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Delivering Great Mixes

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Introduction

If I had to describe mixing music to a layperson, I would say that mixing combines musical arranging with the idea of sculpture. To mix effectively, we must have a vision of how the song will sound when it's finished and then we chip away at the arrangement to make room for its shape to take form. When I get a song to mix, I first listen to the rough mix to understand what the song is about and what elements are "in the way" of the song. Maybe some musical parts that seem really interesting don't actually contribute to the song or actually mask the important elements of the song. As a mixer or producer a big part of the job is reducing or clearing away the clutter that hides the song. Often, simplifying the production makes the whole thing come together. Only after the clutter is removed can we enhance the core elements of the song with the proper placement, perspectives, and ambiences.

In this eBook we discuss the mindset of mixing and how to feature the meaningful elements of a mix. Like a chef, you have to know what great food tastes like before you can cook your own meal, so read the articles here and dedicate a few minutes every day to listening and studying successful productions. Analyze songs you want to compete with to see what makes them tick and learn to apply that knowledge to your mixes.

Take special note of the article "How to Prepare a Mix for a Mastering Engineer" so that you efficiently and effectively deliver your mix to a mastering engineer, client, or record label. Understanding your deliverables in a part of the pro mixer mindset that can separate you from the rest of the crowd.

The Six Elements of a Pro Mix

by Brad Pack

Every mix is made up of hundreds of small decisions that shape the sound of the track. But when you zoom out and look at the big picture, all mixes require attention to the same basic issues—balance, tone, dynamics, depth, and glue. In this blog, you'll learn what to look for in each of these areas to create cohesive, professional-sounding mixes.

My motto is to keep things as uncomplicated as possible to get the most musical results. I'll give two examples to keep in mind as you get into this article. First, volume automation can enhance an arrangement better than EQ in many cases. For instance, if your rhythm guitar is competing with the lead vocal in the verse, instead of cutting out the midrange of the guitar, consider lowering the guitar 2dB during the verse and bringing it back up when it doesn't compete with the vocal or when the track needs a little boost. Second, if the lead vocal has a few moments of sibilance or one or two p-pops, don't be lazy and apply a de-esser or filter to the whole track. That will degrade the whole track to fix a few minor problems. Instead, simply process the trouble spots with some clip-based processing, render those clips and move on to the mix.

1. Balances

A good mix starts with the foundation. Begin by dialing in basic volume balances so you can hear each element and get the basic feel of the song. Of course, the vocal should be the most prominent element in the mix, typically followed by the kick and snare,

which drive the beat. Figure out which other elements help create the groove and which play a supporting role. Some elements are crucial to the message and groove and some simply ear candy.

Each genre has its own unique sonic structure, so it's a good idea to compare your mix to other popular tracks in the same genre to get a feel for how loud different elements should be. Keep the references handy to make sure you're staying on track as you work through these steps. Your track may have slightly different production elements than any given reference, but your mix should still feel like the references as far as overall energy and the amount of groove vs melody.

Once you have basic balances, use the pan controls to spread different elements around the stereo spectrum. Keep rhythmic and harmonic elements balanced on each side of the mix and check your mix in mono to make sure important elements don't disappear. Make sure to keep foundational elements focused in the middle—kick, bass, snare, and lead vocal or lead melody instrument.

To push certain elements beyond the width of the speakers, try using a stereo imaging plug-in like the Ozone Imager or the Waves S1 Imager to enhance the stereo image. Haas style panning with short delays can also provide an enhanced sense of left-right space on certain instruments. The elements that tend to benefit from ultra-wide stereo imaging are effect returns, pads, and percussion elements that can be kept low in the mix yet still "speak well' since they are panned so wide. You can refresh your stereo widening ideas with this article from Tiki Horea.

Polyverse's Infected Mushroom Wider (free) stereo imager is great for making reverbs and effects wider than your speakers.

2. Correcting Problems and Enhancing Strengths with EQ

After dialing in the levels and panning, focus your attention on tones. Start by correcting any frequency issues that immediately stand out to you. Listen carefully to each frequency range to make sure all of the tracks are gelling together to create a cohesive mix that is free from build-ups or holes in any frequency range. You may want to solo tracks during this process, but try to keep each sound in the context of the whole mix to properly EQ it for the track. Bright acoustic guitars sound great by themselves, but may crowd the percussion in the mix!

Scan through each octave for problems. Start in the sub-bass range and work your way up using subtractive EQ to correct any issues with the recording. Pay special attention to the sub-bass range for rumble, check the low-end for boominess, the low-mids for muddiness, congestion in the mids, and harshness or sibilance in the highs. Check out my previous article about types of equalizers for specifics on using equalizers.

Newfangled Audio's Equivocate allows you to solo any frequency band to hunt for trouble spots.

After you've solved some basic tonal problems, use your favorite analog-modeled EQs to add color and character to your tracks, giving them a more "musical" and harmonically rich sound. Not every track will need EQ—and that's OK. The idea is to make certain tracks stand out from the rest—not everything can be bright in a mix!

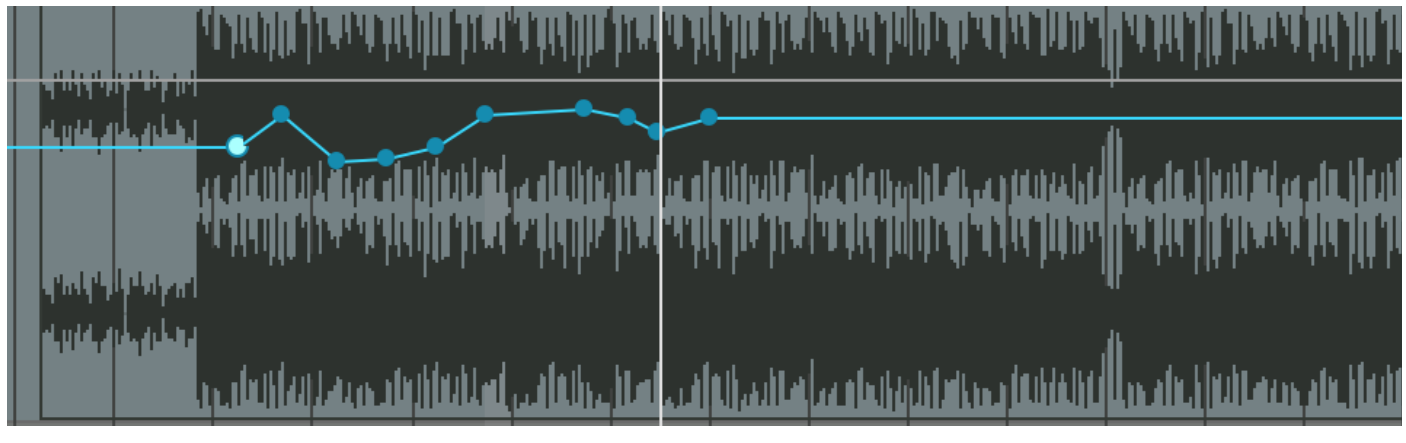
Lead instruments should be EQ'd to highlight their special characteristics—a chesty tenor sax or a cutting guitar solo or an airy soprano vocal. Drums, bass, and pads should be EQ'd to fill in the space around the lead instruments. If the foundation is solid and the lead instruments feel special, everything else falls quickly into place.

If you want to give a certain instrument a little extra energy but don't need to alter its frequency balance, pop in a saturation plug-in to add harmonics without drastically altering the tone. Try exciters, tape, or transformer emulations like the Ozone Exciter, (Waves) Scheps Omni Channel, or Kazrog True Iron.

3. Controlling Dynamics

After dialing in the tones, it's time to shift your attention to the dynamics. While your first instinct may be to slap compressors on many of your tracks, it will serve you well to do a quick pass of

automation to even out a track before trying to force it into shape with too much dynamic processing.



Listen closely to each element of the mix and identify any tracks that are either too dynamic or could use a little more punch. For overly dynamic performances (I'm looking at you vocalists and bassists), use a compressor with a fast attack, a moderate release, and a high ratio to quickly clamp down on transient peaks. To transparently smooth out the average volume of a vocal performance try a very low ratio, like 1.5:1 and a low threshold to get 2 to 3dB of constant compression.

Often, a vocal track suffers mainly from words disappearing, like a singer "throwing away" the last word of every phrase. In that case, it is best to do some volume or clip gain automation before any compression so that the performance feels solid before hitting the compressor. The Waves MV2 (my secret weapon) works well to increase the volume and clarity of the low-level parts of a vocal or instrument track without touching the peak levels.

For tracks that need a little more punch, like kicks and snares, use compression with a slower attack to enhance the impact of each transient. Don't kill the pulse or the punch of the song, but gently even out the dynamics to maintain a consistent presence of the important instruments. Try starting with just 1 or 2 dB of VCA compression on kick or snare to keep the hits sounding even and solid. More extreme compression can help shape the envelope of the

drums if you feel that is appropriate for a particular production.

Review Tiki Horea's post about drum processing and don't forget about using parallel compression to retain your drums' original dynamics while adding punch and clarity. Check out Waves' StudioRack plugin chainer to open your mind to a new world of parallel processing options.

Again, compare to your reference tracks to make sure your drums are as punchy and upfront and the vocal takes up a similar amount of space as in the references.

4. Building Ambiences and Dimension

The frequency spectrum balanced and the dynamics are in check, so your next goal is to add depth to the mix using spatial effects.

