HOW TO MASTER A SONG

The simple 7 step formula for mastering your songs like the pros.

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The simple 7 step formula for mastering your songs like the pros.

BY ROB WILLIAMS
Mastering has been made out to be some form of ‘black-voodoo’ that can only be practiced by an ancient master of the craft who’s been at it for the past 43 years. While that may help, I think it’s been blown way out of proportion.

Having worked as a professional mastering engineer for many years, using “home-recording grade” equipment to master tracks for radio, TV, and film, I can show you how it’s done without all the fancy gear.

I’m here to tell you that you can learn to master your own music, and while it may take years to become a genuine ‘master’, I want to show you the shortcuts to getting commercial quality results in a fraction of the time.

You don’t need the best gear or plugins, and you don’t need any special ability or talent. You just need a love for music and a passion for making great sounding music.

Remember, people (your fans) don’t care how you do it, all they care about is whether they like the song or not and whether it sounds good to their ears.

“YOU DON’T NEED THE BEST GEAR OR PLUGINS, AND YOU DON’T NEED ANY SPECIAL ABILITY OR TALENT.”
The way music is made and released is changing all the time. Mastering was once the process of transferring the audio recording onto a wax master (a little before my time). Now it can be as simple as a couple of plugins on your mix bus.

The important part to remember is that it’s the final link in the chain. Mastering is the last set of processes before a track is released to the world and that’s why it’s so important.

It’s not going to change the song, how well / badly it was recorded or played, or whether the lead singer could sing or not, but it will make the most of it. Simply put, a great master won’t make a poor track great, but a poor master can somewhat ruin an otherwise great track.

So, what do you say we start improving those masters of yours? I hope this short book will help get you started...
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What is mastering?

You can think of mastering as the final step in the audio production process. There’s a lot of complicated definitions out there, but the simplest definition of mastering is this;

“Mastering is the process of finalizing an audio track or album by both enhancing it and preparing it for final release”.

In even simpler terms... Mastering is really just getting your music ready to be released to the world. We’re doing a bunch of stuff to it to make it sound its best, and we’re getting it in the right format so that your fans can buy it, listen to it, and enjoy it. That’s it!

Of course, this doesn’t tell you too much about what mastering actually is... and if you’re asking the question ‘what is mastering?’, my guess is that you’re probably looking for more than a basic definition.

So, if you’d like a better idea of what mastering is, the role it plays in music production, and how it can be used to transform the sound of your tracks, check out my mastering beginner’s guide over here:

Why master?

If you want your music to compete with other commercial tracks, if you want your songs to sound their best, and if you want your music to be taken seriously and make an impact in the world, it's essential that it's mastered properly.

Do you absolutely have to master your music?? No. The music police aren't going to come looking for you, I promise...

If your music is only going to be listened to by you, and maybe a few friends and family, and you're not too concerned about getting 'commercial quality', you can skip the mastering and close this tab.

However, I've yet to meet any musician who says 'the sound isn’t that important to me' – that's like a photographer saying that they don't care how their photos look, as long as people can see them!

I'm sure I don't need to convince you, though... The fact that you're here means you're obviously searching for the answers to make your music sound great. If you'd like some more specific reasons you should master your tracks, check out this page:


"IF YOU WANT YOUR MUSIC TO BE TAKEN SERIOUSLY AND MAKE AN IMPACT IN THE WORLD, IT’S ESSENTIAL THAT IT’S MASTERED."
The 5 Purposes of Mastering

Mastering isn’t random, mysterious, or accidental (as much as some professional mastering engineers may want you to believe that). There are very specific objectives that we need to accomplish in every mastering session in order to be able to say, ‘this track has been mastered’.

Now let me ask you this – if you don’t know what these specific objectives are, how can you ever achieve them?!

Don’t worry, I’m not picking on you ;) You’re one of the very few people actually taking the time to figure this out properly. For a long time my idea of mastering a song was to ‘make it sound cool’, or to ‘make it sound loud’ ... and that’s about where it ended. While both these things may be worthwhile goals, they’re only one part of mastering.

The bottom line is, most people have no idea what they’re supposed to be doing while mastering their music and so they never get anywhere. The good news is, this will no longer be you! I’m going to show you what the five specific purposes of mastering are so that you’ll know exactly what you need to accomplish while mastering your tracks.
#1: The Final Check

The mastering phase is the last chance we have to check the track for any problems and make sure that it’s ready to be released to the world.
The first key objective of mastering is to make sure the music doesn't have any problems and it sounds the way we want it to.

The ‘final check’ simply means the last chance to check the track for any mistakes or problems. Because mastering is the last phase in the audio production process, this is where we have to make the final call about the song or album.

After the track is mastered it's sent out to the world and can't be changed (well, it could be changed, but you can never get back all the copies that have been duplicated or downloaded).

If you’re doing your own mastering, it’s a good idea to get some objective ears in there – someone who hasn’t heard the track a million times. It’s amazing how quickly we lose perspective after listening to something over and over again. Often it’s the most obvious things that we totally miss.

Unfortunately, we can’t ‘un-listen’ to something, so the only two options are:

1. Take a break and come back to it after a few hours / days / weeks (depending on how sick of listening to it you are!)

2. Ask some musician friends to take a listen and give you their first impressions.

A little word of advice on asking for feedback... don't ask someone, 'What do you think is wrong with this?'. It sets you up for failure because they will look for something wrong, and often come up with the most random things that are completely irrelevant. If you ask someone to spot all the problems, they'll look for things just because they don't want to come across as stupid or unaware.

