aux send into the IEM transmitter, one per musician. Another approach is a personal monitor mix system that integrates with your mixing console. Digital mixers from Roland, Allen & Heath, and others incorporate audio networking, which enables a personal monitor mixer to be connected to the main mixer (either directly or using a hub), and "taps" signals from the main mixer. This option provides the ultimate control but requires a larger investment in hardware and setup time, and makes each musician responsible for his or her own mix.

Since you have two ears, it'd be nice if your ear mix were in stereo, but Murphy's Law (*Electronic Musician*'s Corollary) dictates that the least expensive IEM systems will function in mono. That's not such a bad thing; this configuration may actually work better if your mixing console is not equipped with multiple stereo aux sends. While it's possible to use two separate mono aux sends to create a stereo mix, this setup is clumsy at best. So it may work out for practical reasons that you end up with a mono mix anyway. IEM systems from Sennheiser, Shure, and Audio-Technica offer different modes of operation such as stereo, mono,

and 2-channel mix mode (see Figure 7). The two-channel configuration is a mode in which a band mix is sent to one input and a "me" signal is sent to the other, enabling the beltpack's L/R balance knob to function as a mix control between the two channels. If you plan to use the system in this manner, look for audio Through jacks that allow signals to pass through the rack transmitter to another device. A variation of this is the premise behind the PreSonus QMix AI, which provides mix control over two channels (band and 'me') via iPhone, with permissions defined at the mixer.

Utility features to look for in an IEM system include onboard EQ, adjustable input level, battery monitoring on both the transmitter and beltpack, and a limiter on the audio output jack that might help prevent someone's head from exploding. Volume control on the belt pack is a must, and a mute switch certainly comes in handy. If you expect that your system will grow to a point where you'll have multiple channels of personal monitors and wireless mic/instruments on stage, built-in networking will be valuable for system organization and monitoring.

IEMs could help you truly hear what's happening onstage for the first time, resulting in a dramatic impact on your performance—and that's a good thing. ■

Fig. 7. The Sennheiser 300 IEM G3 system enables two discrete channels of audio to be mixed at the belt-pack.

Fig. 1. The SPL Passeq plug-in emulates the high-end, analog passive equalizer by the same name.

Smart EQ Selection

Choose the right kind of filter for the job at hand

BY MICHAEL COOPER

Michael Cooper is a recording, mix, mastering, and post-production engineer and a contributing editor for *Mix* magazine. You can hear some of his mixes at soundcloud.com/michael-cooper-recording.

Of all the various kinds of processors used in mixing and mastering, equalizers are arguably the most important. But not all equalizers sound the same or are best for a specific application. In this article, I'll show you how to choose and use a few archetypal analog and digital equalizers—including plug-ins—for the best results.

PASSIVE MODELS

Passive analog equalizers are renowned for their natural and smooth sound, owing to the omission of any amplification in their filter designs. The best passive equalizers lend a super-sweet quality to high frequencies, ultra-smooth midrange response, and a round bottom end. They are especially flattering on acoustic instruments and vocals when you want a pristine sound.

Passive equalizers by necessity use separate controls to boost and cut in each frequency band. They do this by using capacitors and inductors with different values for each control; this gives the boost and cut filters different slopes and bandwidths. As a result, you can boost and cut simultaneously (using two separate controls) by the same amount at identical center frequencies, and the two opposing filters won't completely cancel each other out. Instead, you end up with a complex frequency-response curve that would be difficult to achieve by other means. The downside is passive equalizers usually require a little more thought to get exactly the response you're seeking. And because passive filters typically have wide bandwidths, they usually can't perform notch filtering or other surgical tweaks; use them instead for broad tonal shaping.

Several plug-ins emulate passive equalizers. One of the sweetest-sounding and most flexible I've used is the SPL Passeq Analog Code® plug-in (see Figure 1), which models its titular analog counterpart and offers a whopping 72 frequency selections. As is typically the case with using passive EQ, you'll need to use a lot of boost or cut to hear anything but subtle effect from the Passeq plug-in. Liberal use will yield superb results, so crank those knobs!

Perhaps the most famous passive equalizer of all time is the Pultec EQP-1A3. Of all the Pultec-inspired plug-ins I've heard to date, the surprisingly low-priced PSP NobleQ sounds the best (see Figure 2). It's not a completely faithful knockoff of the Pultec design, but once you use it on kick drum, you won't care. Boost and cut simultaneously at 20 Hz to create a tight and punchy-sounding kick with thunderous lows.

