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The sound and the fury: part 2

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THE GUITAR ICON GETS A LITTLE  
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SHOWS YOU HOW TO PLAY  
THE IMPOSSIBLE!





# The Sound and the Fury

## PART 2

In the conclusion to our series, we tell you everything you need to know to mix your modern metal production.

By Jeff Tenym \* Illustration by Cojo "Art Juggernaut"

**M**ixing music is an art form. Like any of the arts, it requires a high level of training, intuition and creativity. Technical knowledge alone can help a mixing engineer understand how to fix a problematic mix, but it takes instinct to deal with unique situations and a sense of artistic style to give a mix a character that's appropriate to the music and performer.

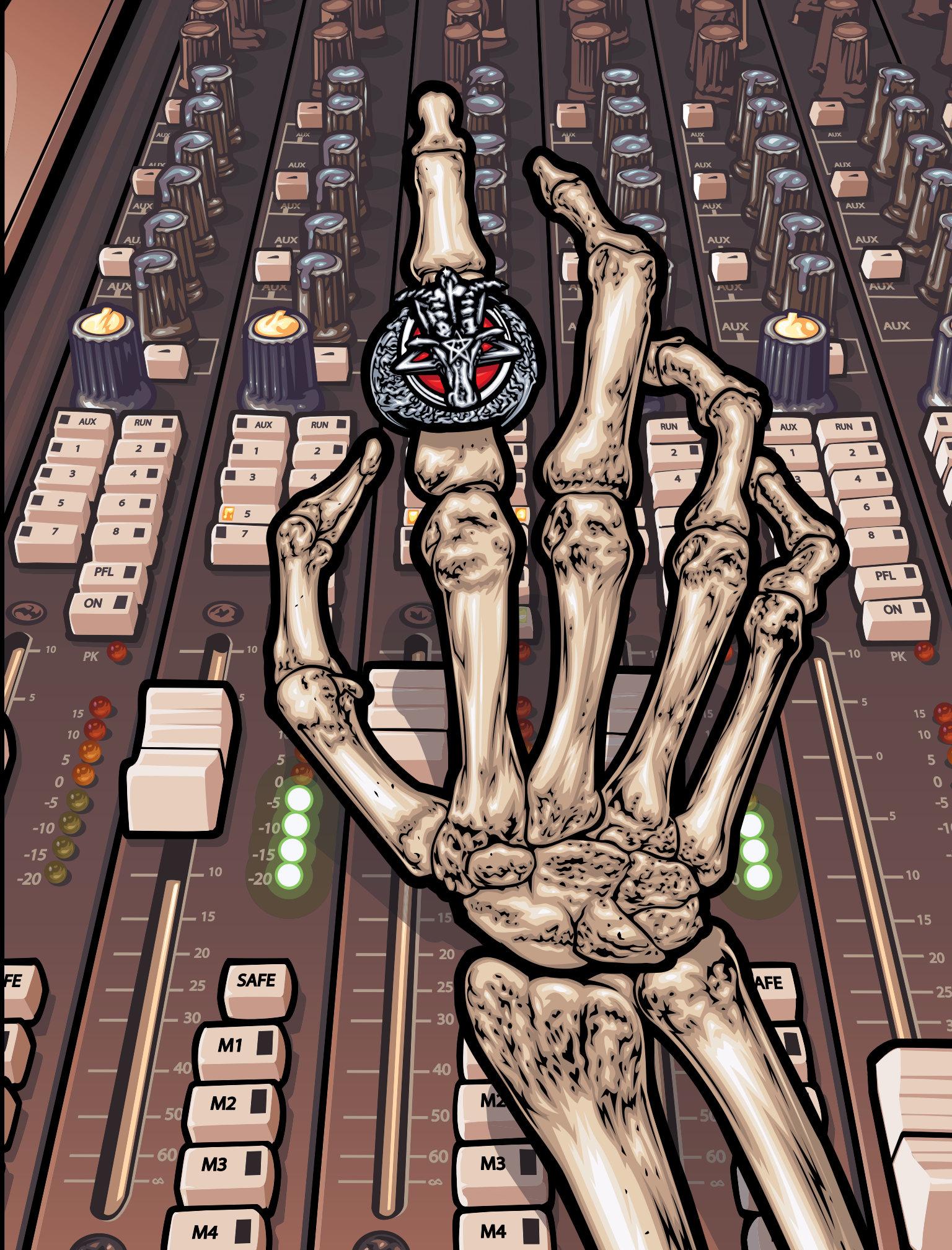
In last month's article, I explained how to plan and record your modern metal music project. In this feature, I'll take you through the next step of the process, mixing the project, with a focus on the technical and creative aspects of the task. By reading this, you can avoid the numerous mistakes that novices make and learn procedures and common approaches to take when mixing modern metal.

### MONITORING

**THE QUALITY OF YOUR** monitors and listening environment has a direct correlation to the results you achieve when mixing music of any style. Cheap monitors and an acoustically untreated room will mask

critical elements of the music and introduce problems of their own, making it impossible to determine what needs fixing. For example, monitors with poor low-frequency response will disguise the quality of bass tones present in your mix. Likewise, an untreated mixing environment can be prone to standing waves, which cancel out key frequencies, and highly reflective surfaces that blur the stereo picture and make accurate monitoring difficult. If you can't hear problems, you can't fix them; and if your equipment or room is poor, you may spend time trying to correct nonexistent problems. Either way, this will result in an inferior mix whose problems will become glaring when played back on another audio system.