All you need are some honest first impressions, so just give the song to a few people and tell them to let you know what they think. Also, always keep in mind that no one is truly objective, so just take all comments with a pinch of salt.
#2: Consistency

The second key objective of mastering is to make sure that the sound is consistent with other commercial songs.
The second thing we must make sure that all our masters have is something I call ‘consistency’. All this really means is that the sound of our music is relatively consistent from one playback system to the next.

Have you ever listened to one of your songs and thought it sounded cool on one system, but then sounded terrible on another? Yet commercial songs sound great played back on pretty much any system. This is what ‘consistency’ is all about.

You never know where your songs are going to be played, or which devices your fans are going to be listening to them on, so we must make sure that our tracks sound great on the majority of playback systems. The easiest way to do this is to compare to other commercial tracks and check that the overall frequency balance and levels are within the same range.

I’m not going to sugar coat it – this is often the most challenging part of mastering. But with the right training and a bit of practice, you’ll be on top of this in no time!

Let me give you a few examples and I think it will already start making more sense...

**Consistent frequency balance** – If you picked a couple of commercial songs from different musical genres and played them one after another, you’d notice that they all have a similar tonal balance. Sure, a dance song will have more bass than a folk tune, but it’s not so drastic that you have to change all your settings to compensate for it. This is no accident. In the mastering phase, we need to make sure that the overall frequency balance is within the same range as other similar commercial tracks so that it will sound consistent when played back on various systems.

**Consistent mix** – Say for example the bass line in a song is very important, it’s the main hook. An important question we need to ask is, ‘if someone plays this song back on their laptop, are they going to be able to hear that bass line?’.
If the song has a lot of sub bass but not enough low-mid range bass, it may sound big and fat on systems with a subwoofer, but smaller systems can’t reproduce the sub bass and the bass line may as well not even be in there. In a case like this, we may need to use an EQ or bass enhancer to add some low-mids in order to get the bass to cut through on smaller systems.

**Consistent levels** – Consistency can also apply to level consistency. If a song has too much dynamic range (very soft and very loud parts) the listener may have to keep adjusting their volume which can become annoying. Dynamic range is very genre dependent so the main thing is just to compare your levels with other tracks of a similar style.

The bottom line is, if our songs are consistent with commercial standards, they’ll sound consistent on the majority of playback systems.
#3: Enhancement

The third purpose of mastering is to improve the sound of the overall song.
An enhancement is anything that makes the overall song sound better in some way. There are no specific rules when it comes to enhancing a track – if it sounds better, it is better!

This could be anything from using a stereo widener to make the track sound bigger, adding some subtle reverb, making some EQ tweaks, using a bass enhancer, or adding compression to make the song sound more aggressive.

Loudness could also be an enhancement. Most artists / record companies want their music to be as loud as possible because they think that this will give the track an edge. Despite the whole ‘loudness war’ debate, I’m not the one to judge whether this is good or bad – it’s your music and you get to decide. If you think louder is better, then it’s better.

There really are no rules, and you often don’t know whether something will work or not until you try it. So my advice is to simply try a couple of different plugins, and then switch between bypassing and enabling various combinations to hear whether it makes a significant improvement or not.

Always keep in mind that when it comes to mastering we’re focussed on the overall sound, so you should only add things that benefit the entire song, not just one or two instruments. For example, a bass enhancer plugin may make the low end sound fat, but if it makes the vocals sound muddy or boomy it’s not worth putting on. If you really want to fatten up the bass it’s best to then go back to the mix session and add it only to the bass track.

“AN ENHANCEMENT IS ANYTHING THAT MAKES THE OVERALL SONG SOUND BETTER IN SOME WAY.”
#4: Album flow

The fourth purpose of mastering is about laying out the album and making sure it flows nicely from track to track.
Although iTunes and music streaming services have taken over the world, and singles are the new hot thing, I don’t think the album is ever going to go away. The real fans always buy the album. Think about it, no matter how great a song is, you can only listen to it so many times before you get sick of it!

That said, if you're making an album, there's a lot more to it than just throwing the song's on a disc and clicking the ‘burn’ button. (Do people still burn CD's?)

Think about a live concert you've been to, the basic format probably went something like this: A couple of louder songs up front, some slower ballads in the middle, and then ending off with a few big numbers. If there's an encore, they'll often play a couple more songs and then round off the set with a mellow track to calm everyone down and end off the evening.

You could think of the flow of an album in a similar way. An album isn't just a random collection of songs, it's a performance. We need to make sure that the end of one song flows nicely into the beginning of the next song, and the beginning of each song sounds good having just listened to the song before it.

You may have noticed that on some albums the tracks flow seamlessly from one to the next (especially live albums), while most studio albums typically have a two second space between tracks.

The cool part is, it's your album and you get to decide :)

"AN ALBUM ISN’T JUST A RANDOM COLLECTION OF SONGS, IT’S A PERFORMANCE."
#5: Final formatting

The fifth purpose of mastering is to finalize the song or album and apply the correct final formatting so that it’s ready for release.
Final formatting pertains to the practical and technical stuff we have to do to get the song / album into the final media format that someone's going to listen to.

Naming the tracks, putting fade-ins and fade-outs, and saving to the desired format are common things that have to get done during the mastering phase.

