THE MUSICIAN'S GUIDE TO
RECORDING

THE ULTIMATE RESOURCE FOR CUTTING
HOT TRACKS!

TOP RECORD PRODUCERS SHARE THEIR STUDIO SECRETS!

MIXING TIPS FROM THE PROS!
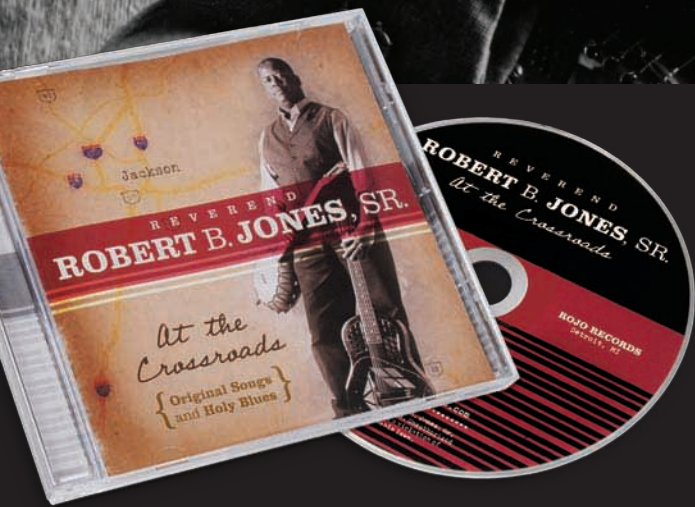
ESSENTIAL STRATEGIES FOR MODERN MUSIC MARKETING

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The Musician's Guide to Recording
Presented by Music Player Network and

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COVER PHOTO: SUZI ROKS

Work It!

Make Your Studio a Better Creative Space

Maximize Your Productivity

Your studio is an extension of your creative self. In order to maximize your creative productivity, you need to maximize your studio as well—make it efficient, ergonomic, pleasant, and comfortable. Any effort you put into streamlining your gear, de-cluttering, beautifying, and improving your space will result in increases in productivity, creativity, and inspiration. Here's a collection of good ideas for making your studio the most efficient, productive place it can be.

EMBRACE DISTRACTIONS

These days, most engineers and musicians spend hours staring at computer screens. This can be very hard on your eyes. It's essential to remember to blink often (really!) to keep your eyes lubricated. As an even better way to keep your eyes fresh and rested, place something visually distracting behind the monitor. A window works, an interesting piece of art may do the trick, or I find that something with a bit of motion—a TV (with the sound off, of course) — can be a great aid in keeping my eyes moving and refocusing. If your eyes feel tired after a long session, find ways to visually distract yourself; it works! —*Mitch Gallagher*

BETTER CD STORAGE

Storing sample CDs in CD binders (also called CD wallets) not only saves space, but it's easier to flip through the binder than read the spines of CD or DVD cases. For example, the Fellowes 320 CD Wallet packs 320 CDs, or 160 CDs and 160 booklets, in a space that's only 12-1/2" x 12-1/2" x 5-3/4". If you don't need that much capacity, there's the 224 CD Wallet and 128 CD Wallet. They're available at most office supply stores; check the web for who's got the best deal. —*Craig Anderton*

DO A CLEAN SWEEP

Most studio owners are pack-rats—we keep everything, on the chance we might need it someday. The last time I moved my studio, I realized there were pieces in the racks that hadn't been powered up in over five years. I had cables for computers I got rid of 10 years ago! I went through with a fine-tooth comb, placing each item in my room into one of four categories:

1. Never use, can't sell. Trash it now! In most cases, broken/damaged/inoperable stuff fits here. If you haven't fixed or replaced it, you probably don't need it very much.

2. Don't use, but someone else might. These items go up for sale or trade.

3. Use occasionally. Remove these items from the studio, and store them nearby. Be brutally honest — when was the last time you truly put the piece to use? If it was more than a year ago, consider getting rid of it.

4. Use all the time. These items belong in the studio where they're easily accessible. —*MG*

KEEP THE HELPERS AT HAND

There are some small items I reach for constantly—certain adapters, tape measure, screwdrivers, SPL meter, etc. To keep them handy, I have a rackmountable drawer (Quik-Lok, Middle Atlantic Products, and Raxxess are some sources) in one of my racks. Warning: Don't let this turn into a catch-all "junk" drawer. Reserve it for items you use on a daily or near-daily basis. —*MG*

DIM THE NOISE

Although mood lighting sets a good vibe, dimmers often emit loads of RF noise. But you can get one level of dimming, with less noise than usual dimmers, by inserting a rectifier diode (like Radio Shack #276-1144) in one leg of the AC line going to an incandescent lamp. Please note that this circuit will not work with fluorescent lights or anything that uses a transformer.

Caution! You're dealing with potentially lethal voltages, so you better know what you're doing! Make SURE the circuit breaker is OFF for the line feeding the light and its associated switch.

One way to implement the dimmer is to replace a single light switch with a dual one (e.g., Leviton Decora #5634-WSP), wired as shown in the diagram. Note that this switch assembly includes a jumper between one side of each switch; leave this jumper in place. Switch A is the on-off switch, Switch B sets dim (switch open) or bright (switch closed). Incidentally, using the dim position also extends a light bulb's life dramatically. —*CA*

MO' MONITORS

I have three computers in my studio. At one time I had them connected to a KVM switch, which allowed me to use one monitor and one keyboard/mouse with all three. But I've come to realize that screen real estate is critical. I still use the KVM switch for the keyboard and mouse, but each computer has its own monitor. (I've gone to flat-panels to minimize

footprints.) The main DAW computer has a big screen, while the PC (mainly used for Acid and GigaStudio) and a second Mac (used as a server, for backup, burning discs, and miscellaneous tasks) have 15" screens. —*MG*

GROUP THE GEAR

Some studios seem to install rack gear randomly. I prefer to group rack pieces by function: All my synths/MIDI interfaces are in one rack, mic preamps are together in another, as are processors, interfaces/recorders, and so on. Having a scheme in mind makes it easier to find and use what you want, and to run cabling. —*MG*

SNAKE THE CABLES

Once you've settled on the lineup and placement of your main studio components, and have everything wired, snake those cables. You can pick up some flexible (and affordable) tubing at OfficeMax and other such outlets. In studios where cabling is visible, a couple of snakes will look much cleaner to you and (most importantly) your clients than piles of tangled spaghetti. If you don't want to bother with tub-

ing, pick up some Velcro or elastic band-type cable wraps to get things in order. —*Greg Rule*

POSITIVE PLACEMENT

I place my computer keyboard and monitor off to one side at 90? to my control surface and speakers. This lets me focus on the computer screen when editing and doing "visual" work, and allows me to focus with my ears when I'm performing mix moves. Editor-at-Large Craig Anderton takes this approach one step further: He sets up two parallel tables, 5' apart. The computer monitor and keyboard go on one, mixer and speakers on the other. In addition to improving concentration when performing visual versus listening tasks, he finds that having speakers behind him cuts down on ear fatigue when doing non-critical work. If he needs to listen more carefully, he just turns his chair around. —*M*

POWER DRIVE

Is there a more valuable studio tool than the power screwdriver? If you don't have one, run— don't walk—to your nearest store and purchase one. It will easily pay for itself the next time

you rearrange your rack gear. You don't need a big honking construction-grade drill; a compact unit provides plenty of power. —*MG*

CONTAINMENT

Organizing cables, adapters, and miscellaneous "stuff" can be a nightmare. I went to my neighborhood Wal-Mart and purchased a stack of plastic boxes with snap-on lids in different sizes (priced from 88 cents for a shoebox size to under $3 for a large bin). I gathered each type of item in a box: short 1/4" patch cables, medium-length MIDI cables, mic stand clips, XLR adapter cables, etc., then applied labels. The boxes stack nicely, allowing more efficient use of space. —*MG*

DON'T BOX ME IN

Is there anything worse than crouching behind a dimly lit rack, barely able to move, trying to get a cable plugged in the right jack? It may seem like a waste of space, but leaving plenty of room to maneuver behind racks, and providing adequate light back there, whether a flashlight or small lights mounted inside the racks, is well worth it. —*MG*

Beat Your Home Studio's Poor Acoustics

Recording and mixing music is a lot of fun. And if you produce your own music, it's even more fun to hear the ideas take shape and begin to sound like a "real" recording. But most of us encounter frustration somewhere along the way. Perhaps you have an impossible kick drum that sounds like cardboard no matter how you EQ or com-

press it. Or maybe you just can't get the bass to sit nicely in the mix regardless of what you do. When you finally manage to get what you think is a good mix, as soon as you play it in the car or on a friend's stereo, your heart sinks as you realize how poor it sounds compared to your favorite commercial recordings.

The good news is that many of these vibe-killers can be solved by understanding and fixing the acoustic problems that exist in all rooms. I'll begin by describing the most common troubles caused by poor acoustics, and then explain some ways to correct them.

WHAT'S WRONG WITH MY ROOM?

All acoustic problems are caused by reflections off the walls, floor, ceiling, and objects inside the room. At mid and high frequencies, reflections can cause echoes and excessive ambience that confuse stereo imaging and make it difficult to tell how much reverb and echo you're adding electronically. In severe cases, midrange reflections also cause ringing — new tones that

resonate when excited by similar frequencies in the music. Low frequency reflections create standing waves that skew the frequency response and make bass instruments sound muddy. You might have the finest loudspeakers in the world, but they're of little value if the room itself creates numerous peaks and dips throughout the entire low end. Nulls as deep as 25dB and more are not only common, but also typical (**Fig. 1**).

This graph shows the low frequency response measured in a typical 16x10x8 foot untreated control room. A pair of Mackie HR-824 loudspeakers were placed against the front wall with the tweeters at ear level, and the measuring microphone was placed precisely at the mix position. Note the peak/dip pair at 110Hz and 122Hz where the response varies a staggering 32dB across a range smaller than one musical whole step. No wonder you can't distinguish bass notes! Now imagine trying to create an accurate mix under those conditions.

In my experience, room acoustic problems are often the main limiting factor on the sound quality obtainable in home studios. Unfortu-
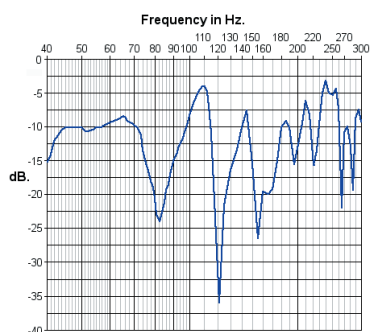

Fig. 1—The horrendous frequency response shown here is typical of the small rooms used for home studios.

nately, too many people consider everything but acoustics when they have trouble making a mix sound the way they'd like. There's no denying that audio gear with rows of lights, knobs, and switches is a lot sexier than boring acoustic panels and bass traps. But acoustic treatment will influence your sound more than the relatively small differences (comparatively speaking) among various mic preamps, sound cards, and outboard compressors.

Of course, not everyone recognizes the need for acoustic treatment. Part of this is based on the legitimate concern that the music won't be heard in a treated room anyway. However, this is definitely a case where two wrongs do not make a right. There's nothing you can do about the room in which your music will be heard, but you can do something about the room in which is it mixed.

The important point to remember is that all rooms have a unique frequency response, so if for example your room lacks deep bass, your mixes will contain too much bass because you will attempt to compensate for what you hear. If someone plays your mix in a room that has too much bass, the error will be exaggerated, so they'll hear way too much bass. The only way to minimize problems at the listener's end is to make your own room as accurate as possible. Therefore, any errors the listeners hear are introduced by their own rooms, rather than having a combination of errors from your room and theirs.

Besides improving the accuracy of your entire system, proper acoustic treatment makes recording and mixing more effortless. It's a revelation the first time you hear every note articulated clearly by an electric bass, and are able to discern even tiny changes in EQ and effects settings. It's a change on at least the same kind of level as switching from cheap speakers to studio monitors. —*Ethan Winer*

Home Studio Tips from a Big Studio Designer

Project and home studios are often located in basements and spare bedrooms, which have numerous limitations. For many studio owners, major reconstruction and remodeling aren't an option—surface treatments, furnishings, lighting, color, and equipment are about all that may be changed.

Despite this, many personal studios rise above their limitations and become comfortable, inspiring places to compose and record music. To try and track the elements of creatively successful personal studios, we consulted Beth Walters—Interior Designer with the Walters-Storyk Design Group—who has designed an incredible array of studios of every price point and size. Our discussion revealed myriad suggestions and techniques that an interior designer might use to create a vibrant, relaxing, inspiring studio space.

Are there techniques for making a small room feel more spacious and open?

Eliminate as much clutter as possible and keep your color scheme monochromatic — using shades of one color. Once a person called our office and asked what they should do with their 20' x 20' basement space. Our quick answer was: "Make a closet." This would eliminate clutter and of course eliminate a serious potential standing wave problem.

What makes a studio feel comfortable and relaxing for long hours of work?

Good ergonomics, soothing lighting, coordinated colors and a great chair. We all know how much gear we can collect, but there are other things that we might consider using as a focal point in our room. How about a piece of art? Or some really nice pillows on a seating area? And, of course, you must have a really good chair. The Hermann Miller Aeron has been around for years and in my opinion is still the one. It's classy, and it lasts.

Are there particular room layout/ergonomic principles that you recommend?

Room layout is always a personal thing. There's really no right or wrong way to work. Most people want to be able to get to almost everything easily and quickly—kind of like of an airplane pilot. The problem arises when there's too much equipment for this to happen.

Make sure you can wheel your chair easily to critical listening positions. Put the most important items closest to the acoustic centerline of the room. When you have positioned everything where it feels correct then make the acoustics work. Symmetry is the single most important design element you can introduce in arranging a room.

Facing the window or not depends on your personal preference. Some producers will only look forward when working with talent—end of story. If there's a great view from your studio, make this work for you. For Carter Burwell, in New York City, the view of lower Manhattan was absolutely a requirement in organizing the primary listening position of the room. Again, when the window decision has been made, then make the acoustics work. Remember glass isn't a bad thing in a studio environment. What is bad are reflections from any surface that will cause harsh acoustic responses, such as comb filtering. Almost any piece of glass can be made to work acoustically in your room.

What lighting mistakes do studio owners often make?

The single biggest mistake is not paying attention to the lights. For most people, lighting is an afterthought. Get some advice, choose the fixtures carefully, make sure that they're properly matched with the dimmers—as this is what usually makes noise in a studio—and think about maintenance.

How do you recommend small studios deal with the inevitable clutter problem?

If you can splay acoustic treatments and equipment away from the walls it gives you the opportunity to incorporate storage behind them. Raise some equipment up and put storage below. Order extra racks and install drawers in them. Maybe the whole room can be oriented on a different axis where you will end up with storage space in the front or on the sides that you didn't realize you had.

What methods do you use to hide the multitude of cables that must run throughout a studio?

This is always a tricky subject. For small rooms, the most successful solution is to house the cables within the studio furniture. The few wires that have to leave the central furniture piece can either be worked into sidewall treatments, perimeter wire raceways, or an occasional wire run on the floor covered with wire mold. Another trick is to have a platform in the front of the room. This allows the wires required for front speakers, amps, and video monitors to be placed in a trough with a removable cover. —*Mitch Gallagher*

Work It!

TEN ACOUSTIC IMPROVEMENTS FOR SMALL ROOMS

Orientation: Assuming you're in a normal rectangular room, orient your mix position so the speakers are facing the long way into the room. The two most important goals are maintaining an equilateral triangle having left/right symmetry within the room, and placing yourself as far as possible from the surrounding walls. Having the mix position slightly forward of the halfway point yields the flattest low-end response, and the ideal speaker height puts the tweeters level with your ears.

Speaker placement: Once the basic placement of your loudspeakers and chair are correct, you can try the speakers at different distances from the front wall to see which yields the smoothest sounding bass response. If your room is small, you may have no choice but to put the speakers flat against the wall. That's perfectly acceptable, and many active monitors include switches to compensate for this placement, which tends to boost bass somewhat. But if you have some space to work with, placing the speakers a few feet in front of the wall often improves the response by making it flatter in the bass range.

Decouple your speakers: Sound travels through solid materials faster than through air. So when loudspeakers are sitting on a desk, low frequencies can transmit from the speaker's enclosure through the desk and floor and arrive at your ears before the waves in the air. If the secondary path is strong enough, the phase shift caused by this time delay contributes to low frequency response errors. One solution is to buy speaker isolation pads made for just this purpose. You can optionally make pads from rigid fiberglass or even kitchen sponges—the kind that become stiff when dry work best for this.

Mid/High frequency absorbers: There's a significant difference between materials and products that absorb from 300Hz and up and those that are effective at lower frequencies. One common treatment that helps a little is heavy blankets or thick bedding hung on the walls. However, these materials absorb only the highest frequencies; what almost all rooms really need is broadband absorption. Treating only the high frequencies may actually be worse than having no treatment at all.

The reason why so many studio designers specify panels made of acoustic foam and rigid fiberglass is because they absorb to a lower frequency. For a given thickness, rigid fiberglass absorbs to about an octave lower than foam (for example, typical foam that's two inches thick is useful down to 500Hz; rigid fiberglass of the same thickness absorbs well to below 250Hz). Fiberglass is also fireproof. The downside of fiberglass is that it must be covered with fabric to prevent the fibers from escaping into the air. In either case, though, don't make the common mistake of covering the entire room with thin material. This makes the room sound creepy and lifeless, yet boomy at the same time.

Reflection free zone: One common cause of poor stereo imaging involves early reflections — echoes that arrive within 20 milliseconds of the direct sound from the loudspeakers. Instead of sounding like echoes, early reflections fuse with the direct sound to create "comb filtering" effects, and therefore obscure clarity. Worse, if sound from the left speaker bounces off the right wall into your right ear, or vice versa, imaging suffers. The solution here is to place 2x4-foot absorbing panels in selected locations on the side walls and the ceiling. Place one panel vertically on each side wall halfway between the loudspeakers and your ears, and a third panel horizontally on the ceiling, also halfway between you and the speakers. To be sure you have absorption in all possible early reflection points, sit in the mix position while a friend places a mirror flat against the side walls. Any surface where you can see either loudspeaker in the mirror should be covered with absorption. You can also do this on the ceiling by attaching a hand mirror to a broom stick with rubber bands.

Bass traps: Although reflections at mid and high frequencies are more easily noticed, low frequency reflections are more damaging. Any decent bass trap should have substantial absorption at 300Hz and lower—hopefully much lower. The least expensive bass traps are 4-foot bales of fluffy fiberglass, left in their plastic wrapper, and stacked in the room corners. They may be big and ugly, but they perform reasonably well, especially given their low cost. The next step up is rigid fiberglass panels wrapped in cloth and placed straddling the room corners, including the ceiling corners. Commercial bass traps include foam corners, corner mounted rigid fiberglass, and wood or fiberglass-based membrane traps.

Many people believe that bass traps should be tuned to specific frequencies, based on the room dimensions. But this doesn't take into account the fact that severe peaks and nulls exist in all rooms at all frequencies. Therefore, the best bass traps for all rooms are those that absorb the entire range of low frequencies.

Diffusion: Diffusion minimizes the damaging echoes and comb filtering effects caused by reflections off nearby walls, though it's used most often in larger rooms. Diffusors range from small, lightweight plastic panels that resemble a city skyline, to large expensive Quadratic Residue Fractal designs. If the room and budget are both small, simply placing absorber panels on troublesome surfaces makes sense. But when money is no object and you want to retain as much liveness as possible, diffusion is very useful.

Room EQ: Trying to use equalization to correct low frequency room problems simply does not work. The peaks and dips shown in Fig. 1 are very localized; if you move even two inches away the response changes drastically. So while EQ can help a little to reduce mid and high frequency response deviations, it is inappropriate for the more damaging low frequency errors. As the old saying goes, "equalizing a room with poor acoustics gives you an equalized room with poor acoustics."

Egg cartons and non-acoustic foam: These do not work either. Egg cartons are far too thin to be useful, and non-acoustic packing foam lacks the porous "open-cell" structure needed to absorb sound waves.

Styrofoam panels: You've probably seen these lightweight, inexpensive panels at home supply stores. They're about an inch thick, and often pink. Unfortunately they have no useful acoustic properties, other than the fact that they make strange noises if you hit them with a baseball bat. —*Ethan Winer* ●

Songwriting Tips From the Hitmakers

If you think you can teach someone to write a hit song, why not show them how to conjure elephants from Hershey bars while you're at it? Hit songs are voodoo spells dressed up as songcraft. The real kick is that virtually anyone can invoke the basic incantation—all you need is a melody, some lyrics, and a few chords. But what turns those simple elements into a work that inspires massive consumer frenzy is beyond human comprehension. So why worry about it? As the wise old hunter used to warn in '30s African safari films, "You could waste your life searching for the elephant's graveyard."

So rather than get lost in unsolved mysteries, let's focus on the tangible structure of pop songwriting. Songwriting is, after all, a craft, and the basic components of that discipline can be readily examined.

To help you improve *your* songwriting chops, we've enlisted the aid of several well-known songwriters, most of whom have been lucky enough to strike that mystical connection with the public. Feel free to, ahem, "borrow" a few of their ideas to use as foundations for your own songs.

JOHNNY RZEZNIK

"The one thing somebody told me which helped me a lot was, 'The A material definitely lies beneath the B material.' You have to let yourself go, and accumulate a lot of crap, and then sift through it to get to the good stuff. You can't rush it. A lot of times I'll pick up the guitar and play, and if a song's not coming, I do something else— clean the house, listen to some music—and come back to writing later. There is a time for your internal judge to come in and make the call, but you have to free yourself from that in the beginning stages of the creative process. I've often stifled myself because I was trying to bash the music into shape instead of letting it lead. When I shut off the judge in my head, music usually comes quite easily."

BJORK

"Songwriting is like a thunderstorm building up inside me. If I don't write songs, I get all bottled up. It's almost like a survival mechanism. For me, music has to have a little speck of intrigue or the unknown. Also, I'm an old-school romantic in the sense that even if you write songs about dark stuff, the root of the song should be about going through the tunnel and coming out on the other side with a happy ending. I'm not into songs that are just about self-pity or self-indulgence. I usually look at songs as little trips that show you going on your way to some other place."

DAVID CROSBY

"Very often, ideas come to me when I'm falling asleep—when the busy mind gets out of the way, and the intuitive, imaginative mind gets a shot at the steering wheel. My friend, science fiction writer William Gibson, told me, 'It's an established phenomenon. The elves take over the workshop. That's why all writers keep a pen and paper by their bed.'"

JAMES HETFIELD

"I've got so many notes and little things that I write down every day. Some of those lines are really important, and I'll just take one and move on from there. Sometimes, there's more than just a line, and sometimes there's nothing. There's a song title, and you just go. That's the beauty of it. Even if I do have an idea of where I want to be, I might end up somewhere else—which is even cooler. But you can't get to that spot unless you travel the other road. You might be all frustrated, and then one line will just open up so many doors."

David Crosby, Graham Nash, and Stephen Stills

RAY DAVIES

"I'm very scathing about art school, but it really taught me to look and to translate. I would go out to a location, do some sketches, take the project back to college, and then turn it into something. I was good at that. To gather material for songs, I would watch the way people interacted—although, generally, the people I wrote about didn't interact much in the world. You have to find a way to get your head working, and really look at something that's seemingly nothing to look at. You must discover some element to take out and use in your work. People don't look enough. So much is handed to us by television, newspapers, and other media that we don't really look at anything anymore.

"I tell writers to do whatever it takes to keep your brain sharp. I'll find something in the

newspaper and say, 'What would I do if I had to write that as a song?' I did a British TV series in the early '70s where I was given an assignment on Thursday, wrote the song on a Friday, and it was in the show on Saturday. That kept me sharp. Every writer is different—everyone has their own handicaps, assets, and needs."

SHAWN COLVIN

"I'm the type who has to get up every five or ten minutes and get a drink of water, or pretend I'm interested in something else. But often that's when I solve a problem. There's a strange little important moment when you say, 'I'll write that down. That might be something.'"

CHRIS CORNELL

"It's easier to be 'vocally creative' over odd-time riffs. In a weird time signature, there's really only one thing you can sing, and it jumps right out at you. Straight-four riffs have been around for so long that you can end up writing the same song 500 times."

WILLIE DIXON

"I get a thing in my mind—the words that I would like to say, and the expression that I would like to have them said in to get the best results. I would like the song to be part of life, because I've always felt like blues was the facts of life being expressed to people that didn't understand the other fellow's condition. This gives me the chance to say the things that I felt people would want other people to know. This is the way I mostly wrote my songs."
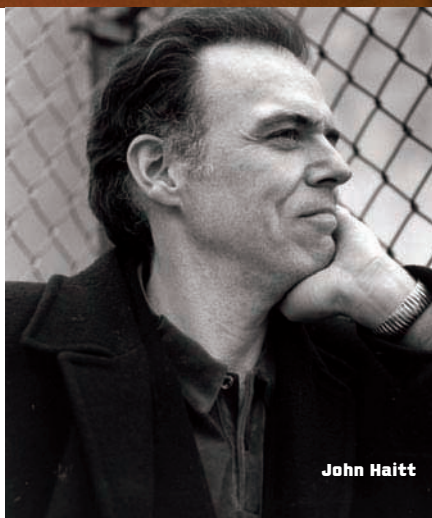
JOHN HAITT

"About 50 percent of my lyrics are autobiographical, and about 50 percent is making up stuff, adding to, or out-and-out lying [*laughs*]—which I like to do quite a bit. It's the artist's duty!"

AIMEE MANN

"Most lyricists don't want to write meaningful stuff. They want to write stuff that *sounds* meaningful, which is a different thing altogether. They rely too much on the standard rock clichés. Good writers turn the clichés around, so at least you know they've thought about it, rather than saying, 'Well, I've heard this 800,000 times, so it must be good!' I try to avoid certain images that I feel have been done to death, such as:
  • Weather and the elements. Rain, storms,

John Haitt

clouds, snow. If one more person prays for rain, I'll scream.
  • Geography. Mountains, rivers, valleys, streams, oceans. Usually someone is crossing or climbing one or more of these to get to his or her love.
  • Any reference to angels or hearts.
  • Traveling or rambling from town to town. Either in a train or car with your baby, or alone, searching for, or running away from your baby.

  • Use of the word 'baby.'
  • Gambling. Rolling of the dice in any way, shape, or form. Ace of spades, queen of hearts, etc.
  • Weapons. Usually guns or knives.
  Many of these clichés were originally written by great writers, but now they're misused over and over again. I'm guilty of some of them myself. I don't consider myself a great writer, but I would like to think that I can at least proofread."

PAUL WESTERBERG

"When the title comes, it all falls into place, because the title sets the mood. For instance, 'Mannequin Shop' was a silly title that came from a *People* magazine article about plastic surgery. Once I decided I was going to write a disposable little pop song about something current and ridiculous, it just flowed. If I hadn't come up with that idea, it would have been a laboring effort. But once you make up your mind that this is going to be a cute one, no two
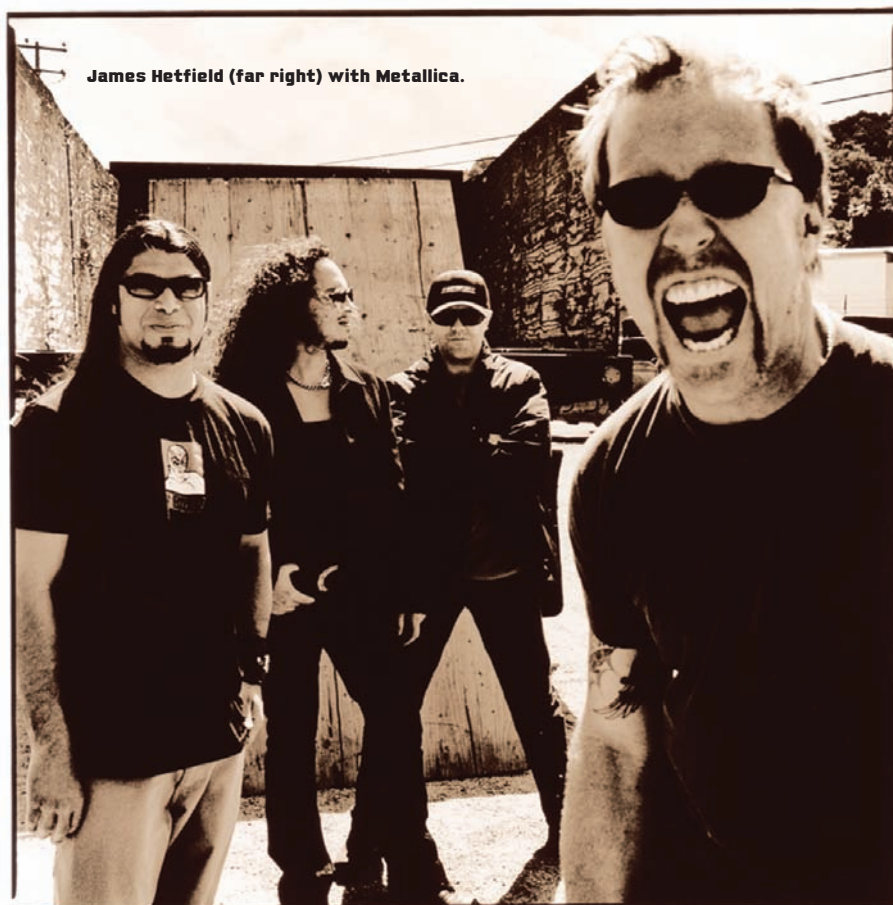
James Hetfield (far right) with Metallica.

ways about it, you can go for it. Now, if it's a rock and roll song, I'd say get your gut feeling out—whatever it is. Even if you think, 'Oh, I can't say that,' go ahead and say it. Spit it out, and if you're going to be a fool, be a fool."

CHRIS CORNELL

"Sometimes personal lyrics can be endearing and cool, and make you feel close to the writer. But, a lot of times, you get this feeling of 'Why do I care? So you had struggles with your relationship—good for you. Everybody does. F**k off.' I'd rather go more towards the Syd Barrett school, and write about shoelaces and banana skins, and make it all seem congruent in this weird fantasy world that makes you want to go there when you get off work."

NEIL FINN

"I like to leave as much as possible in the early stages to a kind of unconscious process. I'll find a place where there are no distractions, get into a dreamy state, and just mess around with chords and chord sequences. Eventually, little melodies come out, and it's really a matter of recognizing what's good. You have to be careful not to think too much about things. For example, my wife—who doesn't write songs—will get in a buoyant mood, and just sort of sing along with some chords I'm playing. And, sometimes, the melodies she sings are as good as anything I could write. I think that's because she's just kind of going with the moment, and letting something come out that's very unconscious. And that has to be the beginning of songs. If you're too disciplined in the early stages of the writing process, then there's a good chance your songs will sound a bit flat or uninspired."

RAY DAVIES

"I recommend minimalism wherever possible. If something is simple, and the observation is true, why burden it with a melody that takes it into some other realm? You must find an emotional moment in a song, as well. A film can only go for about seven minutes before it must have an emotional moment on the screen. Otherwise, the audience gets bored. With songs it's the same, except that you have three minutes—not 90 minutes—to make everything happen."

ROBBIE ROBERTSON

"I try, to the best of my ability, not to think the song to death. The main criteria for me is if it's

Lyle Lovett

working on an emotional level. If I'm writing a song, and something is happening that has the potential to give me goosebumps, then I'll want to pursue that path. I got into music in the very beginning because I heard music that gave me chills. And I thought, 'I want to do that. I want to give somebody else chills!' So, for me, it's all about discovering the emotions in the music."

PAUL WESTERBERG

"You may think you have to be really aggressive or flashy on the guitar, but, more often than not, that gets in the way of what the song is saying. You have to make up your mind: 'Am I going to be a player, or is this going to be a song?' Don't worry—there'll be a spot in the song for someone to show off—whether it's you or another guy."

LYLE LOVETT

"There are varying degrees of success when you're trying to express an idea. I think the most important ingredient in a song is the idea, or what you're trying to say. If you have a clear idea of what you want to say, then you know when you have said it, and the song is finished."

CHRIS WHITLEY

"An 'intentional' songwriting approach, is where you pick a topic and then write about it. When you come at a song like that—with a presupposed literal intent—you block yourself, and your subconscious can't speak. Howevever, when you pull something from your subconscious, you get visceral metaphors, rather than literal or literary metaphors. It's

not exactly a new idea. I think Talking Heads explored it on *Remain in Light*, and Bowie was definitely making up lyrics and melodies on the spot when he recorded *Scary Monsters*. This approach leaves you open to discover what really works on a soul level.

