Mixdown for Mastering Tips

www.onlinemastering.dk/mastering-faq.html

Plug-ins on the Master Output

If you are using plug-ins on the master output during mixing, then export two versions: A) one version with plug-ins enabled on the master output, and B) one version with plug-ins bypassed on the master output. Limiting or clipping should always be avoided on mixdowns for mastering.
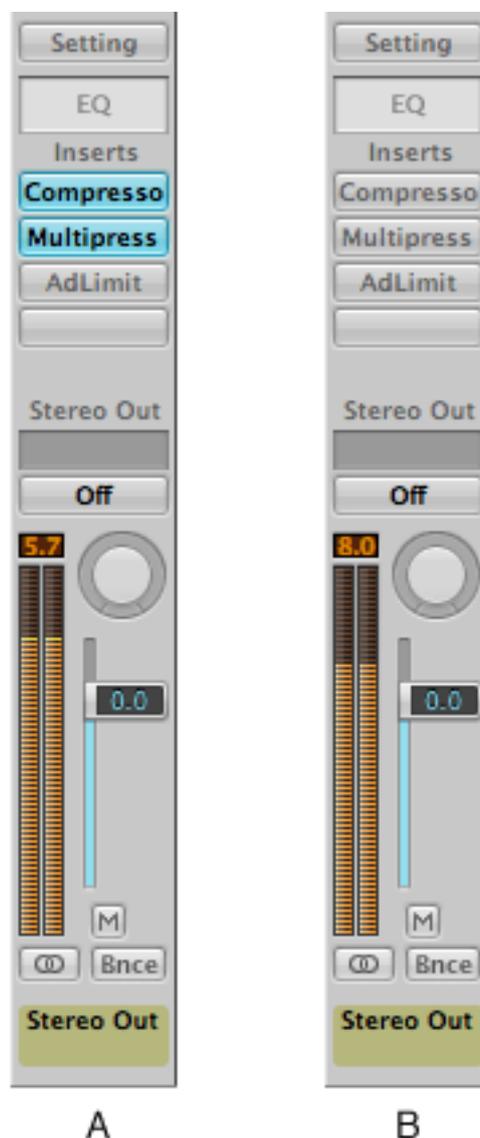

A One version with plug-ins enabled on the master output - except limiter or clipping.
B One version with plug-ins bypassed on the master output.

💡 Having two mix versions gives me a choice in case you over-processed the mix. Check that your mix does not exceed the headroom when bypassing the plug-ins. If the master bus is overloading after bypassing the plug-ins, simply lower the master fader. Do not bypass plug-ins on individual channels in the mix.

Headroom

Your 24 bit mix should have its highest peak below 0 dBFS to make sure you are not exceeding the digital headroom. Do not normalize your exported file.
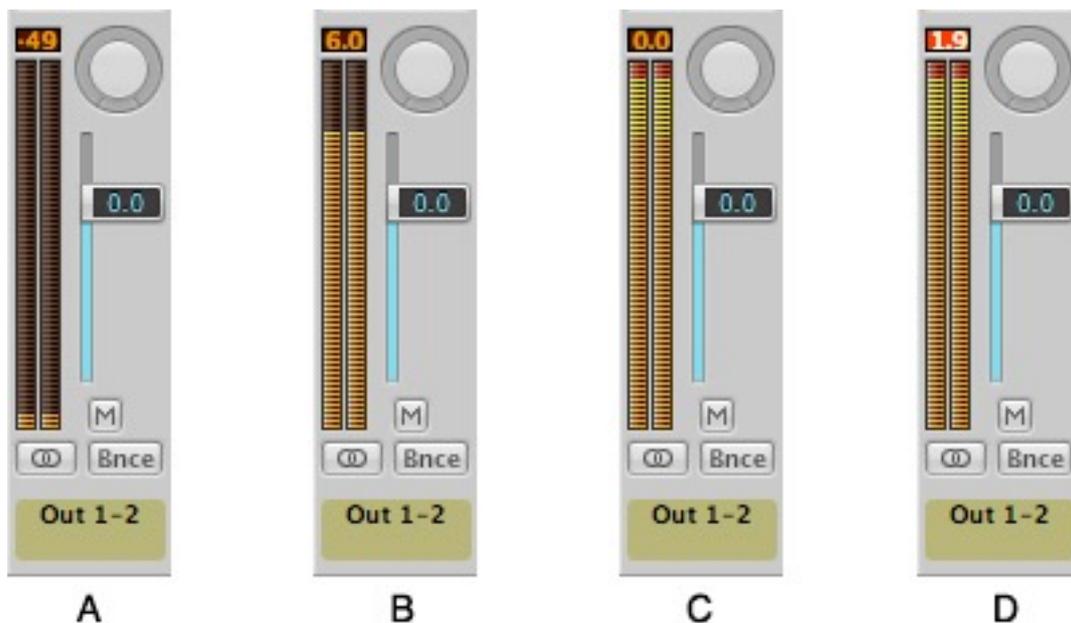
A A very low peak level could mean a worse signal to noise ratio.
B The highest peak is below full scale. Perfect for mastering.
C Trying to peak exactly at 0 dBFS is not recommend because of the *risk* of overloading.
D Overloading (clipping) the mix makes it less usuable for quality mastering.