We want to make sure that each track starts and finishes seamlessly. By putting a very short fade-in at the start, and fading out the end, it will make the transitions sound a lot smoother. You don't want hear the fade, you're basically just fading in and out the track hiss. (If you listen on headphones at a high volume you’ll notice that there's some natural noise just before the song starts and right at the end when the music fades out, that's what I’m talking about)

A little tip to keep in mind, most CD players tend to cut off the first few milliseconds of a track. So you want to account for that by putting in a little bit of space right at the beginning. Whether or not your songs will get played on a CD, it's best to be on the safe side. I generally add in between 100ms – 500ms of blank space before the actual music starts. (If you import some commercial tracks into your software you should notice the same)

In terms of bit depth and sample rate, the industry standard is still ‘CD quality’ which is 44.1kHz, 16bit. If you’re selling your songs as digital downloads, export your master at these settings and then make MP3's (or whatever format you want) from that. If you are making digital downloads, make sure to embed tags with the artist and song info, album art, etc.
The 7 Step Mastering Formula

Whether they recognize it or not, all the professionals have a set way of doing something, a ‘success formula’ if you will. It’s this system that they use which gets them consistent results over and over again.

Now, of course, every track is different, and the specific effects and settings applied will change from song to song. But the basic steps stay the same.

To avoid any confusion, I just want to make it clear that these steps are not all compulsory. For example, you don’t have to compress (step #4) every master and you may not need to fix (step #2) anything, that depends on the mix.

This method is simply meant to help guide you through the various mastering options so that you know you’ve covered all your bases and got the best master possible.

Try it out and hear what works for you and your music, and then decide for yourself what you want to stick with and what you want to throw out.
Step #1: Prepare it

The first step in the 7 step mastering formula is to ‘prepare it’. Before we get going, we need to get the final mix ready for mastering.
**Export your multi-track mix to a stereo file**

Mastering starts when the mix finishes. It's important that we export our mix session correctly otherwise it can make mastering a lot more difficult than it has to be.

Make sure that you leave at least 3dB – 6dB of headroom when you export your final mix. If you look at the master meter, you want the peaks (loudest parts) to be around 3dB to 6dB below the digital clipping point.

If you export your mix too hot (too loud) there won’t be any ‘room’ for the mastering processes to be applied, so if you need to bring everything down in level a little bit, do that before you export it.
Try and get your mix peaking in the ‘sweet spot’ – about 3db – 6db below 0.

Although mastering is done in many different ways these days, to keep it simple it’s best to export (a.k.a. ‘bounce’) your multi-track mix session to a stereo uncompressed format such as ‘.wav’ or ‘.aiff’.

We want to make sure that it’s kept at the highest resolution possible so that we don’t lose quality as we start to add the various mastering processes. I like to master at 96kHz, 24bit, as it seems to ‘hold up’ better to the various mastering plugins and processing.

We won’t go into all the technical details here, but basically, every plugin you use requires the computer to recalculate what the audio should sound like. This isn’t a perfect process, and small inaccuracies in these constant re-calculations are what lead to things like noise, distortion, and other unwanted artifacts.

When you use a higher resolution there’s more information contained in the audio file and the computer can be more accurate when processing it. It’s not that it’s making the sound any better, it’s just better at preserving what was there in the first place.

The important part to remember is just to use the highest resolution audio you can.
In case you’re wondering why we wouldn’t always just use the highest resolution settings available...

The biggest limitation is your computers processing power – essentially the CPU. When you work at 96kHz it’s having to do DOUBLE the work than at 48kHz. If you’ve got a big mix session with 80 tracks, and plugins on each track, that’s a lot of calculations the computer’s trying to keep up with!

With big sessions, it’s often not practical (or possible) to record or mix at such a high resolution. However, you can still convert your mix to 96kHz 24bit for mastering – it may not be quite as good, but it does help.

The reason we want to use a high resolution while mastering is because we’re processing the entire track and we want to preserve as much of the quality as possible.

Always use 24 bit (or 32 bit if available). Never master at 16 bit. The only time you should use 16 bit is when you export your final master.

Sample rate doesn’t make as big of a difference as bit depth does, but it can help. Use 96kHz if possible (or higher if you like). If it’s not possible for some reason, 44.1kHz or 48kHz will do just fine.

Import 2 – 3 commercial reference tracks

Modeling the masters (no pun intended) is one of the most effective ways to rapidly improve your sound... and by ‘masters’ I mean those who are the best at this in the world.

We always want to be comparing to the best.

“MODELING THE MASTERS (NO PUN INTENDED) IS ONE OF THE MOST EFFECTIVE WAYS TO RAPIDLY IMPROVE YOUR SOUND.”
Find two or three commercial tracks that are similar both in composition (the instrumentation and the way it's played) and in intensity (how mellow or aggressive the track is). You want to import these into your actual mastering session so that you can compare to them directly throughout the process.

The challenge is, our ears get used to hearing something in a certain way and very quickly adapt to it. I'm sure you've had the experience of mastering a track and starting to think it's sounding pretty cool – until you compare it to a big commercial song!

Well, instead of wasting hours tweaking things and hoping for the best, we want to be comparing to commercial references throughout the mastering process so that it keeps us focussed on the ultimate goal.

Sometimes it can be a little discouraging when you’re constantly comparing to the very best in the world, but stick with it. If you can even get close to the best, it'll be way better than most of the mediocre stuff out there.

Here's a quick summary:

- Export your mix session with at least 3dB – 6dB of headroom (i.e. Peaking at 3dB – 6dB below digital clipping).
- Import 2 – 3 commercial reference tracks that are similar in style and composition to the song you're mastering.
- Bit depth – Use 24bit (or 32 bit if available). Never use 16 bit for recording, mixing, or mastering. Only use 16 bit for your final mastered export.
- Sample rate – Use 96kHz (or higher if you like). If your computer struggles to keep up, use 44.1kHz or 48kHz. Sample rate doesn't make as big of a difference as bit depth does, so don't worry about it too much.
Step #2: Fix it

Step two is to ‘fix it’. Before we try to improve the sound in some way, we must first fix any problems so that we’re building on a solid foundation.
Confucius says, ‘You can’t polish a turd’ ...Ok, so maybe it wasn’t Confucius, but it was a wise man indeed.