"For example, experienced writers often disregard simple chord progressions as boring. But sometimes a vocal melody can sit on top of a simple progression in a way that makes the song special. It goes beyond the literal meaning of the lyric or the catchiness of the hook to that elusive thing—I call it 'resonance'—that makes lullabies and gospel music so timeless. I also use subconscious writing as a way to connect with the listener, because I think the stuff that resonates with people is pretty universal. It's like, how much can sex change in a couple of thousand years? Culture can change, but, on a soul level, people need the same things."

NEIL FINN

"To some extent, a song either has it, or it doesn't. If I can form an emotional connection with a piece of music, then it has worth and I'll pursue it. If it just feels slight, or if I can admire it on the surface, but it doesn't actually make me feel anything, then it's gone."

BEN HARPER

"Don't be discouraged by writer's block. Writer's block just means you need to listen to other music. That's how new ideas come, and how musical inspiration is passed on—through other music and other brilliant artists. You can re-listen to the stuff you love, but that's not always going to pull you in new directions. With that mental downtime, you can listen to Lee Scratch Perry or Jeff Buckley or the first Pearl Jam record. You can listen to Tim Hardin, Delta blues, country, Emmylou Harris, Dolly Parton, Paul Weller, and Run D.M.C. Listen to whatever pulls you in different musical directions so that you don't start copying yourself."

RICK NIELSEN

"There's no real voodoo in writing guitar riffs—you just look for something that catches your ear—but a good lick should be easy to play. If it's unnatural to play, it should be Mahavishnu Orchestra or something! I mean, listen to Hendrix's 'Purple Haze' and 'Foxy Lady,' or 'Last Time' by the Stones—they sounded neat the first time I heard them, and they still sound

Write It!

good today. I never get tired of hearing those licks. Sometimes it's the simplicity that makes a lick timeless. Too many guitarists get hung up on not wanting to sound dumb. It's like when I saw Mike Judge on *Late Night with David Letterman*, and Dave was giving him a hard time about *Beavis and Butthead*, saying the show was so stupid that anyone could have done it. And Judge just answered, 'Yeah, but I did it first!' So, think about 'Purple Haze.' Anybody could have played that lick, too—it's simple—but nobody did. Not until Hendrix. The bottom line is that there are 12 notes available, and you have to do something with them. Make them work for you, or make them work against you. And remember: Everyone else has those same 12 notes, so it's always going to be interesting and challenging to come up with a unique signature riff."

LIZ PHAIR

"I typically write progressions visually on the fretboard—and also tactilely. Rather than thinking, 'Oh, this is a *G, A, D* chord progression,' I'll look at where my hands physically rest on the neck, and kind of reach my fingers around to find other chords. Otherwise, if I have a chord progression that I like, and I don't know what to do next, I'll think, 'Is this low on the neck? Well, then I'll jump really high.' I try to keep the changes real contrast-y. Either that, or I'll just kind of crawl around like a spider with my fingers on the fretboard. I do conceptual tricks to break formulas and inspire new directions. I'm really brainy about my songwriting on the guitar—but in an ignorant way."

NEIL FINN

"It's a bit cruel perhaps, but I think it's better for writers to get to a point early, rather than later, where they realize that they have some abilities but they don't have anything that sets them apart. That's an awkward row to hoe, because you might end up struggling for years—in your mind, putting all the right pieces together and making impressive music—but never produce anything that has an obvious character.

"What's weird to me is that people continually make the mistake of trying to copy other people's styles. I mean, I did it to some extent when I started off, as well. But, at some point, you have to realize that the flaws and weaknesses in your style are exactly the things that give you character. You should allow those flaws to exist, and, in fact, work on them. It's the

Robbie Robertson

funny way that you get from the chorus to the verse—that doesn't sound like how anybody else would do it—that is actually what will make people notice you. If you spend too much time learning other people's licks on guitar and also try to sing like somebody else and write songs like somebody else, you run the risk of losing yourself in the process."

ROBBIE ROBERTSON

"There's something to be said for experimentation—breaking some of the boundaries and challenging yourself. There's nothing wrong with sitting at the piano, writing some nice chord changes, putting a melody to those changes, and adding a potent lyric. But there are other means of discovering the song. I don't know of any right or wrong, or good or bad, in any method. I think whatever inspires you—and provokes you into getting at what is deep down inside you—is the best method.

"Using an unfamiliar method, however, can lead you down a path where you don't resort to the same type of structure and melodic intent. For some of the songs on *Contact from the Underworld of Redboy*, I'd make a strange noise on the guitar, then record it and loop it. Or I'd program a drum loop. Often that little noise and that little rhythm would make me want to write a song, so I'd improvise over it until something developed. Now, this is a different writing process from the Cole Porter method of sitting at the piano with a cold martini, but I find it's very healthy—in a creative sense—to keep yourself slightly off balance."

RAY DAVIES

"I recommend that writers record all the time. When you're writing, you're doing this balanc-

ing act between the instinctive thing that leaps right out of you and the refinement of that moment. The first time you sing a line, you might use a weird phrasing, or put a line on the upbeat rather than on the downbeat. Shifts like that will change everything, and you have to document what you did. You see, most writers now aren't Leonard Bernstein—thank God—who actually notated everything from day one. Most people come into songs by accident—including me. They get an idea, think they're doing one thing, but they're actually singing in 3/4 or 6/8 or something. But you can always play the tape and say, 'Oh, that's how I did it!' On the other hand, writing down ideas is such a finite thing, and sometimes you don't write what you hear in your head. It's very difficult to come from the dream to the page."

LIZ PHAIR

"Recording is the weirdest thing about being a songwriter, because it stops the songwriting process. It freezes that version in time. You don't know what the song could have become if you had kept going, but stopping may be the merciful thing to do."

RICHIE HAVENS

"I don't claim to write songs. I write them down, verse by verse, without changing a thing. And I'm often surprised when they turn out to have deeper and higher layers of meaning than I'd first imagined."

RICHARD THOMPSON

"Someone very wise once said, 'Copy everyone except yourself.' Looking at other people's ideas and twisting them to fit your own style is a good thing. You can also catch yourself traveling down the same road you've gone down before, and nip it in the bud right then and there. You can say to yourself, 'I've used the same chord sequence before—how can I twist it slightly to make it into a different chord sequence? Can I do something no one has ever done before?' It's important to keep searching, and not go for the obvious idea."

RAY DAVIES

"Having a band perform your work is critical. That's what I call dramatizing your music. When I use this word "drama," I don't mean it flippantly. If the dramatization doesn't work—which is you performing the song—you should look at it again." ●

Top Producers Share Their Studio Secrets

WILL.I.AM

Selected Credits: Black Eyed Peas, Michael Jackson, Usher, Cheryl Cole.

"The role of the producer is the same as it ever was. There are just different tools to execute your thoughts and ideas. The tools have made it a little bit easier to articulate your thoughts. And as they are more user-friendly to aspiring producers, they can bring forth the things they have in their heads, and, as a result, you're going to get a lot of young guys doing all these crazy tricks. But the one thing that technology can't mimic is that natural raw magic. Capturing that is worth more than any crazy trick. You can do all the editing tricks in the world, but natural magic is natural magic, and capturing that is priceless.

"You see, what I do is no different than what somebody reading this magazine could do. I'm no better than nobody else. I'm not the best singer, I'm not the best keyboard player, and I'm definitely not the best producer. But it's all interpretation. I believe my interpretation, and I have a strong belief that somebody else will believe it—that he or she will appreciate my interpretation of music. So that's all it is—perspective and interpretation." —*Lisa Roy*

GEORGE MARTIN

Selected Credits: Beatles, Jeff Beck, Mahavishnu Orchestra, Ultravox.

"If something isn't happening, I try to find out *why* it's not happening. There can be any number of reasons. Perhaps the artist is not really well, or is in a bad mood. His or her instrument might be giving them problems, or he or she may not like the song they're doing. The idea is to remove anything that is obstructive. You have to get to the root of the problem, and then move onwards.

"One of the primary things about being a producer is that you have to be patient. But if a situation is deteriorating rather than improv-

ing—and it goes beyond a certain point—you also have to learn to cut your losses and say, 'Okay, let's forget it. Let's start again tomorrow.' You can dig yourself into the ground if you're not careful. Having said that, you should be open to things that don't go as planned, or that might even be mistakes. I think that's often the excitement of music. The odd mistake—it doesn't matter. In the end, it's the music that matters. Some musicians get obsessed with their own navels." —*Michael Molenda*

BOB CLEARMOUNTAIN

Selected Credits: Bruce Springsteen, Rolling Stones, Bon Jovi, Paul McCartney.

"When I'm mixing, I start by putting all the faders up—a sort of very quick rough mix. Usually, I'm unfamiliar with the recording, so while watching the channel meters, I'll solo each instrument briefly to find out its contribution to the overall picture. I'll play it through once with the vocals up to have an idea of where the lyrics are going, and get a picture of what the mood should be. I'll play the tune down several times, sometimes rewinding over certain sections where instruments or vocals are entering, until I have a good idea of what each instrument or vocal sounds like so I can quickly identify them later in the mix. While I'm doing this, I'm also trying to put the elements in a perspective that makes sense with respect to panning and levels. I'll then begin to EQ instruments that don't seem to be sitting properly after adjusting levels and panning. After that, I might work on the drums and bass a bit to get a good basic rhythm thing happening, or I might find an appropriate lead vocal effect, or perhaps experiment with how the various instruments play off each other in the stereo picture. I might patch in an outboard compressor or EQ on an insert if an instrument or vocal needs it, and maybe try some delays or reverbs to see what might add to the vibe." —*Jeff Anderson*

MICHAEL BEINHORN

Selected Credits: Marilyn Manson, Ozzy Osbourne, Red Hot Chili Peppers, Soundgarden.

"I record individual guitar tracks in mono, and I like to layer tracks. I always begin with one or two guitars per channel, but you have to be open to the possibility that things will sound better done another way. I'm a big fan of the humungous wall-of-guitars approach, so it's a matter of trying to fit everything in. I place the mics as close to the speaker cone as possible. I don't like ambient sound, so I don't use room mics. I don't use compression when tracking guitars, because there's usually a tube in the amp that's already doing a lot of compression, and I don't like to spoil it. Additional compression also tends to muddy the top end, and one of the nice things about high-gain amps is that they've often got amazingly clear and beautiful top end. Sometimes, I've blended synthesizers in with the guitar sound to modify it, because, tonally, a synth does something to a guitar that nothing else really can." —*Barry Cleveland*

GEOFF EMERICK

Selected Credits: The Beatles, Jeff Beck, Cheap Trick, Supertramp.

"A lot more thought needs to be given to a sound before it's recorded. In the Pro Tools era, this fact gets overlooked. You can't have a bad sound in the studio, and think you're going to make something wonderful out of it. In the Beatles' days, it took quite a few hours just to craft the sounds from John's and George's amps. Part of this was because we were recording in mono—which makes it more difficult to give each guitar its own space when everything is blaring out of one speaker. Another part of it was that John was the aggressor and always played flat-out, whereas George was more delicate. Then, the only EQ we had, other than that on the mixing desk, was on the guitar

amps. And we'd often record both of their guitars on one track! It took hours to alter those extra little 1dBs of this and that to give the guitars their identity. And this was all done before the tape rolled. These days, everyone thinks you can just open Pro Tools and create a hit. But the overall sound is really down to the vibe, the feel, and the song. Nobody even talks about the song anymore. I'm still using basically the same technique I used back in the Beatle days—which is to position a Neumann U47 wherever the guitar or amp sounds the best. I do experiment with ribbon mics, dynamic mics, unconventional mic placement, and blending three or four mics together, but I almost always end up printing just the lone U47." —*Michael Molenda*

EDDIE KRAMER

Selected Credits: Jimi Hendrix, Led Zeppelin, Deep Purple, Kiss.
"Don't track guitars in isolation. Rehearse your material so you know what the hell you're doing when you walk in the studio, track the thing as live as possible with a band, and if you must punch in a guitar part, don't belabor the point. After all, it's got to have some hair on it. I always printed reverb and compression to tape, and committing to a sound while tracking stays with me to this day. Otherwise, you wind up editing in Pro Tools for months. I mean, 'Come on guys, it's rock 'n' roll!' It certainly ain't science, and the more records sound like science projects, the more they sound the same. The reason why Zeppelin, Hendrix, and the Stones sound so marvelous is because there was crap on those tracks. There was dirt, hiss, noise, and mistakes—that's all part of rock 'n' roll. Make it perfect, and it ain't going to give you feel. —*Barry Cleveland*

DAVID SCHIFFMAN

Selected Credits: Audioslave, Rage Against the Machine, System of a Down, The Mars Volta.
"Ninety-nine percent of great guitar tone is in your fingers, so keep working on your technique. And don't let the guitar be the boss—dig into the guitar like you want to beat the crap out of it. There are too many players who are too timid around their instruments, and when your playing is tentative, it's reflected in your tone." —*Barry Cleveland*

CHUCK AINLAY

Selected Credits: T-Bone Burnett, Dixie Chicks,

Andy Johns

Bob Clearmountain

will. i. am

Thom Russo

Mark Knopfler, Willie Nelson.
"For miking acoustic guitars, I rely mostly on Neumann KM184s, KM84s, and KM56s, and, often times, I'll do an X/Y pattern with a pair of them—maybe four inches from the body near the 12th fret. That gets the typical Nashville strumming acoustic-guitar sound. If I need a brighter and more present sound, I use a pair of Audio-Technica AT4051s. For a chunkier rock sound, I place a Neumann U67 about two-and-a-half feet straight out from the soundhole. I EQ and compress while tracking. For acoustics, I use a Universal Audio 610 mic preamp, and I pull out a little bass around 70Hz, and I add a little top around 10kHz. Then, I go into a Joe-meek SC4 compressor to create a big sound that's right in your face." —*Barry Cleveland*

CHRIS LORD-ALGE

Selected Credits: Avenged Sevenfold, Third Eye Blind, Slipknot, Stone Temple Pilots.
"I believe there's only one way to get in the business of producing. You have to find the nearest recording studio that has somebody cool in it, and beg, beg, beg to make the guy behind the board coffee. Beg to clean the toilet. Beg to work there. Be a fly on the wall. Be in the room with the guys who make hits like Bob Clearmountain, or Tom Lord-Alge. Be in the room with Andy Wallace. Do whatever you can do to get in the room. Take note of everything they do, and find a way that you can do it for yourself—and do it better. Learn the techniques of the vanishing art of recording from the guys that really know how to do it.

"When you are starting out, you are in the prime time to absorb—to discipline yourself. If you're a slob, it's not going to work for you. Be ready to work 16 hours a day. Make friends, and do it all for nothing. Get up off your ass, and put down the bong. Get your hands out of your pants and head to the studio. I was 12 years old when my mom took me to the studio, and I wanted to be there every single day. That's the love for it. All the stuff you need to learn, you really need to learn while you're young. Listen to the music—don't just look at it. Nobody cares what the impedance is—all they care about is when you can walk into the room, set up a mic, turn the knobs, hit Record, and make everybody go, 'Wow!'" —*Jeff Anderson*

ANDY JOHNS

Selected Credits: Led Zeppelin, Rolling Stones,

Free, Eric Clapton.

"When I was trying to record 'When the Levee Breaks' for *Led Zeppelin IV*, I'd stand next to Bonham's kit, and then I'd go in the control room, and think, 'This is not translating.' We were at this farmhouse mansion, which had a big hallway with stairs going up to landings. So I pulled Bonham out of the room with the rest of the band, and I put him on his own in this hall. It hadn't ever been done before. I used two fairly directional mics—Beyerdynamic M160s—positioned about ten feet away. You get much past ten feet and the sound starts flamming. Then, I just compressed the hell out of the mics, put on this Binson Echorec [*analog delay unit*] that Pagey [*Jimmy Page*] had—that was his idea. Now, it's a classic drum sound, and now everybody uses room mics." —*Dean Kuipers*

JOE BARRESI

Selected Credits: Kyuss, Queens of the Stone Age, Coheed and Cambria, Tool.

"Besides using close mics, always capture the ambience or the bigness of the band sound. And *never* use conventional microphones—a big thing. For Kyuss, we'd never put a Shure SM57 in front of a cabinet. It was always, 'Let's try this mic. What does that sound like?' Even when it came down to tube mics, it was always the oddball tube mic no one else liked that we ended up using. Like [*Kyuss and QOSA guitarist*] Josh Homme says, 'Use the crappiest crap incorrectly, and you'll get the best sounds you've ever heard.'" —*J. Bennett*

MESHELL NDEGEOCELLO

"I find—as an artist producing other people's music—it's most important to create a comfortable atmosphere for the artist, help facilitate their ideas, and help them realize their vision, as opposed to creating something in my own image." —*Chris Jisi*

MATT BAYLES

Selected Credits: Soundgarden, Pearl Jam, Mastodon, Minus the Bear.

"I just try to get people to play their parts right, and make sure I get the best sounds with the gear they bring to the table. In the case of Mastodon, it's Marshalls, not Mesas, for example. It's their identity as a band, and my job is to make sure they play it right, and make it sound good without having to alter it too much." —*Shane Mehling*

KILLING CLICHES

As recording artists, we all want our music to have its own identity, one that establishes us apart from the millions of others also making music. Given that fact, why is there a common complaint that too much music sounds the same these days? How can we avoid falling into this vicious trap?

Many of us learned how to play our instruments by emulating musicians we were drawn to. There's nothing wrong with that—it's called inspiration. Without inspiration, we have little if anything to express through our playing. But what happens when that inspiration goes a wee bit over the line and turns into sheer emulation? It may mean we have learned to play our instruments well, but that we need to find our own identity as opposed to simply copying what came before us.

For instance, let's take the guitar. Many guitar players are adept at rattling off solos they have learned note for note from their heroes. This practice can teach a musician quite a lot of important things at once such as technique, ear training, dynamics, and construction. Sadly, what will happen all too often is these learned solos become relatively easy to play while the important task of composing something original can be a difficult one. How does one overcome this problem?

I suggest such a player should begin closely studying other instruments besides the guitar. This may seem odd, but the other instruments might very well help suggest musical ideas that are not guitar clichés. It sure seemed to work for Keith Richards when he came up with the signature guitar riff to 'Satisfaction' by wanting it to sound like a tenor sax!

This technique can go further than just musical instruments when you apply the same type of study of vocalists. Find out what makes great singers so compelling and experience how they can influence your approach to the guitar. How about gui-

tar solos from a singer's point of view? Chances are the results will be lyrical.

This subject is a two-way street. Singers can learn tons of inventive ways to sing from musical instruments. Frank Sinatra used to say he got his famous phrasing from horn players, fashioning his vocal style to sound like a horn player. I see a trend forming here: Everyone seems to be a frustrated horn player!

Often, drummers will fall into clichés as well. In the studio, when a drummer is lacking in originality, he or she might play the same drum fills over and over in practically every song. Bring this to your attention in the pre-production phase of the project. Ask yourself: Are you consciously making adventurous choices and interesting rhythmic decisions or are you simply doing what feels natural and comfortable to you? You might be surprised to find out what you are doing in the first place! Try to avoid styles that are indistinct, redundant, and downright boring. Break down each song, work to not play out of habit, and focus on getting what serves the identity of the song best.

We could discuss other instruments (as they all have shop worn clichés), but I think you get the gist. So many times we will play on automatic pilot when it might behoove us to search for the real essence of each song we play and make the effort to capture the exact approach needed to make them all shine. We can't get lazy and rest on our laurels simply because we can play well—we need to dig a little deeper!

I encourage you to stay inspired and adventurous in your playing. Listen to your heart and play from it. It may be conveying pain, joy, melancholy, humor—anything goes. Each and every song has an emotion, so find that emotion in the music and lyrics, then simply play it from your own personal place. Nobody else can come from that exact place but you. —*Scott Mathews*

WHAT'S YOUR PRODUCTION STYLE?

Unless your name is Phil Spector—and it's the '60s—being a producer doesn't mean you get to command a bunch of lackeys to render the fruits of your genius. Most recording projects are collaborative endeavors among a producer, an artist, and an engineer. The producer is simply the one responsible for ensuring the project gets done. That's harder than it sounds. Bands disintegrate, money runs out, songs crash and burn, equipment self-destructs, engineers erase tracks, and so on. And, while you're steering a project towards that final mix, you also get to be the artist's therapist, cheerleader, and scapegoat. Lucky you!

So, as producers typically must deal with a mammoth load of creative baggage and "project management" activities, it's important to establish a studio personality and work ethic that can get things done without driving the artists to mental disintegration, or giving yourself an ulcer the size of Pluto. Here are a few helpful personality traits you may wish to consider popping into your personal studio survival kit. Then, cross your fingers.

SURRENDER YOUR DICTATOR'S HAT
Guess who's the boss? It ain't you! You have been hired by the artist, and that often means giving the customer what he or she wants. If a client doesn't dig your suggestion to rearrange a rock ballad into electronica, don't take it personally. You can suggest, harangue, and plead, but if the real boss doesn't buy your idea, just get on with making the best record you can.

BE NURTURING & WISE
It's usually a mistake to push artists beyond their limitations. A frustrated, insecure, or utterly defeated musician seldom delivers impassioned performances. Instead, strive to assess the artist's strengths and weaknesses, and then help them get their best stuff on tape.

BE STUDIOUS
Yes—do your homework! The client depends on you for cogent direction, so don't "wing" the sessions. Study the material until you know it as well as the artist. Also, schedule enough preproduction time to ensure that the material is well arranged and the musicians are well rehearsed.

BE CALM
When the doo-doo hits the fan—and it will at some point—the producer needs to be the one in the room who is a vessel of strength. The artists will be looking to you to make all the carnage disappear, forge a new direction, and deliver a fabulous work—even if the entire DAW session just crashed and burned. You may be freaking out yourself, but, trust me, joining the chorus of screaming, crying, and retching will only serve to push the emotional apple cart over the edge of the Grand Canyon. Stop. Breath. Access. Strategize. Fix. And do all of that while looking as if you always had the answer in hand. (Repeat as needed: "Serenity and strength. Serenity and strength. Serenity and strength.")

BE FUNNY
Nothing helps break the stress of creative work like moments of hilarity. You're not defusing bombs, so every minute in the studio shouldn't be wrapped in extreme focus and uber-serious demeanors. If you're not a comedian, don't try to be (see the next paragraph), but you can at least try to lighten the mood when things start getting too tense. Even subtle humor can help break the spell of angst that sometimes descends on creative projects. Of course, whatever you do to crack a few smiles, do not make fun of the artist. ("Hey, look at Steve making these kissy faces when he leans into the microphone. Let's all make the same faces back at him!") Unless you want a quick end to the session, the Don Rickles vibe should be left to Mr. Rickles.

BE REAL FOR REAL
It's the music business, so insincerity is ubiquitous. If you're working with smart artists—and pray that you are—they will see right through any phoniness you splatter over the proceedings, and they will not respond the way you want them to. In fact, they may lose respect for you at warp speeds. You know when you're "putting it on," so don't. Don't pretend to be something you're not just because you think emulating this or that behavior will make you a hipper, cooler, more revered producer. You are who you are. Find an honest path to artistic interaction.

NEVER SURRENDER
Do not release substandard work. Ever. If an artist has difficulty singing on pitch, for example, either help them get the melody, or pull out an auto-tuning plug-in and fix the bum notes. You can't send an apology with every CD: "Please excuse the crappy vocals. The artist is a horrible singer, and I was too bummed out to do my job." Your production work is judged on the tracks people hear—not feeble rationalizations about why you couldn't make a professional-sounding recording. —*Michael Molenda*

THOM RUSSO
Selected Credits: Audioslave, Babyface, Macy Gray, Serj Tanikian.
"As you work through a project, I don't know if you can necessarily keep fresh ears all the time, but I think that you *can* keep perspective—which is one of the most important things in recording. Because, face it, if you don't have perspective, you don't have anything." —*Jeff Anderson*

KEN ANDREWS
Selected Credits: Pete Yorn, Black Rebel Motor-cycle Club, Tenacious D, A Perfect Circle.
"Some artists are making the choice *not* to have their CDs so hot—to keep more of the dynamic range. I want the loudest part of my mixes to match everything out there, but the quiet parts should still have dynamics. I'm totally over having the loudest disc." —*Jeff Anderson*

Produce It!

PAUL OROFINO

Selected Credits: Cradle of Filth, Blue Oyster Cult, Golden Earring, Zakk Wylde.

"I've never EQ'd a vocal channel on the way into the recorder—*ever*! During mixdown, it depends on what I'm doing musically, and how the vocal has to sit within the mix. I'm a big fan of subtractive EQing. If I've chosen the right mic during tracking, I usually have to use less EQ during the mix stage." —*Rich Tozzoli*

BRIAN MACKEWICH

Selected Credits: Audio-post for HBO, ESPN, VH-1, TNT.

"One of the most important elements in getting a great voice recording is the headphone mix. It can't be too loud, or the talent may perform too softly. And if it's too soft, you can wear singers out by making them work too hard to hear it how they want it. It must be just right, so they can hear subtleties, mic placement, other track elements, and vibe. It is a very psychological thing. Try it sometime. If you want a vocalist to 'push it,' bring down the voice in the cans just before a take. They will naturally either move closer, or bring the volume up themselves. But this approach can also backfire big time, so tread lightly." —*Rich Tozzoli*

JIM ROBERTS

Selected Credits: John Entwistle, HBO, ESPN.

"To get a vocal track to sit better and be less 'mono,' bus the vocal to a stereo aux, insert a stereo delay on the aux, set the left side to 15ms and the right side to 30ms, mix the delay in—to your taste —while leaving the original vocal up in the middle. And if you blend it just right, the vocal opens up without any delay/verb/chorus artifacts." —*Darren Rust* ●

TOO MUCH INFORMATION

IN a world where bling is king, amassing more stuff than your neighbor is the surest path to cheap celebrity. But do more tracks ensure more-better recordings? Layering sounds is a time-honored technique in the studio, and scores of popular albums are stuffed to near bursting with stacks upon stacks of MIDI and audio tracks. The technique is so established, in fact, that many recording peeps wouldn't even consider something as mad-crazy as releasing a track populated with just a single guitar, keyboard, or vocal.

And yet, have you ever asked yourself whether an audio production really needs the equivalent of 13 diamond rings crammed onto ten stubby fingers? Are the gaudy gold baubles purchased at a mall jewelry shop obscuring the elegant and beautiful glow of a bona fide Tiffany design?

Metaphors aside, the test here is whether you're actually thinking about your sonic spectrum, or automatically defaulting to methodologies you read about in magazines such as this one. Overdubs, sweetening elements, textures, layers, doubles, counterpoint lines, and so on can absolutely add interest and vibe to a recording. But that doesn't mean these tasty morsels of aural candy are required ingredients of any musical production. Heck, that approach is not much different than believing the sential rock-guitar sound is always a Les Paul through a cranked-up Marshall.

A curious engineer/producer should constantly seek to discover which performances, tones, and arrangements bring a song to life. In this creative arena, there is no "default." What worked on one song, might not be the best initiative to foist on another. And avoiding safe, conventional practices should not be a process limited to musical parts. It should also inform mic selection, mic placement, signal processing, and every other aspect of life in the home studio.

CHALLENGE YOUR NEED TO PROCREATE

After I finished basic tracks on a recent studio project, the band's talented and inventive guitarist was desperate to overdub counterpoint lines and noises under a rhythm riff that absolutely ruled all by itself. The tone was fat and sassy, the part was memorable and propulsive, and the overall groove was Led Zeppelin good. So why did this artist feel the part needed so much more support? Well, I asked him. And he had no answer. No overdubs were tracked. Happy ending.

The "takeaway" on this point is that I was around to ask the critical question and demand a reasonable answer. It's obvious the artist would not have forced such a conceptual confrontation on his own—he was too absorbed in the idea of laying down textures. As a result, there was zero consideration of whether those overdubs would truly pump up the impact of the track, or serve to needlessly obscure the kick-ass lick that was already front-and-center.

Of course, enforcing productive debate is one of the producer's jobs, and it's easier when the producer is an outside party who is solely evaluating the quality of the recording. But if you are the decision maker, then you have to train yourself to ask and answer any critical arrangement questions.

Here's a tip: Try allowing at least a day where you don't record anything, or even listen to the tracks. Then, write down a few annoying questions as if you were a complete outsider to the project: Are all the parts necessary? Does anything sound too thick, too muddy, or too thin? After the vocal (or lead instrument), what is the main element of this work? Is that main element clearly audible and uncompromised by other elements in the mix? Be brutal. Regard nothing as precious. If you go into the process knowing that you want to keep certain parts, then the exercise is useless. The goal is to surprise yourself with a more objective assessment of what's in front of you.

THE OLD QUALITY VS. QUANTITY BATTLE

Back in the days when 4, 8, 16, or 24 tracks was all the real estate you got, people still managed to create some pretty astounding records. But, heck, maybe you believe "Day Tripper" would have sounded better with 16 more guitar tracks, or that "Foxey Lady" would have been much sexier with undulating layers of synth strings. The perception of audio excellence is obviously subjective, but you should at least determine a song's basic needs before you blindly pile on guitar, percussion, keyboard, and vocal tracks for no other reason than habit. —*Michael Molenda*
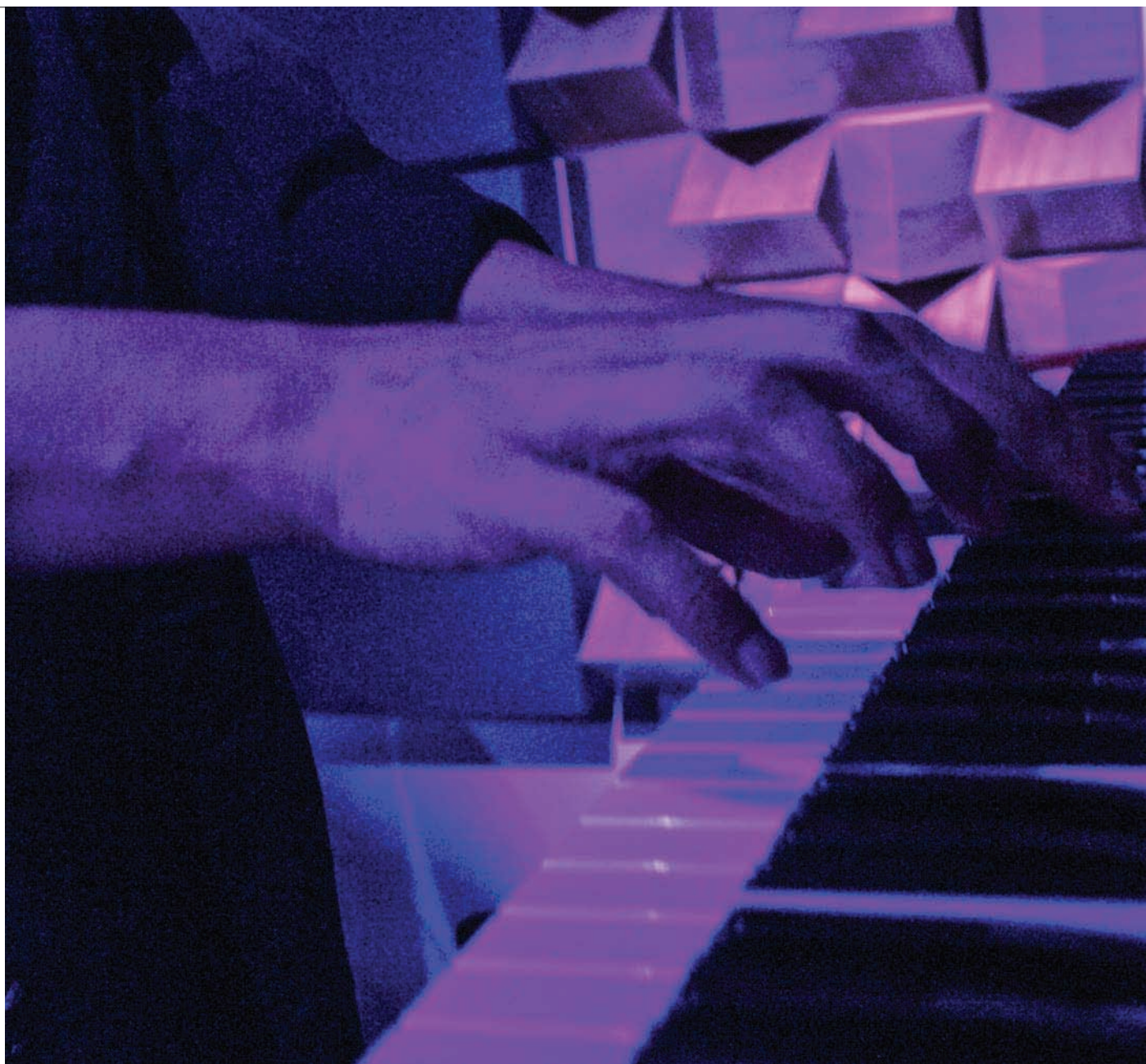
Recording Stunning Piano Tracks

3 Miking Strategies for Grand Pianos

Grand pianos may seem like formidable beasts to record, but they're actually as tame as any other instrument. Depending on the sound you're going after—in your face, bright, ambient, warm, and so on—success is typically measured by critical listening, mic selection, mic placement, and the artistry and dynamic sensitivity of the performer. Here are some starting points for devising your own approach to miking a grand.