Reverb and delay will be your primary tools here, and they can be used to push instruments farther back in the mix or to add space around certain instruments. Start by identifying the instruments that you want to be at the front of the mix and either leave them without reverb or apply effects with short decay times. A quick review of Barry Rudolph's post on ambience and reverb may inspire you. Barry's post on delays provides even more creative inspiration.

Next, identify the instruments you want at the back of the mix and apply effects with significantly longer decay times. You don't necessarily have to use the same type of effect on every track, but too many different reverbs and delays in one mix can start to sound chaotic.

From here, you can continue adding instruments to the "close" and "far" effects busses or create additional layers to stagger elements in a busy mix. Reverb and delay can also add sustain to elements that can help glue things together. Use effects tastefully and feature

effects occasionally to highlight special moments.

Try to find a few spots for strategic echoes on the lead vocal or create a delay throw that extends a guitar solo into the next section. Little tricks like these can make a big impact if not overused.

Sometimes a drier effect can add motion to sounds. For these situations, try a phaser, flanger, chorus, tremolo, or doubler/harmonizer. These effects can give background vocals, keyboards, and pads a sense of depth without adding ambience or “wetness” to the tracks.

5. Fine-Tuning the Mix Bus

At this point, you should have addressed any issues with balance, tone, dynamics, depth for each element in the mix.

Take another listen through the track and focus on enhancing the sound of the mix as a whole. Does the mix feel focused, solid, and as dense and punchy as it should? Use EQ, dynamics processing, and stereo widening to glue each of the individual tracks together and enhance the musicality of the track as a whole. Eli Krantzberg previously covered mix bus compression and saturation in this article. Don’t forget about top-down mixing either!

6. Finishing Touches

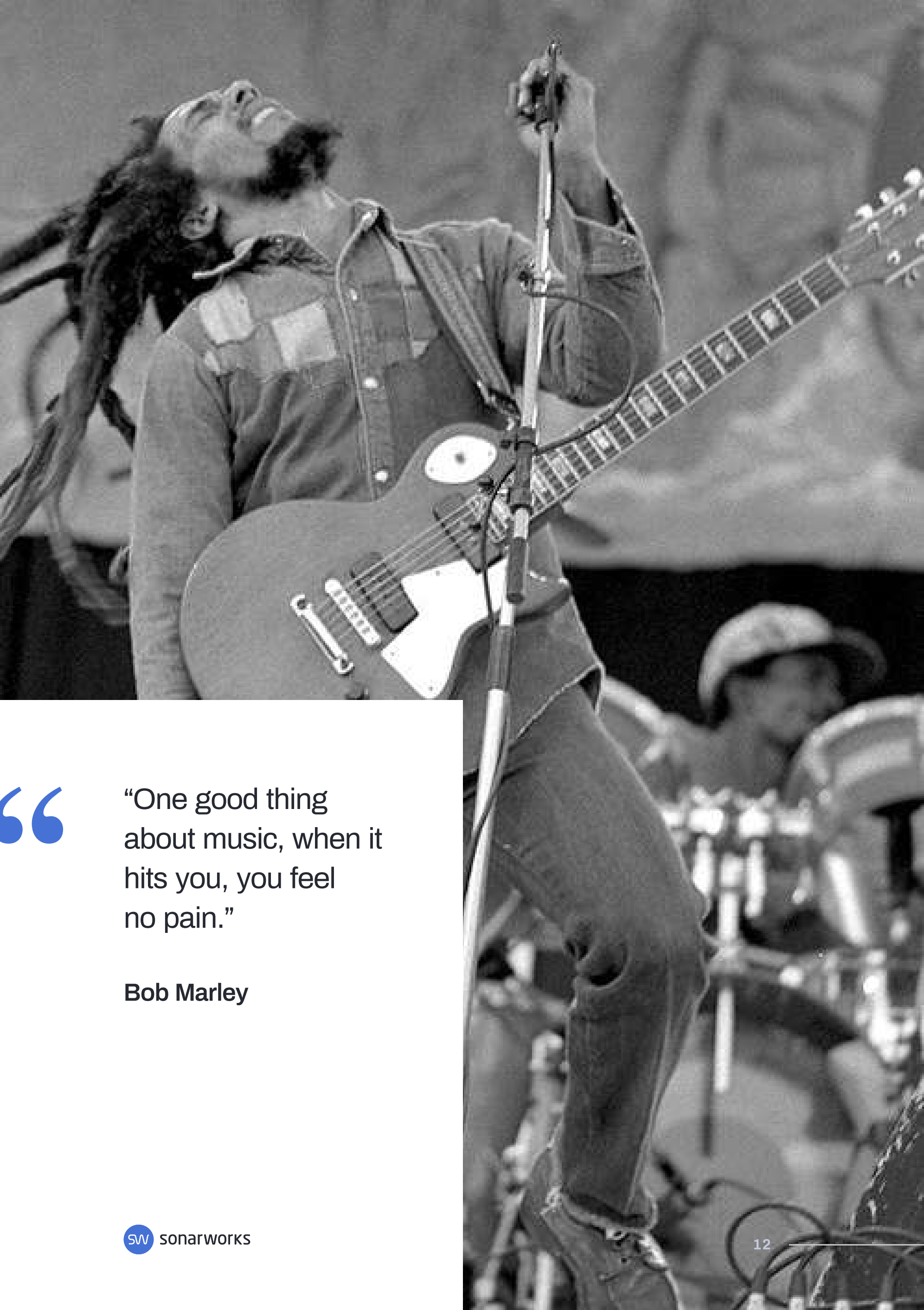
Last but not least, take one more listen through your track and write an automation pass. If you have a physical DAW controller you can manually ride the faders to make each moment feel more dynamic. This is a great way to breathe life into a static mix and easily add excitement without throwing off the balance.

The Softube Console 1 Fader provides 10 motorized faders for your DAW.

One powerful trick for quickly adding energy to a track is to automate the level of the mix bus up by 1dB during the choruses. Just make sure that you don't clip your mix. Use a master fader or gain plugin that is before your mix bus inserts to avoid clipping and drive your mix bus processors a little harder for some extra grit.

In addition to using automation to balance the levels of your mix or make the chorus pop, you can also sculpt the energy of the track from start to finish. While every song is different, most tracks slowly get louder throughout the course of the song. Try using automation to enhance this effect by making the loud parts a little louder (and vice versa).

By following the steps outlined here, you will be sure to pay attention to the most important stages of mixing. After you've completed these steps, do a quick review of all the steps to make sure you covered all your bases. Now that's a pro mix!



“One good thing about music, when it hits you, you feel no pain.”

Bob Marley

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When Is Your Mix Done?

by Adam Kagan

One of the most common questions I get from young engineers, producers, and mixers is “How do I know when my mix is finished?” Many beginning mixers will spend days on a mix, struggling to figure out when the mix sounds complete. There is a well-known maxim that your work will expand to fill whatever amount of time you have allotted to the task, so if you have no deadline, a job can become an indefinite process. I want to present a strategy for confidently completing a mix and not simply working until you are out of time.

Hopefully, you’ve already read Brad Pack’s article on the steps to creating a pro mix. After you’ve completed those steps and exhausted your mixing ideas it’s time to take a break and have a meal or a good night’s sleep. Then listen back to your mix and make sure your mix is actually complete. Since we often work by ourselves, it is especially important to step away from a mix for some time so that we can come back with fresh ears and give ourselves a sort of “second opinion.”

Most of the time we have a client, or at least an audience, in mind so we want to create what we feel is an artistic and appropriate mix, but also one that will please our client and audience. For me, understanding the audience helps me shape a mix and make decisions that lead me to a successfully completed song. If you are your own client and you don't know who the audience is, you need a solid goal. Choose a song you wish to compete with or one that you can model elements of your mix after.

So, finish your mix, take a break, and then consider the concepts outlined here to make sure you've given the mix your best effort, without simply working until the clock runs out. During this process, listen to your mix all the way through and take notes on a pad of paper as the song plays. Don't stop the song or you'll lose your focus. Imagine you are hearing this song for the first time and simply react to what you hear and feel. Repeat this process a few times until you haven't taken any new notes for a few playbacks.

Does your mix present the mood and meaning of your song? If it's a dance song, does it make you move? If it's a sad song, does it feel sad, and is the message clearly felt? Focus on the feeling of the song at this point.