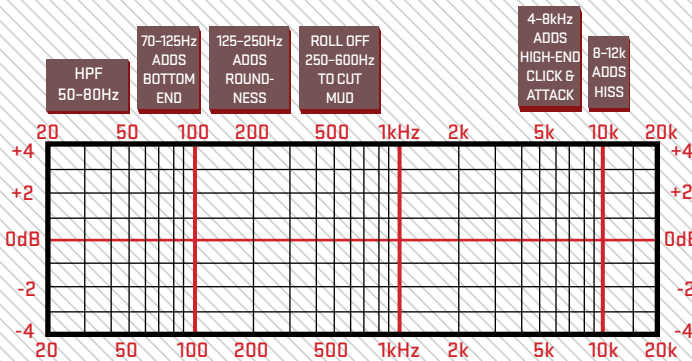
Under the circumstances, it's worth spending money on the best monitors you can afford and taking time to properly treat your room. Research the monitors within your price range, and read as many reviews as you can. Also, be sure to purchase monitors from a store that will allow you to return them, in case you find they aren't right for you. Remember, too, that monitors are not supposed to sound good—they're designed to let you hear your recordings accurately. This is why you shouldn't mix on hi-fi speakers, which are "hyped" to emphasize ear-pleasing frequencies.





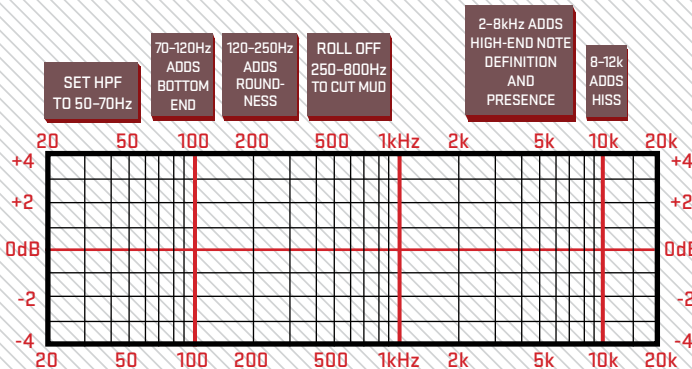
## KICK DRUM: CRITICAL FREQUENCIES

Be careful with the sub-70Hz frequencies, particularly on faster performances. Muddiness can usually be rolled off around 330Hz. Boost around 4-8kHz for the high-end "click" and beater attack usually associated with metal bass drums. [See page 82 for more information.]



## BASS GUITAR: CRITICAL FREQUENCIES

Try boosting around 70-120Hz to add body. Muddiness can be rolled off around 330Hz. If more presence, clarity and brightness are required, look at boosting from 2kHz upward. [See page 82 for more information.]



Room treatment consists in large part of following the room-damping techniques described in last month's feature under the section on miking technique. The key job is to minimize or eliminate reflections, but there are other issues as well, such as diffusion (to scatter reflections) and bass traps for room corners, where bass frequencies gather and exaggerate the low-end content. The topic is beyond the scope of this feature, but with a little online research and a modest budget, you can make most rooms suitable for mixing.

If your budget allows you to mix in a professional studio, by all means do so. If you can't afford to, you might find you have the funds to listen to your final mixes in a pro studio, where some over-all sweetening can be applied to make your work sound more professional.

## HEADPHONES

**NOVICE MIXERS OFTEN** think they can achieve a quality mix with headphones. Certainly, headphones should be used within the process, as they allow you to hear more details, including low-volume signal noises you might otherwise miss when listening on speakers. But you shouldn't use headphones as your primary monitoring source, as doing so will more than likely produce a mix that's unstable in the low end—you'll either hear the low-end so well in the headphones that you'll push it down in the mix, or the mix won't sound full enough and you'll push the low-end content up. Either way, the results will suffer.

Headphones also exaggerate the stereo picture by separating the left and right sides to an extreme degree. When

listening on speakers, each ear hears not only the sound from the speaker closest to it but also a bit of the sound from the other speaker. Headphones also give a mix an unusual spatial feel, since they place the sounds at either side of the listener, eliminating the front-to-back information you get when listening on speakers.

## MIX LEVELS

**WHEN RECORDING MODERN** or extreme metal, it can be tempting to mix at high decibel levels. However, you can better assess the instrument balance, frequency spectrum and content of a mix by doing your primary mixing at a conversational level—one at which you and your bandmates can talk at normal volume and hear one another. Once you think you have a good sound, turn up the volume to whatever level you like or require, and check your results. Likewise, if you need to hear something in greater detail when mixing, turn up the volume so you can hone in on the track, or listen in with your headphones, but return the volume to a lower level when you've finished. In addition, be sure to check your mix on different systems, in different environments and at different listening positions within them. Doing so will ensure that your mix translates well to other systems and rooms.

**"It's helpful to visualize the production as existing in three dimensions: width, height and depth."**

## CONCEPTS

**LAST MONTH'S ARTICLE** on recording modern metal gave considerable space to tracking the drums, and the same will be true for the mixing stage. The reasons for this are largely the same. As noted last month, the range of human hearing can extend from 20Hz to 20kHz, and the frequency content of a drum kit spans almost this entire range. A bass drum will tend to have frequencies right down to 40Hz, a small splash cymbal will usually have content right up to 20kHz, and other drums and metalwork will fall within these two extremes. Therefore, one of the main challenges of mixing is to manipulate the drums so that they appropriately and effectively sit within this range.