If you’re not familiar with this saying, all it means is that no matter how much you try to fix and ‘polish’ a bad sounding mix / recording / song etc, it’s still bad! It’s still ‘a turd’.

Although there’s a lot of truth to this, there is a lot we can do to fix various problems in the mastering phase. The first step is learning to spot these issues in the first place, so let me give you a couple of common examples:

- **Excess noise** – Especially at the beginning and end of a song, and in any quiet gaps.
- **Distortion or digital clipping** – Unfortunately, there’s not much you can do about this in the mastering phase. Try and find the problem in the mix session if possible.
- **Low-end rumble** – Sometimes using an EQ with a high pass filter (low-cut) can help.
- **Harsh esses or cymbals** – Try a de-esser, or an EQ cut around 3kHz – 8kHz.
- **A mixture of dull and bright elements** – This one’s tricky, because using an EQ to fix one problem will make the other problem worse. If possible, go back to the mix.
- **Over compressed** – You can’t undo compression so rather use less compression than you think you need during mixing.

It’s beyond the scope of this short post to go into the ‘cures’ for all these problems, but just start to look out for them so that you can catch them earlier on in the production process.

In general, the sooner in the chain you fix a problem, the less compromise you have to make later on.

For example, let’s say that you have a problem with the cymbals sounding too harsh.
You could use an EQ in the mastering phase to reduce the high frequencies, but you’re going to be compromising all the other instruments in the mix – including the vocals which may then sound too dull.

It’s far better to go back to your mix session and put the EQ directly onto the cymbal track so that it’s only affecting the cymbals and nothing else.

“THE SOONER IN THE CHAIN YOU FIX A PROBLEM, THE LESS COMPROMISE YOU HAVE TO MAKE LATER ON.”
Step #3: Enhance it

The third step in the mastering process is to ‘enhance it’. An enhancement is anything that makes the overall track sound better.
One of the 5 purposes of mastering is to improve, or enhance, the overall sound in some way.

Because sound is so subjective and dependent on the style of music, there's no way for me to say, ‘These are the things you must do every time!’ But to get you started, I’m going to give you some examples of common processes that are used during mastering. You can go and try them out for yourself and see (hear) if they work for you.

Some plugins and suggestions you can try are:

- **EQ** – Can make a track sound clearer, brighter, warmer, fuller, etc. For example, often a slight top end shelf boost can make a track sound more ‘open’ and ‘airy’.
- **Valve emulator** – Adds a bit of thickness in the low end.
- **Tape emulator** – Adds subtle saturation and distortion which can make your master sound more ‘analog’.
- **Compressor** – Can help ‘glue’ the track together and make it sound more consistent.
- **Bass Enhancer** – Good for making the bass more prominent on a variety of systems, especially if it’s lacking on smaller speakers.
- **Reverb** – A very small amount of reverb can help create a subtle sense of ‘space’ around a track.
- **Stereo widener** – If a track sounds too narrow or you want to make it sound a little larger than life.
- **Exciter** – Makes your track sound brighter and edgier by adding harmonics.

**Less is more**

Now, a little word of advice, when it comes to mastering... LESS IS MORE! In mastering, we’re processing the entire track, so we don’t want to go too crazy with any one process or effect.
It's important to keep in mind that there really is no ‘silver bullet’ when it comes to mastering, or producing music in general. There's no one plugin that's going to transform your track from the proverbial frog into a prince.

If you find yourself making big adjustments trying to make up for something that's lacking, that's usually the sign that you need to go back and rework the mix.

It's all the small, incremental improvements, that add up in the end to make a BIG impact and improvement to the sound. So, focus on making small improvements and very subtle enhancements with each plugin you use.

Keep it simple

Along the same lines, don't fall into the trap of trying to use all 56 plugins you own all at once. (I know, it can be very tempting)

It's easy to think that if each plugin is improving the sound a little, then adding more plugins must be the answer to life. But of course, just because you're adding something doesn't mean that it’s getting better!

Keep it simple. Try as many things as you like, but don't feel like you need to keep all of them. I like to put on a bunch of different plugins and then bypass them one at a time to hear whether they’re actually making a real improvement or not.

If you’re not sure where to start, try asking yourself questions about the sound.

e.g. 'What is this track lacking?' – Maybe it sounds a little thin – so you try some valve emulation or a bass enhancer. Or, perhaps it sounds a little dull – try an exciter plugin; or a high-shelf boost on your EQ.

The golden rule of enhancement is simple: ‘If it sounds better, it is better'.

“IN MASTERING, WE’RE PROCESSING THE ENTIRE TRACK, SO WE DON’T WANT TO GO TOO CRAZY WITH ANY ONE PROCESS OR EFFECT”
Step #4: Compress it

Step four in the 7 step mastering formula is to ‘compress it’. Compression can help us make louder, more energetic sounding masters.
Compression allows us to make the overall track sound louder. It can also add a sense of ‘energy’ and ‘power’ to the mix.

The fact is, we’re not really making the track any louder, we’re just making the peaks (those sticking out parts you see on the waveform in your sound editor) softer. When we stop the peaks from ‘jumping out’ so much, we can now bring up the overall level of the track without it clipping.