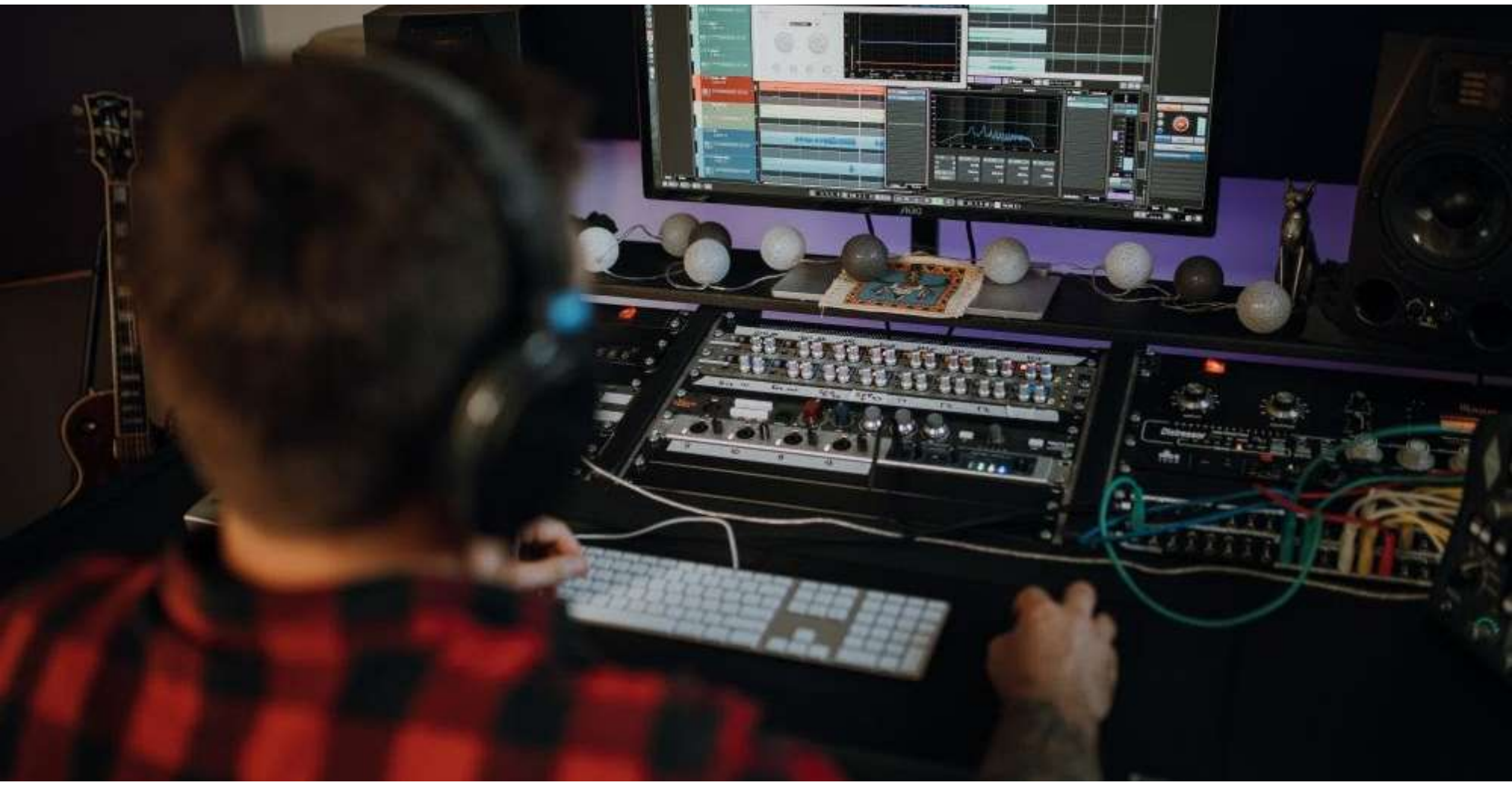
The big picture also includes the dynamic contour of the song. Does the verse build into the chorus? Does the song drop during the breakdowns and build back up in the right spots? Don't be afraid to add some automation to your master fader to help the macro-dynamics of the song. When your mix is nearly done, try lowering the master fader 1dB during the verses and put it back up in the choruses.

Ask yourself, what is the message of the song and would someone get the message on their first listen? This means that you should be able to hear all the lyrics clearly or, if it's an instrumental, that all the melodies are easy to hear. Compare the level of the vocal(s) from verse 1 to verse 2 and keep them consistent. Do the same for the chorus vocals. Each style has an appropriate vocal volume, so mix the vocal appropriately for your song.

Sonic Impact

The message of a song is of primary importance, so much so that we can all name a song that we love, but that has a mix or production that really is not that great. The message is what the audience responds to, so make sure that nothing is hindering that message. If the low-end is too loud, the vocals or melodies may become overpowered and the listener will lose interest in the song. If an element like the snare drum or vocal is too loud or harsh, the listener may become fatigued and lose focus. This can all happen from too much compression, frequency build-ups, or even too little energy in the mix.

Be sure to listen through at a very soft level to make sure the important elements can be heard clearly and that small elements, like percussion parts and sound effects, don't stand out too much. After listening softly, listen at a comfortably loud level to make sure that nothing stands out too much or hurts your ears. Make sure the groove is solid and the bass is full and tight, but also listen for the appropriate dynamics and power from the music. The snare shouldn't make your eyes blink and the vocal shouldn't hurt your ears with sibilance. After listening at a high level for a few minutes, take a break to reset your ears.



Musical Details

Pleasing clients, fans, and ourselves requires attention to details and even creating some details that make certain moments stand out as special. Listen for a spot or two where you can create a special moment. This can be a well-placed echo, a moment of breaking down the beat or bassline, or a special effect like a flanger on a background part. Often just one special moment can become the most memorable part of a song.

Listen to each section of the song and make sure you notice which elements are added or change every few bars. If you can't really tell, maybe you can create small changes, like lowering or raising a pad or percussion element or changing the amount of ambience or saturation on the lead vocal or instrument. I often increase the amount of slap delay or saturation on lines that I want to emphasize. Reducing the volume of a pad during a verse can help lower the overall energy without changing the punch of the groove.

Can you hear the crash cymbals, sweeps, or lifters that create transitions between sections? If not, look for places to gently boost these elements. Do the same for every drum fill, bass fill, or any other musical element that takes place between lead vocal phrases. Try something whenever there is space for an interesting element to be featured.

Get Feedback!

Checking off the previous points has become routine for me after working on hundreds of mixes for discerning clients, artists, and record companies. There will almost always be changes requested by your client, So don't take requests as an affront to your ego—this is about serving the song. I have confidence that I can change almost any element in a way that pleases my client and also serves the song in a musical way. Build an arsenal of possible vocal effects, drum mixing techniques, and mix bus techniques so that you can easily make changes and audition alternate sonic options.

Don't be afraid to send off a mix even if you are unsure of a certain element. Without feedback from the producer or artist, you might never find the solution to a musical puzzle. Sometimes a producer will suggest that a certain part is a little too loud and that suggestion perfectly finalizes the mix. The sooner you get feedback, the sooner you can finish the mix!

Below is a handy checklist that you should print out and refer to as you decide if your mix is finished. Not finishing is never an option, so be confident and get it done!

Mix Final Quick Checklist

Listen back to the mix and ask yourself the questions below. I like to write down notes during my listening passes so I don't get distracted trying to fix one issue and miss another issue. When I can listen down twice in a row without taking any new notes, I know I'm done.

- Does the song's mood fit the meaning of the song?
- Does the groove make your head bob or do you rock back and forth?
- Does the chorus/hook come in bigger than the verse?
- What new elements happen in each section?
- Does the lead vocal/instrument feel special?
- What happens when the singer is not singing? Between vocal phrases, you can feature another element.
- Do your effects feel appropriate for the style/genre?
- Can you understand the lyrics when listening at a very low volume?
- Does the snare or vocal sound harsh at a loud volume?
- Is the low-end clear and deep enough to support the mix?
- Is the high end harsh or too rolled off?
- Make sure the details like crash cymbals or other similar elements are heard but do not stick out too much.

Eliminate Competition Between the Kick and Bass

by Eli Krantzberg

The Golden Rule

Regarding creative endeavors, I don't like to make absolute pronouncements, but when it comes to kick and bass, there is one absolute rule that simply cannot be ignored, and it has to do with the arrangement. The kick and bass parts must not conflict with or fight each other. So what does that mean?

Sometimes the kick and bass play together rhythmically, while sometimes they never play at the same time. These scenarios are both fine, but what isn't okay is the low-frequency elements get in each other's way and distract from the rest of the song. No mix trick or plug-in can effectively fix this fundamental arranging mistake. The golden rule is, make sure the two complement each other in the arrangement.

Low-frequency instruments, like kick, bass, and 808s often fight each other for space in a mix. This fighting can be a result of overlapping frequencies, sloppy rhythms, or simply volume and balance problems. Additionally, many mixers who feel they can't produce loud enough mixes are simply not controlling their low-end well enough. Clarity and balance in the low-end are what allow for loud masters.

Acoustic drums fit naturally against bass guitar because their fundamentals and harmonics tend to complement each other. In a clean arrangement, the kick and bass naturally blend to create a full low end. If you are overprocessing with EQ to make things work,

you may be focusing on the wrong frequencies for each instrument. The kick drum tone doesn't change much during a song, while the bass fundamental may vary greatly throughout the songs.

In the table below, you can see that the kick and bass overlap, especially in the low-frequency range. You need to determine what role each plays in your production and then find a way to have them work together to avoid conflict and still fill out the low end of the mix.