## REINFORCEMENT, PRECISION AND CONTROL

**BEFORE DIVING INTO THE** creative side of mixing, it's important that you perform any tasks necessary to make your tracks ready. This will allow you to stay in your "creative zone" during the mixing stage. The tasks we will look at are re-amping, time alignment, phase correction, gating and waveform editing, and grouping.

### Re-amping

**RE-AMPING IS A** process in which a guitar or bass is recorded by direct injection (D.I.) to the recording con-

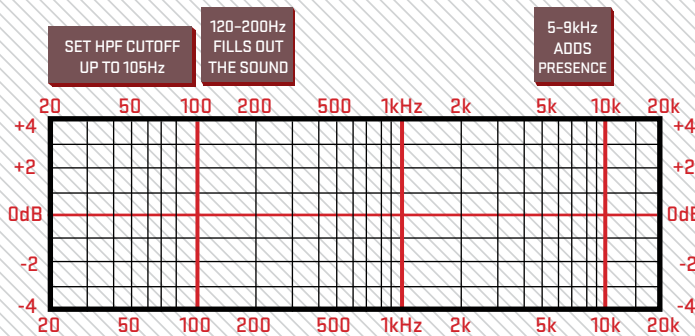
sole, a process that converts the high-impedance signal to low impedance. The instrument is typically recorded without any effects or tone coloration. Once the signal is recorded, it can be routed back out and into a guitar rig and treated to any tone coloration desired. The amp can then be miked and recorded. In essence, re-amping gives you the option of altering an instrument's sound to suit a mix. This is a good approach if you aren't sure how you want the guitar or bass to sound at the time that they are recorded, or if the rig, mic or studio you want isn't available at the time that you record the instrument. Re-amping is highly significant to the metal genre due to the very specific tone, note definition, weight and clarity required for the genre's bass and guitar tones. With this in mind, engineers should always track guitars and bass in this fashion.

### Time Alignment

**ONCE A TRACK** has been re-amped, it must be time aligned if it is going to be used in conjunction with the original recorded signal. Time alignment refers to the time delay between when the original signal leaves the soundcard and is recorded back. Remember, the signal has to travel through the guitar rig, be picked up by the recording microphone and returned to the DAW. The delay is minimal—it's usually represented in milliseconds or samples—but it is significant enough to introduce comb filtering, which results in the "thinning out" of frequencies. Comb filtering occurs when a signal is combined with its duplicate and the duplicate is slightly delayed. This results in reduced frequency response of the fundamental tone and its odd harmonics. Note that time align-

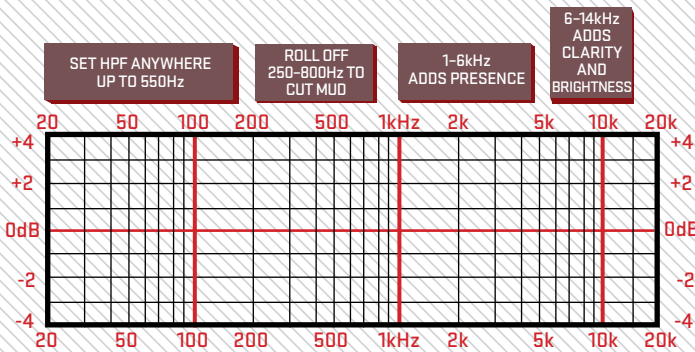
## SNARE DRUM: CRITICAL FREQUENCIES

Try a boost around 120-250Hz if the snare is too thin. Boost near 6kHz to add crack and attack to the snare. Use a shelving filter rather than a peak filter when appropriate. [See page 82 for more information.]



## METALWORK: CRITICAL FREQUENCIES

Use a high-pass filter to roll off frequencies from around 400Hz to 550Hz upward. Boosting frequencies around 6-14kHz can add clarity and brightness. [See page 84 for more information.]



ment isn't a significant issue if you don't plan to use the reamped track together with the original signal, since comb filtering won't occur and the slight delay in the re-amped signal won't be noticeable to the listener.

Time aligning involves lining up the delayed track with the original track to ensure both tracks begin at precisely the same time. Let's imagine we want to do this with a bass guitar track that we have just recorded after re-amping it through a bass rig. To do so, zoom in on the waveform of the bass amp signal and look for a significant transient. (A transient is the short duration initial attack phase of an audio signal. When displayed as a waveform, it can be seen as the initial peak.) Now find this same transient in the D.I. signal. You'll notice the transient of the amp's waveform occurs slightly after the D.I. signal. To align it, simply click on the bass amp waveform and drag it until the transients of the two waveforms are aligned. To make this job easier I will often place a cowbell at the start of the D.I. track before the performance begins and then use its transient as a guide with which to line up the tracks.

Time alignment can also be used with the various drum tracks you've recorded to correct time differences that result from the varying distance between the mics and their sources. For example, the overhead mics may be three feet from the snare, while the snare spot mic is just inches from the drum. By comparing the transients on these tracks you'll see that they are not aligned. To correct this, you would align the transients on the overhead mic tracks with those of the spot mic track. Bear in mind that producers have different opinions about the benefits of doing this, but you should try it to see the results and determine for yourself the value of time aligning the drum tracks. I have had great success achieving a thicker, weightier snare tone by time-aligning the overhead tracks by as little as a few milliseconds. However, be aware that you can't time align the whole drum kit due to the various distances between its composite parts. Instead, focus on a main piece of the kit, such as the snare or bass drum.