So we’re essentially making the average level louder – which sounds louder to our ears. This is known as ‘reducing the dynamic range’ of a track. It’s a fancy sounding term which basically just means making the loud parts and soft parts closer together in level.

Take a look at this illustration below to get a better idea of what dynamic range is:
A compressor reduces dynamic range by decreasing the level of the peaks. Once the peaks are reduced, we can increase the overall level which makes everything sound louder.

I’m just going to be totally honest with you – when you’re starting out, compression can be confusing. If you don’t know what you’re doing yet compression can easily do more harm than good to your tracks. Of course, that shouldn’t stop you from playing around and experimenting, but I’d really encourage you to learn how to use compressors properly because they’re such an important part of modern music production.

Compressors come in all shapes, sizes, colors, tones, speeds, etc. We’re not going be able to get into all of that here, but I am going to give you some key points and some go-to settings to get you started using compression in your mastering chain...

**Key points for using mastering compression**

- Compression is optional, it’s not essential to a great sounding master. If you’re totally clueless about compression rather leave it out for now.

- If you’ve used compression on your mix buss while mixing, you shouldn’t need to use compression again during mastering – you’re essentially doing the same thing.

- Keep it very subtle! The quickest way to make your master sound like an amateur demo is to over compress it. Aim for about 1 – 2dB of gain reduction, 4dB at the absolute most.

- Since we’re processing the entire track, be careful of using compressors that ‘color’ the sound too much during mastering – unless you really love the color :) Certain valve / tube-modeled compressors can do this.
What about mastering with multi-band compressors?

A multi-band compressor is like a regular compressor on steroids – it's sort of like an EQ and compressor combined. While your standard compressor processes the entire track as one sound, a multi-band compressor breaks up the frequency spectrum into several parts and enables you to compress each part differently.

Let me give you a practical, real-world mastering example, to help you understand how you'd actually use a multi-band compressor...

Let's say that you're mastering a song that has a powerful kick drum peaking out of the mix. If you set up a regular compressor to reduce those peaks, each kick drum will cause the compressor to bring down the entire level of the track at that point.
The vocals, the guitars, the pads, the bass – they all get affected.

Using a multi-band compressor we have more control.

Because a kick drum has most of its energy in the low-end of the frequency spectrum, we can tell the multi-band compressor to compress the low-end fairly aggressively so that it sounds fat, tight, and consistent.

At the same time, we can use more a more gentle compression for the mid-range and high frequencies so that the vocals and other instruments sound natural and not overly compressed.

To see how I set up my multi-band compressor, watch my video ‘How to Master a Song’ if you haven’t done so already.

“A MULTI-BAND COMPRESSOR IS LIKE A REGULAR COMPRESSOR ON STEROIDS…”

Compression Made Simple

If you don't understand exactly what the various controls on a compressor are doing, chances are, you're doing more harm to your songs than good.

Compression is a powerful tool that allows us to bring out the energy, power, punch, and nuances in a track. Learning how to use it correctly is an essential part of producing modern music.

If you're ready to master this skill and you'd like a simple, step by step guide, check out my 'Compression Made Simple' program where I'll show you exactly how to use the power of compression to bring out the best in your tracks. Click below to find out more.

Mastering compression settings

Whenever you ask the ‘pros’ for specifics you tend to hear a bunch of “‘ums’, ‘ahs’, and ‘well that depends...’ “. Sure, it always depends on something or other, but this isn’t very helpful when you’re starting out and just want some basic settings.

So, let me give you some go-to mastering compression settings to get you started. In fact, I’m just going to give you one of the ‘cheat sheets’ right out of my Compression Made Simple program. You can use this as a reference when mastering your tracks.

These are the basic settings I use when compressing my overall mix buss, or while mastering a song..

Download the mastering compression cheat sheet here (it’s free):

http://prosoundformula.com/download/mastering-compression-cheat-sheet/
Step #5: Clip it

The 5th step to mastering your songs is to ‘clip it’. If you like it loud, clipping is your friend!
Have you ever compared one of your tracks to some insanely loud record and just shook your head in disbelief? Wondering, ‘How the hell do they do that?!’ It just seems impossibly loud, doesn't it?

Well, I'm gonna let you in on one of the sneaky techniques right out of the mastering engineer's playbook – clipping.

Clipping is one of the ‘secrets’ the pros use to create some of the loudest masters you've ever heard. If you like it LOUD, clipping is your friend. Or, more accurately, ‘soft clipping’. (Hang in there, I'll explain that soon)

Now, clipping is generally associated with being a negative thing, something we're always trying our very best to AVOID. So, why in the name of all things good and holy would we want to put something like this on our entire track??

Good question. Let's take a step back and look at what clipping actually is, and it'll start to make sense.

**Good clipping vs bad clipping**

Basically, there are two types of clipping. You get GOOD sounding clipping, and BAD sounding clipping.

Bad sounding clipping has a harsh, ‘clicking’ sound to it. It's the type of clipping you hear when you sing into a mic and the preamp is turned up way too high – it doesn't sound good.

The worst sounding clipping is pure digital clipping. Digital is far less forgiving than analog because every sound you hear is really just a series of ‘zeros’ and ‘ones’, it's binary.

“CLIPPING IS ONE OF THE ‘SECRETS’ THE PROS USE TO CREATE SOME OF THE LOUDEST MASTERS YOU'VE EVER HEARD.”
A regular section of recorded audio may look something like this on the binary level:

001110101001101101010110110101100101010111

What does digital clipping look like? Something like this:

000000000000000000000000000000000000000000

In other words, a computer doesn't have a value for an audio signal that goes above digital '0'. Once the signal goes above '0' you're in no man's land, it's just a string of numbers that doesn't sound very good to human ears.