Kick Drum Frequencies

30 – 80 Hz – fundamental tone
300 – 600 Hz – boxiness (cut here)
4 – 8 kHz – Click
Above 5 kHz – bleed from cymbals (cut here)

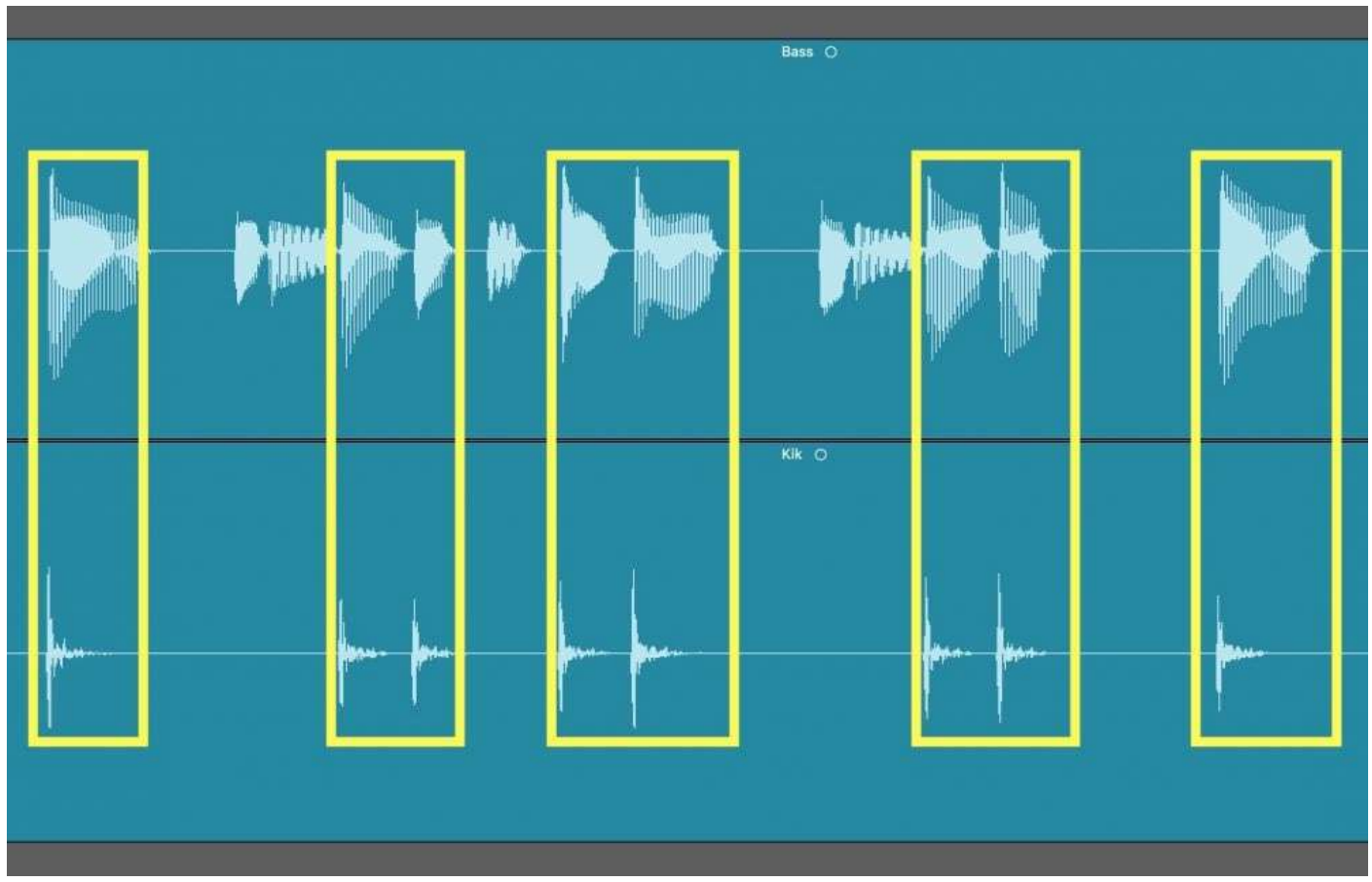
Bass Frequencies

30 – 100 Hz – thickness of synth sub-bass
50 – 150 Hz – thickness of bass guitar
150 – 400 Hz – muddy range of bass
800 – 2 kHz – clarity and presence for bass

All In Good Time

In most pop music genres, it is essential the kick and bass hits that play together are accurate and tight. They don't need to be perfectly aligned, but shouldn't be dramatically off. All DAWs provide utilities for making timing adjustments. When by quantizing or a Flex Time operation, subtle tweaking can correct or reduce minor timing imperfections.

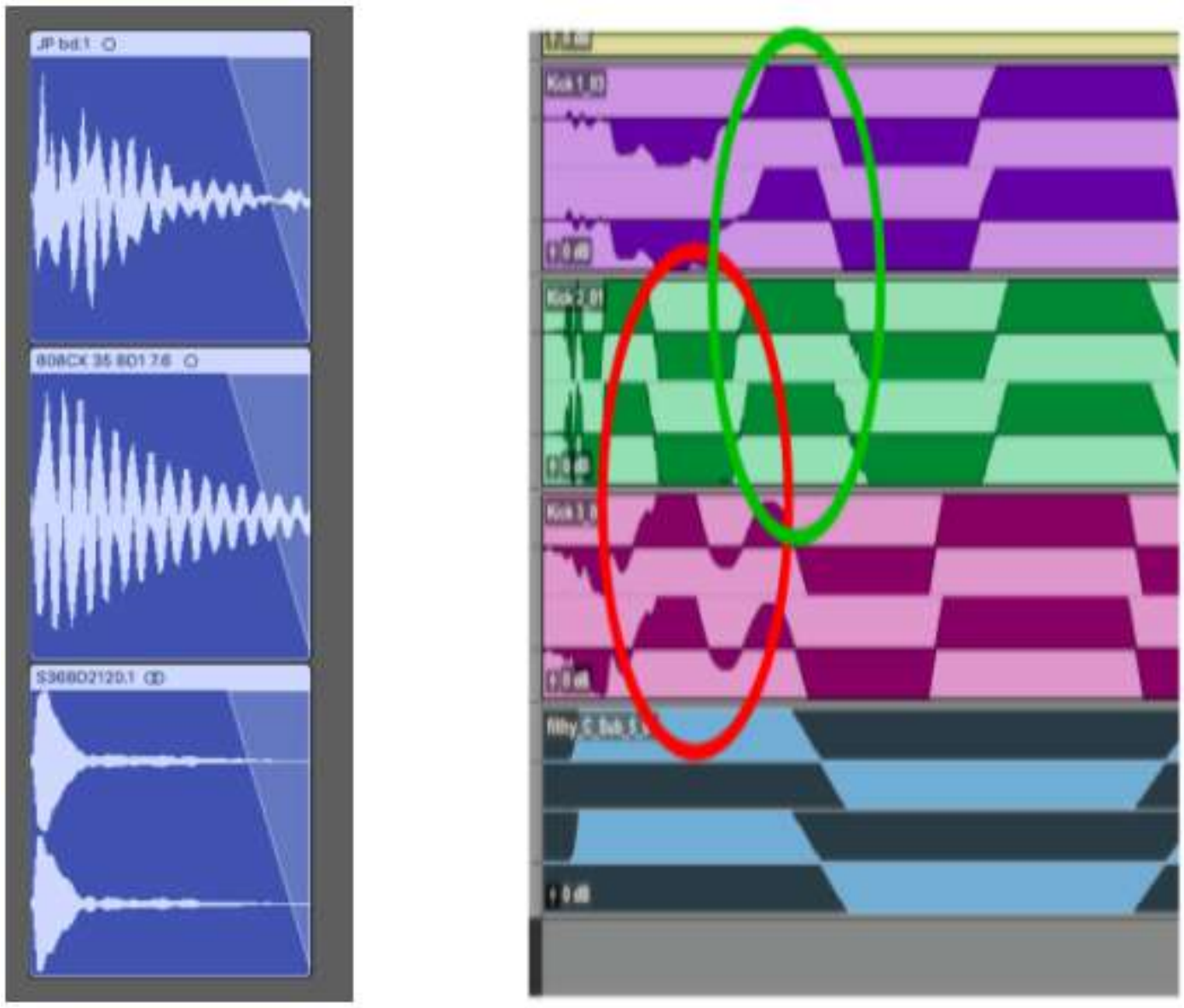
ELIMINATE COMPETITION BETWEEN THE KICK AND BASS



The kick doubles some of the bass notes. The timing between the two is tight, but not perfect.

In many styles of music, it is common practice to layer multiple kick drum samples together. One sound may be a deep sub, another punchy low midrange, and possibly a third to emphasize the attack. When layering multiple kicks together, make sure their attacks line up and that their polarities sum well together. This guarantees a tight, punchy kick drum sound rather than a sloppy flabby or weak sound.

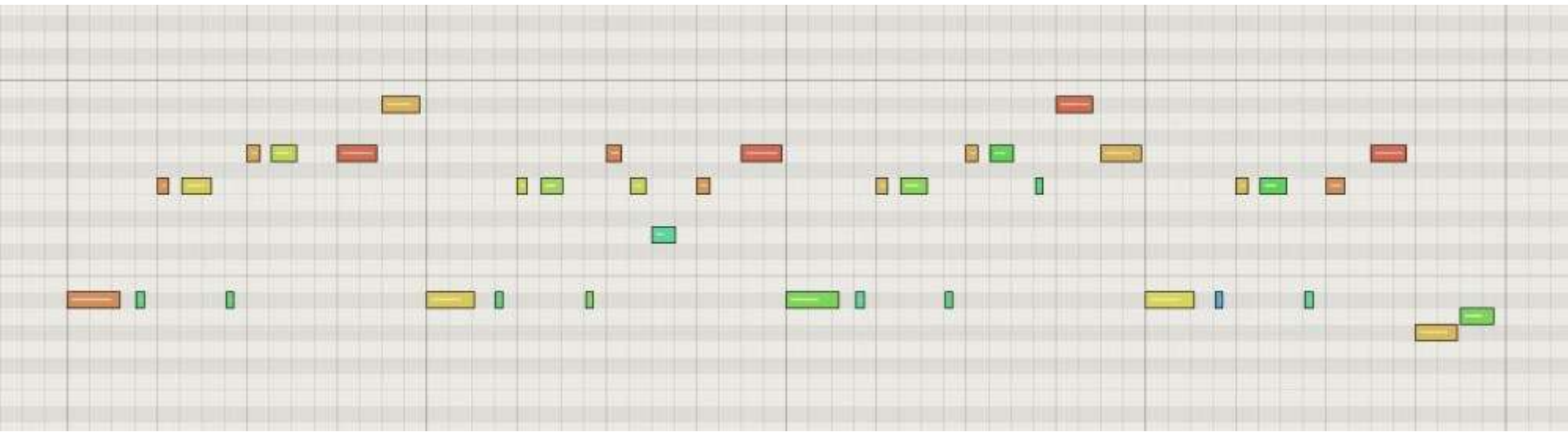
ELIMINATE COMPETITION BETWEEN THE KICK AND BASS



(Left) Multiple Kik drum samples truncated, so they begin and end together. (Right) the top two kick tracks line up nicely and the polarity of the top two tracks lines up nicely, as well (circled in green). The purple track is out-of-phase with the other tracks (circled in red).