### Phase Correction

**ONE OF THE MOST** common problems of a multi-miked kit is phase cancellation, which can make drums sound thin and leave them unable to punch through bass tracks and dense layers of rhythm guitars. Phase correction can solve the problem, but many novice mixers won't even be aware that phase cancellation has occurred. Instead, they will attempt to fix the problem through extensive equalization, which is inappropriate to solving the problem. When I've encountered this problem on the projects of beginning engineers, usually all that was necessary was to reverse the polarity of a certain source, thereby making the drums sound vastly improved. Most DAWs have a utility plug-in that allows you to do this.

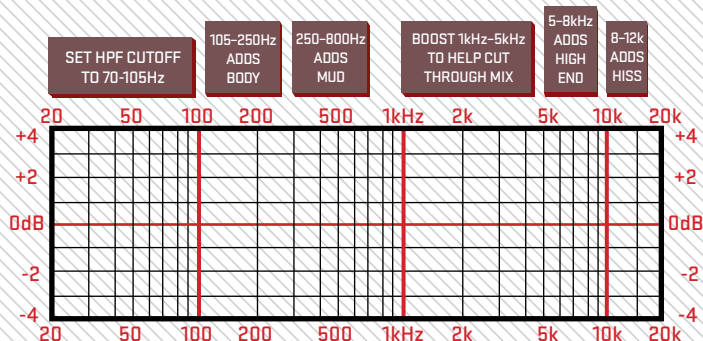
As recommended in last month's article, if you have double-miked your kick drum (or drums), ensure that these are phase reinforcing by fading one in with the other, first without polarity inverted and then again with. The setting that provides the greater level of low-frequency content and volume is the correct one to use, as it will produce phase summation. If you are using a kick drum sample (see below for a full discussion of samples) then repeat this exercise with the polarity of the sample, this time auditioned against both of the spot mics on the kick drum.

In the event that you did not flip the phase of the mic on the snare bottom while tracking, do so at the mix stage. Even if you did, check it with the audio track for the snare's top to ensure the signals are in phase.

Finally, check all the drum mics against the overheads, and after confirming that all the individual bass

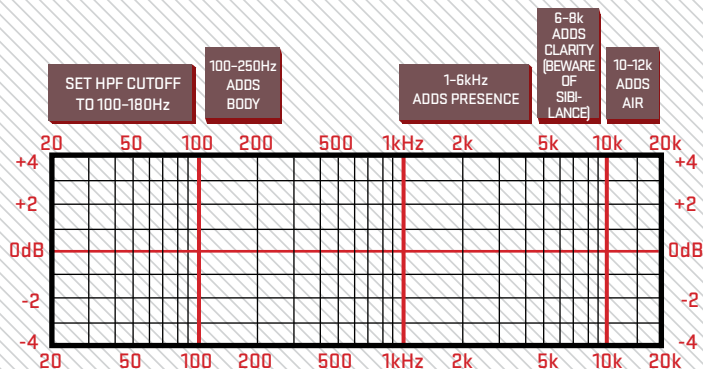
## RHYTHM GUITAR: CRITICAL FREQUENCIES

Use a high-pass filter below 70-105Hz, depending on the degree of drop tuning. Pay attention to the 1-3kHz region, where a lack of mids can be compensated for, but where there are often also resonant mids that will need attenuating. Boost from 5-6kHz upward for presence. [See page 84 for more information.]



## VOCALS: CRITICAL FREQUENCIES

Equalizing vocals can be a big challenge, as frequency content and tonality varies greatly with the voice and microphone used. A boost around 6-8kHz can add some clarity; a boost at 10-12kHz adds "air." [See page 84 for more information.]



sources are collectively phase summed, ensure that the bass and kick drum are correctly reinforcing one another.

### Gating and Waveform Edits

**GATING AND WAVEFORM** edits are performed to "clean up" the sounds on the individual tracks. Gating is used to block out unwanted sounds (i.e. bleed-over from nearby sound sources, fingers on guitar strings and stray ambient noises), while waveform edits such as fades are used to create smooth decay tails on instruments that have some amount of sustain, such as toms.

These tasks are important to modern metal production, particularly the drums. For some genres, bleed-over from the drums onto the various mic sources can be conducive to the overall sound, but this is not the case for modern metal drum tones. Here, due to the

very specific weight, clarity and definition required by the genre, you'll need to use extensive levels of EQ on the drums. Unfortunately, those EQ levels will affect everything on the track to which the EQ is applied. So if you have kick drum leakage on the snare track, you can expect the snare's EQ to affect the sound of the kick, and probably not in a pleasant way.

For this reason, and to reduce the possibility of issues with phase cancellation, it is usually essential that the drums within the kit are extensively and heavily gated and/or edited. (The metalwork will be dealt with using filters, a topic that is addressed below.) For the kick and snare, it is appropriate to use gates, but for the tom tracks it will usually be faster and more accurate to carry out waveform edits, whereby anything other than the tom hits and their decay on

each relevant track is removed. Using a very brief fade in and long fade out will create a natural sound and retain the tail of the tom's sustain.

Similarly, take this opportunity to "top and tail"—that is, remove unwanted noise before and after the performance—the tracks containing the hi-hats, overheads and ride cymbals. Do the same with the guitar and bass tracks, as these will likely have amp noise on them. In addition, spend time cleaning up incidental string noises, again using very brief fades. There may be some guitar performances where gating would be appropriate to the task, but consider this on a track-by-track basis. For that matter, your gate plug-in should allow you to dial in the rate at which the gate closes, which will give you another degree of control. Finally, if an instrument is silent for any significant amount of time, be sure it's faded out, or that its track is disabled, during the time that the instrument is not in use.