This is generally known as 'hard' clipping or 'digital clipping'. The rule of thumb is: Hard clipping should be AVOIDED at ALL phases of the recording, mixing, and mastering process.

OK, so then where does clipping fit into mastering? And what is good clipping? Glad you asked!

"GOOD CLIPPING, OR 'SOFT CLIPPING' AS IT'S KNOWN, ADDS HARMONICS WHICH GENERALLY SOUND PLEASING TO OUR EARS."

Good clipping is any type of clipping that sounds good. If you plug in an electric guitar and throw on some overdrive – that's some good sounding clipping you're hearing.

Good clipping, or ‘soft clipping’ as it's known, adds harmonics which generally sound pleasing to our ears.

Before I go on, let me just put a small disclaimer in here:

All sound is SUBJECTIVE and I'm not saying that clipping is good or bad. One man's music is another man's noise! As a general rule, soft clipping works on more aggressive styles of music such as rock or metal, but should be avoided on more natural, mellow styles... I can't imagine ever wanting to clip a mellow acoustic track or classical number.
With that said, soft clipping can be used in the mastering phase to squeeze out that extra little bit of volume you may be looking for. The pros tend to use very expensive analog to digital converters which happen to have some fancy built-in circuits which prevent digital overloads.

It didn’t take long for certain mastering engineers to figure out that overloading the converters would activate the soft clipping circuit, and increase the level of the music in a ‘good sounding’ way.

Still confused? Instead of me spending another thousand words trying to explain clipping, let me just show you this picture...

![Soft Clipping Diagram]

So, by now you may be thinking... ‘That's all great Rob, you've just told me about something which sounds extremely complicated, and I can't afford anyway!'
Hang on a second...

Now that we know what the mastering pros are doing, we can try to mimic that using some kind of plugin. And, it just so happens that there’s a plugin that’s relatively affordable, and does exactly what we’ve been talking about.

**The T-Racks Soft Clipper**

The “T-RackS Soft Clipper” from IK Multimedia is a great option for getting the power of clipping right inside your DAW – and at a fraction of the price of outboard units.

As the name implies, the T-RackS Soft clipper is a... well, exactly that - a soft clipper. I’ve personally used this plugin and gotten a lot of success from it over the years.
It's simple to setup, and if used correctly can give you that extra level you've been looking for with minimal side effects.

While it may never live up to something that costs a hundred times its price, it certainly does the job, and will fool 99% of people (i.e. ‘Your fans’).

If you want to find out more about the soft clipper plugin and check the current price, here it is: T-RackS Soft Clipper

They also offer it in a few different bundles. The Classic bundle gives you an EQ, compressor, and limiter, along with the clipper. I've gotten great results mastering with nothing but the T-rackS Classic bundle (which is the cheapest bundle that the clipper is included in).

You can find out more about that over here: T-RackS Classic bundle
Step #6: Limit it

The sixth step is to ‘limit it’. Limiting is the final process applied to all masters to bring them up to ‘commercial level’.
A limiter can help you to make your masters as loud as possible – without clipping. It can also help to ‘glue’ a track together, making it sound more like one piece of music instead of a collection of instruments.

Even if you do absolutely nothing else during mastering, make sure that you use a limiter. In fact, if the mix is really good, often the only thing you need is a limiter to finish off your master.

So, how exactly does a limiter work? (I hear you ask) Let me give you a metaphor...

“EVEN IF YOU DO ABSOLUTELY NOTHING ELSE DURING MASTERING, MAKE SURE THAT YOU USE A LIMITER.”
Cars have rev limiters fitted to them to prevent _____ (enter idiots name here) from blowing their engine and then trying to sue the car company. A rev limiter basically limits the revs from getting too high and causing some serious damage.

Audio limiters prevent sound from going higher than a certain point and causing digital clipping – we call that point the ‘threshold’.

Digital clipping happens at 0dB. As far as digital audio is concerned, there is no value for anything above 0dB, so it just outputs a harsh clipping sound which we always want to avoid.

However, we also want our masters to sound loud – or at least in the same volume range as other commercial masters. The problem is, if we bring up the overall level of a track, the audio peaks (those sticking out parts you see on an audio waveform) are going to start clipping.

So, what do we do? Simple, we put on a limiter.

A limiter allows as to bring up the overall level of the track without letting the peaks clip. Magic! Now, if that sounds too good to be true, you’d be right... there are side effects which we do need to watch out for.

Now of course, like anything, there is a limit (no pun intended) to which we can push a limiter before it starts sounding obviously compressed.

The more we limit a track, the more the peaks get ‘squashed’ down into the mix. Drums and percussion are typically most affected by this and will start to lose their attack and punchiness.
Mastering limiters

The type of limiter we want to use for mastering is known as a ‘brick-wall limiter’. It’s called that because it doesn’t allow anything past it!

Basically, you get many types of limiters and they’re all doing a similar thing, but some are more aggressive than others. Some limiters still allow part of the sound to still cross over the threshold.

A brick-wall limiter doesn’t allow any sound to cross the threshold, which means you can set it to just below the clipping point.

There are loads of great mastering limiter options out there. Basically, any type of brick-wall limiter will do.

The limiters I use at the moment are either the Waves L2 or L3. I really like them because they’re quite transparent and don’t make the track sound obviously compressed (as long as you don’t push it more than about 4 – 5 dB’s of gain reduction).

“A BRICK-WALL LIMITER DOESN’T ALLOW ANY SOUND TO CROSS THE THRESHOLD, WHICH MEANS YOU CAN SET IT TO JUST BELOW THE CLIPPING POINT.”