The length of bass notes also plays an integral role in establishing the groove. Kick drums are generally short samples, but bass parts consist of notes of varying durations. Depending on the style, often shorter, more staccato notes help the kick/bass groove lock better. Note length is particularly important if the bass part is busy or if the tempo is fast. Busy bass parts with sustained notes can muddy up the low end. Notes can overlap and resonances can build up.

Shortening bass notes is accomplished by the use of fades, or even time compression if necessary. If you are working with MIDI, making simple note length adjustments is easy.



A MIDI bass part where all the notes end cleanly and notes do not overlap.

Mono

We think of stereo as being bigger, better, broader, and deeper. Stereo imaging works best, though, if there are other elements in the middle for contrast. Stereo width for bass works nicely as an effect on some synth bass parts, but kick and bass tracks firmly centered give a mix punch and focus. Consider running your kick drum and bass tracks in mono, which may provide the added benefit of making the rest of your mix feel wider.

Tone Control

Bass amp simulations are a great way to sculpt the bass tone. Amps create upper harmonics that reinforce the fundamental frequencies without adding extra energy in the low frequencies. Processing bass with an amp can help it cut through a mix, even on small speakers. When recording a live bass, it is common to record the bass direct and also through a guitar amp. A guitar amp provides upper harmonics and midrange presence that compliments the DI signal in a different way than a bass cabinet would. Choose your amp or simulation to produce a bass tone that complements your mix and fits alongside the kick drum without extra mud.

Bass amp simulations saturate the signal, creating harmonics that enhance the fundamentals without necessarily adding energy in the lower end.

Hammer and Screwdriver

EQ and compression are the principle tools in any mixing situation, and they can be of great help getting kick drums and bass to fit together. The kick and bass together are responsible for the predominant energy in the low end of the frequency spectrum. Depending on the key of your song, it's a good idea, if possible, to tune the kick drum so the fundamental tone is not in the same frequency range as the root bass notes. This way, you can carve out some space with EQ on each to make room for the other.

For example, the fundamental of an acoustic kick is in the 40 – 80 Hz range, while electric bass fundamentals extend up to almost 400 Hz.

You may choose to boost the kick drum EQ with a relatively tight band around 50 Hz, and cut gently in the 100 to 250 Hz range. Do the opposite on the bass channel for a clean bass tone and a solid kick thump. For a jazz song, the bass may occupy the 40 – 100 Hz range and the kick will sit a bit higher, around 100 – 150 Hz. Here the bass provides the bottom while the kick provides a rhythmic pulse, but no low end.

Rock kick drums often benefit from a boost in the 3-5 kHz range to add the click from the beater's attack. Basses generally don't have much tonal content this high up in the frequency spectrum but do benefit from a push around 900 to 1.5 kHz to help them cut through, especially in dense arrangements.

Programmed kick drums and synth basses can vary widely in their fundamental frequencies, so choosing the right sounds during the production stage is extremely important. There are some advanced mixing techniques that will help out when the kick and bass need to take up similar frequency ranges, such as in trap music where the 808 acts as a bass line with heavy sub-bass content, often in the 30 – 40 Hz range.

Mixing Techniques

Dynamic EQs and even multiband compressors can often solve the problem of cleaning up intermittent frequency clashes. Dynamic EQs can be set to boost or cut frequency bands based on the amount of energy in that band, while multiband compressors only provide compression, so choose your weapon to suit your need. Set these processors to automatically adjust the signal when a specific note or frequency range is too loud or too soft.

Bass parts often contain some loud notes and some soft notes. Set a dynamic EQ to boost any soft notes so that presence remains consistent. The same idea applies to 808 drums. You can also set a dynamic EQ so that when the fundamental of the bass overlaps the kick drum, the bass is slightly attenuated.

Masking

In addition to EQ and compression, many companies provide tools available that can automatically detect and correct frequency conflicts in a mix. For example, insert Izotope's Neutron on your bass track and choose the kick drum track from the masking sub-menu.

Neutron presents a flashing display in the areas where the frequencies between the source track (bass) and the masking track (kick) are conflicting. You can then see and control the frequency settings of both the main track and the masking track from the one plug-in to correct the conflict.

Even without Neutron, you could insert frequency analyzer plugins on the kick and bass tracks and open them side-by-side. A glance at the two while the track is playing will identify the peaks and valleys in each track.

BC FreqAnalyst 2 from Blue Cat Audio provides a readout of the frequencies on two tracks side by side. Bass is shown on the left and the kick drum on the right. Both tracks contain energy around 100Hz, which could be cleaned up, probably by reducing 80 – 120 Hz on the kick track.

Compression

Last but not least, let's not forget our trusty compressor. The trick to compressing basses and kick drums is to set a relatively slow attack (greater than 30msec) so the transients will pass through intact. Squashing the attack of either the bass or the kick results in weak sound. A release that is too fast can cause distortion. The attack of the sound gives the part its groove.

The compressor, set this way, acts upon the sustain portion of the notes. It fattens both kick drum and bass sustain by reducing their dynamic range and allowing you to raise their overall level. The faster the tempo, or the busier the part, the quicker you want to set the compressor's release, but too fast a release may cause unwanted distortion.

Sidechain

Sidechain compression is another powerful technique for marrying the kick and bass together. Rather than alter the frequency response, as Dynamic EQ does, sidechain compression can duck the level of one sound based on the volume of the other.

The classic sidechain example is to place a compressor on your bass track. Send the kick drum (via an aux) into the bass compressor's sidechain input. When the kick and bass play at the same time, the bass gets pushed down to make room for the kick drum. The bass is not compressed when the kick is not playing. In this context, faster attack and release times help the bass react and recover quickly in response to the kick drum. This effect can be subtle or exaggerated depending on how apparent you wish the "pumping" effect to be.

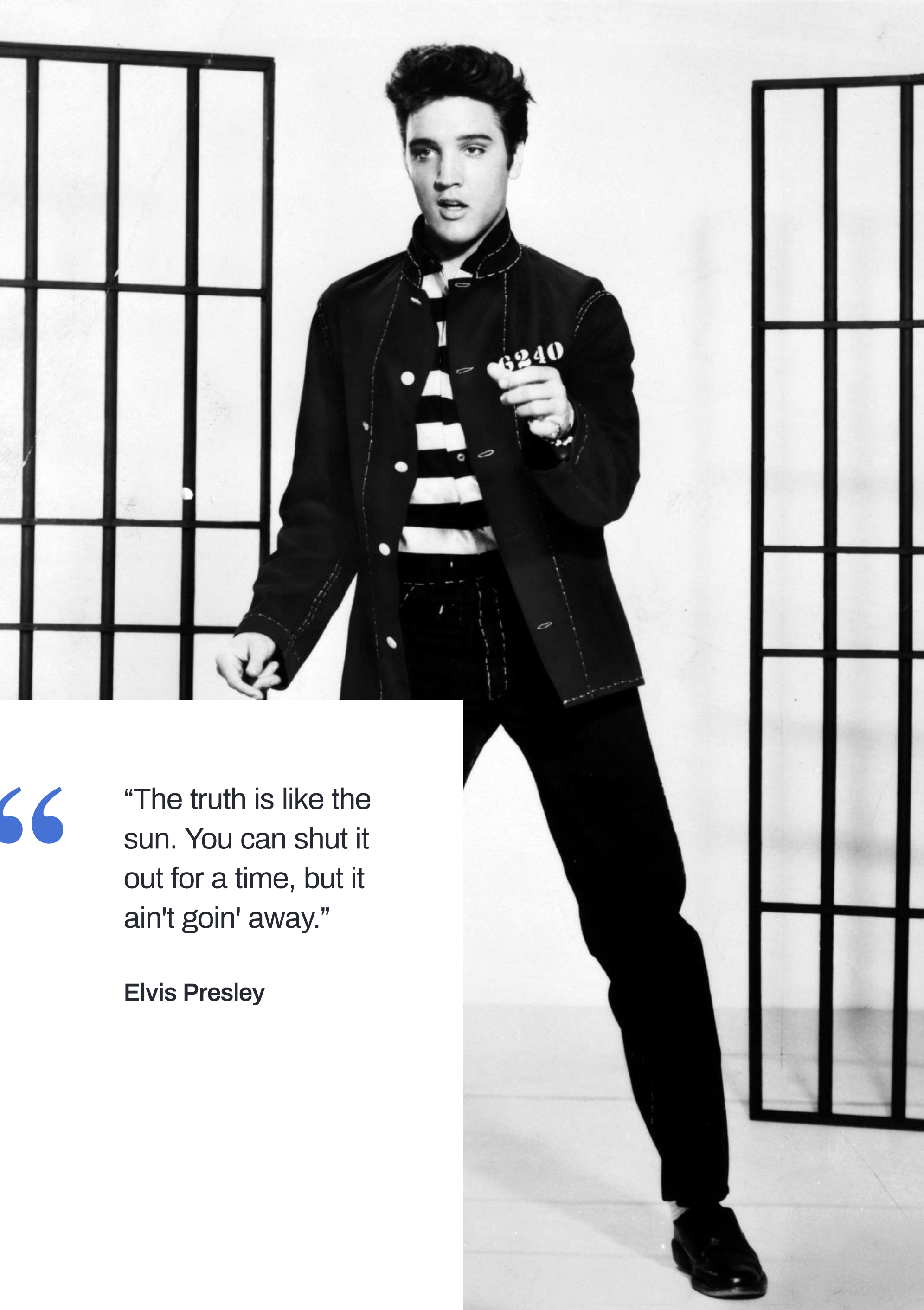
Here we see the McDSP CompressorBank plugin applied to the bass track. In the top right, the Kick Drum track has been selected as the sidechain input. Each time the kick drum hits, the bass will be compressed so that it "ducks" under the kick drum. Notice the quick attack and moderate release times used.