### Drum Samples

**ONE OF THE MORE** unique aspects of modern metal production is the extensive use of drum samples, typically for the kick and snare, though occasionally for the toms as well. Modern metal demands consistent dynamics and power, and samples are perfectly suited to the task, since they provide the engineer with a high degree of control. As suggested last month, if you took clean hits from the drum kit used for tracking, you can create a variety of samples from these by varying the balance of the numerous spot and overhead mics. This is the time to experiment with the samples, by determining how they interact with and reinforce the performance mics. Make sure that the sample not only provides the right weight and attack but also sounds natural in the spot mic and overhead positions.

Unless a performance requires a complete fix, most producers for the genre, myself included, prefer to use drum samples to reinforce, rather than as replacements for, the original performance, as this method retains more of the performance dynamics and provides a more natural tone. In the event that you need to completely replace the kick and snare spot mics, it's probably because the tone captured is unsuitable, in which case your drum samples will be of no help, since they were recorded using the same kit and set up. In that case, consider checking out commercially available drum samples.

When using drum samples for reinforcement, it's essential that they are precisely lined up with the original hits and are phase reinforcing. Also, take care that the dynamics of the snare samples don't exceed those of the snare on the performance mics, or they will tend to sound programmed (often referred to as "machine gunning"). This is especially important on snare/buzz rolls and ghost notes. You can use automation on the samples to approximate the dynamics of the original snare track.

### Side-Chain Gating

**ONCE YOU HAVE** lined up your kick and snare samples, you can copy them to a new track where they can be used to open your gates via sidechain for the acoustic performance kick and snare mics. Clearly, if you have implemented these samples correctly, these will only ever be on the kick and snare hit points, where the gate will need to open.

Automatic gates can sometimes be slow to open, thereby causing truncation of the essential transient attack of the drum hits. To ensure that the gates open on time, copy the drum samples to new tracks and move them 10 milliseconds earlier in the performance, then use the tracks to open the gates for each relevant piece of the kit. The 10ms gap should be sufficient to ensure



the gate opens in time for the transient to pass through. Note that these new tracks will be used only to open the gates and not to provide audio to your master output. The output of the channels with these tracks should be assigned “no output”; a send bus should be used to direct the track to the sidechain of the relevant gate.

## Groups

**YOUR SESSION SHOULD** now be edited, gated and phase summated. At this point, it's worth taking time to set up mix groups. For example, you can take all of the audio tracks related to the drum kit and route them to a single stereo channel on the mixer. This will make it easy to raise and lower the volume of the entire kit and apply compression, equalization, effects and so on across the kit. At the same time, you'll still be able to adjust the volume for each part of the kit and insert compressors and effects on each of the tracks within the group. It may also be useful to create subgroups within the group, such as one for the bass drum mics, another for the snare drum mics, and so on.

Bear in mind that applying EQ to the group will produce a very different result than if you applied it to individual channels within the group. I have my own preferences that I have developed over the years for each instrument, but this is something that I feel that every mixer should experiment with by exporting sections with different applications of processing and comparing them.

## CREATING THE MIX

### Panning

**WHEN MIXING METAL**, I always like to visualize the production as existing in three dimensions: width, height and depth. Width represents the panning and instrument placement across the stereo field; height is the frequency content, from the sub bass to the highs; and depth is the sense of space created in the mix using reverb, delays and so on.

When panning, start by auditioning just the overheads and set the stereo width to appear natural. Avoid the temptation to pan the overheads and toms as wide as possible, as this will usually give excessive movement and an unnatural stereo width to the drums. Instead, pan the toms to reflect where they appear on the kit. Some producers prefer to pan the kit from the audience's perspective, while others like to do it from the drummer's. It's your call.

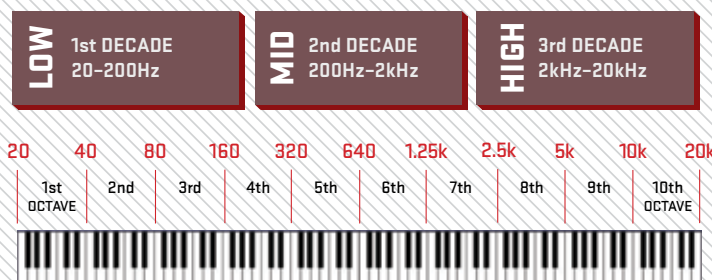
The rhythm guitars should dominate the far extremities of the stereo field. However, if you have stacked up four rhythm guitar tracks, experiment by panning one of the two pairs very slightly in toward center, and analyze how each interacts with the width of the drums.

## EQ

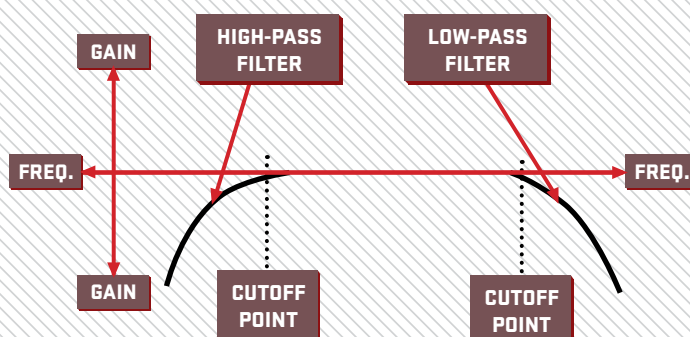
**ARGUABLY, THE GREATEST** single challenge that mixing presents is the perception, understanding and manipulation of frequencies, and this is usually where the novice mixer will make the greatest number of mistakes. Every single decision you make when mixing is the result of what your ears are telling you and how the audio is perceived. Given the highly specific qualities of modern metal production, it may take years of critical evaluation and experience to develop accurate perception and appropriate manipulation of frequencies.