OPEN THE HOOD

A pretty basic option is opening the lid of the piano and positioning a mic near the treble strings, and a mic near the bass strings. If you want more of a percussive midrange attack, choose a dynamic mic such as the Shure SM57

for each position, and place the mics about a foot from the piano strings. Move the mics until you get the preferred balance of lows, mids, and highs. If I want a little more complexity in the midrange—as well as sweeter highs—I trade out the dynamics for large-diaphragm condensers.

For a slightly odd sound, use a single condenser set to its figure-8 pattern, and position it right in the middle of the soundboard and about a foot high. Face the mic directly at the strings so that one side gets the attack of the piano, and the other side picks up reflections off the piano lid, as well as some reflections from the recording environment itself. You can also position the mic sideways, allowing the piano's bass, mid, and treble frequencies to become washed in a little more room ambience.

GO LONG

If you want less of a percussive attack, you can move the mics completely away from the piano soundboard. In this application—as the mics are not positioned inside the piano—you can experiment with opening or closing the top of the piano. Walk around the room and try to determine where you hear the sound you want—which, for me, is typically a magnificent

5 TIPS FOR TRACKING UPRIGHTS

If you really want a really powerful piano sound, forget pansy grands, and go butch with an upright. Many uprights—particularly the taller ones with longer string lengths—yield killer recordings, so forget about tip-toeing around that Bösendorfer grand. Here's how to capture upright piano sounds with impact, weight, and almost frightening presence.

GET THAT THING IN TUNE

Sure, you can say that out-of-tune piano is part of your sound, but to the vast majority of creatures with ears, out-of-tune piano is like having your eyebrows plucked with tweezers. Spend a couple of hundred bucks to make sure the upright is in tune and working properly a few days before recording.

LOCATION. LOCATION. LOCATION.

Experiment with moving the instrument around the room to find the best sounding spot. Because uprights are designed to be up against a wall, my experience has taught me that it is the best place to record them—especially for a real up-front and present sound.

TEAR THAT SUCKER DOWN

The main problem with uprights is the cramped size of their cases. The small, resonant body of the piano is a nightmare of complex acoustic reflections, and just sticking a mic inside the top probably won't cut it. You need to open the piano up so it can breathe!

While it varies from instrument to instrument, most upright pianos come apart the same way. Open the hinged lid on the top. Once the lid is open, you will probably see a pair of hinged pegs holding the front face of the piano together. Unlock the pegs and pull the front off. This exposes the hammers and strings, allowing for a greater degree of mic placement. If you really want to go hog wild, remove the plate that covers the bottom part of the strings (right in front of the player's knees). This will increase the piano's projection, and make the sound much clearer.

MIC IT UP

Now you are ready to explore some mic techniques. As we're going for power, we'll ditch any notion of ambient mics, and get real up close and personal. After rigorous experimentation, I discovered the most powerful sound came from the back of the piano. You'd think this would provide a muffled sound, but with the extraneous body panels removed, the sound really cranks out the backside. The percussive sound from the hammers is still heard, and the exposed soundboard adds some depth, so our power is enhanced with tone. Miking from the back also diminishes noise from pedals, creaky benches, and the player (grunts, sighs, sing-alongs, etc.).

I recommend using two mics on the backside, positioned to capture a balance between the high and low strings. Placing the mics does take some experimentation, and any small-diaphragm condensers will do a great job. Place each mic about two or three inches from the exposed soundboard, and pointing at the bass or treble strings. It is possible to have phase-coherency issues with two mics, so if things start sounding weird or thin or muddy, simply move the mics around until everything sounds full and wonderful. If you need more isolation, put a blanket on the wall behind the piano, but I like the natural reverberation the bare wall provides.

For a final setup, I place a large-diaphragm condenser on a boom, and position it to be the same height as my ears, so I can record a track that's essentially the same sound I hear from in front of the piano while I play. This track is great for blending with the rear mics to construct a truly mammoth and articulate sound.

HIT IT!

If you want a big piano sound, you'd better be prepared to bash the bejesus out of the keys. Sorry, this is old school, so there's no MIDI information you can edit to make the audio loud if your ladyfingers aren't up to the task. Listen to the Beatles' "Lady Madonna." Do you think Paul was tickling the ivories, or hitting it like each key had a picture of John Lennon scrimshawed into the ivory?

As for tracking, piano puts out mucho harmonic content, and there are peaks that meters just don't see, but can slaughter your DAW with evil distortion. Use your ears to listen carefully for any overload the VU meters might be missing. If you need to tame the beast, facile use of compression can work wonders to stop the overloading, and it also can add additional punch to what should already be a piano sound that will detach your retinas if you're not careful.
—*Kent Carmical*

MORE MIKING CONCEPTS

Like any stringed instrument, a piano has a soundboard that generates the sound, and a bridge that serves as the actual amplifier—it connects the "speaking length" [the part of the string that rings when played] to the soundboard. The ribs behind the soundboard support the instrument's curve, or "down-bearing" integrity. This bow is about 7–10 degrees.

The bridge is crucial—the amount of down-bearing, or the height of the top of the bridge compared to the soundboard—determines how well the instrument speaks in relation to the curve or rise in the soundboard.

All modern pianos (1900 and later) have two bridges. One runs the length of the piano from high treble to low tenor, while the other is the bass bridge. The crossover of these two bridges usually happens between notes A1 and G2. This is important, because this is where some of the magic of stereo mic placement occurs.

If you're doing a close mic placement for an "in your face" recording, put the mic in hyper-cardioid or cardioid mode, and place it in parallel with the tuning pins, between the first and second plate stress rails. This way the cardiod pattern picks up the instrument's high and alto notes. Position it about a foot behind the bridge and facing the bridge, around 1.5 to 2 feet high for optimum amplification.

Next, do the low end placement. The low end of the main bridge and bass bridge run parallel for about a foot and a half. Place the low-end mic about 1.5 feet above the strings, between (and in parallel with) these two bridges. This allows the mid to low tenor notes, and the best of the bass notes, to be picked up in the cardiod or hyper-cardioid pattern at the bridges' amplification points. This placement not only gets a good stereo spread, it also allows for some really fine interplay of harmonics and tone in the mid to lower frequencies.

For more "air," move the mics just outside the piano's rim, keeping them the same height above the ground for consistency. Point the treble mic at the same spot and aimed toward the player, with the bass mic also aimed toward the player but at the cross-section where both bridges run together. If you aim both mics at the bridge, the sound has more depth and a wider range of frequencies. Placing the mics further gives less definition, but a wider frequency range because of the way the sound develops on the way to the mics. In all cases, though, the bridges hold the key to the piano's overall sound. —*Spencer Brewer, as told to Matt Harper*

blend of the source piano sound and room ambience. If I'm incorporating the piano into a rather dense rock-type mix, I typically opt for a single condenser mic, as a mono track can often be positioned within the mix a bit easier (via panning, EQ, and level) to deliver enough impact against the competing sonic textures.

I'll also experiment with polar patterns. If I want an "audience perspective," I may go with a cardioid pattern that picks up more sound from the front of the mic. If I want to capture a more ambient, "piano room" sound, I'll go with an omni pattern. There's no wrong way to do this—just go with whatever option gets you all tingly.

For a stereo piano track, position two condenser mics at the spot where you heard the best sound. You can point the mics away from each other in a "Y" pattern, or towards each other in an "X" pattern. Again, there's no right or wrong, so play around until you get what you're looking for. Sonic tweakers can also experiment with putting up two matched large-diaphragm condensers, or using two different condensers, or mixing a large-diaphragm condenser and a small-diaphragm condenser, or going with two small-diaphragm condensers. Trust your imagination and your ears.

CLOSE IT UP

A fairly isolated and percussive sound can be gained if you toss the mics into the piano, close

the lid, and affix PZM mics or mini mics. Just make sure the piano owner won't freak out when you start taping mics to the inner surface of the lid. PZM mics will require a fair amount of tape, while minis might need just a thin strip to keep them from falling onto the soundboard. Where you place the mics is up to you. Now the fun begins. Getting a more conventional sound is as easy as watching your levels and laying down a clean track. But what if you want something unique? Then, experiment with signal processing. You can hedge your bet by running one mic clean, and routing the other mic to a compressor, an overdrive unit, or any number of wacky effects. I've fuzzed the piano sound, compressed it within an inch of its life, added delay for unearthly note cascades, and phased, flanged, tremoloed, and ring modulated the sucker. Sometimes, I go with the full-on processed mess, and, other times, I'll use the clean piano track as the foundational sound, and then mix in a hint of the bizarro sound. I tend to like giving the listener a sound they're used to hearing, but if they listen closer, they'll discover a bounty of weirdness. In the end, you'll need to do whatever is appropriate for the song, but it sure is fun exploring a few uncharted territories. Bon voyage! —*Craig Anderton*
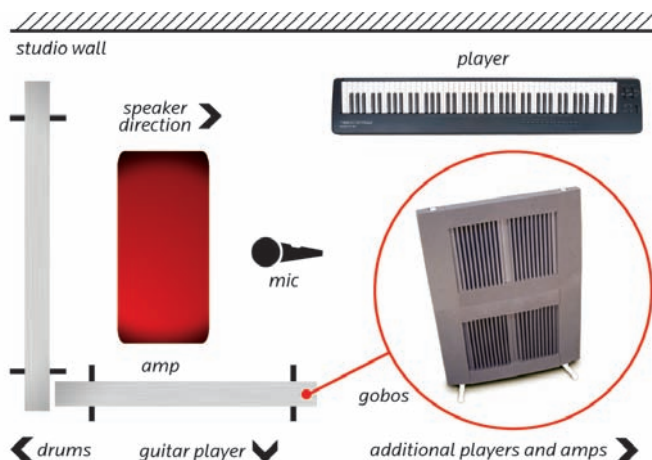
PUMP UP THE VIBE WITH AMPS

With most band recordings, the first and most complex order of business is the drum setup. Engineers and producers usually get everybody else in the band situated before they get to the keyboards. By the time they do sort you out, they show you one direct box and say, "just plug in here." Usually, the assumption is that your sound has been entirely crafted before it leaves your keyboard, and the engineer's job is to record it as transparently as possible.

For many applications, going direct probably *is* the quickest, simplest, and best idea. But if you're not satisfied with the direct tone—or are looking for more unique sounds—giving the good, old-fashioned amplifier a spin may be the way to go.
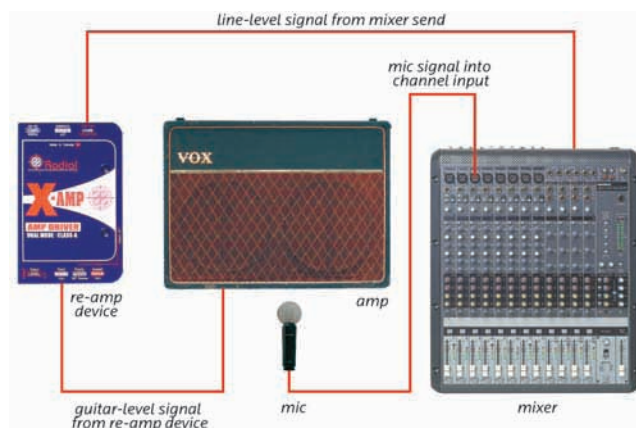
WHY AN AMP?

The late Mike Klein, whose engineering credits included Ben Folds and G. Love and Special Sauce, was the engineer on one of my band's early CDs, *The Hello*. Unlike any session I had done before, this was to be a live multitrack recording, with band members in the same room. It was remarkable how much track isolation he was able to get

Freestanding Gobos or baffles can help you fit more players and amps in a room than you might think. One way to do it is to set up your drummer at one end of the room. Then, face all amplifiers away from the drums. Do your best to convince your bass player to record direct, or to put the bass cabinet in another room, as bass frequencies bleed through like crazy. Using the gobos, create an L-shaped cubicle around your amp, isolating it from the drums and any amps directly across the room from you, while leaving your amp's speaker facing you as you play. Do the same for all other instrument amplifiers in the room, and you'll be amazed at the isolation you'll get for each track—even with all musicians in the same room.

with clever placement of amps, mics, and baffles (see "Going to a Gobo" for the secret). What's more, he insisted that every keyboard in my rig go through its own amplifier. And we're not talking keyboard amps. We threw my Moog Rogue, Ensoniq TS-12, and Rhodes through vintage Silvertone, Supro, and Fender guitar amps. Not a textbook

The idea of re-amping is simple, but the flexibility it offers is fantastic. Your previously recorded track will come out of your mixer or audio interface at line level, but the guitar amp you're sending the signal to would really rather see a much lower, guitar-level signal. The secret? Send your track out of your recorder by routing the track's outputs to an aux send or other individual output, and run that signal into a re-amping device (such as the Radial X-Amp shown here). Then, mic the cabinet as you wish, dial in the tone you want on the amp, and send that signal through a mic preamp, or directly back into your recorder.

recommendation, and, at first, I was worried that there wouldn't be enough bass response or clarity. What Mike was going for was a sense of atmosphere, a sense of the moment, and a sense of "air" in the track. On a technical level, each amp yielded its own niche in the range of frequencies, which made it easier to fit each keyboard into the final mix. The spirit of the session was to make it as live and analog sounding as possible.

RE-AMPING

Re-amping is a technique to beef up or change the character of a previously recorded track. Perhaps you had a great performance, but the sound left something to be desired. Assign the track to an output of your audio interface, then run that into an amplifier. Mic the cabinet, record the resulting sound back onto a new track, and presto! You've got a new, improved track to work with.

While recording their album *Counting Backwards*, New Jersey rock

band Little Dipper found the need to re-amp their synth tracks to fit in with their heavy guitar tones.

"We recorded a Korg MicroKorg direct, and the first thing keyboardist Carlos Alonzo said was that the keys sounded a little lifeless," recalls Michael Nagy, the band's vocalist and guitarist. "It didn't seem like part of the mix, so we ran the track back out to a Marshall Dual-Lead amp with distortion. Putting it through the amp made the track sound like part of the music. It gave it a sense of distance, so it no longer sounded like a hearing test."

AMP SIMULATORS

If you want to work in the virtual world, there's a wealth of sonic flexibility with software amp simulators. Many digital workstations include amp-simulator plug-ins, and there are third-party packages such as Line 6 Amp Farm, Native Instruments Guitar Rig, and IK Multimedia AmpliTube. These simulators offer so many combinations of speaker cabinets, mics, mic placements, and effects, that they can easily induce option anxiety. But it never hurts to start mixing things up and hearing what happens. Some simulators give you a model of a familiar amp to start with. In fact, just about every amp mentioned here has been modeled by one or more companies, and you can construct a virtual rig, choosing how many and what size speakers the "cabinet" has, what effects "pedals" are feeding the amp, even what kind of microphone is in front of the amp.

Whether you choose a simple or more involved route, the most important thing is the music itself. Work with what you have on hand or what you can easily afford to make sounds that inspire you. Try out some of the ideas we've mentioned here, and experiment with everything you can get your hands on. Spending a little time like this could yield a sound you never thought of before. And how cool would that be? —*Tom Brislin*

How to Salvage Putrid Piano Sounds

The piano is an incredibly complex instrument. Capable of a huge dynamic and frequency range, it can sometimes be the monster in the room during a mixdown session. In these instances, you'll likely find yourself bringing up the piano tracks, and then listening, tweaking, and listening some more. You'll continue to tweak, and yet you won't be able to get the piano to sit properly in the mix. Eventually, you'll want to tear your hair out, and run screaming from the studio—actions that will not inspire confidence in your abilities from your band mates or clients.

Luckily, there are some techniques that can save you from scalp damage and a ruined reputation. Just try out a few of these tips, and in no time you'll have that piano singing right in the sweet spot.

PARALLEL COMPRESSION

If your mix is fairly dense—say, with guitars and vocals taking up the majority of the sonic spectrum—you may be struggling to hear the piano part. But using the parallel compression technique can get the level of the piano up, without resorting to compression settings that might cause the piano tracks to sound overly squished. I have used this technique most often on drums and percussion, but it applies equally to the piano—which is, after all, a percussion instrument at heart.

Start by assigning the stereo piano track to bus 1 and bus 2 in your DAW. Next, open up three stereo auxiliary tracks, using bus 1/2 as the inputs to those aux tracks. Route all three aux outputs to the stereo bus.

Now, insert a compressor plug-in on the first stereo aux track, and dial in a compression ratio of 6:1 or greater, and with the threshold low enough that you are getting 6dB to 8dB of compression. Set the gain to +6dB.

On the second stereo aux channel, set up a different compressor plug-in at a 2:1 or 3:1 ratio. Set a slightly higher threshold, so that you are only getting around 2dB of compression.

Leave the last stereo aux channel alone.

What happens at this point, is that the uncompressed stereo-aux track can provide the attack of the piano sound as it was originally recorded. The two compressed aux tracks offer varying degrees of body and volume to the piano sound. As you balance the three aux tracks, you should be able to raise the average level of the piano in the mix, while still retaining the "natural" dynamics of the original piano performance. It may take a few tries to discover the best balance of natural piano, lightly compressed piano, and aggressively compressed piano that delivers enough volume and impact, but you should look like a genius almost as soon as you start moving the faders. Yeah—this trick can work that good!

EXPANSION

There are those times when what seemed like a good idea during the tracking session turns out to be a big problem at the mix. I'm talking about over-compressing the piano during recording. If you fall victim to this miscue, and find that your piano track lacks the dynamic range you want, you can simply "reverse" the compression somewhat by applying an expander.

Start with the same bus arrangement we used in the parallel compression technique, but, instead of compressors, set up a pair of aux tracks with an expander plug-in assigned to one of them. Set the expansion ratio to 1:2, with the threshold fairly high, so that the gain reduction is pulling some of the signal down to create greater dynamic range. Vary the hold and decay times so that the expander isn't staying open (or "off") too long.

Now, mix the expanded aux track in with the non-expanded aux track until the balance between the two sounds natural, and the piano's dynamics are as wide open as you desire. This technique can be very effective in blowing the minds of any cynics who were betting the piano track in question would sound squashed and awful forever.

DISTORTION

A subtle amount of distortion mixed in with the

original track can give the sound of a piano some real ear-catching vibe. I personally like Bomb Factory's SansAmp plug-in for this technique, because you have individual control over how much distortion is applied to each major frequency band. However, this trick will work with any guitar-amp emulation plug-in, distortion or overdrive effects, or even guitar stompboxes.

This is another technique that works best if you "mult" the piano signal, and only apply the amp simulation or distortion to the mult, leaving the original piano track clean and natural. For the distorted track, I typically hit the mids heaviest, and go light on the low and high frequencies. It's also fun messing around with different amp emulations (Fender, Marshall, Vox, Mesa/Boogie, etc.), different amounts of drive, different tone settings, and even different speaker-cabinet simulations (if you're using an amp plug-in, rather than a pure distortion or overdrive effect). The idea is to add some sizzle and impact to the piano without making it sound too muddy or indistinct.

When you blend the clean and distorted piano tracks together, go for a sound that "owns" its space in the mix without your having to push up the faders too much. The piano should command attention because of its tone—even if its volume level is actually pretty low.

MODULATION

I recently mixed a project where, on several songs, the piano was recorded with the drums playing in the same room. The intention was to re-record the piano tracks all by themselves, but we decided to keep the original performances because they really fit the feel of the songs. Unfortunately, there was a substantial amount of drum leakage into the piano tracks, and bringing up the piano in the mix brought up the drums, as well.

Happily, the piano parts were not in a low register, so I was able to EQ a majority of the boominess of the drums out of the piano track. The downside was that this move left the piano sounding flat and lifeless.

To give the now-neutered piano some of its sparkle back, I inserted a chorus plug-in on the piano track, post EQ. I selected a sine wave, set the modulation rate to about 0.4Hz, and dialed in a very low amount of feedback. As I listened to the piano in the mix, I slowly brought up the wet/dry mix percentage from 0 percent, until I liked the result. A 20-percent blend of chorus effect to source sound did the trick. The resulting effect gave the piano a bit of movement and impact that nicely disguised

the fact I had EQ'd the life out of the piano sound. And even though this treatment was very subtle, any time I muted the chorus plug-in, the mix just didn't sound right at all—proof that little things can make a big difference.

TAPE EMULATION

One of my favorite tools for adding vibe and interest to vocals and instruments is the Phoenix suite of TDM, tape-emulation plug-ins by Crane Song. (Similar tape-emulation plug-ins can do the trick, as well.) Phoenix not only simulates the coloration and natural compression of analog tape, it also replicates how tape interacts with the record and playback electronics. You get three frequency-response buttons—Gold (flat), Sapphire (bright), and Opal (warm)—and a big knob that increases or decreases the emulation effect. That's it.

To transform a limp piano track into something marvelous, I'll typically position the big knob between -6dB and -3dB—which is almost full emulation. My frequency-response option will depend on the sound of the original piano track, and whether it needs to be brighter or warmer to fit into the overall mix. I have yet to find a sound that this plug-in can't help. For less-than-stellar piano tracks, it's one heck of a life preserver. —*Tom Luekens*

Setting Keyboard Levels

Anyone with a cable TV box has juggled two volume controls. Set the cable too low, crank the TV, and you'll hear too much background noise. With the cable too high, you can get distortion or a honky sound even with the TV volume low. Even a basic recording setup makes you manage multiple volumes, too. Here's a Golden Mean approach for setting them.

## YOUR KEYBOARD'S VOLUME CONTROL

An old rule says to leave it at maximum, then set levels for recording on your mixer or audio interface. That's a good place to start, but on some keyboards, full throttle might make hiss audible while almost-full sounds clean. Call up the sound you'll record with, but don't play. Move the volume knob or slider slowly from low to high, and listen carefully for background noise. If an increase happens, most likely towards the top of the range, back off until it goes away. Chances are, any making up you'll do using the gain control of the gear that's listening won't add as much noise. If it does, the process is easy enough to undo.

Don't forget MIDI volume. Make sure a pedal, other controller, or even the sound program itself isn't keeping it below maximum (127) without you knowing about it. Also, some synths' edit menus have an output parameter that works in the digital domain—another option if you need hotter levels without added noise.

FADERS AND GAIN KNOBS

Next come the inputs of your audio interface, compact mixer, or stand-alone recorder. Either you're in a channel (or two) with an input gain knob—also called trim or sensitivity, which are not the same as faders on the device or in your DAW's mixer window—or you're not.

In the first case, leave the channel fader at "unity"—usually indicated by a zero located most of the way up the fader's travel range, and start with the trim all the way down. Play as loud as you mean to and adjust the gain until your loudest peaks hit the "yellow" zone on your

XLR in on mixer

XLR output

1/4" input
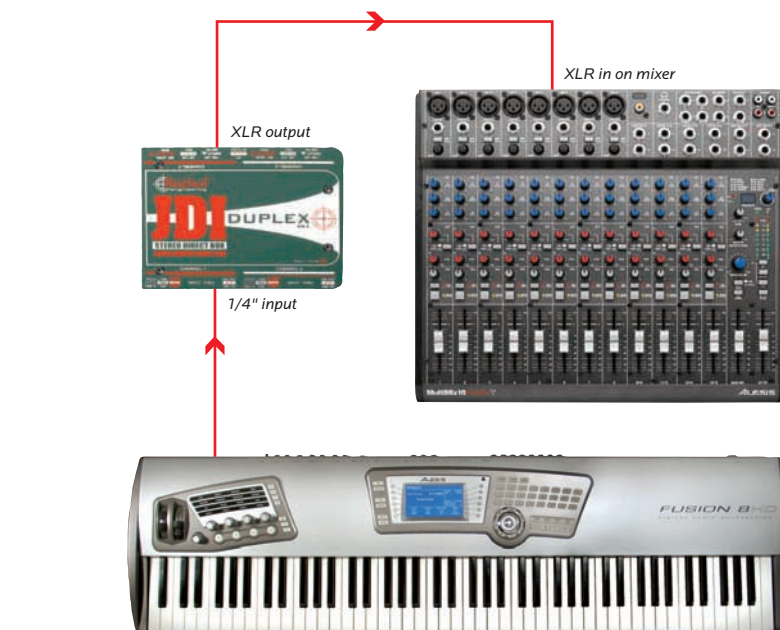
You've probably used a direct box to run your keyboards into a stage snake, but what about recording? "If your keyboard is next to your recording device, a direct box is not critical," says Radial's Peter Janis. "If further away, put a direct box near your keyboard and make the long cable run an XLR for the best quality, lowest-noise signal."

physical or onscreen mixer's meter, but not the red. With most keyboards, you'll turn up the trim very little, or not at all, unless something else in the chain is quieting the signal first.

This is why many audio interfaces and compact mixers have trim knobs only on their mic inputs—line-level ins are pre-optimized for things such as keyboards. If your keys are too quiet no matter what, go for the extra gain of a mic channel. Otherwise, it's one less volume control to worry about. At this point, the channel fader may or may not have any effect on the level that'll get recorded, and it may not have any visible effect on the meter, depending on your setup. If not, don't be afraid to lower your keyboard's volume a bit more if it's still too hot.

What sounds too loud or too soft through your listening system may be the perfect level for the recorder, so use only your headphone, "monitor out," or "control room" volume to get

a comfortable listening level.

SOFT SYNTH SECRETS

Many soft synths have their own volume control in the plug-in window, and the rules are different for soft synths. Push the soft synth's volume too high, and, often, you'll overload its mixer channel in the host program, distorting the sound. Try this advice from Orlando Rashid, recording engineer on Jamie Foxx's *Unpredictable*: "Insert a compressor plug-in on the audio or instrument channel where the soft synth lives. Set it so it's not really compressing, or just barely hitting. Keep the soft synth's volume on the low side, and use the compressor's output or make-up gain control to make it louder."

Some DAWs also have simple "trim" plug-ins, useful for adjusting software instruments that don't have their own volume. —*Stephen Fortner* ●

40 Paths to Recording Great Guitar Tones

By Michael Molenda   *Illustration By Candace Mammarella*

Chances are, your lifelong love affair with the guitar began with a recording. Perhaps you heard Jimi Hendrix or T-Bone Walker or Les Paul on the radio, felt the goosebumps of impending devotion, and went on a mad search for any records by these inspirational artists. Unlike live performances, recordings are tangible documents that can be studied, absorbed, and passed from one excited listener to another. Recordings ensure that the music of great artists—as manifest by their own hands, hearts, and heads—will not fade into the ether, so any guitarist who wants his or her legacy to extend beyond the ravages of memory had better get in the studio.

But recording great and/or musically appropriate guitar tones is not always an easy task—even if you're using pre-tweaked digital-modeling plug-ins or other software tools. Ultimately, tracking kick-ass guitar sounds takes a little technical knowledge, a lot of practice, good ears, and a close personal relationship with the mysteries of luck. Of course, we can't do anything about your ears or luck, but we can help you improve your home-recording chops.

The following tips for crafting fab electric-guitar tones should be considered as tone templates or starting points. Don't be afraid to experiment or find your own way. After all, there's no "right" or "wrong" in the recording studio, only what sounds good to *you*.

AMPLIFIER MIKING TECHNIQUES

1 Dead-on. It's rather funny that something so conventional could become controversial, but the time-honored "mic against the grille" technique is sometimes hotly debated. Detractors condemn the position as lame, lazy, and unimaginative, while advocates defend its enduring value as a fundamental sonic resource. Truth is, the sound of the dead-on mic position is pretty darned punchy. In a best-case scenario of a good amp and guitar combination, the impact of pick or finger against string can be reproduced with stunning clarity. Because the mic is pointed directly at the speaker cone from a distance of one or two inches, the fundamental timbre of the amp and guitar is not diffused by room ambience and signal reflections. In other words, you get a fairly organic and honest picture of the guitar sound.

To achieve the classic dead-on position, simply point a dynamic microphone, such as a Shure SM57, at the center of your amp's speaker cone. (If you use a cabinet with multiple speakers, find the best-sounding speaker.) A good rule of thumb is to place the mic so that its windscreen is gently brushing the cabinet's grillecloth. No grillecloth? No problem. Place the mic approximately two inches from the middle of the speaker cone. For tonal variation, try moving the mic slightly up, down, left, and right. If you hear a divine tone, *freeze*. It's time to record.

2 A little bit o' room. Sometimes a dry, punchy guitar track can be lame and unimaginative. To animate the basic dead-on position, move the dynamic microphone back approximately ten inches from the speaker. This new position allows room reflections to mix with the source sound—the guitar amp—and produce a more dimensional timbre. Find a mic-to-amp distance where the natural ambience is just audible enough to spread out the guitar sound without smearing the guitar's tone and articulation. If you find the right "sweet spot," adding reverb to the track during mixdown will probably be unnecessary.

3 Off-axis. Miking guitar amps off-axis became very popular soon after Michael Jackson scored his first batch of funk/rock hits in the 1980s. The story may be little more than a myth, but the steely, shimmering snap of the rhythm guitars on those tunes was allegedly produced by engineer Bruce Swedien placing condenser mics at off angles from the speaker cabinets. Fact or fiction, one thing is certain: an off-axis position does produce glistening highs and tight, funky mids.

To capture this tone, position a condenser mic approximately 45 degrees off axis from the front of the speaker cabinet. The mic should be set to a cardioid pattern and placed about eight to twelve inches away from the cabinet. You can usually add shimmer by moving the mic slightly above the top edge of the speaker, and add body by placing the mic directly in the line of fire. Obviously, this technique works best when recording clean or slightly over-driven tones that can benefit from accentuated highs and upper partial harmonics.

4 Close/Far. If you're somewhat nervous about capturing a full-bodied guitar tone with one mic, you can always hedge your bet by employing two. In a classic close/far position, a dynamic mic is placed close to the speaker to record a dry source sound, while a condenser mic is set up about ten feet from the front of the amp to capture room ambience. The condenser should be in a cardioid pattern, raised approximately six feet high, and pointed towards the middle of the speaker cabinet.

5 Front and back. To create tonal variation without resorting to room positions that may produce too much ambience, simply mic the front and back of the amp. It helps if the cabinet is open-backed, although you can track some pretty

wacky sounds—mostly low-end resonances—by miking closed-back cabinets.

You can use two dynamic or two condenser mics for this application, or even one of each. (The condensers should be set to their cardioid patterns.) Start by positioning each mic about eight inches from the cabinet, with one mic slightly left of center and the other veering off to the right. Depending on where you place the mics, however, some degree of phase cancellation may result. But, hey, if an audio dysfunction produces a slick tone, go with it. It's often best to put more faith in your ears and less faith in "proper" recording techniques.

6 **Boom and snap.** With a cabinet loaded with at least two speakers, you can achieve even wider tonal dispersion by placing a condenser mic on one speaker and a dynamic mic on another. The goal is to use the dynamic mic for body and punch, and the condenser for shimmer. A large-diaphragm dynamic such as a Sennheiser MD 421 or an Electro-Voice RE20 works best for this application as they "hear" a little more low end than a small-diaphragm mic. You're going for a dry timbre that will highlight the high/low effect, so place each mic as close to its speaker as possible. (More distant mic positions tend to blur the effect because room ambience leaks into both mics and mixes the frequencies into an aural stew.) The condenser should be set to cardioid to minimize leakage.

7 **Omni.** Try a new polar pattern on that condenser mic. Assuming that you're recording in a relatively square or rectangular room, place your amp one or two feet away from a wall. Now, set the condenser to its omnidirectional pattern (you need a multi-pattern mic for this application), and position the mic as near the room's center point as possible. Because the omni pattern will pick up sound from all directions, you should hear an expansive ambient guitar sound reminiscent of the early U2 records. Of course, the size of your room will determine just how expansive the sound is. Feel free to move the mic around until you hear the hippest combination of guitar tone and room sound.

8 **Audience perspective.** Set up an amp at the back wall of the studio, and position two condenser mics ten- to 15-feet away. Point the mics at either side of the amp. The idea is to simulate what a listener might hear when sitting out in the audience of a small club.