In the End

It's unlikely you'll need to employ all of these techniques all the time. But some of them will undoubtedly come in handy when faced with a groove that just isn't working. When mixing, there are two ways to handle the low-end. One is to build your balances so that the main lead and rhythm instruments are well-balanced and then fill in the bottom as much as you can. The second method is to build a solid bottom and then add on top of that as you mix.

Both methods can work, and you may find that certain styles or productions lend themselves to different approaches. Many mixers try to tread lightly on processing low-end instruments while others apply whatever is needed to hammer the bottom into shape. With experience, you will surely develop your own style.

Keep in mind that proper monitoring is key to building a solid bottom. Invest in a good pair of headphones, set up your monitors correctly, and treat your room effectively. Finally, apply some room or headphone correction with Sonarworks Reference 4 to ensure confidence that you can correctly hear and judge the low-end elements of your mix.



> “The truth is like the sun. You can shut it out for a time, but it ain't goin' away.”

Elvis Presley

Many Sonarworks users send us questions about mixing and mastering techniques and a common question is “Why doesn’t my mix sound as big/powerful/clean/punchy as the records that I listen to?” Let me first tell you that this may not be anything you’re doing wrong, but it is something you can improve upon! A mix is the sum of its parts and then some. Many of us, especially when starting out, work with up-and-coming artists and producers who are also developing their craft and the productions that we work on may not contain all the elements of an A+ level production, like those of our favorite artists. Let’s face it, if everyone could produce amazing-sounding songs, competition would be crazy!.

In this next article, Eli guides mixers through the process of creating a mix that improves the quality of the production to create the best mix possible. This process blurs the line between mixer/arranger/producer, but that is what we are hired to do! These tips apply just as much to the producer as the mixer. Also, as a mixer, keep in mind the intention of the original production and work to enhance the intention, not to change an apple into an orange.

Great Mixes from Imperfect Productions

by Eli Krantzberg

Remembrance Of Things Past

Modern mixing crosses many boundaries. The once separate creative steps of writing, arranging, producing, tracking, editing, mixing, are no longer executed in separate silos. Not only do most of us, as engineers and producers, perform all or most of these tasks, we often move back and forth freely between these separate stages of creation. Music production is fluid. Anytime may be the right time to change an arrangement element, a production idea, or a performance edit,—right up until we hit that “Bounce” button.

As a mixer for other people’s productions, our role is metaphorically like that of an orchestral conductor, whose job it is to ensure that all the individual sounds and performances blend as a cohesive and musical whole and represent the producer’s intention. An audio mixer, in principle, has no control over how performances were recorded. The parts have already been committed to disk before we start our mix. Mixing tools traditionally encompass adjusting volume, panning, equalization, and adding effects and ambiences.

Modern mixers must think like arrangers and producers as we craft our mixes. It is no longer just about levels, panning, and effects. There is much more we can do to manipulate the sounds and arrangements given to us to mix. It is at this stage where our creativity separates us from any other mixer who can create a decent balance of the production.

Let’s explore some ideas that cross boundaries between mixing and producing. These are tips for mixers in situations that require some creative outside-the-box thinking, These tips should also be kept in mind by producers and arrangers so that they can produce their best efforts.

Create Interest

During the initial stages of a mix, we often think in terms of fixing problems, but our job is more than just making stuff sound good. We need to make things sound and feel interesting, which is not always the same thing as sounding good. We want to give our mixes character and emotion. If everything is perfectly blended and smooth, a technically perfect mix may wind up sounding dull and boring.

One technique to grab the listener’s attention is to purposely make some things a little too loud. We’ve all heard modern productions where the kick, snare, bass, or some other element, is way up front. This may not technically be proper balancing, but it sounds interesting. It grabs the listener’s attention and focuses it on what otherwise might be a relatively unexciting part. Alternatively, featuring a rhythm part can distract from, or even elevate, a boring melody.

Conversely, try making some parts a bit quiet so the listener has to listen carefully to make out precisely what they are doing. Sometimes lowering the first vocal line of the second verse forces the listener to focus again after the exciting chorus got them dancing. I can get your attention by screaming at you or by whispering at you.

Attention Please

Not everything in a mix has to be heard equally well. We need to wrestle the listener's attention away from distractions, by challenging and then rewarding them with pleasing stimulus. Listen to "Blurred Lines" by Robin Thicke and notice how loud some percussion elements are. From a technical standpoint, this may sound like a messy mix, but the song gets its energy from the feeling of a chaotic party. The vocal floats in the mix and doesn't need to be heard that well for the song to be felt.

We usually think of mixes as building in intensity as the song progresses and arrangements generally support this by adding new elements as the song develops. For example, we might add additional parts in each subsequent chorus to add weight, gravitas, and emphasis. Things don't always have to get louder or fuller on the chorus, though, especially in modern EDM production. We can surprise a listener with unexpected dynamic changes.

We can shift the emotional impact of a chorus by stripping it way down. Try maybe just a lone piano or guitar and single voice. Bringing the energy way down when we expect it to build to a crescendo is the kind of dramatic device that will draw in the listener. We've all heard modern dance arrangements where there is a huge build-up leading to an expected climax, only to have everything drop out. This emotional shift can create unexpected intimacy to what otherwise might be a four on the floor dance hook. Listen to David Guetta's "Titanium" and see how the chorus is actually a breakdown that builds into the big instrumental post-chorus section.

One of the elements I try to bring to every mix is finding a way to make each section feel special and enhance the build-breakdown-build flow of the song. A simple mix enhancement idea might be to drop out the bassline for the first half of the second verse. This simple mute brings the energy of the verse way down

after a big chorus. Also, try to drop out the bass or drums for a beat or two just before a chorus hits. That will enhance the impact of the chorus.

> *Do something that the producer didn't think about or something that surprises them. If they don't like your idea, no sweat, but it may just give your mix the sparkle they hoped for! Pretty soon producers will look to you as a collaborator that they count on to take their production to the next level.*

Producer or Reducer

As mixers, the mute button is our most underused creative tool. Not every track in a production has to be used in the final mix. Sometimes if the mix is too dense with layered sounds and doubled and tripled parts, everything becomes an aural blur. Try muting some of the non-essential components until you get to the essence of the critical elements in the arrangement. Bigger isn't always better. Another idea to clear out clutter is to bring down a dense part, like a piano or organ after a few beats, so the listener notices the part and then it gets out of the way of the mix.

Study the musical arrangement of Justin Bieber's "Sorry." Listen to how the kick drum comes and goes during each section and other instruments take over the same pattern. This very simple arrangement keeps a listener's interest by using different combinations of just the same few elements in each section of the song. Also, notice how loud the percussion effects are in the verses. As a mixer, we are free to mute tracks to create an arrangement that changes over time, especially with today's copy/past song structures.

When it comes to doubled, tripled, and quadrupled tracks, it is essential to differentiate each part, so they each have a unique sound or character. Separating parts can be easily accomplished in the tracking stage by using different vocal approaches, adding background singers, using different mic positions, or changing guitars and amp settings.

In the mixing stage, there are other strategies to differentiate doubles. Why not try some early reflection reverbs on the various tracks to position them in different spaces. A bit of stereo delay can help as well. Use Haas effect delays for stereo imaging with 10 – 40ms of delay being plenty for this purpose. Varying the EQ, compression, and panning are also effective means of separating layered parts.

Beef Things Up

While stripping down dense layers is often useful, adding new layers to existing sounds can enhance clarity, punch, and separation. For example, one way to make drum sounds jump out of a mix is to augment the existing drum tracks with your own samples. Adding parts is easy when you are working with MIDI drum tracks, but drum replacement is still relatively simple even you only have audio tracks to work from. Drum replacement plugins like Slate Trigger or Massey's DRT can be used to trigger your own samples or they can create midi tracks from audio tracks that can then trigger any plugin sampler or drum machine.

The goal of triggering is to layer multiple drum samples that emphasize different elements of the sound. One sample might emphasize the drum's attack, another the body of the sound, maybe a third to enhance the tone or reverb. Chris Lord-Alge's signature snare sound always includes the original production's dry snare track(s) augmented with samples that provide the ambience and width that Chris desires. For toms, I often add samples of tom ring (without any attack) to existing tom tracks that lack sustain.