This is another critical area where I can recommend a level of investment. Unfortunately, many of the stock EQ plug-ins that come with software DAW platforms lack the quality and accuracy necessary for corrective equalization. In particular, they often don't provide a tight enough Q, or resonance, setting. Q is the band-

## EQUALIZATION AND THE THREE FREQUENCY DECADES



## HIGH- AND LOW-PASS CURVES



The audible frequency spectrum can be divided into three “decades” (top diagram) representing the low-, mid- and high-frequency ranges. This provides a convenient and useful way to regard the frequency balance of your mix. High-pass and low-pass filters (bottom diagram) can be used to filter the bottom and top ends of the frequency spectrum to reduce low-end clutter and high-end sibilance, respectively. This graph illustrates how the filters reduce the volume (gain) of frequencies below the HPF's cutoff point and above the LPF's cutoff point. (See page 80 for more information.)

width of a filter, and its value is adjustable on many equalization plug-ins. Narrower bandwidth, represented by a higher Q value, yields greater precision over the frequencies that are affected. Note that both narrow and wide Qs have their uses—one is not better than the other, though narrower Q values let you hone in on frequencies and adjust them with minimal impact on neighboring frequencies. If you're interested in high-quality EQ plug-ins, check out offerings from Waves, IK Multimedia and others.

## Low-End Depth and Definition

**ACHIEVING A STRONG** balance between the frequency ranges is essential to any production, no matter what style of music. However, the intensity, density and downtuned nature of the tones and performances in modern metal make it difficult to get a heavy, yet tight, low end that

retains note definition and clarity. It also makes it hard to achieve a clean high end that has the necessary attack and energy and doesn't sound brittle and abrasive.

Novice mixers make the mistake of dialing in bass frequencies to make their mix sound heavy. This tends to create a muddy, flabby low end and poor overall intelligibility. Instead, they should remove or minimize the nonessential low-end frequencies so that few instruments are fighting for space in the low-frequency region. When instruments vie for frequency space, the result is frequency masking (also called simply “masking”). The more dominant instrument will obscure the quieter or weaker sound.

Masking can be avoided by cutting the frequencies that are causing the problem, rather than by boosting the frequencies on the track that is being unduly affected. For example, if a vocal sound is having trouble cutting through

layers of downtuned, tracked up rhythm guitars, you might think you should boost the key frequencies of the vocals. Instead, try cutting the frequencies on the guitar that are masking the vocals. This will usually result in a much more natural-sounding production, as the extreme EQ boosts that are required to make vocals cut through will make them sound artificial.

## High-Pass Filters

**HIGH-PASS FILTERS** (HPFs) are a great way to help clear up the low-end spectrum. An HPF cuts frequencies below a set cut-off value and passes frequencies above that value. I can't stress enough the importance of HPFs to achieving a clear, well defined low end. I will frequently use HPFs on every instrument. The more dense, intense and heavily layered the production, the higher I'll set the frequency below which to filter.

Generally speaking, I recommend removing frequencies below 50Hz right across the mix (with perhaps the exception of sub-bass samples). Set the cutoff frequency for each HPF to the lowest useable frequency of each instrument. With bass drums, the speed of the kick pattern will affect how high you set the cutoff. Faster performances would require higher cutoffs, since the low frequencies of each kick would otherwise build up and resonate excessively. An appropriate setting would be in the region of 50 to 80Hz, and possibly even higher with particularly fast kick drums.

A large floor tom would be treated in a manner similar to the kick. Smaller toms require higher cutoff frequencies, up to about 180 to 220Hz for a small eight- or 10-inch tom. For the snare top, I would typically set the HPF between 125 and 170Hz, depending on the source, but slightly higher for the snare bottom.

It's usually easy to set the cutoff on the HPF for the kit's metalwork. Start at 50Hz and, with your ears focused on the high-frequency content of the cymbals, sweep the cutoff upward until these high frequencies are significantly affected, and then back off the filter slightly. As a reference, this will usually be between 400 and 550Hz.

The bass guitar, like the bass drum, will usually require a HPF in the 50-to-70Hz range, though this will be affected likewise by the speed of the performance.

The nonessential rhythm guitar frequencies will be heavily impacted by the degree of downtuning involved. The lower the tuning, the more likely it would be that your HPF setting is set to a lower frequency, usually anywhere between 70 and 105Hz. In any event, the filter used should prevent the rhythm guitars from fighting the kick and bass guitar for sonic space, and provide the guitars with better clarity and note definition.

Depending on the style of vocalist and the register used, there is very rarely any

useable frequency content below 100Hz, but it is usual that a HPF would be set higher, anywhere up to 160 or 180Hz.

## Low-Pass Filters

**TO A LESSER EXTENT**, low pass filters (LPFs) can also be used to mark the highest useable frequency range of an instrument, or alternatively to minimize high-end hiss. Clearly, this can also help minimize masking of instruments with a lot of high-frequency content, such as hats/ride and overheads.

## Creative EQ vs. Corrective EQ

**ONCE YOU HAVE REMOVED**, or minimized as much as possible, the undesirable/nonessential frequencies from the low and high ends of the spectrum, areas within the remaining critical range can be emphasized (creative EQ) or attenuated (corrective EQ). Most novices tend toward creative EQ, emphasizing rather than attenuating frequencies. I caution against this. Boosting frequencies often seems to make them sound better because our brains tell us louder is better. But too much boosting can result in frequency masking, as explained previously, and create fatiguing mixes. It also makes instruments sound unnatural. Obviously there are times for this, but I suggest you focus mostly on corrective EQ.