9 **Un-electric electric.** This old trick still works great. Have the guitarist set up the amp in another room and mic it however you wish. Now, place the artist in a quiet space where sound leakage from the blaring amp is minimal. (Use a long guitar cable or a wireless system to get the performer far enough away from the amp.) It's best if the guitarist sits down while playing, because you'll need to position a condenser mic eight inches from the guitar neck. Move the mic around until you capture a tight, skankin' snap and you're almost there. You can record the "acoustic" and miked amp sounds on separate tracks if you plan to do stereo tricks in the mix, or simply submix the two tones to taste on a single monaural track. Either way, you've captured a dry, steely timbre that can be mixed in with the roaring amp tone to increase sonic articulation and midrange sparkle.

10 **Out of bounds.** For an almost unusable rumble and roar, drop a boundary or PZM mic directly on top of your amp. All of the amp rattles and speaker resonances will be brutally documented, but for "end-of-the-world" solos, it's hard to beat the terrifying noise this technique produces.

11 **Window dressing.** Signal reflections can be your friends—especially if you're looking for bizarre tones. To capture flutter echoes or slapback, point your amp directly at a window or sliding glass door. Position a condenser mic (set to its cardioid pattern) one or two inches from the glass. Move the mic around until you find the best "unsweet" spot that delivers ragged, springy timbres.

12 **Take a bath.** If you're really into "enhancing" (or, should I say, *creatively destroying*) your guitar tones with wacky reflections, don't underestimate the value of the bathroom. Place your amp in the empty bathtub or shower, or perch it atop your toilet. For mic positions, drop a condenser in the dry tub with the amp, plop a PZM in the sink, or hang a dynamic from the shower curtain rod. Seek out ugly reflections everywhere and get them on tape.

TEXTURAL MADNESS

13 **The basic double.** Doubling unison parts to produce a denser sound has been an audio-production staple since the '60s (singers have been doubling their lead vocals for ages). Once you've laid down a great part, simply record a near-identical performance onto another track. Conceptually, doubling works best for rhythm parts, but solos can be beefed up too.

14 **Non-identical twins.** On the other hand, if you're doubling parts, why not track two entirely different tones? Play one part, say, through a Marshall and a Les Paul, and perform the double using a Strat and a Vox AC30. The combinations are as endless as the gear you can get your hands on.

15 **Sneaky EBow.** To punch up chord progressions—this works especially well for kicking in pop choruses—double the rhythm tracks, and then add an EBow track that mirrors the chord progression. For example, if the chorus is *Em, G, C, A,* the EBow would play sus-

The close/far position combines dry and ambient sounds to get the best of both worlds. In this example, a Shure SM57 covers the close position on a Fender Tremolux, while a RØDE Classic Tube mic goes long.

taining, single-note lines of *E, G, C, A*.

16 Wet/dry split. You don't have to save effects for the mix, where many recordists simply add a stereo reverb or chorus to a guitar track and think they've added some dimension. Ha! That ain't real stereo, that's enhanced mono. In a dense mix, most stereo effects are so subtle that they might as well be monaural—the listener seldom perceives the effect as having different acoustic elements on the right and left sides of the soundscape. So, if you desire a processed guitar sound that really kicks some stereo butt, try tossing the effect to the opposite side of the dry source sound.

To accomplish this, set up your desired recording path. Then route the signal to an effects processor. The source sound (your guitar) and the effects should be recorded on separate tracks. When it's mix time, simply pan the two tracks hard stereo. You now have a dry source sound that will appear to morph into whatever effect you've chosen. And what you hear on the left speaker is way different from what you hear on the right.

17 Guitar Armada. Sometimes it pays to get a little megalomaniac with your guitar sounds. A doubled part simply may not be dense enough to produce the desired sense of awe. In these cases, I recommend layering as many unison guitar parts as you have the tracks to handle. Triple and quadruple the part—heck, record six of 'em. You don't need a license and there's no limit. However, to ensure that the tones don't disintegrate into mush, take care to mix and match your guitar sounds. Combine big, raunchy chords with clean, wimpy ones. Also, try different chord inversions. Don't just record four tracks of yourself banging out an *A* barre chord. The idea is to spread out the

timbres and imply a sense of sonic magnitude.

18 Townshend. Speaking of massive guitar sounds, one of the compelling—and, some would say, "classy"—elements of the Who's vibrant tumult were the acoustic guitars that Pete Townshend would layer under his electric parts. Again, we're talking about utilizing disparate timbres to construct a guitar sound with added dimension.

After you've tracked your electric parts, determine whether it makes sense to layer several monaural acoustic tracks or record a single stereo or mono track. If the soundscape is very dense, keep in mind that a fat acoustic tone will probably muddy up the track. I recommend recording the acoustic parts brighter than you may feel comfortable with to ensure that they can cut through.

Performance-wise, unison parts are a safe bet, but it may also be appropriate to try different chord inversions and even mess with dynamics a bit. If the electric parts drop back in intensity, that may be a cue for the acoustic guitars to rage. Experimenting with performance dynamics, as well as timbres, is another way to animate guitar tracks.

19 Now you hear it, now you don't. Audio productions don't have to be symmetrical. For example, it may make musical sense for a particularly loud, rude, or beautiful guitar timbre to make one, well-placed appearance in your track. Keep your eyes open for opportunities to delight, surprise, and wake up the listener.

20 Distorto! After sweating over how to record transcendent guitar sounds, you should give your "quality meter" a short vacation and get gruesome. In other words, you don't have to layer guitars with good

sounds. Here's the deal: Find a blissfully awful fuzzbox or overdrive pedal or plug-in, and use the buzz bomb to double one or more of your well-recorded parts.

21 Direct. Amp tones and stompboxes and plug-ins rule, but don't overlook the value of a direct guitar sound. Sometimes a simple, harmonically uncomplicated timbre is just what a track needs.

22 Blend-ola. Obviously, digital-modeling software provides quick, relatively no fuss, and fabulous-sounding options for tracking guitars. You simply plug-in and play, and you can even monitor everything over headphones, crafting brutally loud emulations of stacked amps without worrying about waking the neighbors, destroying your hearing (unless those headphones are cranked—not a good idea), or shaking the rafters. Sometimes, however, it's a good move to add some actual air-moving-through-a-speaker-cone attack to simulated amp textures. For this, you still don't need to wheel big amps into your home studio and risk eviction for noise abuse. Just get a small, very low-wattage amp, use one of the close-miking techniques outlined in the miking section of this article, and track away. Even if you want ballsy tones, a five-watt (or less) amp will give you the roar without the high volume that annoys housemates and neighbors. Then, just blend the natural amp sound with the digitally modeled sound to taste. You should be able to craft a totally cool tone with more attack and impact and airiness than what you can typically derive from a modeled amp sound alone.

DYNAMICS PROCESSING

23 Pump it up. Compression can help your guitar tracks jump right out of the mix and, best of all, appear as if they were recorded louder than a jet turbine at full throttle. Of course, you don't have to go ballistic right off the bat. Start out with a punchy, yet subtle, setting of a 2:1 ratio with a threshold of -5dB. If your box has attack and release controls, both should be set to "fast."

24 Squeeze play. Beefier, more aggressive dynamics can be achieved by setting the ratio between 2:1 and 4:1, and

Here's the dead-on mic position with a Shure SM57 pointed directly at the speaker cone of a Vox AC15 1x12 combo.

increasing the threshold to -10dB. Keep a fast attack, but set the release a little longer to keep signal decays more up front.

25 **The Hulk.** Typically, as you employ more compression, low-level signals such as bass resonances become more audible. This is a boon if you're losing bass articulation in a crowded mix. Now, if you compress the signal to the point where the highs, mids, and lows squash together into a chunky mass, you'll have one heck of an aural weapon. This thick, dark timbre can be used to add visceral impact to a track without letting the mids and highs get so out of hand that the sound appears brittle or clangy. To turn your guitar into the Marvel Comics' antihero, set your compression ratio at about 8:1 with a threshold of -15dB. Set the attack to fast and the release so long that The Hulk rages almost forever.

26 **Classic spit.** One of the lovable things about some old rock records is that the unprecedented volume of the guitar amps just flipped out the mics (and, probably, the engineers), and you hear these wonderful clipping noises when the players crank it up. For years, that spitty crackle *was* rock 'n' roll to me. If you feel the same way, you can revisit the past by hammering your guitar tracks with a 10:1 ratio at a threshold of at least -20dB. Loosen up the attack a little and keep the release very slow. A tube compressor—or a tube-compressor plug-in—is best for this operation, because you want the signal to fry just a tad.

27 **The chopper.** You can keep staccato rhythms absolutely pristine and lively by setting a noise gate to abruptly shut down the audio between strums. No hiss, no hum, no finger noises—just the "snap, snap, snap" of your rhythmic majesty. The threshold setting on the gate should be tight enough to silence all sound when you're not playing,

and the attack and release should be whippet-quick. As soon as your pick or fingers leave the strings, the gate should clamp down with extreme prejudice.

28 **Clean house.** Unless you're a lo-fi type who adores happy little noises, it's not usually a good idea to sully great guitar tracks with audible hiss, buzzes, accidental skanks, feedback, and other gremlins. You can use a noise gate plug-in to keep all of those naughty bits out of the mix—just make sure you don't set the gate too aggressively, as that might terminate your phrasing by knocking out soft intros and releases. While not a "dynamics processor," you can also negate noise by simply erasing any sounds that aren't the sounds you want listeners to hear. It's amazing how many recordists track guitars and never do a clean-up sweep, and then lose their minds over annoying sonic glitches they can't seem to find. The culprit for such anxiety is often messy guitar tracks, so be Mr. or Ms. Clean, and buff those suckers until all you hear is the glory, and not the grime.

EQ TWEAKS

29 **Flat.** More times than most recordists care to admit, the best EQ tweak is no EQ tweak. Organic guitar sounds— meaning the natural sound of the guitar and amp as documented by the microphone—can be very cool if you give them a chance. It's also a good thing to avoid obsessing over minute EQ adjustments while you're tracking an instrument. You see, the sound of the guitar (or vocal, or snare, and so on) must ultimately co-exist with all the other sounds in the mix, so dialing in individual refinements before all the other

tracks are complete may be a waste of time and creative energy.

30 **Low blows.** The typical home studio is not an ideal acoustic environment. Traffic noise may leak through windows, furnaces can come to life with rumbles and sighs, and a housemate's trip to the kitchen can trigger an orchestra of thumps, bumps, and creaks. And, of course, all of these uninvited guest sounds can leak into your mics during a take. High-end and midrange sounds are problematic because you can't diminish them with EQ adjustments without also compromising the frequency spectrum critical to the guitar. But if a low-frequency sound is making your studio life miserable, you can usually cut it out and still record a fine guitar track. A 5dB or 10dB cut at 80Hz or 100Hz should do the trick.

31 **Bulk up.** If you're confronted by a limp guitar tone, you should be able to beef it up somewhat by boosting the low mids. Zero in on the 250Hz to 750Hz range and boost the appropriate frequency anywhere from 5dB to 15dB.

32 **Instant weight loss.** A thick or flabby tone can cause a guitar to sound muddy and indistinct—especially within the context of a dense mix. But don't start boosting mids and highs in an attempt to get the guitar to stand out. The low-end flab will still be audible because you haven't attacked the frequency that is causing the problem, and the high-end boosts will probably just thin out the sound and add noise. Keep in mind that cutting frequencies is often a cleaner, more sonically pleasing way to add presence and clarity. So, to eradicate

Track It!

that gut, try cutting anywhere between 100Hz and 500Hz by 10dB or more.

33 De-Fang. Brutally sharp midrange frequencies may be great if you want your guitar to bust out of a live stage mix, but they can deliver an unpleasant listening experience for anyone hearing your track via conventional ear buds. Taking a bit of the bite out of your guitar sound just might put you on the fast track for humanitarian awards. Seek out those deadly mids in the 1kHz to 5kHz range, and neuter them by at least 3dB.

34 Punch me. On the other hand, we are guitarists! Healthy mid tones are practically our birthright. To add a dash of macho punch, boost anywhere between 500Hz and 3kHz by approximately 6dB.

35 The King's cut. An old friend once did a session with an idiosyncratic singer/songwriter who insisted that any studio equipment labeled as "digital" be masked off so that he couldn't see the dreaded "D" word. Then, the artist turned every high-EQ knob on the mixing console to its full cut position. "Sun Records couldn't record 12kHz," he said. The guy had a point. If you're looking for a warmer sound, it doesn't hurt to cut 12kHz or 10kHz by a few dB to mitigate the sheen of modern recording technology.

36 Razzle-dazzle. If your acoustic and clean electric tracks need a little extra sparkle, boost 10kHz by 6dB or so. This can be a dangerous tweak, however, because boosting higher frequencies can introduce audible hiss along with the desired shimmer. Your tonal adjustments should strike an acceptable balance between glow and gunk.

37 Faux spectral enhancer. If your guitar needs some added dimension and luster, you can simulate the sparkle of a spectral enhancer by boosting 12kHz by 10dB. Take care, of course, not to add any hiss.

38 Laser beam. For a totally obnoxious tone that can cut through any soundscape, cut 80Hz by 5dB and 250Hz to 500Hz by 10dB, and boost 7kHz by 10dB. This tweak works best on massively overdriven tones—the ruder, the better.

SUZI ROKS

39 Hourglass figure. Here's another multiple EQ tweak. This one is perfect for clearing sonic space for midrange elements such as vocals and horns, while still allowing the guitar to remain present. First, boost the low end of the guitar—anywhere between 100Hz and 250Hz—by 6dB. Then cut the mid frequencies in the vocal range, say between 1kHz and 5kHz, by 10dB. Finally, add some snap by boosting the high end above 10kHz or 12kHz by 10dB.

40 Double trouble. For a real slap in the face, copy your guitar to an available track, so that a clone exists of the original source sound. EQ the original guitar to taste. Now, listen to that tone in the context of the complete mix and determine if it needs more highs, mids, or lows. Do not make any tweaks on the original track. Instead, brutally EQ the clone track in the range that is lacking. During mixdown, simply increase the level of the clone track until the guitar sounds absolutely marvelous.

With this double-track EQ trick, your original sound can remain full and robust, while the clone can be used to sneak in any frequency information that is needed. Had you, for example, started messing with the original track if it needed more highs, you might have destroyed what you dug about the original tone. What usually happens next is that you keep chasing your tail, making EQ tweaks upon tweaks, until you lose critical perspective. ●

Capturing Beautiful Acoustic Guitar Sounds

By Michael Molenda   Illustration By Nathan Ota

Subjecting the mysteries of beauty to cold, bloodless scrutiny often invites disillusionment. It's the "Every rose has its thorns" dilemma. Take your favorite acoustic guitar, for example. Played in the open air, it can caress your ears with a beatific timbre that inspires songs, melodies, and even inner peace. But point a microphone at your old friend, and strange things can happen.

The combination of mic coloration, signal chain anomalies, and room acoustics can transform your flat-top's once-shimmering highs into piercing clangs that sound like the rattling chains of Marley's ghost. In addition, the guitar's inviting warmth can degenerate into an aggressive, booming low end, and fret buzzes and string squeaks can wail like a World War II Stuka blitzkrieg. Of course, you can always get lucky and capture a wonderful tone the first time you set up a microphone, but it pays to have a few tricks and techniques up your sleeve for those times when luck is partying with someone else.

To provide you with the insight to record stunning acoustic guitar tracks, we'll trace the audio path from source sound (the guitar) to tape, identifying some frequent problems and discussing possible remedies. Keep in mind that recording is often a creative science, rather than an exact one, and that experimentation and outright foolishness can produce brilliant results. In other words, don't get discouraged if you're wrangling an awful tone. Perseverance, good ears, and common sense will prevail.

THE SOURCE

In the recording studio, the old adage "You can't

Fig. 1—Liven up a "dead" room by positioning the mics amongst reflective elements such as glass doors or windows, plywood, metal or glass furniture, or, if you happen to be a sly "liberator" of rock history (not recommended), an authentic Abbey Road street sign.

make a silk purse out of a sow's ear" is gospel. Your ultimate success often rests on the quality of the source sound. When faced with a thin, buzzy acoustic guitar, for example, the most expensive microphones, preamps, and signal processors can only endeavor to record a bad sound exceptionally well. This unassailable fact of studio life makes our first tip an easy one: If your acoustic guitar sounds horrible, don't record it. (That is, unless you *want* a horrible tone.) You'll do yourself a tremendous favor by renting or borrowing a fine instrument.

But even if you own an exceptional acoustic, you should take pains to ensure that it sounds its best whenever it does its thing in front of a microphone. Change strings often—especially before critical sessions—and have the frets, neck, and intonation checked regularly. Don't let obnoxious fret buzzes and/or tuning problems sabotage the tone of an otherwise excellent guitar.

THE ROOM

The recording environment also affects the quality of the source sound. A typical bedroom studio—inhabited with plush bedding, thick curtains, and wall-to-wall carpeting—produces a very dry room tone that can suck the shimmer out of even the most sparkling acoustic. On the other hand, a small, tiled bathroom often produces spiky signal reflections that can mix gnarly slapbacks and annoying flutter echoes with the source sound.

Obviously, most home-studio buffs can't afford to build acoustically marvelous rooms just to sate their recording jones. But you can be a tad more finicky about where you record important acoustic guitar tracks. Play your gui-

tar in every space in your house, and listen critically to determine where the tone sounds best overall. Also note where the guitar sounds brightest, where it sounds chunkiest, and where it sounds the downright weirdest. Don't limit your search to actual rooms—audition stairwells, walk-in closets, enclosed patios, (unfilled) bathtubs, and other suitably bizarre nooks. The reason for this is not simply to get crazy, but to document the different sonic environments available. While you'll most frequently choose to record in the space you've marked as "best," at some point, a strange, spiky, or boomy room may produce better tonal options for a particular track.

However, if you're stuck with a bunch of recording spaces that sound just plain funky, you can try "tuning" the room acoustics. For example, if a room is so dead that it causes your guitar to sound limp and boring, scatter reflective surfaces around the mic positions (**Fig. 1**). You can even counteract the sound-deadening characteristics of carpet by laying down sheets of 1/2" plywood.

Conversely, if an extremely live environment is drowning tones in an ambient wash, tame the signal reflections by enclosing the mic position in a web of soft, absorptive items such as blankets and throw pillows. Pro studios often use specially designed absorptive panels (**Fig. 2**) to "shrink" an acoustical space into a less ambient environment, and they're a good investment if you plan to do a lot of open miking at home. However, a little ingenuity can often turn household goods into surprisingly workable sound absorbers. For example, try standing a mattress on its side, and leaning it against some chairs, or drape thick blankets over a few sawhorses. Then, simply move the objects around until the acoustical problems are diminished, or until you hear the desired combination of source sound and room ambience.

MICROPHONES

Once you've identified the timbral colors that are attainable acoustically, you can start auditioning a critical electronic tool: the microphone. As the mic is really your aural camera to sonic majesty, selecting a particular type and model should not be taken lightly.

The acoustic guitar—much like the human voice—is a very dynamic instrument that produces an abundance of subtle and not-so-subtle tonal shadings. It's critical that the microphone

Fig. 2—Rooms that are too live can be tamed by employing sound-absorption devices such as tube traps—if you have the budget for them— or you can get inventive with mattresses, pillows, and thick blankets.

Fig. 3—A single mic can deliver robust acoustic tones if you aim it at the guitar's sweet spot.

selected is up to the task of reproducing every nuance of the guitar's timbre. To this end, your matchmaking should involve trying a number of different mics to see which one best captures the instrument's tone. As few home studios have bountiful microphone collections, this is a good time to pool resources with other recordists in your area. If the "mic collective" option is not possible, consider renting three or four pro-quality microphones from a local studio-rental outfit or a live-sound company.

So which type of mics are the hippest? Well, condensers are often the hands-down winners. These mics typically possess the sensitivity, frequency response, dynamic range, and mystic vibe factor to capture all the glories of an acoustic guitar's chime and luster. Large-diaphragm models offer a wide tonal range, with robust lows and shimmering highs, and small-diaphragm models tend to accentuate mid and high frequencies. And if you desire a tad more warmth, tube condensers should bring a smile to your face. Dynamic mics—such as the venerable Shure SM57—can certainly do a fine job, too, but most models fail to deliver the airy, dimensional quality of a good condenser.

MIC PLACEMENT

Ultimately, the mics you choose and how you place them in relation to the source sound determines the lion's share of the recorded timbre. Of course, you can futz with EQ—and we'll get to that a little later on—but the basic foundation of the instrument's tone often rests solely on what you can accomplish with mic placement. In addition, the less audio circuitry you can involve in the recording process, the better. By going directly from mic to mixer preamp to tape, you bypass added electronics (mixer EQ sections, insert points, effects sends, etc.) that can soil your tracks with audible hiss and other sonic gremlins. Therefore, be sure to allow yourself the time to really experiment with mic positions. If it takes an hour or so to discover a fantastic sound, so be it. The following mic-placement techniques should help you get started on your search.

Monaural miking. Having only one mic available is not a tragedy. You can still capture an exquisite tone if you find the guitar's sweet spot. If you want to accentuate the instrument's high-end sheen, place a condenser approximately ten inches from the face of the guitar, pointing at the 12th fret (**Fig. 3**). To add some

low end—or to balance the relationship between bass and treble frequencies—aim the mic at the bottom of the soundhole, near the bridge. Be sure that the mic capsule is not pointing directly at the soundhole, however, because the airflow can cause woofy or flabby bass. To minimize the boom, simply turn the mic until it is at a 45 degree angle to the top of the guitar so the air rush will not hit the mic capsule dead on.

Switching a multi-pattern condenser mic to its cardioid pattern can minimize room reflections and produce a sharp, articulate jangle. For a more ambient perspective, select the omnidirectional pattern, as it lets the mic hear everything within a 360-degree radius.

Stereo miking. To produce a more expansive tonal spectrum, use a large-diaphragm condenser to record the low-end resonance of the acoustic, and a small-diaphragm condenser to pick up the guitar's high-end sparkle. Position the large-diaphragm mic approximately six inches over the bridge, and angled towards the bottom of the soundhole. The small-diaphragm mic should be placed four to eight inches from the neck, aiming at the 12th fret. Both mics should be switched to their cardioid patterns to ensure that the stereo perspective is preserved. (Omnidirectional patterns can smear the articulation of the right/left sound field by recording too much room ambience.)

While professional engineers often prefer

Fig. 4—Stereo miking yields expansive timbres. Here, a Neumann U87 is positioned to capture some lows, while an AKG C451 goes for the sparkle.

to use matched mic pairs (same manufacturer and model) to capture a balanced and natural picture of the source sound, an unmatched pair can be used to further emphasize the timbral differences between the guitar's high and low end (**Fig. 4**).

Amp and acoustic. For a complex timbre that is rife with overtones and ambience, run an acoustic/electric guitar through an amp, and set up two room mics—as well as a mic on the amplifier's speaker cabinet (**Fig. 5**). The mic used to record the speaker cabinet should be a dynamic to best reproduce the midrange punch of the guitar/amp combination. Position the mic directly on the grille, dead center to the speaker cone, for a dry snap, or move the mic back a few inches to capture some room ambience. (You can also use the acoustic/electric's pickup output to record a fourth track as a safety. This direct signal will obviously be devoid of signal bleed and can be used to bolster the track if the miked-amp tone is too messy.)

Now, place two condensers in a left/right stereo position to the performer and the amp. Experiment with the mics' distance from the source sound until you hear a thrilling blend of jangle and room tone. You can also play with the width of the mic positions to expand the stereo field, but take care—if you move the mics too far apart, you risk creating a "hole in the middle" effect, where sounds coming directly at the listener lose tonal integrity and resolution.

Obviously, you should also play with the tone and volume of the amp, as the amp sound will have a marked impact on the overall timbre. Although this technique is designed to produce a stereo soundscape, if your track space is limited, you can mix the three mic inputs to a single, monaural track, and still reap the tonal benefits of the multiple mic positions. For a brilliant stereo effect, however, record each of the three mics onto a separate track, and, at the mixdown, bring up the monaural amp track until it provides the left/right stereo field with an aggressive "centerfield" punch.

Sing and play. The age-old problem of recording artists who simultaneously play and sing is how to deal with the signal bleed between voice and instrument. When miking acoustic guitarists, for example, you'll always get vocals on the guitar track and guitar on the vocal track. While you can't totally isolate the two source sounds, you can diminish the bat-
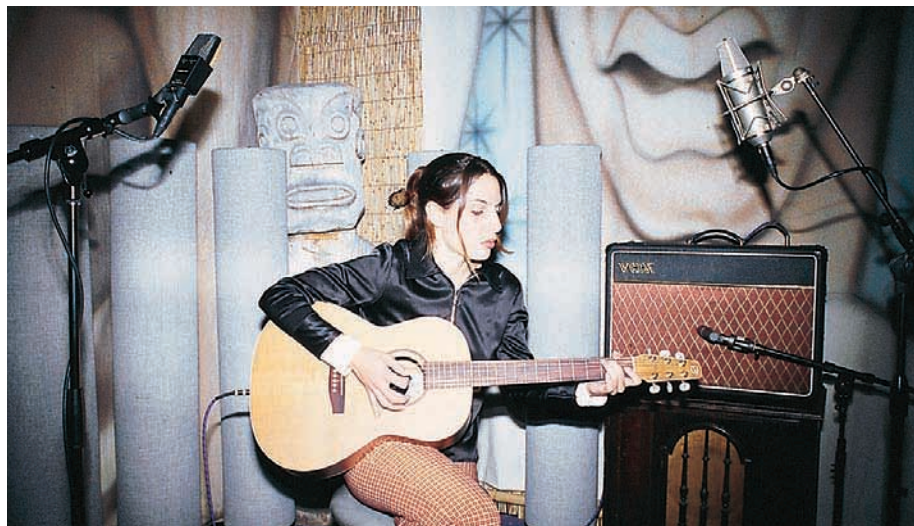

Fig. 5—Don't waste the sonic possibilities of acoustic/electric models that can be both miked and amped. For this setup, I used four tracks: a direct signal from the guitar pickup, a miked-amp tone, and an ambient stereo perspective.

tling tones somewhat.

A facile trick is to use a music stand as a sonic barrier between the guitar and the performer's mouth (**Fig. 6**). Position the top of the music stand so that the tray can be tilted until it sits like a ledge about seven inches under the player's chin. (Obviously, you need a stand with a solid-backed sheet-music tray for this technique.) Position the guitar mics under the tray in a stereo-miking position (as explained earlier), and hang a vocal mic over the tray, approximately five inches from the performer's lips. Finally, lay a small piece of cut-to-fit carpet (or a hand towel) atop the tray to minimize signal reflections bouncing off the tray itself.

The good news is that this contraption can diminish signal bleed enough to let you increase the level of the guitar track during the mix without also raising the perceived volume of the vocal, or vice versa. Phase cancellation due to massive signal bleed is also minimized. The bad news, however, is that this is hardly a comfortable position for the performer. Use your judgment as to whether the improved sonic quality is worth the diminished performance quality of a cranky artist.

EQ

Although you can produce a cleaner, more visceral sound by minimizing the presence of studio electronics, mic placement alone is sometimes not enough to deliver the perfect acoustic-guitar tone. In these instances, forget about what's optimum, and start twisting your console's EQ knobs. Here are some basic quick fixes for common tonal problems:

• If traffic rumbles, electronic hum, or room resonances are muddying the low end of your guitar, try cutting 80Hz or 100Hz by 7dB to 10dB. Take care to cut just enough to lose the bad stuff—you don't want to thin out the guitar tone.

• To liven up dull strings (or dull rooms), boost 3kHz to 5kHz by 3dB or so.

• Want more sparkle? Boost 10kHz or 12kHz by 6dB.

• To tame overly aggressive midrange frequencies that are making the guitar sound clangorous, try cutting anywhere between 750Hz and 3kHz by at least 6dB.

SIGNAL PROCESSING

As there is no law against recording unnatural acoustic guitar timbres, have a little fun by using the acoustic as a basic tone for some

Fig. 6—Look comfortable? This awkward setup is designed to diminish mic bleed between the vocal and the guitar when a performer wants to sing and play simultaneously. A music stand with a piece of carpet on top acts as a sonic barrier between the vocal mic and the two guitar mics.

Fig. 7—Again, don't overlook the wacky signal-processing capabilities of an acoustic/electric guitar. Here, an AKG C414 captures the guitar's natural timbre, while a Danelectro Cool Cat chorus brings on some shimmering swirls. The two different tones were blended at mixdown.

adventurous sound sculpting. For example, run an acoustic/electric through a favorite stompbox—going straight to tape via a direct box—and set up a mic to record an organic, ambient perspective (**Fig. 7**). Record the two signals to separate tracks, and then adjust the tonal colors to taste during the mixdown.

Skilled use of compression can also help punch up the sound of acoustic guitars. A basic setting for tightening up the jangle is a 2:1 ratio at a threshold of -10dB. While this tweak also compromises the overall dynamic range of the instrument—there will now be less of a level difference between the loud and soft passages of the performance—the great side effect of compression is that it can make the guitar sit into a track with more conviction and presence. Experiment with various ratios, signal thresholds, and attack and release times until you achieve the desired amount of punch. A helpful hint: As compression often changes the timbre of the source sound, it's best to dial in your compression settings before making any critical EQ adjustments.

ARRANGEMENT SENSE

If you want your home-studio productions to compete with major-label releases, a basic knowledge of recording techniques is critical. However, keep in mind that brilliant audio chops won't save a bad song, or a bad song arrangement.

To really make your acoustic guitar tracks shine, you must determine what role the acoustic is playing in your production, and record an appropriate tone. For example, a huge acoustic guitar sound is not usually a good thing if you plan to fade acoustic tracks under electric rhythm guitar tracks á la Pete Townshend. For this application, the thinner the guitar sound the better, as a robust tone may compete with the electric guitars and the bass, ultimately causing the mix to sound cluttered and boomy. Conversely, a solo-acoustic performance should probably be recorded with all the bass, midrange, and treble frequencies the guitar can deliver.

The trick here is to avoid considering the acoustic guitar as the main or singular element of an audio production. No sound is an island. Ultimately, all timbres must coexist within the stereo soundscape of your mix. So don't just strive to record great guitar tones—struggle to produce empathetic timbres. Your songs will thank you. ●

Recording Lead Vocals For Maximum Impact

Photo By Paul Haggard

Good Tools for Great Vocals

The human voice was arguably the first instrument, and to this day it remains the focus of many styles of music. But the technique and technology for capturing vocals has changed dramatically over the years, and what happens after they're captured—like correcting pitch deviations—has aroused a storm of controversy.

Reality check: We're not here just to capture a performance, but also to capture an emotion. The tools used to record vocals—like mics—have proliferated to the point where it's easy to experience option overload. If a singer loses that moment of inspiration because you wanted to try out mic #5 to see if it sounded better than mics 1-4, you'll realize that any mic

5 WAYS TO STANDOUT VOCAL TRACKS

KISS AN OMNI

The problem with cardioid and other directional mics (such as those that have a hyper-cardioid, super-cardioid, or figure-8 polar pattern) is that they have an inherent bass-proximity effect. The closer you get to a directional mic, the more bass boost your vocal track will exhibit. That's not necessarily a big issue if you maintain the same distance from the mic at all times while singing. But should you vary how close you stand to the mic, many vocal lines will have a completely different tone from the others. For a consistent sound, you may need to adjust bass-cut equalization line-by-line during mixdown to clean up varying amounts of mud and boominess on your vocal track.

An omnidirectional microphone exhibits no proximity effect, no matter how close you are to the mic. This allows you to get within kissing distance of the mic's capsule and still produce a crystal-clear sound. Sing as close to an omni mic as possible, and your tracks will boast technicolor detail and compelling urgency that demand attention. If the mic overloads, switch on the pad to prevent distortion.

TRY A FIGURE-8

If your trademark is a singing voice with naturally very deep bass, an omni mic may not do you justice. Try setting a multi-pattern mic to its figure-8 (or bi-directional) position instead. All other things being equal, a figure-8 mic will produce the most low bass. Try singing about a foot away from the mic, and keep that distance consistent. During mixdown, use a parametric equalizer's bell-curve filter to cut roughly 4dB at around 150Hz, and set the filter's Q control to about 1.2. That will clean up any muddiness that the figure-8 mode produced but leave the lowest bass frequencies intact. Don't be afraid to apply a little bit of narrow bass boost at around 60Hz to enhance that glorious low end you were born with, and apply a bit of boost at 4kHz to improve presence. The result: a clear, detailed vocal with mineshaft-deep bottom end.