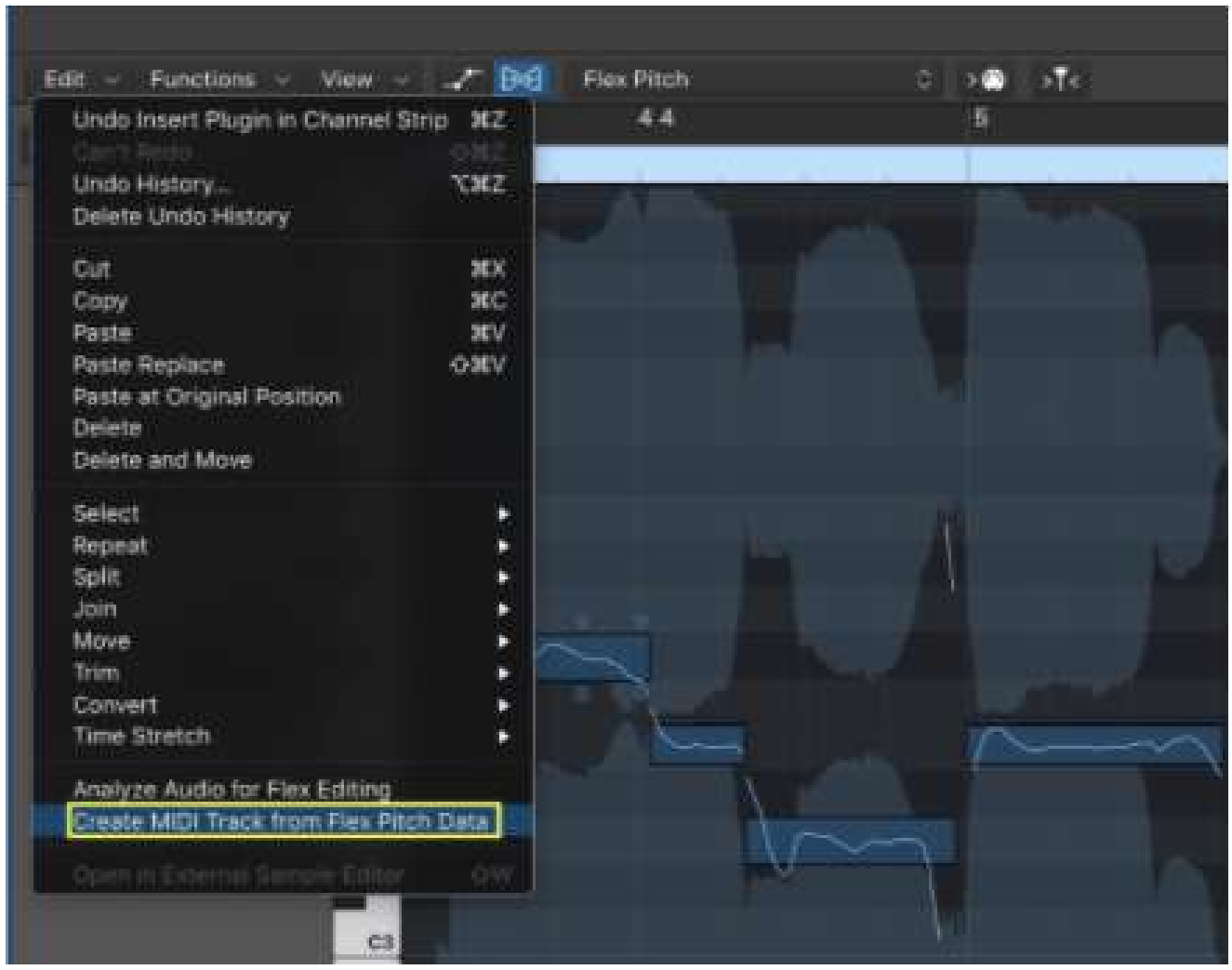
A quick tip for drum samples:
As you get closer to the end of your mix, it may be easier to choose the perfect drum samples to complement your mix. As you gain experience mixing, it becomes easier to choose good samples earlier in the mixing process. Sometimes adding a kick or snare sample is the final touch that brings a mix to life. Don't forget to change the sample/dry sound balances between sections for even more dynamic color.

Create Musical Layers

Layering sounds is not just for drums, it also works well with synth sounds. When programming sustained pads, layering one pad on top of another pad may simply blur the original sound. Instead, add one layer with a distinctive attack or edge, another with a unique sustain or width, maybe a third to emphasize the release or to add some motion.

This same layered pad effect can be achieved during a mix through effects or parallel mix processing, where distortion, harmonic exciters, phasers, or rhythmic gating can provide additional flavors on top of the original, unprocessed sound. Change the effects or parallel track levels between different sections of the song to provide dynamic and textural changes.

This also works for bass sounds. During production, use different bass layers with different characters. When mixing printed audio files, there are plenty of tools, like Melodyne, that can convert audio to MIDI. Most DAWs provide an audio-to-MIDI conversion, like Logic Audio's Flex Pitch function. Use the midi info to add sub-bass or a buzzy bass to add character and clarity to a dull bass track. Alternatively, just duplicate a bass track and add a high-pass filter and some distortion to the duplicate track so it cuts through on small speakers.



Flex Pitch in Logic Pro X is used to convert monophonic audio data into MIDI

Create Special Moments

It is common to have various instruments enter at different points in the arrangement. An often-overlooked means of grabbing the listener's interest when introducing new elements in a mix is simple volume automation. Try a little volume automation bump when adding new instruments into the mix. Once the listener is focused on it, they won't notice when you bring it back down. You can manually ride the instrument's fader automation or draw it in with a mouse. The idea is to draw attention to a sound as it enters and then get it out of the way of the main melody or vocal.

Alternatively, you can bury an instrument and only feature it when the arrangement has space for it, like between vocal lines. That way the part seems important when it's featured, but stays out of the way when there is no room for it. Listen between vocal lines for what instruments or groove elements can be featured in those spaces.

Special Processing

Experiment with extreme plug-in settings for special moments in the mix. These special moments may happen only once or twice in the entire mix but can be the most memorable aspects of the whole listening experience. Think ear candy. Like an extreme reverb on a single snare hit that emphasizes the transition into or out of a dramatic breakdown. As a mixer, this idea can really light up a moment and also impress your client. Special echoes at different moments create interest and variety—just don't overuse the same trick!

Try a distorted bandpass filter on your drum buss during a breakdown to give the drums a whole new feeling. Sometimes a vocal counter-melody that re-enters during the last chorus of a song can be filtered so that the part is distinct but doesn't compete with the main chorus and lead vocal. Experiment this way with any musical part that you don't know exactly what to do with—there is always the mute button, too!

Reverse (backward) effects are another great aural cue to grab the listener. A huge reverse swell leaves us anticipating a considerable climax. Play with expectations to create a moment. Why not drop the intensity way down right at the peak of the reverse swell. Vocals, guitar chords, piano chords, or crash cymbals are all excellent fodder for dramatic reverse swell FX. Take the region and reverse it in your DAW's sample editor. Line it up so the very end, formerly the sound's attack – now the climax of the swell, lands right at the downbeat of a transition point. Use fades to control the entry or start of the swell.

> *I often take the first syllable of the first word of a verse or chorus, copy it to a new track, and print it with several seconds of reverb. I then reverse that whole sound, so that we hear a backward reverb swell that ends just as the first syllable of the word starts. This way, the backward reverb introduces the tonality of the vocal that is about to happen.*

Make Parts Hyper Real

Delays are a great way of adding interest to a sound. Instead of simply slapping on a tempo-synced delay, try panning the delays. Some plugins will do this automatically for you, but it is easy enough to do in your DAW with pan automation, an LFO, or a tremolo/auto-pan plugin. Why not also filter, distort, or saturate the delays, so they get more effected on each repeat. Echo Bandit from Nembrini Audio has all the necessary tools built right in.

When mixing, it is essential to think beyond the two dimensions of left and right. Think front and back as well. Use volume automation, reverb, and even a low pass filter as a means of pushing things a bit further away. It is useful to think in terms of dark versus bright to make a sound feel more present versus farther away. More brilliant sounds feel like they are closer and more present, while darker tones feel more distant. These effects are, of course, easily achieved with EQ, but also think about the damping and diffusion settings in your reverbs. A dark sounding space feels more distant than a bright space with no damping.

Conclusion

It goes without saying; we need to get the foundation of a mix right. Develop a trusted and reliable workflow with a handful of your favorite plugins that you know you can rely on to get a fundamentally well-mixed and balanced track. A solid base is what will make these special moments shine, and not just sound like mixing mistakes. Often we are presented with arrangements and productions that are lacking the punch, space, impact, or interesting elements that make a great production stand out. The tricks and techniques mentioned here are tools to enhance a less-than-stellar production and elevate the final mix and make the whole more than just the sum of its parts.

How to Prepare Your Mix for a Mastering Engineer

by Brad Pack

> *“The one call you will never get from me as a mastering engineer is ‘hey can you send me a version with the limiter off?’ My suggestion if a mastering engineer calls you and asks you for a version with the limiter off and you know you have a solid mix, you should tell them ‘I’m sorry, I’m gonna find another mastering engineer”*

Handing your track off to a mastering engineer can be stressful, especially if you’ve never done it before. Each mastering engineer has their own preferences, and it can be difficult to know exactly how to process and export your mix for delivery. I often get comments from both my mixing and mastering clients like these:

- I heard I should take off all my stereo bus processing before sending my mix to be mastered.
- I heard I should leave 6dB of headroom on my mix when I send it to be mastered.
- I heard my LUFS should be -18 before I send it to be mastered.
- I heard you should never limit a mix before sending it off to be mastered.
- I heard you should never dither before sending a mix off to be mastered.

We put together this helpful guide to make the process as smooth as possible. Read on to learn how to make the most out of working with a mastering engineer.