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LINEAR-PHASE DIGITAL

When mixing or mastering with EQ, linear-phase equalizers can sometimes offer the most transparent-sounding results. That's partly because linear-phase equalizers delay all frequencies by the same amount, thereby avoiding phase distortion that would create a slightly smeared sound. A linear-phase filter also precludes phase cancellations from occurring when mastering EQ is applied to only a select region—using crossfades before and after—instead of throughout an entire track. (The inherent phase shift that analog EQ would apply to the region would cause partial cancellations during the crossfades, where processed and unprocessed audio are combined.) The outstanding FabFilter Pro-Q2 equalizer plug-in (see Figure 3) offers linear-phase operation in addition to analog-like Zero Latency and Natural Phase modes.

The downside of linear-phase equalizers is they cause *pre-ringing,* an effect that can subtly

Fig. 2. The PSP NobleQ plug-in's design is loosely based on the vintage Pultec EQP-1A3 passive equalizer.

soften detail by introducing a mild reverberation of sorts that precedes transients. For technical reasons, pre-ringing is usually not a practical concern when EQ'ing high frequencies or using a low (broad) Q setting—the best applications for linear-phase filters. But it can be audible when, for example, using a steep linear-phase highpass filter (HPF) to roll off lows on percussive, bass-heavy material; for that application, it's usually better to use analog-modeled filters such as the ones that Pro-Q2's Zero Latency and Natural Phase modes provide.

CLASSIC ANALOG

At high Q settings, classic analog filters such as those used in vintage API models produce overshoot that creates highly useful EQ curves. In low-shelving filters, this overshoot manifests as an opposing resonant peak and dip in response below and above the corner frequency, respectively.

Try using Pro-Q2's analog-modeled Zero Latency mode to apply a low shelf

Fig. 3. A low-shelving filter's Q setting is boosted in Fab-Filter Pro-Q2's Zero Latency mode to create a resonant peak and dip in response below and above the filter's corner frequency, respectively.

to a kick drum track. Set the filter's corner frequency to be between 80 and 90 Hz. Then crank the filter's Q setting to create a resonant peak and dip at about 60 and 110 Hz, respectively (see Figure 3). The kick drum will have a very big and tight bottom end. (You may also want to roll off sub-bass rumble and boost a little at 4 kHz to accentuate beater slaps.)

DON'T TOUCH THAT DIAL

The next time you need to EQ a track, don't automatically reach for your DAW's stock equalizer plug-in. There may be a better tool. Happy filtering! ■

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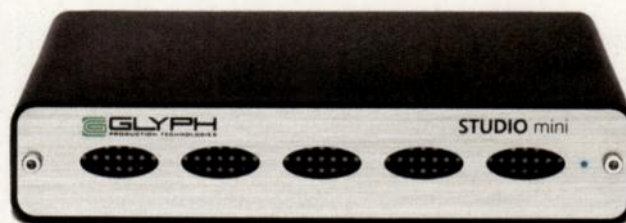
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Great Expectations

Achieving a neutral listening environment requires analysis

BY GINO ROBAIR

I am always surprised when musicians and engineers don't do their homework before attempting to "correct" their studio's acoustics.

JANE RICHEY
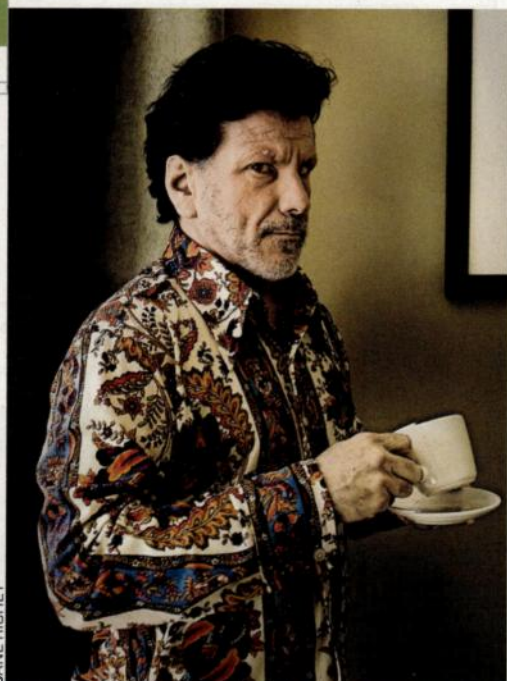
While most of us working today know better than to glue cardboard egg cartons to the wall to control first-order reflections, few are willing to go the full distance to get the most out of their primary listening environment. The excuse is usually that it will be too expensive. But that's not the problem. Whether you go the DIY route or use industrially designed materials, your investment into the project requires more than a financial outlay. If it's to be truly successful, it takes analysis and follow-through. As the old saying goes, you can't manage what you don't measure.