THINK SMALL

Most vocal tracks are cut using a large-diaphragm condenser mic. Small-diaphragm condensers generally capture more detail than their larger cousins, but their lightweight diaphragms tend to pop very easily when exposed to vocal plosives and wind from heavy breathers. For a vocal track brimming with detail, try singing over the top of—instead of directly into—an omni small-diaphragm condenser mic. Omni mode is typically the least sensitive to plosives and wind turbulence and therefore less likely to pop. And if you sing 90 degrees off-axis (that is, perpendicular) to the mic's diaphragm, wind from your mouth will safely project over its top. Use a windscreen for added protection.

SLOUCH!

There's a good reason why many singers prowl the stage bent over like the Hunchback of Notre Dame while belting it out—diaphragm support. For more power in your vocal delivery, try setting up your mic about a foot lower than your lips and angle it up toward your mouth at roughly a 45-degree angle. You'll need to bend forward in order to sing directly into the mic. Doing so will compress your diaphragm, providing greater support that will turbo-charge your vocals.

STARVE YOUR HEADPHONE MIX

Listening to too many tracks while singing can confuse your sense of pitch and groove. Limit your headphone mix to drums, bass, one or two chordal instruments, and your live vocals. Hearing instruments that play melody lines, especially in your vocal range, will tend to distract and make you sing off-key, so take 'em out of the cans. To improve your vocal phrasing, goose the kick and snare drums in your cue mix to reinforce the beat and backbeat. Add little or no reverb and other effects to your vocals in the headphone mix, because they will also throw you off-pitch. A vocal that sounds great with such a sparse headphone mix will sound unbelievable once the other instruments and effects are added during mixdown.

—*Michael Cooper*

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would have been a better choice.

Recording vocals is easy. Recording great vocals is more difficult. But recording vocals that move the listener is the real goal. There's a great line in the movie *Spice World* where someone working with the Spice Girls says, "That was absolutely perfect—without being actually any good."

Are we recording perfect vocals, or vocals that are really good? Are we using pitch correction to fix a few choice glitches, or as a default on a track? Are composite vocals sucking the life out of a performance, or helping to augment the life that's already there?

Let's sort out the techniques and technologies that will help you record better vocals, and figure out how to tame technology so it serves us instead of taking over. It's all about the right performer, the right gear, the right techniques, the right attitude, and yes, the right magic. Ready to push the record button? Let's go.

Capturing the best vocal tracks requires the right tools, along with the knowledge and technique to apply them well. However, while the tools for recording vocals are well established, the variety and assortment available can be overwhelming. You can choose among hundreds of microphones, an amazing array of

microphone preamps and channel strips, plus a vast sea of compressors, limiters, gates, EQs, and vocal processors of every stripe. How can you possibly narrow down the choices to what you need? Let's take a look at the components in a vocal recording chain, and how to use them.

MICROPHONES

The microphone is the recording chain's first stage, and sets the "tone" of things to come. Choosing the best mic for a particular voice can be a challenge. Once you've learned your mics' sound, you'll more easily match them with the characteristics of each voice—such

as putting a darker-sounding mic with a bright, strident voice. But even if you know your mics extremely well, selecting the right one may involve some trial and error. Consider the mic's dynamic response as well as its sound—in most cases you'll want equal dynamics from the singer and mic, but if your vocalist is overly dynamic, a mic with a smoother dynamic response can be a help.

Most engineers default to using large-diaphragm condensers for vocals, but don't let that stop you from trying whatever you can. If a small-diaphragm mic sounds best, go for it! Likewise, cardioid is the most commonly used polar pattern due to its good rejection of unwanted room noise and reflections, but that shouldn't stop you from trying mics with other patterns.

Cardioid mics typically feature strong proximity effect, which an experienced vocalist can put to good use. Careful though, inexperienced singers tend to "eat" the mic to get the fattest sound, resulting in unwanted distortion and severely reduced dynamics. One tool to help counter this is a . . .

POP FILTER

This device helps protect the mic from moisture from the vocalist's mouth, and controls distortion from plosives—the bassy pops that result from sounds such as "p" and "b." But pop filters can serve another purpose: If you're working with an inexperienced singer, set one up at the distance you want them from the mic, and tell them to stick right on it as they sing. This will not only help control proximity effect, but also erratic dynamics and vocal level—the singer has something to focus on.

Note that pop filters and windscreens are different. A pop filter is generally fabric stretched over a frame that's positioned in front of the mic. (Higher-tech designs use screen grids and molded plastic louvers to redirect plosives away from the mic diaphragm.) A windscreen is hunk of fitted foam that slips over the mic and is designed for live use outdoors to curb wind noise, etc. Most windscreens audibly affect the mic's frequency response, so they're not used in studio situations.

SHOCKMOUNTS

For a sensitive large-diaphragm mic, a shock-mount can be a useful accessory. This isolates the mic physically from its environment so that noise transmitted through the mic stand (thumps, foot tapping, rumble) won't be picked up by the mic. Most use some variation on elastic bands woven into a web that supports the mic without physically coupling it to the mic stand.

PREAMPS

After the microphone, the mic preamp is probably the biggest contributor to the vocal sound, gear-wise. As with mics, there are literally hundreds of preamps available, from those built into low-end recorders to big-bucks boutique models. Flavors run the gamut from solid-state to tube to units that can blend the two types of circuits together.

As a result you can access myriad preamp tones, with one that's hopefully appropriate for each situation. But you also have to sift through the available choices before settling on the best one. As with mics, this ultimately comes down to personal preference and knowledge of the sound of the preamps at your disposal. Is the preamp extremely present? Then it will help a mellow voice punch through a mix, but may make a harsh voice even harsher. It's also important to match the mic to the mic preamp—certain mics sound great through some preamps, not as well through others. You can look at spec sheets all day, but the only way to really know how a mic will respond with a preamp is to try them out together.

Also consider the preamp's dynamic response. Some will be smoother, while others will faithfully track even the slightest level change and inflection in the vocal. Which type you want depends on the result you're after.

EQ

Engineers tend to fall into two camps: Those who will use EQ during tracking, and those who refuse to let an EQ touch their signal chains. Which type you are depends on a number of things, including your confidence in your ability to select EQ settings that will hold up all the way through the final mixdown, and your feelings on whether EQ should correct for frequency response characteristics, or if a different mic/preamp should be used for the track. For many, the second factor really comes down to how much gear is available. If you have one mic and one preamp, and they're both bright sounding, you have two

options: reposition the mic to capture a different tonality, or use EQ to create the sound you want.

As with most questions related to gear selection and technique, there's no correct answer to whether you should EQ as you track or not. Most engineers ultimately admit that the ends justify the means—as long as the final tracks sound great, who cares how you got there? Personally, I try to use mic and preamp selection, as well as mic technique, to get as close to the sound I want as possible (hopefully all the way there). But if it's necessary to add a dB here and there during tracking to make things sound right, then so be it.

COMPRESSION

In the ideal world, there would be no need for dynamics control. Our recording devices would have unlimited headroom, and vocalists and performers would have complete mastery over

their dynamics and levels. But this is the real world, and dynamics control for vocals can be necessary. While 24-bit (and higher) recorders have reduced the need for heavy compression — at least during tracking — it can still be useful to clamp down a bit if the performer has too wide a dynamic range.

If you're recording once-in-a-lifetime tracks digitally, you might also want to consider either inserting a limiter in the signal path to help prevent digital overs and resulting nasty distortion, or to use an analog-to-digital converter with built-in limiting (although these built-in limiters may be very audible when they kick in on a loud passage). Still, that can beat a big burst of digital grunge in an otherwise pristine track. While it's best to set your levels conservatively if you're not going to get a second shot at a take, if you're going to use a limiter to prevent overs, use the best, most transparent one you can find. —*Craig Anderton*

10 Ways to Ensure a Productive Vocal Session

SEE THE COACH

Working with a vocal coach prior to recording is always a good idea. Go through the material you're going to record, and listen to the coach's feedback on pitch, phrasing, stamina, breathing, and so on. The goal is to remedy any potential vocal problems before you stand in front of those sexy studio mics.

DO PREPRODUCTION

Work out the song so that the lyrics, timing, phrasing, and breathing are rock solid before you start recording. This sounds so obvious, but many singers and producers blow this step, and the result is often a performance that's less than what it could (or should) be.

CHOOSE THE RIGHT KEY

A half-step up or down can make a huge difference in whether a singer can deliver a great performance. Try the song in at least three keys: the key you think it will work in, a half step higher, and a half step lower.

WARM UP

Most singers typically need 45 minutes to an hour to warm up their voices enough to cut a

good vocal. Matt Forger— who engineered Michael Jackson's *Thriller*, *Bad*, and *Dangerous* albums—advises: "Do vocal exercises so that your voice will sound up to par right from the beginning of the session." I like to sing scales in an octave sequence up to my high end, and then sing the chorus of the song I'm about to record to see if my voice feels completely comfortable and free. Remember, unlike guitarists or keyboard players, the singer's body is their instrument, so make sure the vocalist is in his or her peak-performance zone.

FRESHNESS COUNTS

Don't make the vocalist wait for other instruments to be tracked before you start on the vocals. The singer may get tired or distracted, and lose the energy required to cut a great vocal track. Always schedule a separate date that focuses solely on the vocal tracks.

PICK THE RIGHT MIC

Microphones bring out different textures, timbres, and overtones. Try a least three mics for reference, and choose which one sounds best.

HOW TO DESTROY PLOSIVES

Maybe you used a pop filter, maybe you didn't. Maybe the singer was a little over-enthusiastic that night. In any event, there's a P-pop (called a "plosive") that's sitting in the track like a cockroach in a punch bowl. Mostly, this is low-frequency energy. Select the popping sound (which can happen with "b" and other sounds as well as "p" sounds), and apply a sharp low-cut filter. Set the cutoff at around 100Hz and see if that helps. If not, you may need to:

[1] Move the cutoff higher to remove more bass.
[2] Increase the slope to attenuate the bass further.
[3] Place two filters in series to double the amount of attenuation.
[4] Combine low-shelf and parametric EQ to reduce low-frequency energy.

—Craig Anderton

Don't make the selection based on the price or model. (Don't laugh—some musicians go for the most expensive mics whether those mics enhance their voice or not.)

HEADPHONE TECHNIQUES

First, you need a good headphone mix to ensure the singer can feel the music. A vocalist shouldn't start singing until he or she is 100-percent happy with their mix. If the headphones kick in a feeling of claustrophobia, go for the one earpiece on/one earpiece off method. This approach lets you hear both the track and the sound of your voice in the recording space. Additionally, you can cover the "free" ear to tap into bone resonance if you need to hear your voice clearer.

HAVE A ROAD MAP

Put a lyric sheet on a music stand and use it to make notes—including breath marks. The engineer and producer should have copies, as well, so that they can notate pitchy parts, lyric goofs, technical misfires, and any other problems. When everyone is on the same page, so to speak, the chore of fixing less-than-stellar moments in the vocal performance is much easier.

HELPFUL FEEDBACK

Make sure that all vocal instructions are clear and specific. This is where constructive criticism comes in. Negativity only makes things worse.

BE REALISTIC

The recording process will always take longer than you think. You may want to cut three lead vocals and all the harmonies in one four-hour session, but the goal is to cut an amazing vocal, not check off objectives on a to-do list. In short, don't choose quantity over quality. —*Teri Danz* ●

BANISH HEADPHONES

Frank Sinatra was a tough customer in the studio. He wanted to sing in the room with the band, and the musicians had to be on their game. This was the era of capturing transcendent live performances from exceptional players, so there was no doing 20 takes to acquire "audio data" for comping, no isolation booths, and no headphones. Yeah, Clyde, it was Frank's way or the highway.

But, even though many recording types are currently under the spell of DAW editing, this doesn't mean vocalists must sacrifice their "inner Frank" by jettisoning personal comfort in favor of the supposed requirements of technology. For example, if you hate wearing headphones while singing, you can dropkick those puppies—just make sure you are aware of what you may gain or lose by such an action.

THE PRO/CON GAME

The main drag of wearing headphones for some singers is the weird feeling of being isolated from the fury of sound produced by the band. This distraction can sometimes result in a stiff performance that doesn't match the energy or vibe of the track. Even the slight physical impediment of having foam pads pressing against your ears and a cable dangling from head to toe can be enough of a bother to prevent a vocalist from really letting go. On the other hand, a clear benefit of wearing headphones is that the direct-to-ear sound source can often help pitchy singers find their notes more easily. Likewise, singers who exhibit difficulty with phrasing might lock in better by having the groove pounded directly into their ears. The trick is determining whether headphones are truly one of the obstacles to capturing a great track.

THE SANS HEADPHONES SETUP

If a set of headphones proves to be your "poor-performance culprit," tracking without them is pretty simple from a logistical standpoint. Drop your mic stand somewhere near your speakers, stand in front of the mic, roll the track, and sing. Some professional recording engineers diminish signal leakage into the vocal mic by wiring the playback speakers out-of-phase and positioning the singer in a "sweet spot" where the mic hears almost none of the backing tracks. It can work, but it can also be too much trouble wiring your monitors one way for tracking, and then switching the wiring for listening back. (I'm assuming most home studios are working with one set of monitors.) The easiest move is to experiment with mic placement and playback volume until you're happy with the balance of source sound (the vocal) and signal leakage (the track). Choosing a microphone with a cardioid or supercardioid polar pattern that "hears" less sound from directly behind it will also help diminish leakage. I stand a bit to the side of the monitors and keep the volume at a low, but comfortable playback volume that allows me to hear everything I need to find my pitch and deliver the proper energy and phrasing. I also play back the entire mix, rather than select just drums, bass, and guitar to minimize the number of instruments sneaking into the vocal mic. I figure, why go the "I'm free" route in order to cut a more amped-up vocal if you're only going to delete some of the elements that make your rhythm tracks rage? The goal here is to deliver a thrilling vocal performance, so give yourself a mix that fires you up and triggers all your rock-star neurons.

AH, THE GLORY . . .

The genius of tracking without headphones is only proven by a vocalist delivering a brilliant take that leaves you stunned, excited, and shivering with bliss. You'll know it when you hear it. 'Nuff said.

OOO, THE AGONY . . .

The downside of singing without headphones has already been revealed—it's the resulting signal leakage. What this typically means in a practical sense is that you may not be able to bathe the vocal in massive reverb, long delays, and other aggressive processing, because whatever other signals appear in the vocal track will be effected, as well. For example, if you want a specific line to echo-echo-echo, you might hear the drums and guitars echoing, too. Of course, a lot of leakage never hurt Phil Spector's "wall of sound" productions, so, once again, it's your personal concept of the final mix that will likely determine your comfort level with signal leakage. —*Michael Molenda*

A Comprehensive Guide to Recording Bass

BY JAY GRAYDON AND CRAIG ANDERTON

Recording bass is easy, right? You just plug right into the mixer and go direct for a clean tone, and you can also stick a mic in front of your amp to make your bass sound more live. What could be simpler?

Not so fast. Recording bass is indeed simple—but getting a tone with god-like low end, crispy and well-defined presence, and a consistent level is a whole other story. To begin with, there's the issue of physically recording the bass: Do you go direct, mic an amp, or both? And if you do use an amp, what kind of speaker sounds best, and where should you place the mic? What happens if the frequency response isn't even, with a wimpy low end and muddy midrange? There's also the problem of uneven level, where some notes jump out while other notes sit timidly back in the track. And if you didn't have enough to think about already, you should know even your cords can affect your sound.

Recording Direct

With direct recording, you plug the bass into a direct box (also called a DI, for direct input), whose output typically feeds a mixer's mic-preamp input. Recording bass direct is popular because loudspeakers and microphones don't handle low frequencies very well, often removing some of the fullness. Unlike guitar amps, where speaker limitations can enhance the sound, bass amps are constantly fighting the laws of physics. Still, since an amp can be a big part of a bassist's sound, some people like to mic their amp or combine a miked amp and a direct box.

DIRECT BOXES

A direct box transforms the high-impedance output of a typical bass (approximately 4,000 to 10,000ø) to a low impedance (usually 150–600ø). This lower-impedance signal is better suited for mixing consoles, which usually have a fairly low input impedance.

A DI has some or all of the following:
• **1/4" input jack.** The bass plugs into this.

THERE ARE THREE BASIC DI DESIGNS

• **Passive.** Uses an audio transformer with a high-impedance input and low-impedance output. Unfortunately, quality transformers are expensive, and a passive-DI input can still impedance-load the pickup somewhat, resulting in a dark, mushy sound and reduced level. However, if you're trying to recreate classic bass sounds of the '60s and '70s, transformer-based DIs will get you there.

• **Active solid state.** Essentially a preamp that adds clarity and punch compared to a passive DI. Downsides include more noise and the need for a power supply (battery, ac adapter, or console phantom power).

• **Active tube.** Similar to the solid-state type but with a vacuum tube. Tubes have high input impedances, making them well-suited for pickups; they can also warm up the sound. Tube direct boxes require their own power supply.

Incidentally, before plugging into any DI or patching one into a mixer, set the console's faders all the way down to avoid nasty noises and possible speaker damage.

• **XLR (3-pin) output jack.** This uses a mic cable to take the signal to the board.

• **1/4" output jack.** This can be routed to an unbalanced mixer input but can also feed a standard bass amp, drive an effects pedal that gets mixed in with the main signal, etc. Note: Some DI designs use this jack as a "mult" (simple split) from the input jack. If so, plug this only into a bass amp, not a mixing console.

• **Ground-lift switch.** This helps eliminate
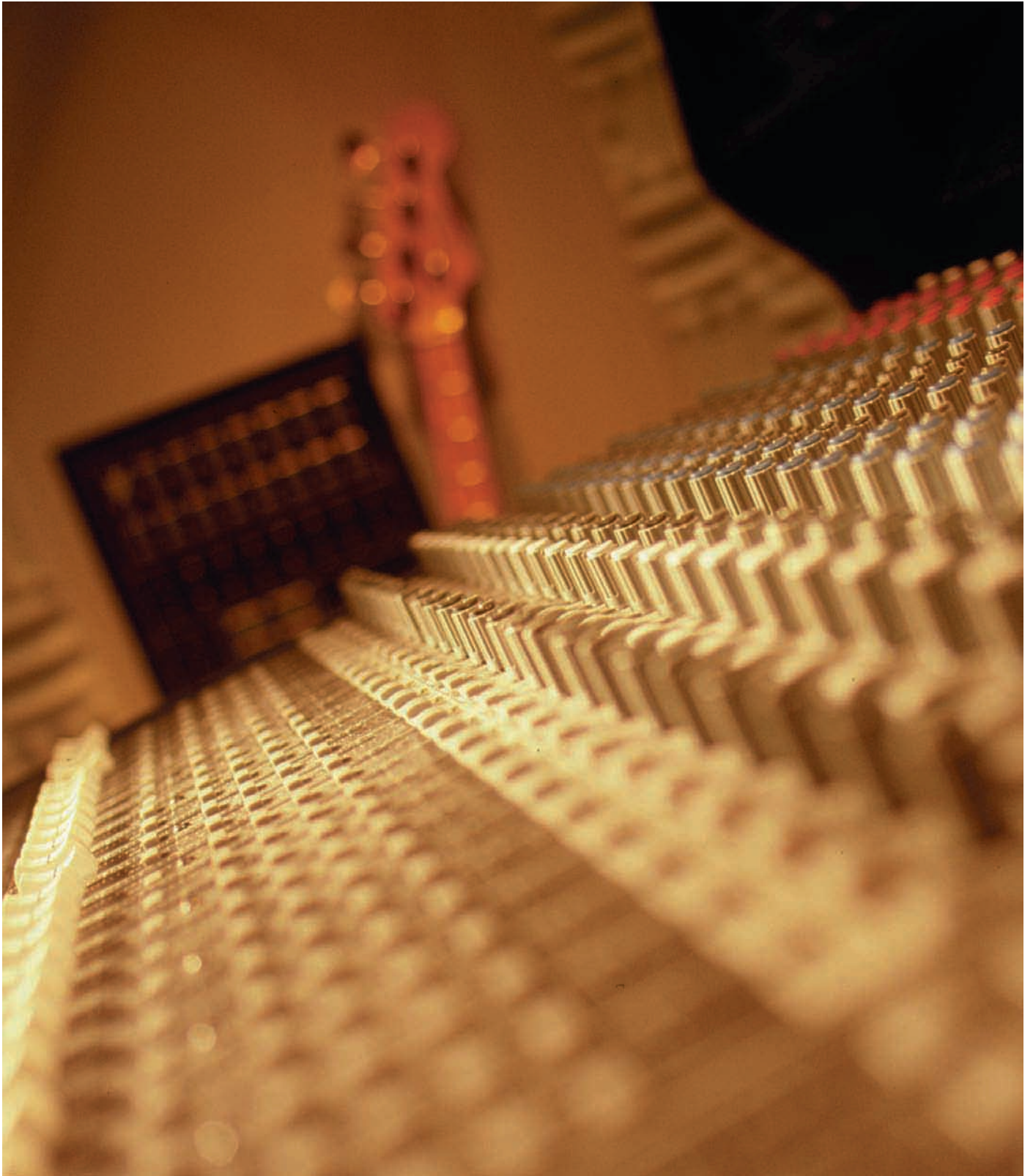
ground loops; if you encounter hum, radio-frequency interference, or other forms of noise, use whichever switch position sounds best.

• **Goodies.** Direct boxes may also include EQ, distortion options, and other extras.

Direct boxes are also useful for live performance, as you can pull a direct output for the PA and/or recording setup and also feed a bass amp onstage.

PREAMPS

Instead of using a DI box, you can use a preamp. Preamps add gain to the bass signal, which improves the signal-to-noise ratio and delivers more signal to the console. There are four main types:

• **Onboard.** Some basses have built-in active electronics that deliver a hefty signal capable of directly driving an unbalanced mixer input. This also minimizes the impedance-loading effects of cables and amplifiers or mixer-channel inputs.

• **Outboard.** Typically a rackmount unit containing controls for gain, EQ, etc. Some also have xlr outputs for direct recording. These preamps have q" output jacks and can directly drive a console with unbalanced inputs—no DI required.

• **Bass amp direct out.** Many amps have a direct output for recording or PA connection. Some have a q" output jack, but recording-savvy manufacturers may include an xlr.

• **Effects-loop send connection.** If an amp has an effects loop, you can use the send jack as a preamp out. Some loops use a 1/4" TRS (tip-ring-sleeve) stereo jack where the tip corresponds to send and the ring corresponds to return; to use such a jack as a preamp out for a mono 1/4" plug, insert the plug halfway—until it hits the first "click." (Plugging in all the way will interrupt the effects loop, thus allowing no output from the amp.)

FEEDING THE PATCH BAY

You can also plug an unbalanced output into a recording-console patch bay that has 1/4" jacks. Depending on the patch bay, this may require plugging in only partially, or you may need to use an unbalanced-to-balanced adapter.

DIRECT RECORDER FEED

For the cleanest possible signal, bypass the mixer entirely and patch the DI out, preamp out, or effects send directly into the recorder. There's nothing quite like a good tube direct box feeding a quality recording deck.

CABLES & CONNECTIONS

In a typical studio setup, you'd patch your bass into a direct box's input and patch the output into the mixer (or mic bay, in larger studios). It's usually best to use the DI's XLRjack, as this is tailored for the console's mic input. If there's an additional 1/4" output, you can run it to your bass amp, either for monitoring or miking. Careful, though—with some DIs the XLR and 1/4" jacks aren't isolated from each other, so using more than one of these outputs can cause loading problems that degrade the sound.

Amp Miking

Adding a miked amp to your direct signal changes your tone, since a microphone, amplifier, speaker, and cabinet are now in the equation. They're all essentially signal processors, and the way you use them will make a big difference in the final sound.

SECRETS OF THE GRILLE COVER

A grille cover is a passive filter that can affect frequency response, and if it rings or resonates it may buzz like a blown speaker. Once a cabinet is in place in the studio, if it's easy to remove the cover, do so—the sound will be better. However, don't let a mic hit an exposed speaker—be sure to anchor it (see below).

MIC POSITIONING

It helps to have someone else, like a second engineer, adjust the mic position while you're in the control room. (If the console is in the same room as the musicians, all of you may be wearing headphones.) Any type of mic can work: dynamic, condenser, or ribbon. If the amp will be fairly loud, use a dynamic mic; these deal best with loud sound sources. (Rule of thumb: Never put a condenser or ribbon mic where you wouldn't put your ear.) Whatever mic you select, choose one with an even bottom-end frequency response.

For a single-speaker cabinet, start by positioning the mic in front of the speaker, directly facing the cone. To capture the punch of the moving air, mic very closely—about one inch back from the grille cover (or where the cover was before you removed it). Pointing the mic at the speaker cone doesn't allow for much low end, though, so more upper-mid frequencies will come through. As you play, have someone slowly move the mic toward the speaker's left or right outer edge. You can also try moving the mic toward the top of the speaker, but only if the amp electronics are not right over the speaker. If you're using
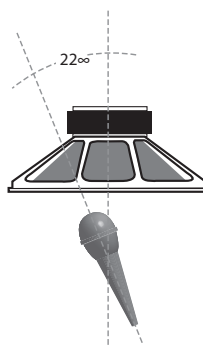

Fig. 1—Pointing a mic at a single speaker.

a combo and you're picking up hum from the amp's transformer (which typically sits on one side of the chassis), move the mic to the other side. If that doesn't solve the problem, move the mic toward the lower part of the speaker. The sound bouncing off the floor may cause phase anomalies, so consider putting the cabinet on a chair, milk crate, etc. Also, when an amp sits on the floor, there is a buildup of low end; this may not be a problem when recording unless you notice uneven lows. If so, raise the amp or reposition the mic.

Sometimes you'll find a mic position where the bottom end sounds good but there aren't enough mids. In this case, try angling the mic slightly toward the cone at about a 22° angle (**see Fig. 1**).

If the cabinet has more than one speaker, mic each to find the best-sounding one. Use

that speaker mostly for the bottom end, pointing the mic at least halfway between the cone and the edge. (Moving closer to the outer edge results in less mids, but going too far reduces punch and adds mud.) Then, for the mids, point a separate mic directly at the center of the second-best-sounding speaker. Experiment with both mic positions.

Important: With two or more mics, keep them the same distance from the cabinet so both will receive the sound at the same time. If there's a difference you may get phase problems, which can cause frequency buildups and cancellations. If the board has phase switches, blend the channels in mono, flip one mic channel's switch, and use the position where both mics' combined sound is stronger. And if you're combining the mics with a direct signal, check its phase against that of the combined mics, too.

ANCHORING THE MIC STAND & CABLE

Merely positioning the mic is not enough—it has to be stable. Most mic-stand bases can tip easily. The heavier the base, the better. Anchor the stand with sand bags or any stable, heavy object that will not slip or rattle. Placing three 20-pound sand bags around the base is ideal.

While positioning the mic, wrap its cable around the stand's boom (adjustable upper arm) a few times, and leave a little slack so the cord doesn't pull and change the mic's position. To keep the cord from moving, tie it to the stand using removable cable ties. Don't use permanent cable ties, as you will have to cut the tie later and risk damaging the cable. Velcro cable wraps are the easiest to set up and remove. Duct tape also works, although it leaves an adhesive residue. There should be very little cable slack at the mic-stand base.

Secure the cable to the floor. On wood floors use duct tape, and cross the cable with tape in one-foot strips at least every two or three feet. Avoid duct tape on carpeted floors; instead, put throw rugs or carpet remnants over the cable.

GROUND ZERO

Before plugging any mics into the console, set the board's faders all the way down. In fact, whenever you start a recording session, it's good practice to "zero out" the console (i.e., turn down all faders and auxiliary sends, reset all EQ controls, and set all switches to their standard positions).

BAFFLING THE AMP

When your amp is in a live-sounding small or medium-size room along with mics for other instruments, leakage from one track to another can occur. Leakage will be a major problem if you need to fix a performance later, because when you punch in, the leakage disappears and the mix changes. Baffling (surrounding the amp with sound-absorbent structures) can minimize leakage.

If necessary, create a "baffle box." Pro studios use manufactured baffles that combine air pockets and sound-absorbing materials; however, you can stack milk crates and throw blankets over them, or get two tall fans and stretch a thick blanket between them. All baffle surfaces should be very soft—for example, cloth stuffed with cotton. Baffle each side of the amp (unless you're using a closed-back cabinet, in which case the baffles can form a V in front), with a baffle lying across the box's top. If you don't have a good baffle for the top, use a packing blanket. Leave room on the front for speaker "breathing room" as well as space for the mic stand. All other sides can be baffled "tight." (With an open-back cabinet, leave breathing room in the back, too.) If the room has a soft, non-reflective wall, point the cabinet toward it and use the wall as a baffle. Angle the speaker slightly away from the wall to avoid phase problems.

Caution: When baffling overhead with combo amps, allow for air circulation to prevent the amp from overheating. Never let a blanket drape over the back of an amp! With a separate head and cabinet, set the amp head on a carpeted section of floor so the speakers won't rattle the electronics. As always, patch the amp to the cab with heavy-duty speaker cables—preferably 14 gauge or heavier—not mic or guitar cables.

REFINING THE SOUND

Once the baffling is set and the mic is roughly in place, dial in the sound on the console. First, set the levels to avoid overload. Next, move the mic to find the best spot. Before adding console EQ, try adjusting the tone at the amp; when it sounds good, try adding some console EQ. If the sound still isn't right, you may need to move the mic around some more. If that helps, switch out the EQ and start over. Try other mics, too. You often won't get things right the first time, so don't be impatient.

Even with really good miking, you may notice certain notes jumping out or dropping back in level. This is normal and caused by frequency buildups and cancellations. Adding compression should help.

When the amp is isolated in its own room, adding a room mic can yield a more live, rock-friendly sound. Place it a fair distance from the amp so it picks up lots of room reflections. There may be huge anomalies in the low end, so you may need to add lots of compression and EQ before it blends with the other bass signals.

Equalization

Equalization can make or break a bass sound. It's important to remember no two instruments sound exactly alike—so in addition to trying the suggested EQ settings, you should get to know how your bass responds at specific frequencies. This will help you recognize problem areas and find "sweet spots."

As usual, experimentation is the key. Tweak the EQ controls and let your ears be your guide; there are no rules in EQ-land. And remember that like basses, not all EQs have the same sonic character. This is one area where subtle differences in tone can really influence the overall sound.

STRINGS AS TONE CONTROLS

Strings are the most basic form of EQ. New roundwounds have more highs; old strings sound more dull—or mellow, depending on your taste—and may also have tuning inconsistencies. Flatwounds have less highs and

EQ TYPES

Shelving EQ is similar to the type found on a typical home stereo. It can boost or cut either the treble or the bass. **Fig. 2** shows the shelving EQ's response; note that in this example the corner frequency (the frequency where the boosting or cutting begins) is not selectable. Common corner frequencies are 100Hz for bass and 10kHz for treble.

A **3-band EQ** system adds a midrange control, which typically boosts or cuts 12dB–18dB, sometimes at a selectable frequency. A stepped switch or variable control selects the center frequency, and a knob dials in the amount of boost or cut.

Graphic EQ splits the audio spectrum into a number of bands and lets you boost or cut each band with a slider. The more bands a graphic EQ offers, the more precise the adjustments you can make. Top-of-the-line graphics provide a band every third of an octave. Graphic EQs work best for subtle sound-shaping over a wide range, or significant boosts or cuts within just one or two bands.

A **parametric equalizer** is a more flexible device that spaces several full-function, active filters throughout the audio spectrum. Controls for each filter include boost/cut, center frequency, and bandwidth (the range of frequencies boosted, also called "Q" or "resonance"). **Fig. 3** illustrates both the response of a typical parametric EQ stage and the concept of bandwidth.

Some boards have what's called "quasi-parametric EQ." This resembles a parametric but without the bandwidth control.
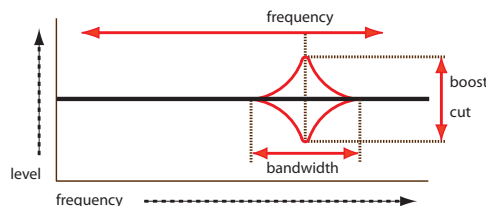
Fig. 2—Shelving EQ response.

Fig. 3—Parametric EQ response.

produce fewer squeaks. Also, playing finger-style generally produces less highs than using a pick.

To make sure your new strings stay in tune while recording, after tuning a string to pitch (preferably with an electronic tuner), pull hard on it to take up any slack on the tuning machine. Retune, pull again, and repeat until the pitch stays constant.

FINDING EQ HOT SPOTS

Here's how to find any instrument's EQ "hot spots." It works best on a full parametric EQ, but you can modify the procedure to work with other EQ types.