Mastering limiter settings

Firstly, a limiter should always be the very last process applied during mastering.

I set my limiters threshold to just below digital zero, ‘-0.1’. This means that no sound is going to go past this level.

If I’ve already used clipping, I generally aim for about 2dBs of gain reduction – because the peaks have already been ‘chopped off’ to a certain extent.

If I haven’t used clipping, I’ll go for about 2dB – 4dB of gain reduction. After that point, you tend to get serious side effects which aren’t worth the extra level you’re gaining.
Step #7: Reference it

The final step to mastering your music is to ‘reference it’. Referencing is about taking your track out into the real world and hearing how it sounds on a variety of playback systems.
If you want to make sure that your songs sound great no matter where they're played, and what they're played on, referencing is the key.

It doesn’t matter whether you’re just starting out, or you’re a seasoned pro with years of experience under your belt, referencing is essential to making sure that our masters sound great out in the real world – not just our home studios.

Referencing is really just a fancy word for “go listen and compare your masters on a bunch of stuff”.

A good analogy for this can be found in web design. Let's say you're a web designer... You’re working on your big 27-inch thunderbolt display, designing the most beautiful looking web page the world has ever seen. You sit back and stare it in wonder, thinking ‘look at how clever and talented I am to design such a marvel’.

The problem is, most people are NOT going to be looking at your website on a 27-inch thunderbolt display!

They may be on their iPad, a laptop, their Samsung Galaxy, a 17inch monitor, an old iPhone 3, a Nokia 3310 – Ok, hopefully not the 3310, but it literally could be anything...

The point is, every device, every platform, every browser, all look and behave slightly differently. As you can imagine, this can be a challenge (as I discovered putting together the site you're on now!). The only way to truly test this out is to check the site on as many different platforms and devices as possible and make adjustments and compromises.

“REFERENCING IS REALLY JUST A FANCY WORD FOR ‘GO LISTEN AND COMPARE YOUR MASTERS ON A BUNCH OF STUFF’ ”
The same is true for your music. Just because your master sounds great in your home studio or on your headphones, doesn't mean it'll be the same in a car, on a large HiFi, or on a crappy little boombox. You are the only person who is ever going to listen to your music on your exact system, everyone else is using something different.

One advantage the big mastering houses have over ‘the little guy’ is convenient access to a whole bunch of different playback systems in one place.

Often they'll have entire rooms filled with a variety of different speakers, sound systems, and reference monitors, so they can instantly listen back and compare the sound on many different sources. The reason this is important is because ultimately we’re trying to make sure that our masters sound great no matter where they’re played or what they’re played back on.

Although you may not have an entire room of your house dedicated to referencing you masters, we can do this the old school way.
There's no secret to this step, you simply want to burn your master to a CD, or put it on some kind of player, and go and listen to it on as many different systems you can get your hands on. Everything from small portable stereos, the car, a laptop, headphones, a PA, HiFi with a subwoofer, PC speakers, iPod, etc.

Make sure to compare it to the two or three reference tracks you used for comparison in your mastering session. Because all systems sound different, you want to get an idea of what some professionally mastered commercial tracks sound like on them before judging your own.
Look for patterns

What we're looking for are patterns – consistent differences or problems with the audio.

For example, if you notice that your master sounds harsh on four out of five of the playback systems you test, chances are, it's got too much energy somewhere in the 2kHz – 8kHz range.

On the other hand, if you find that the low-end sounds good on most systems except for your laptop, chances are, this is probably just because the laptop can't reproduce much bass!

The point is, don't jump to conclusions based on one playback system. Use your reference tracks to get an idea of what a commercial master should sound like on a particular system, and then listen to how your masters compare to that.

Keep in mind that you can only do so much in the mastering phase and that if the bass wasn't mixed loud enough, or at the right frequencies, you may not be able to fix it with one overall EQ. As I mentioned earlier, it's often better to go back and fix issues like this in the mix session.

This is the great part about learning to master – it teaches you so much about what you need to be aiming for in the recording and mixing stages.

Mastering is the art of compromise. It's about the overall song and making it the best it can be, not about making an individual instrument sound great at the expense of everything else. Every decision made while mastering a song should be about what's best for that song as a whole.

“EVERY DECISION MADE WHILE MASTERING A SONG SHOULDN'T BE ABOUT WHAT’S BEST FOR THAT SONG AS A WHOLE.”
Three playback systems that make mastering easier

While going out and listening to your masters on a bunch of different systems is important, it can also be a bit of a hassle – especially when you have to keep on coming back and making changes.

I like to have at least three different playback systems / speakers / devices right in my studio and ready to go, so that I can quickly switch between them. If this sounds complicated, it’s not! This is what I have set up at the moment...

Firstly, I have my studio monitors. At the moment, I’m using some relatively inexpensive (as monitors go) Yamaha HS80’s. They’re not the best in the world, but they do a great job and I’m happy with them. You may be able to record, or even mix, without proper reference monitors. But when it comes to mastering, you’re going to find it extremely difficult to hear what’s really going on unless you have a set of decent monitors.
Mastering without studio monitors is kind of like trying to paint in the dark. If you can’t hear what’s really going on with the sound, it’s very difficult to make accurate judgements.

You don't need the best or most expensive monitors, you just need some basic studio monitors that aren't going to hype the sound like most consumer HiFi speakers and headphones do.