When mixing metal, you will usually be presented with signals that exhibit resonances. These resonances are high levels of energy at a particular point in the frequency spectrum. Often they are not needed and will cause a mix to lack clarity and definition. They also tend to mask other frequencies and are generally not pleasing to the ear. A well-trained ear will be able to hear, pinpoint and pull out these frequencies without much problem.

However, until you develop your frequency recognition skills, the "sweep Q" technique can be used to locate resonances. Place an EQ plug-in on your channel, set it for a peak filter with a tight Q curve, and boost it about 8 to 10dB. The resulting curve should be flat across, except for a tall and narrow peak. Sweep the frequency selector to move the peak across the spectrum. When you reach the signal's resonant frequency, you'll know it, as it will be quite loud and ringing. (Be sure your monitors are not turned up high or you may damage them, as well as your ears.) Once you've located the frequency, dial down the gain on the EQ until the curve is flat. Continue dialing down the gain below 0dB until the resonance is less harsh or obvious. Don't dial it down too much or you may lose the essential character of the sound. For that matter, be sure to listen to the resulting sound in the context of the entire mix (see page 82).

Remember that, because our ears have a tendency to find the amplification of frequencies more appealing than

attenuation, it may take longer for you to hear and appreciate the benefits of these changes.

## Context and the Audio Element Perspective

**WHILE IT'S IMPORTANT** to make each instrument sound good, don't spend too much time equalizing each one in isolation. Ultimately, the way the instruments sound in the context of the mix should take priority.

## dB vs. Q and Frequency Dispersion

**AS YOU ATTEMPT TO** create low-end density and high-end energy and aggression in your mixes, you'll undoubtedly make significant boosts and cuts to the frequencies. Although 12dB of frequency gain could be seen as over the top for most genres, this is not the case when mixing modern metal. Unfortunately, sometimes this much of a boost can make an instrument sound unnatural, obtrusive and harsh. Instead, consider using less gain with a wider (lower) Q value. By doing so, you'll raise the gain of a wider band of frequencies but by a lesser amount than you would have had to raise the narrower band. This may produce a more natural-sounding effect.

When attenuating, it's appropriate to use a tight (higher) Q setting, as you will often be seeking to remove, or significantly reduce, what is usually a narrow bandwidth of resonant or undesired frequencies.

In general, avoid amplifying or cutting the same frequencies on too many different elements of the mix—the first will overemphasize that portion of the frequency spectrum, and the second will create a frequency hole. This is especially important when working on the kick drum and bass portion of your

mix, as you need these two elements to sit together in the low end. It's usually beneficial to solo each of these sounds to determine the best EQ choices, but as always make sure the results sound good within the entire mix.

## Using the Octaves

**WHEN TWO INSTRUMENTS** are in the same frequency range, it may not sound good to boost the same frequencies on each, as this can lead to masking or over-emphasis of the particular frequency. To achieve a psychoacoustic effect similar to boosting, consider amplifying frequencies an octave higher. For example, if you want to boost the bass at 85Hz but this turns out to be a critical frequency for the kick drum, consider amplifying the bass at 170Hz instead.

## CRITICAL FREQUENCY RANGES

### Kick Drums and Bass

**AVOID AMPLIFYING ANYTHING** lower than 70Hz on either instrument, as this can create a boomy, muddy mix, which would be emphasized by compression in the mastering stage. Be sure to vary the frequencies for each instrument if you make any creative EQ boosts, as described in the previous section.

You can give the kick drum clarity

by heavily cutting the low mids, around 300 to 450Hz, where there is a lot of unwanted energy that can sometimes distort speakers. This can also help provide room for the bass to breathe. The essential high-end attack and kick-drum beater click can usually be located and dialed in the range from 4 to 8kHz.

If your layered bass tracks include a track of distorted bass and the result sounds muddy and harsh, you can remove the lows and highs from the distorted bass track, as the other bass sources will provide the necessary low-end weight and high-end note definition. Overall, a less “woofy” bass sound with better clarity can be achieved by using corrective EQ in the range from 200 to 400Hz, and this can also help provide space for the rhythm guitars to sit in. The high-end note presence and definition of a bass can be dialed in from 2 to 4kHz.

## Snare

**THE WEIGHT AND BODY** of a snare is usually located around 175 to 450Hz, depending on the snare's size, tuning and construction materials. To accentuate the attack, boost the area around 3.5 to 8kHz; to emphasize the “spit” of the snare wires, boost the 10 to 12kHz area. As an alternative, try cutting the lower frequencies for a similar psychoacoustic effect.





## Toms

**USE THE SWEEP Q** technique to locate and emphasize the frequencies for the stick attack to help the toms cut through.

## Metalwork

**A GENTLE BOOST** above 10kHz can help provide brightness, but be careful that it doesn't make the hats, ride and overheads too abrasive in the process.

## Guitars

**TRY TO KEEP** any creative boosts in the range from 85 to 125Hz, as going below this can interfere with the kick and bass. To reduce honk from the mids,

cut frequencies in the 1-to-3kHz range and experiment with making broad midrange boosts to compensate for this cut or you may end up with a thin, overly scooped guitar tone. The essential high-end brightness can be dialed in around 5 to 8kHz.