1. Start with very low monitor levels, as you'll be adding a lot of boost. Set the boost/cut controls to zero and the bandwidth controls to a relatively narrow Q value (such as one-quarter octave).

2. While you're playing, have someone boost the low frequencies by 6dB–8dB. Sweep the frequency control—rapidly at first to get an overview, and then more slowly to zero in on specific areas.

3. You will encounter certain settings that sound good and strong, while others will sound bad (muddy, noisy, etc.). After finding a good spot, set the boost/cut to flat, turn up to a normal monitoring level, and then boost or cut as needed. You may also need to narrow or widen the Q setting; go back and forth between the Q and boost/cut controls until you get the sound you want.

Follow the same procedure with all of the frequency ranges on the EQ. If you hear a response "bump" (peak) you want to remove, find the frequency where the bump is most obnoxious and cut that frequency until the sound is more balanced. With parametric EQ, if the bump is not too wide, a small Q may be all you need.

TYPICAL HOT SPOTS

Here are some important frequency ranges for bass:

10Hz–30Hz. Most home stereos can't reproduce this range, so there's little point in boosting here. If you do boost in this area and don't hear any change, return to zero boost; otherwise you'll use up headroom on frequencies you'll never hear, and you may even damage your monitors' woofers. While miking your amp, if you hear "room rumble" from a ventilation system or outside traffic, try cut-ting in this range, using shelving EQ if available. (Beware of low-cut buttons on mixing boards; if they extend higher than about 30Hz, they'll thin out your tone.)

30Hz–150Hz. Boosting here brings out the fundamentals (lowest harmonics) of your bass notes.

150Hz–200Hz. A little 200Hz boost may help the bass seem rounder—but if you add only at 200Hz, lower frequencies may seem less prominent, thinning out your tone. If you like what you hear when boosting at 200Hz, use a parametric EQ with a wide Q (two or more octaves) so the boost extends down to 100Hz. If using a wide Q reaches up into the 300Hz–400Hz range and the sound becomes too "puffy," narrow the Q.

200Hz–600Hz. Boosting in this area tends to cloud up the sound, making neither the notes nor their attacks stronger. You may even want to cut a bit in this region, but be careful—there's still significant bass energy here.

600Hz–1kHz. To emphasize the higher harmonics, try boosting here. A little more 800Hz usually does the trick. If the bass is in a thick mix and isn't very audible, boosting here will allow the bass to "speak" more—and you won't have to increase the overall level (which can

clutter the mix further).

1kHz–3kHz. 1kHz helps define notes but does not increase brightness. 1.5kHz–3kHz emphasizes upper harmonics as well as the sound of the strings hitting the neck. In general, boosting here adds snap and definition.

3kHz–5kHz. Adding a little boost around 4kHz can open up the sound slightly—but finger noise might get overpowering, especially if you're using compression. If you want to boost in this range, listen to the bass part all the way through first.

5kHz–10kHz. Boosting this region doesn't add much (other than finger and string noise) unless you're going for a bright slap sound. But remember, there are no rules—so if this works for you, great.

10kHz–20kHz. Basically the same as the 5kHz–10kHz range, but boosting at 10kHz can add a little air to your sound. If the string noise is not too bad and boosting here sounds good, go for it.

A TYPICAL EQ APPLICATION

Consider what kind of bass sound will be appropriate for the song, not just what sounds good by itself. You will almost surely re-tweak EQ during mixdown so the bass sits well with the other tracks—but get as close as possible while tracking, as the bass tone will also influence the other parts as well as the way you play.

Let's assume the song calls for a fairly standard bass sound and you're playing with your fingers. First, experiment with the low-frequency settings. A typical adjustment is to boost a bit at 100Hz or 150Hz. Play a groove that uses all the strings but favors the low ones. Boost 100Hz by 2dB–3dB and listen. If this adds a "friendly" bottom without increasing the amplitude too much, fine. If the sound gets kind of muddy (i.e., the notes lose definition) but you like the lows, try adding 2dB–5dB at 800Hz with the midrange control. This brings up the harmonics, which helps define pitches. Go back and forth between 100Hz and 800Hz and find a good balance.

Second, you may want more upper harmonics for brightness and snap. If so, try adding a few dB at 1.5kHz–3kHz.

Third, check for noise problems, possibly due to an active direct box or active onboard electronics. If you're recording to an analog tape recorder and the bass has its own track, wait to roll off any high-frequency hiss until the mixing stage so you can reduce the tape hiss as well. (This tip applies to any noisy signal recorded onto analog tape.) Hiss can be reduced by rolling off the highest frequency your console allows (usually 10kHz or above; sometimes a high-cut switch will do this). Note that even though the bass does not put out much energy above 10kHz, rolling off these frequencies may start to remove some air from your tone.

Playing with a pick typically produces less bottom and a brighter top. If you want a more fingerstyle-like sound, cut a few dB around 2kHz—that's the frequency region of the pick's bright attack. Also consider boosting at 100Hz–200Hz, since the pick does not get as much natural low end as fingers. With a pick, boosting at 800Hz may not be necessary, as the pick usually provides plenty of high-frequency definition.

Thumbstyle playing usually sounds best with a scooped tone, where the lows (250Hz and below) and highs (2kHz and above) are boosted while the mids are cut. This "smiley face" EQ curve is best achieved with a graphic equalizer.

Compression

A compressor/limiter is one of the most important tools for recording bass. This type of signal processor alters dynamics; for example, it can make a wide-dynamic-range signal more compatible with recording media that has a narrow dynamic range (such as cassette tape). And since bass has such a wide dynamic range, compression increases punch and audibility, makes the instrument easier to balance in the mix, and increases sustain of long notes. Compressor/limiters are not miracle workers, though; they cannot make your strings vibrate any longer, compensate for dead strings, or fix instruments with poor sustain characteristics.

HOW COMPRESSOR/ LIMITERS WORK

A compressor evens out dynamic-range variations by amplifying soft signals and attenuating loud signals, resulting in less level
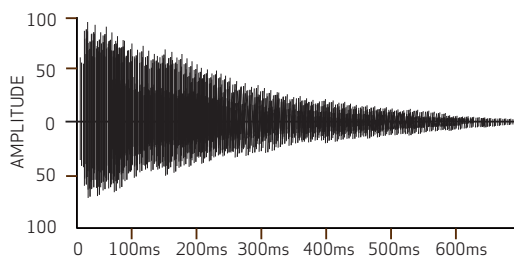

Fig. 4—A decaying string. Note how the amplitude starts off strong and then decays to nothing.
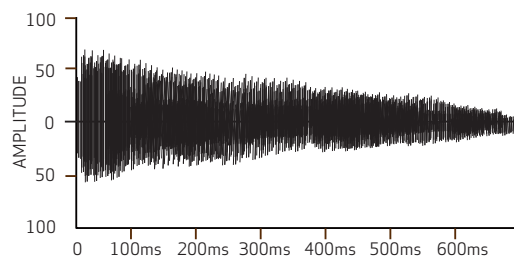

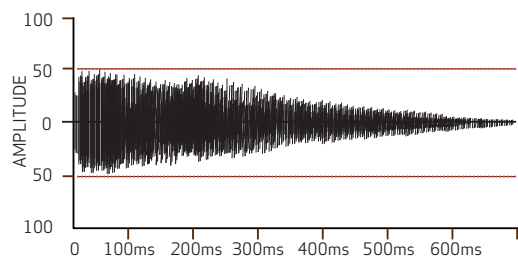Fig. 5—Compression attenuates the peak somewhat and amplifies the decay.

Fig. 6—After limiting, anything above the threshold (set here to 50) gets clamped to that threshold. Lower-level signals are unaffected.

Fig. 7—This graph shows how input, output, ratio, and threshold relate. The threshold is set at -8dB, with the compression ratio at 4:1. If the input increases by 8dB, the output increases by only 2dB.

difference between your softest and loudest notes. A compressor incorporates a high-gain preamp and a control circuit that alters the preamp gain based on the compressor input. As the compressor's audio input increases, the control circuit senses this and turns down the preamp gain to maintain a more consistent output level. **Fig. 4** shows the normal amplitude of a decaying string; **Fig. 5** shows the same signal after compression.

A limiter is similar to a compressor; it also restricts dynamic range but affects only the signal's peaks. A limiter prevents a signal from exceeding a certain level, leaving quieter passages untouched (**see Fig. 6**). Limiting is worth trying, but is not as universally applicable as compression. It's often used with PAs to prevent speaker-damaging distortion, and it's also used with digital recorders, which have a fixed ceiling level the input level must not exceed. When recording, limiting often yields a smaller, more "squeezed" sound.

Most modern dynamics processors can compress and limit, hence the term compressor/limiter; for simplicity we'll just use the term "compressor."

COMPRESSOR/LIMITER PARAMETERS

A typical compressor has several parameters that often interact (**see Fig. 7**)—after adjusting one parameter you may need to go back and tweak another.

Input level adjusts the signal going into the compressor. It's important not to slam a compressor with too much input; even though the signal is being compressed, it's still possible to clip (distort) the electronics.

Threshold sets the level above which signals will be compressed. With a lower threshold, more of the signal crosses this threshold, so more of the signal is compressed; as a result the output dynamic range (and the levels of

the highest peaks) is lower. When the signal drops below the threshold, the compressor leaves the signal alone until it exceeds the threshold again. Typical threshold settings for bass are –2dB to –5dB, although the threshold can get down to –15dB for more extreme applications. Raising the threshold results in less compression and sustain and lets more signal peaks through.

Ratio sets how the output signal changes in relation to the input signal, once the input signal exceeds the threshold. Higher ratios mean more compression and a more "squeezed" sound. For example, a ratio of 2:1 means that increasing the input signal level by 6dB yields an output increase of only 3dB. In other words, for every 2dB of input-level increase, output increases by only 1dB. (With a 3:1 ratio, increasing the input signal by 6dB increases output by 2dB.) A typical ratio starting point for bass is 3:1. Extremely high ratios clamp the output level to the threshold, essentially turning the compressor into a limiter.

Attack determines how long it takes for the compression to kick in once it senses an input-level change. Longer attack times let more of a signal's natural dynamics through, but those dynamics do not get compressed. If it's really important to reduce sharp peaks, use a short attack time; for more natural-sounding transients, use a medium attack of 20ms–40ms.

Decay (also called release) sets the time required for the compressor to "let go" of the signal once the input passes back below the threshold. With short release times, the compressor tracks even very slight level changes; if this results in a choppy sound, increase the release time to smooth things out. 125ms–250ms works well with bass. Some compressors automatically set the attack and decay times; while this is convenient, you don't get as much control of dynamics.
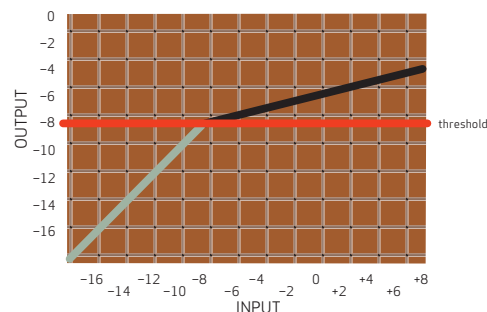
The **output level** control is pretty self-explanatory. Since we're squashing peaks, we're actually reducing the overall peak level; increasing the output compensates for this perceived volume drop. Turn up this control until the peak levels of the compressed signal match the peak levels of the bypassed signal—in other words, until there's unity gain between the input peaks and output peaks. Bringing up the level usually adds noise, especially with a budget compressor. For more level with less noise, try adding gain at the board, which probably has quieter preamps.

Some compressors have a **hard knee/soft knee** switch, which controls how sharply the amplitude curve changes at the threshold. With soft knee, when the input nears the threshold, the compression ratio gradually increases as the input increases. With hard knee, as soon as the input signal crosses the threshold, it undergoes the specified compression amount. Hard-knee action creates more punch; soft knee may work well if the level variations are extreme, as it preserves dynamics better.

Two-channel compressors usually have a **link** switch, which changes the operation mode from dual mono to stereo. Linking the two channels allows one channel's changes to affect the other channel, which is necessary to preserve a stereo image. This feature has applications for mono bass signals, too.

METERING

Most compressors have two meters, or one meter that's switchable between two modes. Gain reduction shows how much the signal is being compressed. The needle on an analog gain-reduction meter normally sits at 0 VU and swings to the left to show how much the signal

level is being compressed. For example, if the meter reads –5, that means the signal is being compressed by an average of 5dB. (Analog meters read average—not peak—gain reduction, so short transients don't register.) With most digital meters, when there is no compression, the LEDs are either all on or off; applying more compression either lights more LEDs to the right or turns off LEDs going to the left. Digital meters tend to read peak rather than average levels, so even short transients register.

The output meter shows the signal level coming out of the compressor; this meter might be switch-selectable to monitor input level as well if there isn't a separate input meter. With this display you can tell how much output you've lost by adding compression, which makes it easier to set the output level control correctly. For example, suppose that without compression your input signal hits 0dB on the highest peaks. With compression you notice the output has now dropped so the peaks don't register above –3dB. In such a case you'd turn up the output gain until the peaks once again hit 0dB.

ADJUSTING THE PARAMETERS

Let's assume your compressor has separate threshold and input level controls. Start the input level control at 0dB. For now, adjust the compression with the threshold control only; start with threshold set to 0dB, meaning anything under 0dB will not be compressed. While playing, check the gain-reduction meter and reset threshold to average about 2dB of compression, with no more than about 5dB of compression on the peaks. If the peaks' output level is less than the input's, use the output level control (not input level) to trim it up to unity gain.

If you need more compression to make notes sound more even, lower the threshold; this way compression will kick in with lower level signals. But be careful—too much compression can squash and thin out your sound. Use the compressor's bypass switch (if available) to compare the compressed and non-compressed sounds. You may find just a little compression gives the desired effect.

SOME BASICS

I've always been the guy who doesn't read gear manuals. I just dive right in, spin knobs, and take my lumps for dialing in crap, or bask in the wonderment of some surprising and cool

COMPRESSION DO'S & DON'TS

Compression can be like a mischievous god of Greek mythology. It can bestow upon you a bounty of grace, riches, and stature, or it can wave a dismissive hand and transform you into a turnip. And, as with dealing with those bipolar deities of Mount Olympus, the key to happiness is always keeping well within compression's favor. Using too much—or too little—compression on a bass track can absolutely affect the quality of the instrument's tone, vibrancy, and drive. You can enhance the player's subtle performance gestures, or you can ruthlessly destroy all evidence of musical dynamics. And here's the kicker: In these endeavors, you control your own fate. You can't blame Zeus for your mix misfortunes if you're the one squashing the life out of a once-fabulous bass performance. Here are some templates for keeping the compression gods on your side.

ROCKIN' PULSE

Effect: A meaty and consistent throb that can move SUVs, aircraft carriers, and small mountain ranges.

Basic Settings: Ratio at 4:1, fast Attack, medium-long Release, Threshold at –6dB.

DO: If you want the groove of a rock or dance track to explode out of the speakers to get booties shaking.

DON'T: If you want the player's touch and dynamics to be experienced by the listener.

THE GIRDLE

Effect: A subtle tightening of the low end.

Basic Settings: Ratio at 3:1, fast Attack, short Release, Threshold at 0dB.

DO: If you want some relatively consistent thud, but also wish to spotlight the player's phrasing and dynamics.

DON'T: If you tend to get all sweaty and nervous when the low end isn't pounding as forcefully as a mammoth taiko drum.

FREEDOM!

Effect: The low end ebbs and flows with the gestures and attack of the player.

Basic Settings: Ratio at 2:1, medium-slow Attack, fast Release, Threshold at 3dB.

DO: If you're tracking jazz, world music, or any other genre that depends on the musicality of the performer to deliver a journey through the low-end dynamics.

DON'T: If your track requires a consistent and forceful low end.

FUNKY STUFF

Effect: Pop and slaps move the groove, while the low end stays consistent and solid.

Basic Settings: Ratio at 4:1, medium-slow Attack, medium-slow Release, Threshold at –2dB.

DO: If you want those barrages of funk wonderfulness to dance around your track.

DON'T: If you feel the pops are too distracting. In which case, you may want to switch to a faster attack and a higher threshold in order to tame to dynamics more aggressively.

—*Michael Molenda*

sounds. You can certainly take this approach with compressors, but I'd recommend a quick get-to-know-you session with the basic parameters.

Attack: This control sets the time it takes for the compressor to react to the input signal and reach its maximum processing level. Fast attacks can catch percussive explosions, slap them down, and let you crank up the overall level of the track.

Release: Once the compression is activated, this control determines the amount of time the compressor keeps working on that input signal. A long release time can goose sustain considerably.

Threshold: This is the point—measured in

decibels—where the compressor is activated.

Ratio: Don't be frightened—it ain't algebra. This control simply determines how much the input level is smacked down in favor of the output level (or amount of compression). For example, a 2:1 compression ratio means that for every 2dB of input you'll get just 1dB of output. A 10:1 ratio gives you 1dB of output for 10dB of input, and so on.

Output: Okay, I'm aware you know what "output" is, but in the world of compression this is also referred to as "make up gain." The grooviness of this control is that it allows you to compress a signal to taste, and then raise the level of the compressed signal as desired without slamming your channel faders. ●

Why the CD Is Still a Crucial Music Media For Indie Artists

AS the world of digital music evolves, the debate over formats continues to evolve as well. The question of the CD's lifespan as a viable sales tool is one of many topics that have been receiving a lot of attention lately. Increasingly, the sales numbers for CDs have been falling off for the major label artists as the proliferation of both paid and free (pirated) online downloads becomes more prevalent. For the independent artist however, this trend doesn't hold true. The reliance on CD sales at live shows has continued to sustain (and even grow) the CD market for independent artists, while providing them with a viable method to generate income and exposure. These sales seem to come in large part from displaced dollars that were once reserved for major label releases.

Until a viable and efficient method for selling downloads at live shows is available, the public will need a physical format in order to take home music. CDs are still the logical and most widely accepted format to do just that. In addition to their universal portability and playability, CDs also offer independents the opportunity to market themselves through their packaging choices. Because much of the music industry is still largely driven by image conscious consumers, the ability to distinguish yourself from, or align yourself with, the crowd is an ever-important factor. CD packaging still affords bands that opportunity, whereas straight downloads lack in that respect.

It may be hard to believe for a lot of people who are now familiar and comfortable with the virtual world of music downloads that there is still a large contingent of society that isn't. According to readily available recent sales statistics, physical CD sales still outnumber downloads by a margin of more than 3 to 1. While the gap is narrowing, it isn't narrowing as quickly as some would like you to believe.

This fact makes it even more surprising when you hear that an indie act has decided to forgo making CDs because they feel "CDs are dead." In a business with continuous travel and high gas prices, giving up on 75% of your potential sales could be the difference between touring and staying home.

Luckily for the independent musician both mediums are great revenue generators. In fact, it takes the availability and advertising of both to successfully sell your music in today's marketplace. By giving fans and potential buyers options you are providing them with the choice to make a purchasing decision that fits comfortably with their buying habits. In other words, you want to give your customers what they want, and in this day and age some customers want CDs, and some want downloads.

When concerned with audio fidelity, an MP3 is no substitute for a physical CD. High compression rates on MP3s break down files so that they are smaller and take up less space on portable music players and computers. However, this compression also reduces the audio fidelity. Most music listeners would barely notice the difference when listening through tiny headphones, but when played in a car or on a home stereo system the difference can be noticeable. There are very discerning fans out there that want their music to be of the highest quality available and will pay to receive just that. Offering CDs gives them the opportunity to buy your music at the highest level of clarity and fidelity available. Plus, once they have the CD they can always import it for use on their portable music players. Then they'll have both versions.

And since they have your CD, why not autograph it for them? CDs give consumers a physical reminder of your show and your band. Think of it as a small billboard that constantly prompts them to check out your music. With MP3s it's much easier to get lost in the file folder and forgotten about. People inherently love the tactile quality of having something in their hands. It makes them feel better about having spent their hard-earned money when they have something tangible they can show for it.

That being said, CDs don't always have to compete with digital downloads, in fact, they actually work very well in conjunction with each other. CDs sold at live shows often drive consumers and fans to artist's websites where they have the option of downloading other content. Older libraries of work, bonus tracks, and slower moving titles will all benefit from the increased site traffic a CD can generate (which is made easy by clearly printing your web address on your CD packaging). Some unique promotions that combined the two have included offering a bonus track online, downloads with the purchase of a physical CD, or including content on an enhanced CD that takes the user to the artist's website or MP3 download page where they can purchase other albums or singles.

Downloads continue to be a fantastic tool for independent artists to build their fan bases. By promoting yourself online (possibly with a free download) you give fans an opportunity to get to know you. If you allow others to pass along your download, more fans may get involved. And, of course, the more fans you have, the more CDs and downloads you'll eventually sell. Downloads have virtually no distribution cost, which makes them a great promo tool.

In the end it is always in the best interest of the artists to provide whatever formats they can to ensure their fan base will be able to buy their music. In today's music marketplace downloads are indeed the hot topic, but CDs are still generating most of the dollars for independent music sales. The savvy independent artist recognizes this and takes full advantage of both formats for as long the market supports it.

CHOOSING A CD MANUFACTURER

Open any musician trade magazine and you'll find dozens of ads from audio manufacturers. The competing offers and promises can be bewildering, and the jargon they use, such as "backprint," "glass mastering," "film output," "four-color printing," and "supplied design," is tossed about as if every reader has worked in a manufacturing plant. To further complicate things, one ad may offer a deal on quantity, another on design... how do you compare the offers to get the most bang for your buck? We've taken some of the mystery out of the manufacturing business to help you make the best decision.

First, all legitimate manufacturers offer free catalogs or brochures with pricing and product information. Gather materials from several companies to start comparison shopping, and look beyond the hype.

Compare details:

• Are they all full-service plants that can create production masters, or will you be required to supply computer media for design, and PMCDs or DDP's for audio? You may find the seemingly inexpensive advertised price isn't anything close to what you'll wind up paying, and you'd have been better off with a full-service manufacturer.

• Do any of the manufacturers on your list mostly handle runs of 10,000 units or more? If so, your project will sit while their major-label clients' projects head to the front of the line.

• Are prices clearly marked, from master formats you can supply, without a lot of fine-print additions that can drive up your final cost? Do they provide free templates for your art files?

• You want a company that will manufacture a major-label-quality product.

Have they won awards in design or printing? Look at the samples, are they appealing and professional-quality? Do they have client testimonials and a list of famous clients?

• Do they offer the additional services you might need? Do they offer a full range of products like Merch and promotional materials, or will you have to put together a patchwork quilt of companies to fill your order?

• How long have they been in business? Are they financially stable or could they go under before your album is finished? (It's not uncommon for bargain-basement manufacturers to declare bankruptcy and be unable to deliver product.)

• Is the work done in-house to ensure fast turnaround and good quality control, or is everything outsourced to who-knows-where?

• What about after you get your CDs? Do they offer help with distribution (digital as well as bricks-and–mortar) and promotion? Are they set up to quickly process reorders when you need to replenish your stock?

• Do they offer a 100% money-back guarantee?

In addition to comparing vendors, determine your needs. Ask yourself the following questions:

• What medium will your master be on (CD-R, digital file upload, etc.)?

• Will you supply finished art files formatted properly in the manufacturer's templates, or will you ask them to design your project?

• How many pages of a CD booklet or folder will you need to get your message across?

• Aside from CDs, what other products will you need? How about posters, stickers, and postcards?

Knowing this information will help you further narrow the field of manufacturers.

Next, get a realistic price and turnaround estimate from prospective providers. Remember, if you are using a broker, he/she may have no control over the turnaround time.

Even after selecting a manufacturing house, beware of pitfalls. Don't assume everything will go smoothly, especially if you are working with a low-price provider. Don't be afraid to call your representative if you haven't heard from him or her in a while. If the job is going well, you will feel reassured, but if it slipped through the cracks, your call will put it back on track.

Make sure you are given audio and design proofs and check them carefully. Make sure every word is spelled properly, that the song sequence on your design matches your audio, and that it is laid out properly. Listen to your audio tests without interruption, checking for any audible anomalies that were not present on your original master. If you are paying for post-production services, make sure you are satisfied with the adjustments that were made. Be careful: The approval process is your last opportunity to catch mistakes – if you overlook any errors at this stage (even if they were made by the manufacturer) they will end up on your final product. Once everything is to your satisfaction, approve your proofs promptly – delay here will only delay the final delivery of your project.

Pay attention to tax, freight, and over/under-run costs. Depending on where you live (or ship your merchandise), local sales tax and/or freight fees may be added. If your manufacturer has a good quality control program, a certain number of "overs" (up to 10% is standard) will be produced so substandard pieces can be rejected without reducing your order. Find out beforehand how much overs could cost you and budget accordingly.

Don't confuse value with economy. In manufacturing, your decision comes down to who will provide you with the most value for your purchase. Of course, how you define value is up to you. Helpful customer service, high quality control, quick turnaround, additional services (i.e. distribution, a UPC bar code, free marketing and promotion guides, a guarantee of customer satisfaction, free master screening, additional print materials, etc.), location, and one-stop convenience all fit into the picture every bit as much as the price.

It's a common mistake for musicians, many of who have spent more time and money in the studio than they expected, to try to cut corners in manufacturing. Don't sabotage your release's chances of competing successfully just to save a few bucks. This is a major purchase, one with a big impact on your career. While a reasonable price is important, you really do get what you pay for.

Capturing the Boom and Bang of Drums

Recording the Drum Kit

If you're looking for a "one size fits all" solution to recording acoustic drums, forget it! When it comes to miking and EQing drums or anything else, every recording engineer has different opinions and techniques. While that may seem chaotic, it's also liberating: Never be afraid to experiment in your quest for the ultimate sound, as there are no rules.

Recording acoustic drums defines the meaning of "give and take." A common technique is miking each drum, so all the mics will pick up leakage from each drum/cymbal but with a slight time delay. This delay can cause "comb filtering" (phase cancellation and addition), which alters the miked signal's tone. The less leakage the better, but it's impractical to baffle other drums and cymbals within the set. A work-around to cut down on leakage is to use fewer mics, and try to capture the set with a couple mics on the set itself, and maybe some room mics.

Another problem is that the drum head tuning will likely change over a relatively short period of time, due to the constant hitting of the drums as well as temperature changes within the studio environment. Keep lighting and air conditioning consistent, as they're the main causes of temperature variations. Remember to check tom and snare tuning throughout the session.

ISOLATION

Isolate the mics from the floor as much as possible so that they don't pick up any rumbling noises. If your studio was not built with a floating floor (a second foundation over the first supported by rubber and styrofoam, as used in most pro studios (**see Fig. 1**), a drum riser will help isolate the mics. Even if the studio has a floating floor, a drum riser may still be helpful. (When constructing a drum riser, make sure that it is solid and includes some type of rubber on the bottom of all surfaces that rest on the floor. Cover the platform with rugged, indoor/outdoor carpet.)

If the drums will be set up on the floor itself, a carpeted floor cuts down on reflections; a hardwood floor will allow sound waves to bounce back up into the drums, possibly causing phase cancellations. Consider a floor tom mounted in a standard vertical orientation:

With a hardwood floor, when the player hits the drum the bottom head vibrates sympathetically. This directs a waveform toward the floor, which bounces back up and interacts with the vibrating bottom head to cancel or emphasize certain frequencies.

To minimize this problem, angle the floor tom slightly by lowering the triangular height rod—the one nearest the drummer—to taste (**see Fig. 2**). This causes the waves to scatter somewhat.

MIKING CONSIDERATIONS

If the drums will be hit medium to hard, you'll usually want to enable the mic's built-in attenuation ("pad") switch. This helps mini-

Fig 1.—Floating floor construction. Note how the spacers (Auralex U-Boats) are placed to isolate the floor support boards from the "real" floor.
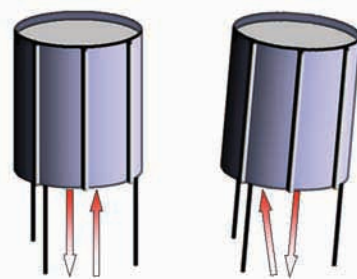

Fig 2.—With the tom set up vertically, sound waves hit the floor and bounce back to the bottom head. Angling a tom slightly causes sound waves to scatter, and diffuses them.

mize the chance of distortion.

Some condenser mics offer pattern choices. With an omni response, the mic hears everything — the front and back as well as on the sides. The figure 8 response allows the front and back of the diaphragm to be active but not the sides. Cardioid is directional on one side only, and is typically used for drums. Other patterns include "super cardioid" (very directional), which may be useful if you want to tighten up the sonic picture.

Note that all of the following mic placement positions are my starting positions. When listening to the mics to dial in the sound, always move the mic around a bit to find the best sound.

Regarding mics, there are so many, and the landscape has changed so much in the past few years with the advent of budget mics, that we won't even attempt to recommend possible mics; I'll just mention a few personal favorites and deal in generalities. One strategy for getting pointers on mics is reading interviews with producers and engineers whose work you admire, as they will often mention which mics they use for specific applications.

THE INITIAL MIC SETUP

Once the drums are set up, start by using one mic only — preferably a large capsule, wide-range condenser mic. Otherwise, use your best-sounding dynamic or ribbon mic.

With the mic placed on a boom stand, position the mic about two feet above the drummer's head, and point it straight down at the bass drum pedal's inner edge. But positioning the mic is not enough: It has to be stable. Most mic stand bases can tip easily; if a mic hits the floor, it may be permanently damaged. The bigger the mic stand base, the better.

Anchor the mic stand with sand bags or any stable, heavy object that will not slip or rattle (three sand bags in a triangular position works for me). The best weights have a handle in the middle for carrying.

Now that the stand is solid, while positioning the mic, wrap the mic cable around the boom stand arm a few times and leave a little slack at the back of the mic so the cord doesn't pull at the mic and change its position. To keep the cord from moving, tie the cord to the stand using removable cable ties (available at most electronic supply stores). Put a few cable ties on the boom and a few on the main mic stand, all the way down to the base.

Avoid permanent cable ties, or you will have to cut the cable tie and throw it away when putting away the mic and stand. Velcro cable wraps, available from most pro and consumer recording supply companies, are costly but are also the best choice as they are easy to set up and remove. In a pinch, you can use something like Scotch tape.

Even though we've secured the mic stand and cable, someone could still trip over the mic cable and knock over the mic. But there is a solution.

With wood floors, use duct tape to tape down the mic cable on the floor, from the mic stand base to the mic panel or recording console. There should be a very little mic cable slack at the mic stand base.

If you are low on duct tape, cross the cable in one foot strips about every two or three feet. Artist tape or any thin tape will not do the job. Keep the tape down tight, with no slack between the tape strips. In areas where there will be foot traffic, cover the cable totally with duct tape.

With carpeted floors, avoid duct tape (which leaves glue residue) and put something like throw rugs over the cable. Bathroom rugs will work in a pinch. Get some carpet remnants, and cut them up to suit your needs. If you use carpet on a wood floor, make sure it won't move (i.e., has a rubber underside) if someone walks across it.

Now that the mic stand and cable are secure, and the cable is taped down, plug the mic cable output into the appropriate mixer or audio interface channel. As there typically will be some cable slack at this end, "cable tie" after plugging in, then tape this down if someone could trip over the mic cable.

GENERAL EQ TWEAKING

When you're satisfied with the mic position, experiment with the EQ. For more "bottom end" with the bass drum, toms, and snare, try boosting the low frequencies (e.g., +2dB at 100Hz). Experiment with other frequencies (from 50 to 150Hz or so) to discover the best area for your particular mic setup. Typically,

50Hz will not do much with distant miking, but 150Hz may be better than 100Hz in this situation.

Experiment with the midrange EQ. 2kHz through 4kHz will make the snare "bite," and the toms will have more of an attack sound. However, the cymbals may start to sound painful with this added EQ. As mentioned, recording drums involves tradeoffs.

For the high frequencies, start with a very slight shelving boost at 10kHz. You'll notice an added sheen; the cymbals will get louder, and all drums will sound brighter and more open. Careful, though — your ears can get used to the extra high frequencies, which means you'll want to add more, but your ears get used to that, so you add more . . . a little high frequency boost goes a long way.

A typical setting (**Fig. 3**) for one drum over-head mic would be adding at least a few dB in the low end (100 to 150Hz) and a few dB at 10 to 12kHz.

MIKING THE KICK DRUM

A dynamic mic, which can handle loud sound pressure levels, is the typical choice. The Sennheiser 421 is popular, but try all the dynamic mics at your disposal. Some people use the Neumann 47 FET (condenser) mic. If you use any condenser mic, it is crucial to real-ize that the sound pressure may hurt the fragile condenser diaphragm. The rule of thumb regarding condenser mics is "use it only if you can put your ear in front of the sound source you will be miking without hurting your hear-ing." Because the kick drum sound pressure and transient is strong, I highly recommend a dynamic mic.