For the purposes of this discussion, I am addressing the main listening position in your studio; the place where you will make important decisions about the sound of your recordings. Of course, many of us track, mix, and master within the same four walls, yet we need a solid reference point when it's time for critical listening. If your studio has separate rooms for tracking and overdubbing, much of the following may still apply.

THERE'S NO SILVER BULLET

The first thing you need to understand is that there is no single solution that will fit every studio. Sure, you will apply the same measuring techniques and treatment types to your studio that professionals use, but the acoustic space you occupy is unique: Even if the dimensions in your room are exactly the same as someone else's, there will be subtle differences (building materials, door and window locations, gear and furniture placement, etc.) and you need to account for them.

Consequently, analyzing the room is one of the most important aspects of the tuning process. Without it, everything you do in terms of acoustic treatment will be guesswork and possibly a waste of time and money. However, this doesn't mean that you have to spend big bucks hiring an acoustician. There are numerous resources available that explain the ways that a room is measured, from calculating modes using the studio's dimensions to testing it with room-analyzing software to see exactly where problems occur.

Of the many books that cover studio acoustics and room tuning, I highly recommend *Home Studio Recording: Build It Like the Pros, 2nd Edition* by Rod Gervais (Course Technology). Gervais introduces all of the acoustic phenomena you'll encounter in a studio space, as well as ways to analyze and manage it, whether you're a homeowner who can install heavy-duty treatments or a renter who can't. He also covers a range of essential topics, such as sound isolation, AC power, and HVAC. Gervais even outlines do-it-yourself techniques for building your own surface treatments. (Full disclosure: I edited the second edition of the book, but I used the first edition when setting up my own studio and was impressed.)

Once you begin the analysis process, you'll see how delicate the balance can be when it comes to speaker placement and the sweet spot in an enclosed space. And the smaller the space is, the trickier it will be to create a neutral frequency response.

All of this is important to keep in mind if you intend to use surface treatments, especially if you plan to purchase pre-fab kits, such as those mentioned in this month's Roundup. Although manufactures assemble the elements based on the common types of problems encountered in studios within specific dimensions, you shouldn't install every single piece without checking the results. Just because a kit includes two dozen treatment products doesn't mean you have to use them all.

In a recent online interview with *Electronic Musician*, acoustician Bob Hodas shared an anecdote about visiting studios that already have room treatments installed, but where the owners complain about a hole in the lower frequency range. By simply removing the corner treatments—ostensibly installed as bass traps—he often corrects the situation. It's not that using a bass trap is a bad thing, but that simply "applying a treatment isn't necessarily going to solve a problem." Consequently, knowing where *not* to put surface treatment is just as important.
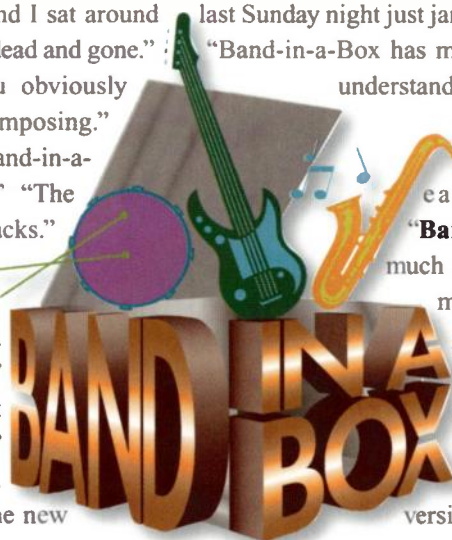
LOCATION, LOCATION, LOCATION

Of course, surface treatment is only one variable that needs to be considered when setting up your listening station. First, you have to settle on a location in the room that makes the most sense for the way you want to work, and all other decisions will be made from there.

Typically, the dimensions of whatever room you've commandeered determine where you will place your monitors, desk, and chair. In a narrow, rectangular studio, it might be impossible to set up in the corner. Or the placement of a door or windows will force you to pick one end of the room over another. Accept the fact that there will always be compromises and work to manage them.

Again, careful analysis of the room will steer you toward a location that allows you to create the most balanced listening environment you can achieve given the circumstances. And you'll get there quicker than if you work solely by trial and error. ■

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