Check out the HS80's on Amazon: [Yamaha HS8 Studio Monitor, Black](https://www.amazon.com/Yamaha-Studio-Monitor-Black/dp/B00AOX3OFM)

(Tip: Often they stock a bundle option which gets you a set of monitors, speaker stands, and cables – for no extra cost.)

Secondly, I always have some headphones on hand. I'm actually using some real 'el cheapo's' – these Sennheiser HD 201's.

You don't need anything fancy, but you do need some headphones to be able to pick up the finer details and stereo balance which is more difficult to hear on monitors. I also like to keep my Apple EarPods around as another reference.

Check out the Sennheiser headphones on Amazon: [Sennheiser HD 201 Lightweight Over Ear Headphones](https://www.amazon.com/Sennheiser-Lightweight-Over-Ear-Headphone/dp/B00A48KEC6)

Here's the newer version of those headphones (the 202's) which only cost slightly more: [Sennheiser HD 202 II Professional Headphones](https://www.amazon.com/Sennheiser-Professional-Headphones-Headphone/dp/B01FVR0L6W)
Finally, I have a Bluetooth speaker which I've linked up to some extra outputs on my audio interface. I've used all kinds of things over the years, but the concept is the same – have something to represent the small boombox type systems out there.

The one I'm using at the moment is this Creative Audio Bluetooth speaker pictured above. It just gives you a good general representation of the 'average system' people are listening on these days. It's really affordable and does a good job. It also has a mini-jack input so you can plug straight into it from your sound card if you like.

If you want to check it out on Amazon, here it is: Creative D80 Wireless Bluetooth Speaker
Summary Checklist
1. Prepare It

Goal: To get everything set up and ready for mastering.

✓ Bounce down (export) your mix session to a stereo, uncompressed, file.
✓ Use .wav or .aiff
✓ Use minimum of 24 bit 44.1kHz. 24 bit 96kHz is ideal.
✓ Create a new session for mastering and import your final mix.
✓ Make sure the mastering session you create matches the sample rate and bit depth of your exported mix. e.g. 96kHz, 24 bit
✓ Import 2 – 3 commercial reference tracks into your mastering session so that you can compare your track directly to them.

2. Fix It

Goal: To fix any problems with the overall sound.

✓ Compare your track to the commercial references and listen for any problems – anything that sounds strange or bad.
✓ Use a spectrum analyzer to look for problems with the frequency spectrum – this could be too much, or too little, energy in a certain range.
✓ Common problems include; harshness, thin & brittle sound, vocal esses too loud, boomy bass, muddy low end, stereo image too narrow or wide, inconsistent frequencies, etc.
3. Enhance It

**Goal:** To improve the overall sound of the final mix in some way.

- Experiment with things like EQ, stereo wideners, harmonic exciters, and analog emulation plugins, to hear whether they improve the overall sound.
- Could the track use some thickening up? – Try some tape or valve emulation plugin, or a bass enhancer.
- Would it sound better with a stereo widener?
- How about a little bit of EQ on the top end?

4. Compress It

**Goal:** To reduce the dynamic range of the overall track in order to add energy and make it louder.

- Try a compressor to hear whether it improves the overall sound, if not, remove it and move on.
- Use a low ratio to avoid compressing too much – Start with a ratio around 1.5:1 – 2:1
- Aim for around 2dB’s of gain reduction, no more than 4dB!
- Multi-band compressors allow you to compress the different frequency ranges separately and thus give you more control – they can be very powerful but best avoided if you’re unsure what you’re doing yet!
5. Clip It

Goal: To soft-clip the audio peaks of a track in order to achieve maximum loudness with minimal negative side effects.

✓ If you're going for loud, soft clipping is your friend.
✓ Generally this is for more aggressive tracks, if it's a mellow song or something more natural, stay away!
✓ If you're not rich (yet), consider trying a plugin such as the T-Racks Soft Clipper to get a similar effect to what the pro's use.

6. Limit It

Goal: To increase the overall level of the track as much as possible without clipping or losing quality.

✓ If you do nothing else, a “brick-wall limiter” is a great way to bring your track up to a good level without digital clipping.
✓ A limiter is always the LAST step in the chain, don't put anything after the limiter.
✓ Limit to -0.1 (Some people say -0.3 is better, personally I don't think it makes any difference but that's up to you to decide).

7. Reference It

Goal: To listen and compare your master on a variety of different playback systems to get a better idea of what's working or not, and then make adjustments if necessary.

✓ Listen on as many different systems as possible – in the car, on a boombox, bluetooth speaker, large HIFI, headphones, PA system, etc.
✓ Compare to your reference tracks and listen out for consistent differences.
✓ Make adjustments and repeat the process as many times as necessary.
I'm impressed, you're one of the very few who downloaded this book and made it all the way to the end – nice! Here's a couple of resources to help you take the next steps to getting awesome sounding masters...

Download the 7 Step Mastering Formula Infographic

Get a quick overview and checklist to guide you through the 7 step formula as you’re mastering your songs. Click below to download it now – it’s on me :)

http://prosoundformula.com/download/how-to-master-a-song-infographic
Mastering Mini-Course

Join me for my Mastering Mini-Course where I'll be sharing with you some of my best tips, tricks, and insights, into producing great sounding masters from home. Did I mention it's totally free? :) Click below to sign up:

http://prosoundformula.com/mastering-mini-course/
The Ultimate Mastering Formula

If you're serious about producing great sounding music, and you want to learn to master your tracks properly, I've got a great in-depth mastering training which I really think will help you. From setting up your mastering session to laying out your final album, everything you need to know to produce commercial quality masters is in here. Click below to find out more.

http://prosoundformula.com/products/the-ultimate-mastering-formula/