If the mic you choose has a bass rolloff switch (bass attenuation), don't use it! The rolloff (low end filter) might have choices like "music" and "voice" or "M" for music and "V" for voice. There may be more than these two options, like Voice 1&2. The voice mode is surely a low frequency rolloff, so use the lowest num-ber music mode. When dialing in the sound, experiment with any switches to make sure that you are getting the mic's full frequency range.

KICK OPTIONS FALL INTO THREE CATEGORIES:

• If there's no front kick drum head, posi-

Fig 3.—This EQ shows a 2.1dB boost at 115Hz, and a 2.1dB boost at 10.5kHz. There's also a slight boost at 3.7kHz, and a very slight dip at 410Hz to reduce a bit of room "mud."
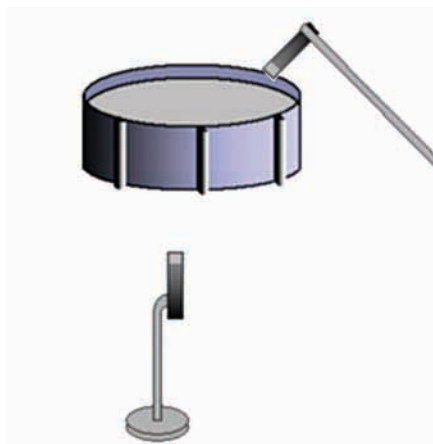

Fig 4.—A typical setup when miking the tom and bottom of a snare.

tion the mic inside the bass drum about a foot back from the point where the beater hits. Now move left half way to the side, and angle at 45% towards the left rim.

• If the kick has two heads, with a hole for miking, place the mic about one foot in and angle slightly toward the left rim.

• If the kick has two heads and no hole for miking, place the mic about 6" back from the center, and slightly to the left.

All starting positions are just that. Finding the best mic position involves finding the best compromise between getting as much "natu-ral bottom end" as possible without losing too much of the "point" (beater attack). Some like a boxy or boomy sound with or without "point."

For less point, move the mic farther away from the beater, meaning near the side of the shell and pointing away from the beater.

But also note that in these days of unlim-ited tracks, it's very common to place more than one mic on the kick, and you'll usually find a hole in the front head where you can stick a mic. Steve Sykes (a brilliant engineer) uses a dynamic mic inside the kick basically pointing at the beater. He also uses a Neumann U47 FET on the outside head a few inches back, and a Yamaha NS 10 woofer speaker as a mic! This adds the real lows (around the 60Hz range) in this era of home and car playback systems with extended low frequency response. He positions the woofer to taste on the outside head in which the low frequencies are thick — simply move around until you hear the most natural low frequencies.

When using multiple mics, though, slip the track for any mic set at some distance from the head so that its phase lines up with the dynamic mic inside the kick. This is important to main-tain the fullest possible sound.

After experimenting with the kick drum mic placement, when you feel that it sounds good, reset the levels (if needed) and EQ to taste. Try adding around 60Hz-100Hz to bring up the bot-tom end. If the sound is kind of "boxy," try cutting the EQ response a bit at around 300Hz-500Hz. To add more point, add a boost at 5kHz or so.

The kick drum may have a pillow resting up against the inside bass drum head. Typi-cally, the pillow rests equally between the bottom of the bass drum and the inside head. This stops the bass drum from ringing (rever-berating) like a tom. The amount of pressure of the pillow against the 'head defines the sound's "dwell." During the '70s pop music era, the pillow was packed against the head but these days, there are no rules — the kick sound can go from a totally dead sound to wide open, with no pillow or padding. When using padding, anchor the pillow down with a sand bag or a non-reflecting heavy object so it does-n't move.

Drum tuning is crucial. If using padding, pull back the padding and ask the drummer to get the tuning "even" and as low as possible without making the head too loose for the beater. This is a touchy area. The drummer needs to be comfortable with the feel of the beater hitting the head. The experienced drum-mer should know the sweet spot for the tuning.

The room sound may help dictate the best tuning if you don't use a pillow.

If the kick drum has one head, after getting the kick drum sound to taste acoustically, put a packing blanket or any thick blanket over the bass drum's outer shell. This helps isolation. Tape the blanket on the drum near the center of the shell with duct tape or any strong tape, and let it hang on the floor over the outside of the kick. If you're not using a pillow, and will be using room mics, you may not want to use the packing blanket.

MIKING THE SNARE

Typically, a dynamic mic (like the "old standby" Shure SM57) does the job. There are many options to explore, as most dynamics will sound anywhere from usable to great on a snare. Condensers are used sometimes, but watch out regarding mic placement. If the drummer accidentally hits an SM57, this is a drag but the replacement cost is cheap in comparison.

My favorite condenser for snare is the Sony 37A tube condenser mic. Yes, this breaks the rule regarding sound levels with condenser diaphragms; but if this mic sounds best after trying many mics, I cross my fingers and hope it survives the session.

You'll need a mic "boom stand" for the snare. As with all mic stands for the drum mics, a big base or triangular base (three legs) is best. Position the mic stand between the hi-hat and kick drum, with the boom extended to the nearest edge of the snare rim. Now move the boom in order to position the mic about 2" over the rim edge, and move in about 2" in toward the center of the snare head. Adjust the mic capsule to point at a 45º angle toward the drum head (**Fig. 4**).

Ask the drummer if the mic is in the way, i.e., it would be possible to hit the mic when playing. If so, back it up until the drummer feels the mic is out of the way.

Moving the mic closer to the drum head picks up more low end. The '80s-era mic placement was around 1" away from the head to get the "proximity effect." Around 3" is typical these days but as always, move and experiment. If the mic has a bass rolloff, don't use it — you can always trim the bottom later with the console EQ.

Some people mic the snare on top with something like an SM 57 and use another mic (typically a dynamic or small capsule con-

denser) on the bottom to pick up more of the "snare rattle." Start by pointing the bottom mic up to the center of the snare drum bottom head, about 4" under. If the mic is a condenser with pattern selection, use super cardioid or cardioid.

This is a good place for a short mic stand, as fitting a boom stand in the area of the other stands will be tight. Small stands usually have a small base, so secure it with sand bags and maybe duct tape too. A gooseneck stand adapter may work — but the gooseneck will move easily if the mic cable pulls on it.

When using a top and bottom mic, note that when two mics face each other so the top mic diaphragm sees the air moving away when the snare is hit, while the bottom mic sees the air coming toward the diaphragm. This causes phase cancellation. The fix is to reverse the phase on one of the mics. In this case, reverse the top mic. (Note that you should also reverse the phase of all mics on drums that are miked from the top of the sound source — the only mic that sees correct phase is the kick — air moving towards the diaphragm at initial attack.)

MIKING THE HI-HAT

Many condensers will work. Small diaphragm condenser mics are the usual choice. The AKG 451 or 452 are both fairly common. If the mic has a low end rolloff filter, you may want to use it as you do not want bottom end (low frequencies) from the hi-hat mic. If you will use something other than a condenser mic, use a mic that sounds "small," "tight," and bright.

Set the mic boom stand so the mic is directly above the shaft of the high pedal, then back away from the drummer half way to the outer edge of the hats. The mic should point straight down and about a foot above (**Fig. 5**). As always, you will want to move this mic around while dialing in the sound.

MIKING THE TOMS

This is an area where dynamics and condensers are used about equally. With dynamic mics, use ones with a fair amount of low end response. The Sennheiser 421 is a good choice but watch out where you place it, as the mic is large and may get hit by a drum stick or wobbling cymbal. SM 57s are a possibility, as are many others. I like small capsule condensers (AKG 391 or 451/452) on rack toms, and large diaphragm condensers (AKG 414 EB) on the floor tom(s)

for a smooth, big response. For the high and mid toms, it's best to use the same model mic.

Set the boom stand for the high tom on the floor in front of the kick drum/tom; position the mic about 2" above the tom, and about 1" in from the rim away from the drummer. Same for the mid tom. Position the floor tom mic stand on the floor and set in the same manner. One reason for setting the mics fairly close is that the "proximity effect," which accentuates the low end, will be a good friend if you want a full, deep tom sound.

If the drummer has the cymbals positioned low and close to the toms, grab each cymbal and move it on its axis to see if it will hit the mic or stand. If there's no way to avoid the cymbal hitting the tom mic stand or mic, as a last resort you now have to ask something drummers usually don't like to hear: "Please move the cymbals up a taste." An experienced player will adapt if necessary.

CYMBALS

Condenser mics are the norm. I like AGK 414s, but most any good condenser pair will do the trick. Neuman, Telefunken, and AKG are typical brands of this era as well as past eras. Avoid mics with a built-in 2kHz bump (build up) like the SM 57; this is one application where this mic is not recommended. If you must use the SM 57, when "dialing in the sound," use the EQ to roll out a few dB at 2kHz or so.

When positioning the two overhead mics, be very careful that they don't fall down as the booms will generally be extended to full length. Secure the mic stands as soon as you've set the position.

As mentioned previously, I look at drums from the audience perspective (floor tom at the left, hi-hat on the right). In this case, position the left overhead boom mic between the center of the ride and crash cymbal about 2–3 feet above. Start by pointing the mic straight down.

Position the right overhead over the crash on the right side, with the same basic placement. If there's more than one crash on this side, go between the cymbals as on the opposite side. Position the mic stand on the floor near the hi-hat mic stand.

If the drummer hits the crash cymbals hard, and they're fairly loose on the cymbal stand, they will wobble and you will hear this wobble in the mics. A little wobble sounds natural, but extreme wobble will sound like the cymbal is

almost canceling out during the travel when the cymbal edges get near 90º away from the mic. A possible fix is to angle the mics at about 45º in towards the center of the cymbals, but this may not totally fix the problem and is not a good position for the overheads in general. The best fix is to ask the drummer to tighten the cymbal nut to cut down on the wobble.

If the drummer uses more than four cymbals, and if the ride cymbal is used instead of the hi-hat as the constant time keeper, you might need to add another mic for the ride cymbal if it's not loud enough in the overhead mic compared to the crash cymbals. Again, a small diaphragm condenser works well.

Position the mic above the center of the ride cymbal, looking straight down and about a foot above. Move in half way between the center and the inner edge of the ride if you want more "ping" (drum stick sound).

Which is the main overhead mic? Typically the one with the ride cymbal, so let's say left overhead. Take a piece of string (or a mic cable, whatever) and hold it against the center of the main overhead mic diaphragm. Put the other end of the string in the center of the snare head. Now that you know the distance of the left over-

head in relation to the center of the snare head, use that same measurement for the right overhead mic, meaning move the right overhead mic up/down, or slightly change where the cymbal is miked, to achieve the exact same length to the center of the snare head. This will minimize snare comb filtering/phase cancellation in the overhead mics.

ROOM MICS

This area is tricky. Room frequency "build-ups" and "suck outs" have a major influence. Condensers are the typical choice but each room sounds different, so try every mic that's left over. It's a good idea to use two of the same model with the overheads.

You might think an omni pickup pattern would work well, meaning the condenser mics would hear behind as well as the sides. Maybe, but I use cardioid most of the time. Start by placing the mics about 15 feet in front of the drums, about four feet above the floor. Spread apart the mics around eight feet or more, using the bass drum as center.

This is what works for me in my studio, but every studio will have "sweet spots" so experiment! Even a "semi-dead room" might like

Fig 5.—Miking a hi-hat.

room mics.

It is possible to use more room mics, especially if the room is big with high ceilings. If this is the case, for high distant miking, try the Neumann M50 (nickel capsule is best) which is designed to be a room mic. This mic sounds bright even when distant from the sound source. It's a hard mic to find, but it's great for this application. —*Jay Graydon*

The One Kit, One Mic Approach

I t's a fair assumption that some recordists are challenged by tracking drums in their homes or rehearsal spaces. Even if noise isn't a particular concern (whether that's incoming or outgoing noise, or both), decisions over how many mics to use—and which mics to use where—in order to capture the most powerful drum sound can be daunting. After all, a clean, clear, and mammoth drum sound drives your track, and it also provides a healthy chunk of the song's tonal and dynamic foundation. If you blow the drum sound, you can seriously damage the power and seductiveness of the entire production.

But what if you didn't have to stress out over the placement of multiple mics? What if you used just one mic?

I'm not trying to be crazy or provocative. The one-mic approach could actually be a fun and viable approach for recording explosive drum tracks. Years ago, I was reading Dick Clark's autobiography Rock, Roll, and Remem-

ber, where he talked about recording late '50s and early '60s rock and roll singles. Back then, one mic often recorded everything, and the trick was putting that mic where it documented all elements—from drums to vocals to guitars and piano—clearly and cleanly. Clark described a session for Bobby Pickett's "Monster Mash," where the drum kit was set up on a rug, and if the drums were too loud in the mix, the technicians grabbed the rug and moved the entire kit further back from the microphone. If the drums needed to be louder, they tugged the rug until the kit was closer to the mic. This certainly sounds hilariously prehistoric by today's studio standards (or, heck, even 40 years of yesterdays), but if you listen to classic '50s ravers such as "Train Kept-A-Rollin'," "Rock Around the Clock," and "That'll Be the Day," you can absolutely hear every swack, boom, crash, and sizzle of the drums. There may be genius in simplicity, here!

THE SETUP

Whether you record drums with one mic or 20, you need to ensure the acoustic environment where the kit will be recorded is as sonically pleasing as possible. As we've said many times, one can't expect a home studio to offer the same level of marvelous acoustical spaces as a big-buck commercial facility, but you can at least check your room for obvious anomalies such as flutter echoes, weird slapbacks, low-end resonances, and dead zones. If any sonic gremlins threaten to tank your drum sound, either move the kit to a better-sounding space, or start laying absorptive materials (blankets, pillows, rugs, commercial absorptive foam, etc.) around until the room starts sounding more transparent. Try to avoid positioning the kit too close to adjacent walls as you'll risk forming sonically problematic standing waves within the close acoustic quarters. Hard surfaces such as tile floors or picture windows can produce amazing reflections, or

GETTING BIG BOOMS IN SMALL ROOMS

Recording huge drum sounds in a home studio is something like The Ultimate Struggle. You typically don't have fabulous microphones, and the recording space is usually your dining room, living room, or garage. So you may decide to go the loop-and-sample route, royally pissing off your (hopefully) loyal drummer, and causing the band to perhaps revise all the parts the members had worked out to groove with the drummer's feel and his or her specific input into the songs. You don't have to do that—unless you want to, that is.

It is totally possible to get some bombastic drum sounds at home with less-than-insanely expense microphones if you follow a few simple recording and processing guidelines. You can record your songs the way you've always played them, keeping your drummer rocking to the material the band has worked on together, and retaining that wonderful vibe that occurs when a good band plays a good song. Here's one way to go about it. . .

MICROPHONES

Don't worry about them. Great mics are wonderful, but if you don't have them (or can't borrow them), don't sweat it. Except for almost toy-like models, most mics can at least deliver a clean and relatively clear sound.

Start with the snare. Find a suitable dynamic mic, and position it about a half inch off the drumhead, pointed from the drummer's left arm towards the kick pedal. Look for a relatively dry and clean swack. The next critical element is the kick drum. If all you have is another small- to mid-sized dynamic mic, don't sweat it. Larger models, such as a Sennheiser MD421 or an AKG D112 can capture great wallop and boom, but even a Shure SM57 can give you enough kick attack and bass to serve up a rockin' drum sound. Tighter kick sounds can be achieved if the front head is off (or if there's a "mic hole" cut into the head), and more boomy and resonant sounds are produced when the head is left on. Start by positioning the mic somewhere near the midpoint of the drum shell, and angled inward towards the rear head. Amend the positioning until you get a nice,

big smack or punch.

Finally, position a mic in front of the kit, three feet away, and at about the height of the drummer's chest. This mic will capture the overall sound of the kit, as well as some nice room ambience. If possible, keep the ambience to a minimum. A little is cool, but too much may wash out the drum sound, and we need to get maximum impact from the three mics we've used.

PROCESSING

At this point, your unaffected drum sounds should be tight, clear, clean, and punchy. If not, reposition the mics until you hear some slammin' tones. Try to avoid using EQ, but if you hear too much mud or edginess, go for subtractive EQ at the offending frequencies. In other words, try to cut, rather than boost, but do whatever is needed to make the drums rage.

A decent compressor or compression plug-in will help dial in punch and impact. Set compression to taste on each track (a good start for aggro sounds is a 4:1 ratio at a –10dB threshold with a fast attack and release), but route the compression returns to dedicated stereo tracks. At mixdown, you'll want to be able to blend the uncompressed drum sound with the compressed sound to taste. It's kind of like "doubling" the drum track, although this trick works best when the compressed sound is just audible enough to add punch.

Now, let's go after some John Bonham-style ambience. Find a nice room or hall program, assign it pre-fader to the "room-mic" track (so you get all effect and zero dry source sound), and, once again, return the reverb signal on separate stereo tracks. You're working with some big wet stuff, and you don't want to wash out the drums. The trick is to subtly fade in the reverb so that you initially hear the dry-ish impact of the kit, and then perceive a beautiful decay in the background. If everything works out right with your blends of source sound, compression, and reverb, you should get a marvelously articulate punch that sounds Zeppelin big—and all recorded in your home with three mics and some studio magic. —*Michael Molenda*

they can blitzkrieg your tracks with tinny pings and other tone killers. Listen critically to test recordings before deciding whether you've put the drums in the best possible environment. Don't be lazy. Any time spent crafting a great acoustic space for your drums will be rewarded with fabulous sounds. The quickie, I-don't-care approach may deliver nothing but rather unusable cacophonies of percussive foulness.

GOING SINGLE

Once you have the drums set up in a reasonable acoustic space, you can agonize over where to place that single microphone. Um,

just kidding! It's easy to move one mic (and mic stand) around your kit, and it's fast, too. You're not worried about skewering phase relationships by placing multiple mics too close to each other, or sweating over optimum stereo perspectives, or even getting tangled up in mic cables. Bliss.

The mic. Any model should work fine. Condensers tend to be more detailed than dynamics, and ribbon mics typically deliver more organic tones, but if you place any mic in the sweet spot, your drums will rage.

Mic placement. There's no wrong move—just whatever sounds good to you. Some

positions I've used include:

• Large-diaphragm condenser ten feet back from kick drum, and positioned to the height of the drummer's chest. Nice thud and boom from kick, a meaty snare, and tight cymbals.

• Small-diaphragm condenser positioned drummer's head at about ten feet high, centered between floor tom and hi-hat, and pointed down at snare. More highs and cymbal sizzle, bright snare, and snappy attack on kick drum.

• Dynamic mic placed a foot behind drummer's right ear, pointing toward hi-hat side. Great mids, nice rumble to toms and kick, punchy snare. —*Michael Molenda*

Get Five Different Drums Sounds from One Kit

If you want to deliver a drum sound that catches listeners' ears and intensifies rhythmic impact, you'll have to be versatile, flexible, and up to the task of pulling different sounds from the one kit your drummer probably brought to the session. Let's say the drummer is using a standard, five-piece set consisting of a 22"x16" kick drum, a 14"x5.5" snare, a 12"x8" rack tom, a 13"x9" rack toms, and a 16"x16" floor tom. For cymbals, he has 14" high-hats, a 22" ride, and 18" and 19" crashes.

So how do we get five completely different sounds out of this setup? First, you need to deal with tuning the drums. Knowing how to tune drums is as important as knowing how to play. If the sound isn't right coming off the drum, it will be a lot harder to get the sound you want, and no microphone or signal processing can magically compensate for poorly tuned drums. On the upside, a single drum can produce an amazing array of sounds to compliment whatever style the music demands. So don't be afraid to experiment with different tunings until you find the one that knocks you out.

THE NATURAL

Let's begin with an approach that is sparse and quick to set up, and one that you've heard on a ton of hit records. As this setup utilizes only four microphones, it does require a player with finesse, as well as a room that has a smooth, balanced ambience. Dynamics are key, so work with the drums (and drummer) until they produce a consistent volume level, and listen closely to the drums/cymbals ratio to ensure the relationships are pretty even.

Kick drum. Set a large-diaphragm dynamic mic a few inches from the front head. For more boom, point the mic at the middle of the head. For more punch, offset the mic about 60 to 75 degrees.

Snare. Point a trusty Shure SM57 (or similar dynamic mic) right at the head, and away from the hi-hat.

Overhead one. Position a large-diaphragm condenser (set to its cardioid pattern) about three feet above the kit, pointing at the rack toms and snare.

Overhead two. Place a large-diaphragm condenser (set to its cardioid pattern) about six feet above the floor tom, and facing the hi-hat across the snare.

DRY AS A BONE

For this popular sound that originated in the '70's, set up the drums in a small, dead-sounding room with low ceilings. This environment will effectively capture a tight and percussive drum sound with minimal amounts of room artifacts such as "ringing" or odd slapback echoes. Remove the front head from the bass drum, as well as the bottom heads from all of the toms. Dampen the snare and tom heads until they "thud," cutting down on clear notes and ring. You can make like the Beatles and employ tea towels to deaden the drums, or you can simply gaffer's tape some paper towels to the offending heads. Fill the kick drum with pillows or dirty clothes—just enough so that the attack is tight. Loosening the heads can further deaden the sound.

Kick drum. Put an Electro-Voice RE-20, an AKG D-12, a Sennhesier MD421, or similar large-diaphragm dynamic inside the drum. Cover the front of the kick drum with a piano blanket (or any thick, large blanket) to control signal leakage.

Snare. Position a Shure SM57 or Beta 57A close to the head, and angled away from the hi-hat.

Toms. Place large-diaphragm condensers about 2" from the heads.

Overheads. Position a matched pair of small-diaphragm condensers left and right, aimed at the cymbals.

Hi-hat. Place a small-diaphragm condenser 3" or 4" from the hi-hat to get a more "direct" sound than the ambient hi-hat sound that will be picked up by the overhead mics.

ROOM TO BREATHE

This is a "roomier" sound that can be achieved with the same mics used for the dry sound. First, replace all the bottom drum heads on the toms and the front head on the kick drum. Cut a 3" or 4" hole in the kick-drum head slightly lower than the middle of the head, and off to one side. You'll need to retune the drums to taste—I recommend letting the tone open up so that the drums sing as well as bang. Some dampening may be needed on the toms and snare, and if the resonance or ring on the kick drum is too much, remove the head, place a pillow inside the shell, and then replace the front head.

Now, move all of the mics about an inch or two further away from each drum. For the kick drum, position the mic in front of the hole you cut in the head at a distance of a couple of inches. Experiment with whether you like the sound produced by positioning the mic straight-on, or angled slightly away from the head. Also keep in mind that a fair amount of air is going to be rushing out of that hole, so you may need to pad the mic to avoid signal overhead or a woofy sound. To intensify this open-room perspective, place two large-diaphragm condensers in different corners of the room. You can move these two mics around to taste, listening carefully to ensure you're capturing the sweet spots in the room (where the combination of ambience and source sound is thrilling), and that you're not introducing any phase-cancellation problems that will thin out the drum sound.

BOOM BOOM ROOM

Using the same mics and mic positions employed for the previous setup, open up the tuning, and let the drums bark. Overtones and leakage be damned as with this approach—you want to prove the big bang theory. Now, add a single large-diaphragm condenser down a hallway or in the next room—wherever the sound can travel that will produce a bright ambient timbre. This is your "power mic." At mixdown, you'll blend in this track to introduce a huge and ungodly cacophony to the overall drum sound. Of course, when you're recording, make sure the drummer beats the living daylights out of the drums, and doesn't get meek and mild on you.

SEPARATE BUT EQUAL

Now, let's break all the rules, and try recording one section of the drum kit at a time. Pick the mics of your choice and go nuts with the mic positions. Yes, you are going to individually record the kick, snare, toms, and cymbals. Yes, your drummer may freak out at being asked to play his or her snare part independently, then the kick part independently, then add the tom figures independently, and finally track the cymbal and hi-hat parts. And, yes, this is a wild way to go, but it has worked for many producers and engineers—just check out most of Jeff Lynne's productions. Obviously, this approach will take longer to record, but the mixing possibilities are endless. —*Scott Mathews* ●

34 Steps to Crafting Dynamite Mixes

Photo By Suzi Roks

20 Questions You Should Ask Yourself

1 Can you hear everything? This seems obvious, but sometimes a musical part gets hidden. While the mix is playing, listen just for the sound of each track, and make sure it's there. No matter the genre of music, the minimum requirement for a good mix is that you can hear all the instruments and vocals—nothing is missing and nothing sticks out. Sometimes you need to mute or turn down some tracks to make a hidden track come out.

2 Can you understand the lyrics? If you can't tell what the words are in certain spots, raise the vocal level with a volume envelope (automation). Also, you might compress the vocals, make sure they

have enough clarity around 5kHz–10kHz, and maybe reduce the level of instruments that compete in the same 3kHz–6kHz range as the vocals. Don't overdo vocal effects. Some engineers use this guideline: The lead vocal in rock music should be just loud enough so you can understand the lyrics without straining. In ballads, traditional country, or folk music, the lead vocal can be a few dB louder than that.

3 Is there too much reverb or other effects? A little goes a long way. If the mix seems to be distant, rather than present and engaging, try adding about 25ms of predelay. Also try reducing the reverb sends a dB at a time, and see how little you can get away with. Some engineers ask, "Can I notice the reverb only when it's turned off?"

4 Is there enough stereo spread? If you pan vocals and most instruments to the middle, you have essentially a mono recording. Spread things out a little. Try panning two similar guitar parts hard left and right, or pan guitars left, and keys right.

5 Is each instrument's sound appropriate for the song? For example, a twangy bass or an edgy kick seldom work in a ballad. Turn down the upper mids if those sounds are too bright and distracting.

6 Is the mix appropriate for the genre? For example, if you're mixing punk rock, a clean, tight sound probably won't work. If you're mixing a folk song done by an acoustic group, you probably don't want to hype the highs and lows. Instead, leave the tones natural.

7 Is each instrument in its own spectral space? If multiple instruments play in the same range of frequencies, they can cover up each other's sound. Then, they blur together and sound indistinct. You might roll off the lows in the guitars so they don't compete for space with the bass guitar. Then, thin out the kick and keep the bass full, or vice versa.

8 Is the mix competitive with commercial CDs? Plug a CD player into your monitoring system. Put in a CD (or several) of the same genre that you are

mixing. Switch back-and-forth between your mix and the CD playback. You'll quickly hear if your mix has enough bass, midrange, and treble compared to the commercial CD. This can be very enlightening.

9 Are the vocals too sibilant? Are the "s" and "sh" sounds too piercing and annoying? Some singers are very sibilant, or the mic used on the singer is too bright. Solutions: Use a de-esser, which is a multiband compressor set to compress only the range from about 3kHz–20kHz. A high-frequency cut around 7kHz–10kHz helps. too.

10 Are the vocals too loud or too quiet sometimes? Either apply compression, or adjust the vocal levels with automation. The latter sounds more natural.

11 Do the vocals sound too small or squashed? Usually, that means you are applying too much compression. You might reduce the compression ratio to 3:1 or less, and/or raise the threshold so that the gain reduction is 6dB or less.

12 Is the overall sound harsh, or is it warm and pleasant? If it's harsh, maybe there is too much 2kHz–4kHz in the mix. Or maybe there's some distortion caused by excessive track levels or clipping plug-ins. Try reducing the amount or type of compression, too. If the mix sounds edgy, reduce the highs a little, or use a tube or tape plug-in.

13 Is the overall sound muffled? If the mix seems lackluster or weak in the treble, maybe you need to boost the upper mids or highs a little. Try boosting electric guitars around 2kHz–4kHz, vocals around 5kHz–10kHz, toms around 5kHz, kick around 4kHz, and cymbals around 12kHz. Or cut a little around 250Hz–600Hz instead.

14 Is the mix dynamic? Do the choruses get more sonically exciting than the verses? If not, you might need to bring up the overall level a dB or two in the choruses, switch to a different guitar timbre, add a doubled vocal, increase

the reverb-send level, add harmonies, increase the panning width, and so on.

15 Is the mix creative and exciting? Are you employing unusual effects or instrument sounds? Or are they like everybody else's record? Try to do something different, but tasteful.

16 Are solos at the right level? Generally, a guitar solo should be just as loud as the lead vocal. Guitar licks in the holes (vocal pauses) should be quieter than that so they are not too distracting.

17 Does the mix seem to have a focal point? At any part in the song, is there something that grabs your attention, or is everything equally loud? You know the vocal is too quiet when it doesn't stand out from the background a bit.

18 Are vocal harmonies at the right level? Generally, a harmony vocal's level should be below the lead vocal just enough so that the melody of the lead vocal is clear. If a harmony line is too loud, the listener isn't quite sure who's singing the melody line.

19 Is the arrangement too busy? If too many instruments play at the same time, a mix can turn to mush. Consider having guitar licks just in the holes, not playing continuously. Think call-and-response. Start the mix with fewer instruments, and gradually bring them in so that the mix builds.

20 Is the mix musical? This one is hard to define in tech terms. Can you feel the emotion expressed in the lyrics? Does the song make you want to move or dance? That depends on the song and its performance, but it also depends on the mix. —*Bruce Bartlett*

4 WAYS TO ANIMATE YOUR MIXES

There's nothing wrong with your typical, full-bandwidth stereo mix, accept that it is, well, *typical*. The stereo field wraps evenly around your ears, the frequency spectrum is balanced, and, thanks to the current obsession with loud, the track hits you in the face like a boxer's punch. Is that really the most dramatic and stunning way to present your music?

Well, if you crave an IMAX-style audio experience you'll have to jettison conventional methods and start screwing up your mixes big time. After all, drama is often achieved by introducing an antagonist, and, depending on the style and vibe of your music, that adversary can evoke anyone from Scooby-Doo to Hannibal Lecter. Let's explore four options for transforming a mix from a static, one-dimensional "sound portrait" into a thrilling animated soundscape of wonder and delight.

STUPID STEREO

When stereo appeared on pop records in the '60s, the "new" listening experience was often boldly presented with extreme left/right mixes, such as vocals on one side and instruments on the other. Panning got pretty nutty in the psychedelic era, and, after that, many mixes seemed to settle into faux concert perspectives where sonic elements were somewhat evenly distributed across the stereo field. An animated mix, however, has no patience for balance or subtlety. It is like a loud, boisterous guest at a dinner party who is constantly calling attention to himself. So to animate your stereo spectrum, you should experiment with jagged perspective shifts that snap a listener's head around. Take some cues from early singles by the Beatles, Paul Revere and the Raiders, and just about any band from the Nuggets anthology. Always pan hard right or hard left, or ping-pong from one side to the other. Put selected instruments solely on one channel or the other. Splitting layered guitars right and left is almost a cliché these days, but are you brave enough to put the electrics on one side and the acoustics on the other? Never employ stereo background vocals, just toss 'em over to the left or right. Getting the idea? Your mix elements should stand out boldly and demand that you notice them. When the listener doesn't know what to expect, then you've truly animated your music.

DIMENSION

Messing with spatial relationships is also critical to animating a mix. A compelling balance of things moving front and back is as valuable as shifting a listener's focus left and right. This may be painful for reverb and delay hounds, but in order to intensify your track's dimensional interest, you'll have to leave some mix elements totally dry. Of course, you'll also get to bathe some elements in ambience, as well. (Feel better?) Thinking in cinematic terms, your dry sounds will be foreground elements, and your wet sounds will become background elements. It's critical, therefore, that you resist all instincts to make nice with reverb, and let one or two broadly ambient environments define your mix. There's nothing wrong with a big, juicy wash of reverb, but it won't animate your sound stage. Here are a few ideas to experiment with as you develop your own dimensional sleight-of-hand:

• Leave the kick, snare, and toms dry, but add a medium reverb to the overheads.

• Leave rhythm guitars dry, but add reverb to solos and/or riffs.

• Try putting pre-fader "ghost-style" reverbs on a selected instrument. This is where the source sound is not audible—just the reverb effect.

• Fade a slapback echo behind the lead vocal, and put gallons of reverb on group background vocals, but fade them way back in the mix.