## Vocals

**TO MAKE VOCALS** sit well within the mix, boost the presence around 4 to 5kHz. This may require that you insert a de-esser in the signal path prior to the EQ to eliminate sibilance. If the vocal still sounds flat and lifeless, add some "air" in the 10-to-12kHz range.

## COMPRESSION

**THE KICK AND SNARE** will often require heavy-handed compression settings to get them to sit in the mix at a

constant level. However when mixing metal, which will usually involve drum sample reinforcement or replacement, extreme compression is usually less essential due to the consistency that the samples will bring to the kick and snare dynamics. If you are not using drum samples or using them subtly to reinforce the spot mics, it's more likely that you will need to rely on compression for the dynamic consistency and power required of the genre's drum tones.

The basic compression principle for your drums will depend on whether you wish to emphasize the transient attack or the body of the drum in question. To emphasize the transient, use a slow attack setting, perhaps in the region of 20 milliseconds. This will allow the transient to come through before the compressor clamps down on the body of the drum source. Set the threshold so that the drum decay is above it. Alternatively, if you are trying to bring out the body and weight of the drum in question, a faster attack time and release time, perhaps around a few milliseconds, will be required, with the threshold set below the attack, but above its body. By clamping down on the transient attack of the drum, the body will be emphasized.


It's safe to say that modern metal rhythm guitar tones are by their very nature overdriven and require no additional compression. And where drums are concerned, I prefer the pinpoint accuracy of overheads that have not been compressed. However, bass and vocals will invariably need heavy compression, often with higher ratios (8:1 and above). In many instances, I will use parallel compression by applying this on the channel as well as the group, and using different settings on each. The vocals may also require some automation to help them stay at a constant level.

## EFFECTS

**IN LAST MONTH'S ARTICLE**, I wrote at length about how to minimize the degree to which the acoustic surroundings color the source. It's here at the mixing stage that this will pay dividends with the drum tracks, as you will be able to effectively control the correct level of ambience using digital reverb.

Although digital reverb can be viewed as the collective glue that brings the whole mix together, I believe less is more, particularly with regard to the number of different reverbs that are used for a mix. By using many different reverb sizes in a mix, you are effectively putting the various elements into different "rooms." While this may be fine for some genres, it usually sounds inappropriate on a modern metal production.

Avoid inserting reverb and delay effects onto the individual tracks. This wastes CPU processing by requiring that you insert many instances of the plug-in; it also degrades signal quality,



because the whole of your audio signal is sent through the plug-in. Instead, place reverb and delay plug-ins on a stereo aux channel, and use the send bus on an audio track's channel strip to patch the original signal into the effect plug-in. This way, the original signal will be present in the mix, and the effected signal can be blended in using the fader on the aux channel that contains the plug-in. This is also an efficient way to use plug-ins, because any instrument that uses the effect can be patched into the aux channel—much better than inserting the plug-in onto every channel that needs it.

If you want to add some low-end

boom to the kick drum, a small amount of tight reverb can be applied, but make sure the track has room for ambience. For metalwork, I prefer to keep things dry to maintain pinpoint accuracy, but other producers have different opinions on this. As for the snare and toms, opt for a short, tight plate reverb, usually less than a second in length, but obviously dependent on the tempo and drum performance of the track. The more complex the snare subdivisions and drum parts, the less the ambience you should apply to the track.

Make sure that you use some pre-delay to set the reverb tail slightly apart from the initial transient attack of the source, as would occur in the real world. A setting of 8 to 15 milliseconds will usually be sufficient, but use a higher setting for longer reverb times.

For the vocals, I like to use a different reverb with a longer reverb decay time. However, be careful: too

much reverb can reduce intelligibility. For metal productions, I recommend using a greater level of delay than reverb.

In some instances, particularly where the performances and tones are relatively dense and intense, I find it's sufficient to use just one short plate reverb for the snare, toms and vocals. This acts as a glue that makes these instruments sound as if they are in the same acoustic space.

Unless doing so as a special effect on a specific section, never use reverb on the bass, as this will muddy the tone and minimize clarity and note definition.

## BALANCING

**DON'T BE AFRAID** to set your kick drum levels slightly higher than the snare level. The kick drums will be the first things that will get lost when mastering compression is applied, as will the vocal, though to a lesser extent.

Most demos suffer from too little bass. If you're having trouble getting the bass to sit well in the mix, add some distortion to the signal or use more of the distorted bass track if you have one.

## MASTERING AND MASTER BUS PROCESSING

**ONCE YOUR MIX IS** complete, it will go on to the mastering engineer. A primary task of mastering extreme metal is to aggressively minimize the dynamic range to retain a consistent power and fullness, particularly in the low end of the mix. Another goal is to keep the final volume on the higher side of the spectrum, without introducing distortion.

To get a general idea of how mastering compression will affect balance level and frequency, insert a compressor over your stereo output bus while mixing. Keep the ratio fairly low (no more than 2:1) with a fairly high threshold, providing no more than 3 or 4dB of gain reduction, which will likely occur with kick drum hits. This compressor should be removed prior to mastering, since the mastering engineer will want a clean stereo mix with no master bus processing.

If you use a limiter, set it for a fast attack and fast release, then slow these settings until a natural, relatively transparent sound is achieved. In addition, use a global EQ on your master bus to filter out frequencies below 55Hz, as this will help the compressors and limiters perform more efficiently and assist the focus the mix. If there is a lot of crash ride work and your completed mix sounds slightly abrasive, consider filtering above 16kHz.

I wish you all the best in taking these theories, procedures and common approaches for the genre, and personally refining them, so that you develop your own unique mixing style. **GW**