💡 Headroom is the amount of dB before your mix clips and the overload indicator lights up on your master output. If your mix is too loud then simply lower the output fader until the highest peak is within the recommended range. Sound quality will not be affected when you lower the fader. With 24 bits you can go as low as -48 dBFS and still have full CD quality (16 bit). However, once you exceed the digital ceiling, distortion could occur, and it will not be possible to restore the original quality. There is no reason to maximize the volume during mixdown. I will make sure your song reaches its maximum loudness potential later in the mastering process.

Tips for Mixing - From a Mastering Point of View

The following issues can be fixed with greater success in the mixing process than in the mastering process. Make sure you pay extra attention to these points:

Noise
With analog recordings (guitar, drums, etc.) or completely analog mixes, use the mute automation function in your sequencer or on your mixer to eliminate hiss. Mute individual channels or groups when they are not active. This is especially important in the intro, breakdown and outro since the noise is usually most audible there.

Phase and polarity
Check to see if recorded drums are out of phase. Other common problems are synthesizer sounds with too much anti-phase and applying a fake stereo spreader. Check your mix in mono playback to see if sounds almost or entirely disappear because of inverted polarity.
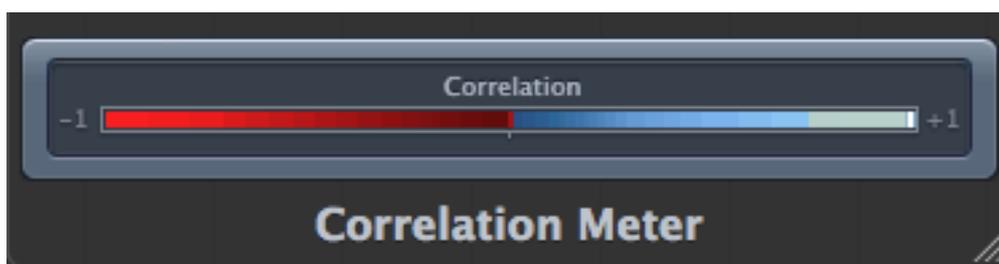
Correlation Meter

Most professional sequencers include a correlation meter to check for phase problems. When the meter is indicating a value towards +1 the sound is in phase. When the meter value is towards -1 the sound is out of phase. A value of exactly -1 means you have inverted the polarity, which will make it disappear completely during mono playback.

Sub frequencies
Loud or unnecessary sub frequencies (e.g. below 50 Hz) in individual tracks can cause problems with the sound quality and the final volume of the master. Consider low cutting tracks that do not contain meaningful sound in the sub frequencies. For instance, a vocal can be cut at around 80 Hz to avoid pops or rumble. Using a gentle 12 dB/Octave slope will sound more natural than a steep filter. Some sounds will not benefit at all from low cutting. Do not automatically cut the entire mix as this could lead to a thin sounding mix if you are not careful.

Sibilants and other sharp sounds
Sibilants and other sharp whistling or clicking sounds from the mouth or string instruments are a serious challenge when mastering. Use a de-esser if necessary, preferably *not* a narrow band de-esser since it can cause lisping artifacts. Use volume automation on very loud sibilants, plosives, or click sounds. Also pay attention to other sharp sounds that stick out, i.e. crash cymbals and hi-hats.

Vocal levels
An uneven vocal is difficult to fix in the mastering process. Sometimes two compressors with a low ratio is better than one compressor with a high ratio. Even with correct vocal compression you often still need to do volume automation. Turn individual passages or words up or down until everything is smooth and clearly audible. Try listening at a low volume while adjusting the volume automation on the vocal track.
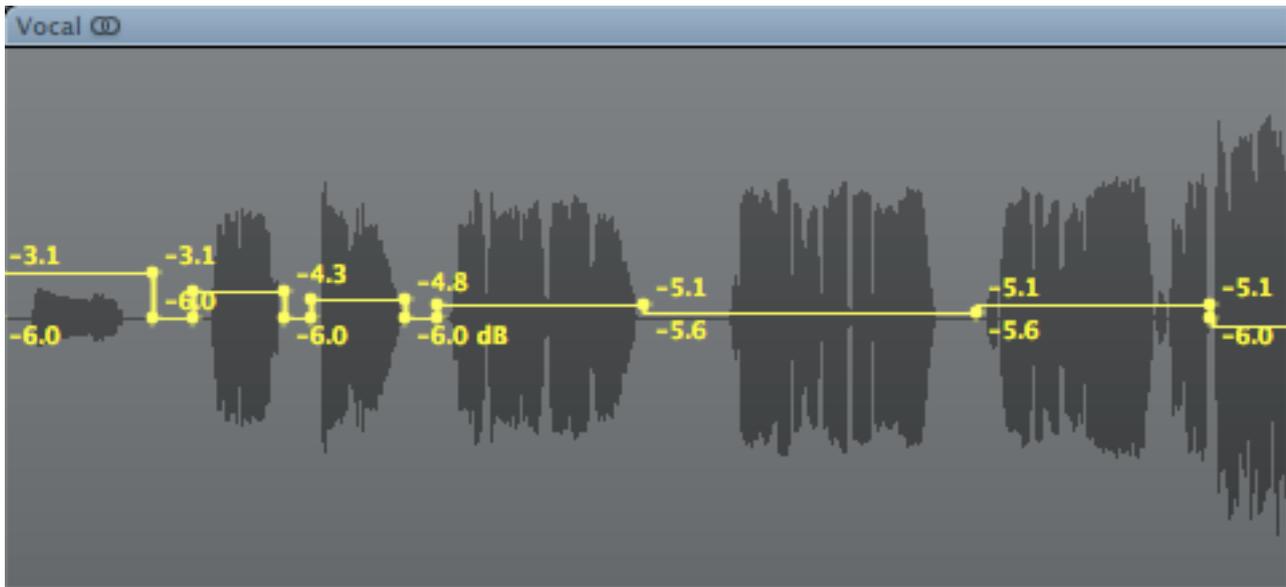
Volume automation on the vocal track