DYNAMICS

As I mentioned earlier, many artists and producers destroy every last drip of dynamic range in order to make their tracks sound as loud as possible through various playback systems. (Metallica's *Death Magnetic* anyone?) Again, there is nothing wrong about wanting your tunes to explode out of car speakers, earbuds, and boom boxes, but the absence of soft sounds and loud sounds will make your mixes appear one-dimensional. Digital media offers a wide dynamic range, but it may take some gravitas to embrace it, as the softer elements of your mix will definitely not do any leaping out of your speakers. However, an animated mix presents numerous perceptual dips, drops, rises, and zigzags—just like a roller coaster—so you must fearlessly seek a near-orchestral approach to dynamic range. For example, consider making a breakdown a break down, where you don't simply pare away the density of the instrumental mix, but you also diminish the volume levels in a musical way. In addition, don't be afraid to allow the song to rise to a crescendo from a soft intro, or drop to silence after a huge chorus and then have the track almost immediately crash back even louder. Drama is your goal, and the more dramatic you can get, the more your mixes will come alive. Get off that compression carousel!

THE UNEXPECTED

This is perhaps more of an arrangement technique than a mix strategy, but be sure to insert minute musical, tonal, or textural elements that only happen once in a section. As with the spatial, ambient, and dynamic applications previously discussed, these "little surprises" are tremendously helpful for seducing a listener's attention. The surprise could be as subtle as, say, an E-Bow line following the chord progression for just four bars, or a long delay that hits the vocal on the last line of a chorus, or a piano motif that drops into the first phrase of the bridge and then disappears. And, of course, if you really want to animate these surprises, impose extreme stereo, panning, ambient, and/or dynamic effects upon them. —*Michael Molenda*

10 Ways To Conquer Plug-Ins

Plug-ins need power. CPU power. But, CPUs can't supply infinite amounts of power. Get the picture? Run too many plug-ins, and your CPU will act like an overdrawn bank account. And you'll hear the results: Audio gapping, stuttering, and maybe even a complete audio engine nervous breakdown. Bottom line: If you need to use processing in your mix, you want as much available power as possible. Here are the Top Ten tips on how to get it.

UPGRADE YOUR CPU

Let's get the most expensive option out of the way first. Because plug-ins eat CPU cycles, the faster your processor can execute commands, the more plug-ins it can handle. Although there are a few other variables, as a rule of thumb, higher clock speeds = more power for plug-ins. Still running in the sub-GigaHertz range? Time for an upgrade. Cool bonus: Any kind of "rendering" (applying effects, format conversion, and so on) will happen faster, too.

INCREASE LATENCY

And in the spirit of equal time, here's the least expensive option: Increase your system latency. When you're recording, especially if you're doing real-time processing (e.g., playing guitar through a guitar amp simulation plug-in) or playing soft synths via keyboard, low latency is essential so that there's minimal delay between playing a note and hearing it. However, that forces your CPU to work a lot harder. Mixing is a different deal: You'll never really notice 10 or even 25ms of latency. The higher the latency, the more plug-ins you'll be able to run. Some apps let you adjust latency from a slider, found under something like "Preferences." Or, you may need to adjust it in an applet that comes with your sound card.

USE HARDWARE-BASED PLUG-INS

Several companies make high-performance audio DSP cards. These either insert into your computer, or connect to it via a fast interface, like FireWire. The cards run their own proprietary plug-ins (although they often enjoy third-party support), so the plugs don't load down the host CPU—the boards handle the heavy lifting. Although these boards will eventually say "*No mas!*" as well, one advantage compared to CPU-based processing is you have a finite, known amount of power so you can "red-line" the DSP without fear. With your CPU, sometimes running too close to the edge will cause a meltdown when the CPU has to perform that one extra function. Cool bonus: Hardware-based plug-ins are often platform-independent.

AUX BUS BEATS INSERTS

Inserting one effect in an aux bus is much more efficient than inserting multiple instances of an effect in multiple tracks. Of course, there are some cases where an effect must be limited to a single track. But for something like reverb, which tends to draw a lot of juice, see if it isn't possible to do the aux bus option instead. Sometimes, even EQ can work as a bus effect. For example, suppose you miked a bunch of acoustic percussion, and feel all the percussion tracks need to be brightened up a bit. Send them to a stereo bus, and insert a single EQ into that bus.

TURN OFF WHAT'S NOT NEEDED

Anything that's active is making demands on your CPU. Using only one band of a four-band EQ? See if you can turn off the others. Even input and output drivers drain your CPU. When you're mixing, you probably don't need any of your sound card's input drivers to be active (with an exception we'll cover next)—go ahead and disable them.

GET HARDWARE INTO THE ACT

Reverb is one of the most CPU-intensive effects, period. A native reverb that sounds good will show no mercy to your CPU, which is why some of the best reverbs come from hardware-based plug-ins. But you can also use an external hardware processor. Dedicate one of your sound card output buses to feeding the reverb, and bring it back into an input. But, you say, there will be some latency going through the reverb. Well, you're right. Think of it as free pre-delay, or record the reverb to a track and shift it ahead in time if you're really picky.

SEND STEMS TO A MIXER

A digital mixer remains an important part of my setup, not only because it's useful while tracking, but because I really like the EQ in my particular model (Panasonic DA7). If I need more high-quality EQ than the computer can handle, I'll send out individual tracks or premixes to my mixer via the Creamware interface's light pipe. Then it's time to use the mixer EQ. Either I'll return the mixer out back to the host, or with some projects, do my mixing in the DA7 itself, using that old school "move the faders" technique. Cool bonus: The outboard mixer's aux bus is an ideal place for putting a reverb. And, you get to mix with real faders.

FREEZE YOUR TRACKS

Soft synths, especially ones that sound good, suck power like there's no tomorrow. "Mastering quality" signal processing plug-ins also like to drink at the CPU power bar. So, use your host's "freeze" function to convert tracks that use real-time plug-ins into hard disk tracks, which are far more efficient.

USE SNAPSHOT AUTOMATION

Plug-ins aren't the only things that stress out your CPU: Complex, realtime automation also chows down on CPU cycles. So, simplifying your automation curves will leave more power available for the CPU to run plugs. Your host may have a "thinning" algorithm; use it, as you generally don't need that much automation data to do the job (particularly if you did real-time automation with fader moves). But the ultimate CPU saver is using snapshot automation (which in many cases is all you really need anyway) instead of continuous curves.

CHECK YOUR PLUG-IN'S AUTOMATION PROTOCOL

Our last tip doesn't relate to saving CPU power, but to preserving sound quality. Many plug-ins and soft synths offer multiple ways to automate: By recording the motion of on-screen controls, driving with MIDI controller data, using host automation (like VST or DXi), and so on. However, not all automation methods are created equal. For example, moving panel controls may give higher internal resolution than driving via MIDI, which may be quantized into 128 steps. Bottom line: Using the right automation will make for smoother filter sweeps, less stair-stepping, and other benefits. —*Craig Anderton* ●
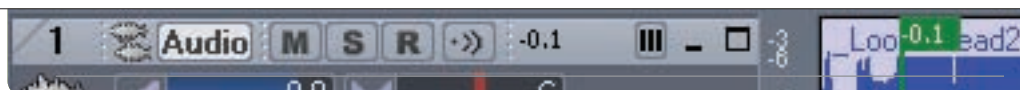
Home-Studio Mastering Tips & Techniques

BY CRAIG ANDERTON

Let's get one thing out of the way: There's mastering and there's *Mastering*. Mastering, as in this is a crucial CD for your band, you're going to duplicate 1,000 copies, you want to blow people away when they hear it ("You only get one chance to make a first impression"), and you don't want any mistakes. This is when you call in the professional who has done this dance a zillion times before, and will squeeze every last bit of musicality out of your creation. Yeah, you'll pay—but, hopefully, when you look back (and assuming you chose the right mastering engineer, which is a whole other issue), you'll think it's the smartest move you ever made.

But then there's mastering, with a small "m." It's the demo that the band listens to when deciding the song order, the live recording that gets sold at gigs, the 30-second spot for Mighty Dave's Kool Kar dealership, and the narration for the kiosk video done by one of your regular clients. You're not going to hop on the first plane to Maine and beg Bob Ludwig to do the mastering, so you decide to master it yourself. But do you really need a separate digital audio editor with a bunch of pricey plug-ins, or have DAWs progressed to where you can do it all without leaving your favorite host software?

First off, 95 percent of mastering is not in the tools, but in the ears. If you have good ears, you can probably convince your DAW to do a decent job of mastering. Granted, most home-studio, computer-based mastering is done with specialized digital audio editing programs that offer deep navigation facilities, the ability to zoom in on waveforms, pencil tools to draw out clicks, and include mastering-oriented

Fig. 1—This stereo output bus in Cubase SX is dedicated to mastering effects. The PSP MasterQ and a multiband compressor goes pre-fader, while the UV22HR dithering plug-in goes into the post-fader slot.

plug-ins. However, if your mastering needs aren't too demanding, there are several ways to master using conventional multitrack recording programs. Interestingly, some can even do tricks conventional digital audio editors can't do.

MIX WITH THE MASTERING PROCESS IN MIND

There are several steps you can take while mixing to make for easier mastering. You should do these whether you plan to master material yourself, or hand your project to a mastering engineer.

• Always mix with the highest resolution possible—don't downsample or do bit reduction (dithering) until the very end.

• Add any fade-ins or fade-outs during the mastering process, as you'll have a better sense of the ideal fade time as you do the mastering.

• Don't trim out all the "air" at the beginning of a tune. A clean sample of this may be essential if you need to apply any subsequent noise reduction or other audio restoration process, as the sample of hiss, hum, or whatever can be loaded into a noise reduction program that mathematically subtracts the noise from the track. Besides, sometimes you don't want too abrupt a transition between dead silence and the beginning of a track.

• Don't add any processing to the overall mix, just to individual channels—processing completed mixes is best left for mastering.

• As you mix, watch closely for distortion. A few "overs" may not be audible as you listen to the mix, but may be accented if you add EQ or limiting while mastering. It's better to concede a few dB of headroom rather than risk distortion.

• Roll off low frequencies in tracks that don't have any low frequency energy. You don't want any subsonic signals to work their way into a mix or a final master recording.

• Don't normalize any of your mixes, as that means another stage of DSP (which may degrade the sound), and you may need to change the overall level anyway when assembling all the mixes into a finished album.

• Always make copies of your original mixed, high-resolution files prior to mastering. If the song is later remastered for DVD-Audio, included in a compilation, or used in any other context, you'll want a mix that's as easy to remaster as possible.

REALTIME MASTERING

A major difference with mastering in a host program is that you have the option to adjust mastering processors (which affect the final mixed output) as you mix. With digital audio editors, you are always working off-line with a previously mixed file. However, there are advantages and disadvantages to both methods. The process of mixing is daunting enough without throwing mastering into the equation; still, mastering while you mix means you know exactly what the final version will sound like.

Another consideration is that many people feel that separating the mixing and mastering process is beneficial to both, as they are different disciplines. You might want to "sleep on your mix" before mastering it.

If you decide to master as you mix, you'll be inserting mastering processors in buses. This is because when you create a non-surround multitrack project, eventually all the tracks are going to dump through a mixer into a master stereo output bus. As with individual channels, buses have provisions for adding plug-in effects. How effects are accommodated depends on the program. For example, with Sonar the buses have standard effects slots, just like tracks. But Cubase SX has a few extra touches—both pre- and post-fader/post-EQ slots for effects, as well as excellent dithering algorithms for doing bit reduction (**Fig. 1**).

MASTERING DO'S & DON'TS

One of the most-asked questions I hear from musicians is how to prepare audio files properly for mastering. After all, you want the mastering engineer to have the best possible raw materials. Following are some guidelines relating to the three most common issues: volume, resolution and editing.

VOLUME

A common mistake the well-meaning musician makes is attempting to get a mix as loud as possible. As far as I can tell, this is because most people don't know whether mastering addresses this issue (FYI, it does). Many artists—believing it's better to be safe than sorry—do one of two things: normalize their tracks, or send them through a compressor/limiter (or some sort of "finalizing" plug-in). Unfortunately, both degrade sonic quality and neither delivers the desired result.

Contrary to common belief, normalizing does not make tracks as loud as possible. The normalization process scans a digital audio file and looks for its peak volume, then moves that point up to digital zero. All other sounds in the file are adjusted proportionally. So, if the file's loudest point is a snare hit that registers one dB below digital zero (-1 dBFS), normalizing will make the entire track one dB louder. This is hardly what most users of this function are trying to achieve. Furthermore, normalizing does nothing to address the average volume of songs—which is more crucial for the proper aural perception and flow of a good CD.

Another problem occurs when musicians add a "mastering" plug-in to the mixdown process. I receive a lot of files that have been treated this way and it creates two problems. First, the files may be so hot that they overload any process applied in mastering (equalizer, limiter, etc.). Second, the process's effects cannot be removed, so I have to pull every trick in the book to counteract the plug-in's negative effects. This turns mastering into an audio salvage effort, not a fine-tuning improvement process.

This narration example was recorded on location, and had severe camcorder noise. Fortunately, it was sent for mastering with the end untrimmed, thus making it easy to grab a piece of the noise (the yellow stripe toward the right) for use in a noise-reduction program.

RESOLUTION

Always deliver the highest possible resolution digital audio files for mastering. If your hard-disk recording setup offers 20-, 24-, or 32-bit—as well as 48, 88.2, 96, or 192 kHz—capability, it's to your advantage to utilize it. Even though your audio files will eventually convert to 16-bit/44.1 kHz for the CD's commercial release, editing done on the files before that point will be much more transparent-sounding when processed at a higher resolution. While it's okay to burn audio CDs to reference your work, always make sure that what you deliver for mastering is the same resolution as what you used while recording and mixing.
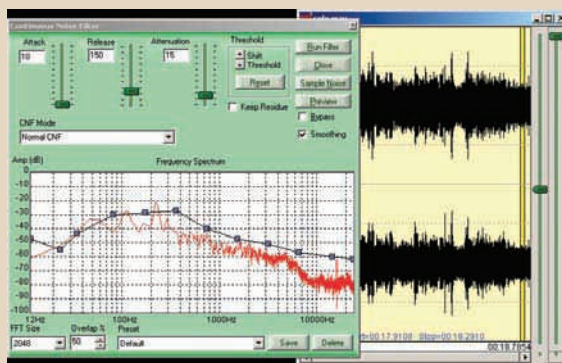
EDITS

Another common problem comes from musicians who've already done intro edits and outgoing fades, because "the song only needs EQ and level treatment." Contrary to common lore, adding fades does not make the mastering engineer's job any easier, and in some ways it can make specific tasks nearly impossible. Consider a recording that needs to have some electronic hum or microphone hiss removed. To do this successfully, a bit of that noise must be taken from a part in the song where there is no music, so as to effectively isolate a digital "fingerprint" and create a filter. Ironically, the best place to take this fingerprint is the few seconds before or after a song. If that space has been removed, it is much more difficult to get a good sampling of the problem noise.

If you need an exact fade or edit point in the recording, it's best to carefully document these requirements (H:M:S) on a song-by-song basis for the mastering engineer. Accuracy can be confirmed in the reference disc.

The next time you're working on a project, keep these concepts in mind. They will give your mastering engineer the necessary flexibility to bring out the best in your music, and result in a more professional-sounding product. —*Paul Abbott*

If a program doesn't include a post-level control effects slot, try feeding one bus into another. Insert the effect that should be post-level control into the second bus, and leave the second bus output level control at 0. Control overall level at the output of the first bus.

Once any effects have been added and edited as desired, you have three main options to create a mastered file:

• Export the track (also called bounce or render) to hard disk. This reads the final mixed output signal, including the results of any effects you've added, and writes the file to hard disk. Note that it still needs to be assembled with other tracks to create a complete CD.

• Send the output to a stand-alone CD or DAT recorder. This will record the final, mastered song, although again, you'll still need to assemble these.

• Send the output through analog mastering processors, record their outputs into two empty tracks in your multitrack, then export those tracks to your hard disk.

A different technique is a compromise

Master It!

between mastering as you mix and mastering offline. After hearing a mastered song, you'll sometimes wish you had mixed the song a little differently. For example, the mastering engineer might add some compression that subtly changes the mix, requiring you to go back and do a quick remix (let's hear it for mix automation).

So, to create a more "mastering-friendly" mix, consider adding some multiband compression and overall EQ (usually a little more high end "air" and some tweaks in the bass) in the master bus to create a more "mastered" sound. Mix the tune while monitoring through these processors. Then, when you render or otherwise save the file, bypass the master effects you used. This results in a raw mix you can master in a separate program, or give to a mastering engineer, who anticipates the use of mastering processors but doesn't incorporate their effects in the file. Should you do this, you may need to tweak the overall level when you remove the processors.

MASTERING INDIVIDUAL TUNES IN YOUR DAW

Mastering a multitrack project in real time is a fairly new technique that's definitely not for everyone. So, let's look at two approaches to mastering that use the DAW more like a standard digital audio editor.

The more "old school" approach is to take each tune, master it, save it as a stereo (or surround) file as a separate operation, then assemble all the tunes into a cohesive whole. A newer approach is to assemble all the tunes in a workstation, and apply any processing, level changes, etc. on a more global level. Basically, this combines both mastering and assembly as one operation. Let's look at the individual song approach first.

Open up a new file in your DAW, and import the mix into a track. If you need to process the right and left channels independently (e.g. there's an instrument in the left channel that has excessive treble, and you want to EQ just that channel a bit without processing the right channel), then separate the stereo file into two mono files. Most software will let you do this as part of any "bounce to track" function. You may also be able to bring a stereo file into two tracks, use the balance control to separate the left and right tracks, then recombine them.

Here are some of the editing operations you might want to do:

Fig. 2—iZotope's Ozone 3 is a mastering suite of processors that can also work well as a master bus effect. This shows the multiband compressor in action, but note that the loudness maximizer stage is also active to add a subtle amount of brickwall limiting.
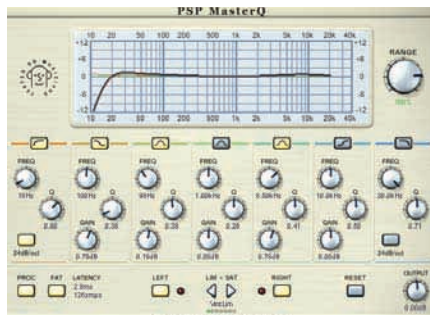

Fig. 3—PSP's MasterQ is a fine example of an EQ designed specifically for mastering. It has low pass, low shelf, high pass, high shelf, and three parametric sections.

Reduce peaks using automation envelopes. If some peaks are significantly louder then the rest of the material, this reduces the chance to have a higher average level, as the peaks use up much of the headroom. One solution is to add limiting, but another option that can affect the sound less is to use an automation envelope to reduce the levels of just those peaks. If the automation works on just a few cycles of the waveform, you probably won't hear any difference compared to not reducing that peak; but once the major peaks are reduced, you'll be able to raise the overall level. (And if you do add any compression, it won't have to work as hard.)

Add dynamics processing. Generally, you'll use a dynamics plug-in for the track holding the file, or possibly for the bus it feeds. Multiband dynamics processors are your best option; compared to standard compressors, they're

more transparent because dynamics control in one frequency band doesn't affect other frequency bands (**Fig. 2**). However, some people like slamming a stereo compressor because they can hear some "pumping" and "breathing," which can give more of a vintage sound.

Another popular option is a loudness maximizer plug-in. This type of processor can greatly increase the overall average level, producing a "hot" sound. These plug-ins are often overused on today's recordings, which creates distortion and degrades definition. I advise increasing the amount of maximization until you can hear the effect working. Then reduce the amount so you don't hear it working. Eventually you'll find a "sweet spot" between retaining good dynamics and increasing overall loudness.

No matter what form of dynamics control you use, it will affect the mix by reducing peaks and bringing up lower level sounds. This is equivalent to having a more "even" mix, and might be desirable. But if the mix ends up sounding too uniform, reduce the amount of maximization. Peaks and valleys are essential to a satisfying listening experience. A really "loud" cut may seem impressive at first, but is fatiguing after a short period of time.

Add EQ. For mastering, you'll hopefully be dealing in broad strokes — a mild bass cut, or a little high-end lift — because any serious response issues were dealt with during the mix. This is why many older equalizers, like the Pultec, are favored for mastering; they have a subtle, yet pleasing, effect on the sound. Plug-ins like PSP's MasterQ (**Fig. 3**) and the UAD's Pultec emulation fulfill this role in software.

If significant EQ problems exist, like large midrange or low-end peaks, you'll likely need to plug in a full-blown parametric EQ, and tweak out the individual problems.

Your DAW probably includes EQ, but be careful about using it. The DAW's EQs were likely optimized so you can open lots of instances at the same time, which means they can't get too nuts about consuming CPU power. "Mastering oriented" plug-ins tend to eat more power, but it doesn't matter because you're using them on a simple stereo file, or inserted in a stereo bus, rather than using a lot of instances on individual tracks.

Other goodies. Some people swear by particular plug-ins for mastering, like "exciters," stereo image wideners, and the like. I tend to avoid these because in most cases, dynamics and EQ cover 99 percent of what's needed. But

in some situations, a little high-frequency exciter helps add a different kind of sparkle than EQ, and once I even added a phasing effect in the middle of a tune during a spoken word part (the client loved it). If a mix has a certain direction, it's often best to enhance what you have rather than try to turn it into something different.

MASTERING AND ASSEMBLY IN A DAW

You can do album assembly in a multitrack host, either of individual, previously mastered cuts, or of raw mixes that you master and assemble as you go along. With the second option, you bring the tunes into the host program, arrange them in the desired order and, when complete, render the whole thing to disk as one large file. If needed, you can then import this into a CD-burning program to add track markers, CD Text, etc. Note that some programs include CD burning as part of the program.

When assembling within a DAW, files can be placed end-to-end in a single track, each in its own track, or different files in different tracks (**Fig. 4**). For example, one project I mastered had three distinctly different "flavors" of mixes: Some were mixed in a studio that probably had bad acoustics, because the bass was too heavy. Another set of mixes was very neutral (just the kind I like to work with). Another set had compression applied to the master bus, and were already somewhat squashed.

I sorted each type on to its own track, and applied the same processing to like-sounding files—the bass heavy ones needed the same kind of bass EQ, whereas the neutral ones needed a different type of EQ. I also added instances of multiband compression to both of these tracks. The songs that were already compressed didn't get any multiband compression, but did need a fair amount of EQ. This created a few peaks, so I added a slight amount of limiting.

GETTING CREATIVE

Because you're assembling in a multitrack environment, you can do tricks that are difficult to do in typical stereo editors. Here are some:

• It's easy to create just about any type of crossfade within a host, either through an automatic crossfade function where overlapping two tracks creates a crossfade, or by having the tunes on separate tracks and adding fade ins/outs manually.
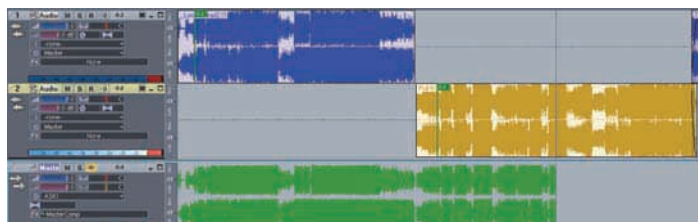

Fig. 4—The tracks to be assembled sit in alternate Sonar tracks. The first and second tracks have the "industry standard" two-second space between them. The second and third tracks have fades added so they crossfade. The Master buss has a PSP MasterComp inserted to do compression. Note the waveform preview that Sonar generates in the Master bus as the file plays back, which makes it easier to verify clipping isn't taking place (otherwise, part of the waveform would turn red). Also note the small green "flags" in each clip that indicate the maximum level that was attained. After listening all the way through and verifying all is well, the entire file would be bounced to disk.
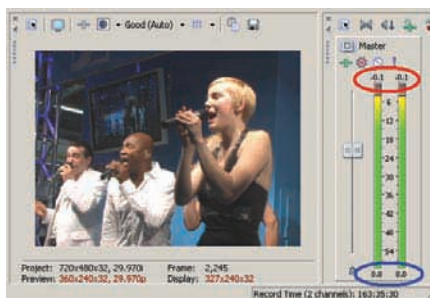

Fig. 5—The soundtrack for a video I shot as the Frankfurt Musikmesse is being mastered in Sony Vegas. Note the peak hold levels (circled in red) that indicate the maximum level attained was -0.1dB—perfect. The values circled in blue indicate the fader setting of 0.0, which is also pretty much ideal.

• For dance or continuous DJ mixes, you can dedicate a separate track for transitions or sound effects.

• Add effects automation to vary effect parameters in real time (e.g., increase a high pass filter's cutoff as a song fades so it seems to "disappear" just before the next track comes in).

• Use automation to do extremely sophisticated fade ins and fade outs.

This process essentially creates a "meta-mix," where instead of mixing individual tracks to create a two-track file, you're mixing two-track files to create a final album.

SETTING LEVELS

Channel headroom isn't much of an issue in today's DAWS, which use 32-bit floating point, 48-bit fixed, or even 64-bit resolution. However, when you sum them all together at the master bus, overloading is a definite possibility unless levels are set properly.

Output level clipping indicators aren't very helpful for serious mastering; an unambiguous numeric readout at the output that indicates the peak level relative to 0 (called the "margin") is much better. For example, +1.7 would mean the maximum signal was 1.7dB above 0; -0.8 would indicate the maximum signal came within 0.8dB of the maximum available headroom (**Fig. 5**).

Meters that flash these values are helpful, but a "peak hold" feature is more useful because you don't have to keep watching the meters — just check levels at the end of the song, and adjust the output faders accordingly.

Assuming the faders themselves are also calibrated, here's an example of how to use this feature. Suppose the current fader setting is 0 and at the end of the song, the readout displays a margin of +2.0dB. Bring the fader down to –2.0, and the next time you play the tune all the way through (after first resetting the meter value, of course), the maximum level should hit 0.0.

However, you don't want the margin to be 0 but instead slightly less, like -0.1dB below maximum. If a tune has peaks that hit 0 for more than a few milliseconds, it may be rejected by a CD pressing plant on the assumption that those peaks represent distortion.

"MASTERING" MASTERING

I certainly don't mean to imply that following the above techniques will make you a mastering engineer. However, if applied correctly you'll end up with mixes that sound better than if you'd just left them alone — and that's the whole point. Besides, if you start working on your mastering chops now, you just may discover a whole new outlet for your creativity. ●

Get Yourself Out There!

BY JEFF ANDERSON AND MATT HARPER

We're all artists, and thus by default a bit averse to all that business nonsense. In a perfect world scenario, we'd all be left alone to just make good albums, work with musicians we like, and go to bed not worrying about marketing, promotion, and all the stuff we need to do to get known and drive towards success. But if you're lost in the crowd, the blame may be yours for not effectively marketing your music, your band, and/or your studio (if you do outside production and recording work).

Visibility is key in attracting fans and clients, and the best way to do that is to market yourself ruthlessly. "But how," you may ask, "do I do that without breaking the bank?"

Following are some choice tactics—many of which are free, and the rest of which are reasonably cheap—for reaching potential fans, music lovers, and other musicians, and luring them into your musical world.

MULTIPLE MARKETING OPTIONS

While online marketing is quickly becoming the route of choice for many businesses— and we'll discuss this options in a bit—but the notion that banner ads and emailed press releases are enough is built upon faulty logic. There's really something to be said for the tangible, of which the web is anything but, and there is definitely an air of professionalism that is conveyed in "real world" marketing tactics. Let's look at some relatively affordable means of marketing outside the web.

FLYERS

It's an age-old approach that absolutely should be exploited, as it's cheap, easy, and relatively non-time consuming. The creation process is so simple that it hardly needs to be explained here—even a nominal working knowledge of Photoshop will suffice. Price of copies is rather low, but it's worth the extra expense to spring for color copies. In the world of advertising, paying attention to aesthetics and design is crucial. Your gut instinct may be to cram as much information about your band, your next

gig, or studio as you possibly can on one sheet of paper. This, however, is not the best approach—the beauty of a design is most often in its simplicity. One or two well-taken photos will suffice, and text should be limited to your band or studio name, the release or gig you're promoting, and pertinent contact info (web site, Facebook, MySpace, etc.). The purpose of the flyer is to be functional—this isn't something that demands high art.

Placement of the flyer is of penultimate importance; you must be visible to musicians, fans, and potential studio/production clients. Most music stores (particularly of the independent variety) provide bulletin boards, and if the real estate is available, most shopkeepers will be cool with you placing a stack near the counter or entrance of the store. Furthermore, colleges that have music schools usually have free bulletin boards for classified flyers in their musical facilities—use these too.

A smart approach, and one oftentimes used by concert promoters and the like, is to print up 3" x 5" handbills and stand outside of venues directly after a show and distribute them manually. Sure, most of them will be folded up in pockets and never given a second glance, but the purpose here is recognition, and one or two sets of eyes can go a long way.

MERCHANDIZING

At first glance, promotional products can appear as a waste of monetary resources, and the concept itself, admittedly, is a bit cheesy. However, if they were largely ineffectual then it wouldn't be a standard practice for many businesses. Heavy brand circulation leads to brand recognition, and recognition of your brand (your band, your studio, your label, etc.) leads to increased business.

The key to marketing via merchandise is to pick products that are of actual use to your target demographic. As your business is going to be supported by musicians and music fans, it's imperative that you pick musician-centric swag. Stickers and t-shirts are no-brainers, but highly effective. Because stickers are likely to be plastered on the side of guitar cases and shirts will be sported directly by the musicians who receive them, you're essentially being endorsed by public figures who hold a degree of influence over their peers—which are all potential fans and/or clients. T-shirts can get pricey, and thus should be distributed carefully, but stickers are super cheap. Check out

Sticker Guy (www.stickerguy.com)—one of the cheapest custom vinyl sticker manufacturers. Even in small bulk quantities you will pay less than $0.05 per unit. Many companies specialize in custom T-shirt designs.

Of course there are plenty of other cool options for promotional products. Check out Westsky (www.westsky.com) for musician-friendly swag, from guitar picks to drum sticks. And if you really want to get out there, Promo Peddler (www.promopeddler.com) offers virtually every kind of customizable product under the sun.

WEB MARKETING

Taking the aforementioned strategies into account, it's also wise to come with a double-sided approach, and that means branching out into the web and getting your music and/or studio piped down into every computer. The beauty of web marketing is that it's generally (and this is comparatively speaking) cheaper than "real world" marketing, and incredibly effective to boot. So let's take a look at some of the best ways to become visible via the web.

It's a pretty safe bet that you already have a website devoted to your band or studio, but is it up to par? You should have, at bare minimum, pictures, bios, mp3 downloads, videos, and gig announcements. (If a picture is worth a thousand words, then a video is worth a million.)

KEY WORD RANKING

Key word ranking involves constructing your pages in a manner so that search engines can prioritize your website to early result pages, thus presenting you more quickly to prospective fans and/or clients. You can do some research as to what keywords have been used most often by your site visitors using programs such as Word Tracker (www.wordtracker.com). Then, apply that knowledge toward developing more appropriate metatags that will help link you to search engines properly. And while you can certainly take the DIY route in regards to meta tagging, depending on how fluent you are in webpage construction, you can also outsource the project to a number of companies. These companies can be invaluable for marketing your studio via key word ranking.

So make sure your keywords are right, then track your progress. You can go and grab a hit counter for free if you don't already have one from a site like Visible Counter (www.visible-

counter.com), and then quantify the results. However, that in and of itself is not enough, as your ranking is also determined by the number of related pages that you link to and from. Therefore, it's really important that you trade links with other bands, studios, rehearsal spaces, and in fact, almost anyone involved in the music business.

TRADING LINKS

The primary goal of marketing is exposure, so you should pursue appropriate link trades at every possible opportunity, as it's necessary to have incoming and outgoing links from your site to maintain high search-engine rankings. If you don't already have a page on your site devoted to links, you would do well to construct one immediately, and once you do this, you should make it a policy exchange links with other bands, and even local music stores, rehearsal studios, professional recording studios, and any other business that will embrace the practice.

SOCIAL NETWORKING

Obviously, MySpace, Twitter, and Facebook offer mammoth promo opportunities for musicians. Taking this into account, it's downright negligent to not take advantage of these massively trafficked sites that let you utilize their outreach and dive into their global communities for free. Signing up is easy, and you can promote gigs, provide links to your mp3s and videos, and build communities that are interested in your act or studio or production services. Voilà! Instant promotion to scores of potential fans.

OTHER RESOURCES

Though all of the above are great starting points for taking your studio to the next level in terms of marketing, it would be very imprudent to stop here and not conduct further research so as to really understand the concepts and strategies of marketing. There are a ton of great online resources that are free and offer all the information you could ever need to apply to your own business for increased visibility and further growth. Guerilla Marketing (www.gmarketing.com) is an awesome site that is free to join and is jam-packed with tons of articles and tips. Bards Crier (www.bardscrier.com) is a great e-zine that focuses on music marketing. So read up further on it, and prep yourself for a boom in your career. ●

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