Make Sure You Love the Mix

Ask any mastering engineer and they will tell you that the key to a great master is a great mix! Your goal should be to get your mix sounding as finished as you possibly can. Don't count on the mastering engineer to finish your mix, or even "make it right." The job of a mastering engineer is threefold: find and fix any technical flaws, create a master that is appropriate for your intended distribution format (file type, competitive level, EQ, etc.), and add any metadata and encoding necessary for distribution or manufacturing (DDP encoding, ISRC codes, etc.).

A talented mastering engineer will also add the final polish, depth, punch, clarity, sheen, warmth, crispness, or whatever you need, but they won't change an apple into an orange. During mastering, processing will be added to correct any frequency and dynamic issues that may have been missed during the mixing stage. The final level will also be adjusted to the appropriate level (not always louder) for your distribution medium. Mastering will also ensure that a good mix will translate well to all kinds of different playback devices, from phones to cars to clubs. These steps can take a grade A mix and make it into an A+ master, but it can't make a grade C mix into an A-level master. Get your mix right first!

Check for Technical Issues

Since the mastering engineer can't perform surgery on the individual elements of your mix, you need to go over every track in your mix with a fine-toothed comb. Put on your favorite headphones and listen

closely for clicks, pops, plosives, sibilance, bad edits, rough fades, and anything else that may stand out. It's important to identify any technical problems before the mastering engineer makes things clearer and more audible. Minor clicks and pops in your mix often become much more noticeable after mastering. A mastering engineer can probably clean up your clicks and pops, but why have them spend time cleaning up your mess?

Pay special attention to edit points on the lead vocal track, as this track is the focal point of the mix. Apply short fades (5 to 15msec) to the start and end of each clip to ensure smooth transitions without clicks or pops. Tracks with low-frequency content often click at edit points, so make sure to listen carefully to bass, drums, and keyboard tracks. Clicks may also occur from abrupt automation moves, including volume, panning, and plugin automation. These clicks are sometimes intermittent, but if you hear a click, figure out where it came from!

This is also your last chance for quality control so it's important to listen for mistakes, like cutting off the beginning or end of the song, leaving a plug-in disabled, or forgetting that a track is muted. One time, I accidentally sent a mix that was nothing but three and a half minutes of the snare drum—whoops! Now is a good time to review our article about finishing your mix.

Bus Processing

Here's a good rule of thumb: if you feel that a mix bus plug-in is adding a lot of value to your mix that the mastering engineer can't replicate, leave it on. Otherwise, get rid of it. If you have a question about whether or not you need a specific processor on your mix bus, print your mix twice. This rule applies to dynamic processing, but you, as the mixer or producer, should decide if your mix is better with or without any specific processing. I tell mixers to mix as if there will be no mastering engineer.

If you added a limiter (maximizer) to get your mix approved by a client, send two versions of the mix to your mastering engineer—one with processing and one without. Always send the mastering engineer the mix that the artist, label, or producer signed off on. If the mastering engineer hears what you were going for, they can probably find a way to do it better. Sometimes, however, the mix bus processing does something that can't be easily replicated at the mastering stage, so it's good to have that option.

Alternate Versions of the Mix

Mixing on analog consoles doesn't afford the opportunity to easily and quickly recall a mix if the mastering engineer suggests a change, like a louder vocal or lower kick drum. DAWs excel at this, but it is still frustrating for a mastering engineer to set aside time for your project only to put it on hold while you prepare an alternate version of the mix. If you question whether your lead vocal is loud enough or too loud, print an extra version or two and label them "Main," "Ld Voc Up," and "Ld Voc Down." Don't forget to print an instrumental mix and a performance track, often referred to as a TV track or MMO (music minus one).

I include running masters of alternate mixes in my mastering fee, but if a client calls me weeks or months later and asks me to run their alternate mixes I may charge a fee to reload their project and print new versions. Think about what you might need in the future.

Consider printing clean versions if your song contains rough language. The mastering engineer can create a clean version for you but may charge extra for the service. The same goes for radio or club edits. These days, I am often asked to deliver DJ Packs, which include alternate versions and instrumental intros on all mixes. DJ packs often include up to nine versions of each master. I'm happy to make all the versions, but there will be an additional fee, so be sure to discuss those options in advance.

Don’t Stress About the Level

Browsing the audio forums, it seems like everyone has a different opinion on what level your mix should be at. Some argue that you should leave 3 dB of headroom, while others insist it should be 6 dB or more to give mastering engineers enough room to work their magic.

The truth is, as long as your mix doesn’t clip or overload any plug-ins, it doesn’t really matter how loud the track is when you send it to a mastering engineer. If they need more headroom to apply signal processing, all they have to do is lower the clip gain. Did I mention that you should never overload a plugin or bus? Don’t do it, especially on your master fader. If you know something special about a plugin that you like to overload, then, by all means, go for it, but if you don’t intend to clip a plugin, don’t do it.

A dynamic pop or rock mix through an analog console will probably measure about -18 LUFS, so old-school analog mastering engineers are used to something around this level. In-the-box mixes can be much louder—often averaging as loud as -9 LUFS before mastering. Mix without a limiter on your mix bus and don’t overload your mix bus— that’s a safe level for your mix.

Peak levels shouldn’t hit digital zero, but peaks should be above -10 dBFS, if possible. There’s not much risk in delivering a mix that’s too quiet. Increasing the loudness is already part of the mastering engineer’s job. When in doubt, err on the side of caution and keep the levels safe.

If your mix sounds great and you got there by hitting your maximizer for volume and tone, print your mix that way and then print a “no limiter” version just for safety. After you get your master back be sure to ask the mastering engineer which mix they preferred.

Bounce High-Resolution Mix Files

Bounce or export your mixes at the same sample rate as the mix session. Upsampling will not enhance the resolution, so if you tracked everything at 48 kHz, bounce the mix at 48 kHz. If you need a master at a different sample rate, just ask the mastering engineer for a version at a specific sample rate. They will have excellent tools to create the versions you need.

When it comes to bit depth, you should always choose the highest option available. Regardless of your mix session's bit depth, most of your plug-ins operate at 32- or even 64-bit float. Bounce your final mix at 32-bit float or 24-bit fixed. If you're not sure which is best, ask your mastering engineer which they prefer.

Leave Space At the Beginning and End of Your Mix

Be sure to leave a little bit of space at the beginning and end of the track. This means, leave your master fader up and print the mix from a second or two before the music starts. At the end, print a few seconds of audio after the ending or fade. Mastering engineers can analyze these sections to help identify, isolate, and remove noise that may occur throughout the track. This is especially true if you recorded live instruments or used analog modeling plugins that generate noise. Always leave a few blank bars at the beginning of your mix session!

I often receive mixes to master where the downbeat is clipped off because the mix was bounced from exactly the first beat of the song. In those cases, I might have to find a clean kick drum to copy/paste it to the top of the song or even fade the song in. Give the mastering engineer detailed information about how you want the song to end or fade or if one song should crossfade into another song. Mastering software allows songs to overlap and still have proper start IDs, so leave that up to the mastering engineer.

Labeling and Metadata

Before sending the final mix off to your mastering engineer, make sure each file is named appropriately. Your file name should include the song title and some way to indicate the version, like “Song Title_Mix 1,” or “Song Title—MM/DD/YY.” Some mastering engineers prefer that you use a specific naming convention, so be sure to check with your engineer first. I prefer the song title to include the order of the songs, so “01_SongName_VocUp.” Also include a text document with the track names spelled correctly and the order of songs, including any crossfade or spacing suggestions. If you plan to create CDs or vinyl, be aware of allowed running times. The mastering engineer can suggest how to best sequence the songs to optimize the properties of vinyl cutting.

Find out ahead of time if you need ISRC codes, CD-TEXT, or ID3 metadata. At a minimum, you would provide at least the artist name, album name, song titles, track numbers, and album artwork. Check with your mastering engineer to see what info they need from you before sending the final file. Aggregators, like DistroKid or Tunecore, can help you decide what metadata you need before you submit for distribution. Check out this article for more info on making great-sounding music for streaming.

Plan for Extras

Know what you intend to do with your music once it’s mastered. Streaming services will accept almost any file type (.wav, .aif, mp3, FLAC), while CD and Vinyl pressing plants each have different requirements. iTunes and other HD streaming services prefer high-resolution masters for distribution. If you need a DDP master, CD-M, vinyl master, or any other special file type, be sure to discuss those with the mastering engineer ahead of time, in case there are additional fees.

Every mastering engineer will make time for a conversation before you submit your files to go over your expectations and their expectations. Once you have worked with a particular engineer, you will be more comfortable printing your future projects. It is important to build a relationship with a mastering engineer as they become a collaborator and you can learn what to expect and how they can add to your creation. Follow these steps and you'll be on the fast track to becoming one of your mastering engineer's favorite clients!

> "Musicians want to be the loud voice for so many quiet hearts."
>
> **Pablo Casals**

Key Takeaways

- [ ] Analyze and study commercial records to understand how a good mix is put together.
- [ ] Practice and keep in mind the six steps of mixing a song.
- [ ] At the end of a mix, sit back and take in the mix as a listener.
- [ ] Go through the final mix checklist to assure yourself that you have made informed mix decisions
- [ ] Keep in mind that the producer’s vision should be respected and relied on to guide the mix.
- [ ] The low-end provides the foundation of a mix, so learn to get that right.
- [ ] Learn to identify production issues and mix issues and treat them appropriately
- [ ] Anticipate what versions of your mix will help the mastering engineer create the most appropriate master and print them so you don’t waste time during mastering.
- [ ] Learn to effectively communicate with your collaborators!

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