Alternative Versions

It is not uncommon to provide alternative versions of the mix with vocals up (or down), e.g. +0.6 dB or +1 dB, as well as an instrumental and a capella version. Sometimes you make a version with a louder kick and/or snare drum. You do not have to send these right away, but having them available is a good idea.
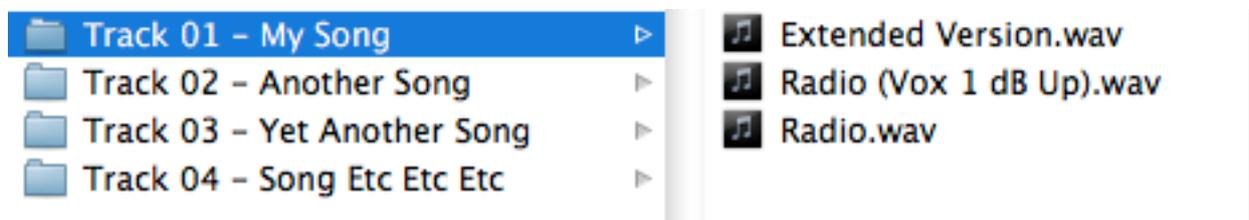
Use clearly labeled file names to avoid confusion

💡 Clearly write the difference in the file name itself and in the notes. Everything else in the file should be 100% identical to the normal version, so do not adjust the master fader. If necessary I can choose from the alternative versions or splice parts later. If you ask me for a mix check before delivering the final mix then alternative versions are rarely needed. Many record companies insist on having the alternative versions, so be prepared.

Most professional sequencers have an easy way of offsetting automation. This makes bouncing alternative versions a breeze. In Logic Pro X you use the Trim automation field in the track header. For other sequencers please refer to your manual.

Alternatively, you can use the output gain in the last plug-in on the track channel to raise or lower the output level. If you are outputting or sending the channel to a bus with dynamic processing or if your are using the channel for sidechaining, you can not use this alternative method.

Trim automation in Logic Pro X offsets all automation points relatively

Start/End

Export your mix at least one bar before it actually starts. Include a couple of extra bars at the end to ensure reverbs, delays, and instrument decays have tapered off completely.

Include empty space at the start and the end of the song

Fades

Do not fade out the end of the mix. Instead, tell me where the fade should begin and end. Write down the fade times in absolute or relative terms, i.e. "fade out from 3:15 to 3:30" or "fade the last 15 seconds of the song".

File Format

WAV or AIFF is preferred.

🔎   The WAV format can also be referred to as BWF (Broadcast Wave Format). Both WAV and AIFF is a so-called PCM (Pulse Code Modulation) format, and are identical in sound. The SDII and CAF formats are also PCM, but are not normally used for mixdowns for mastering, though they are readable.

Stereo Format

Choose interleaved stereo and not split stereo when bouncing or exporting your mixdown for mastering.

🔎   If your sequencer does not give you a choice of stereo format then it is most likely using interleaved stereo. Interleaved stereo uses one single stereo file. Split stereo uses two individual mono files, something that does not suit the mastering workflow, though it is readable.

Bit Resolution

24 bit fixed point or 32 bit floating point.

💡 16 bit files are only used whenever it is not possible to get a 24 bit file of the same mix. All professional sequencers are able to export in 24 bit, but some hard disk recorders only burn audio CDs (which are always 16 bit). 32 bit floating point is not as common for mixdowns for mastering, though it is readable. The actual sound contents of a 32 bit float file is virtually identical to that of the 24 bit fixed format, though there are some very minor benefits to the format.

Sample Rate

44.1 kHz or higher.

💡 Only export in higher sample rates than 44.1 kHz if your project is actually recorded and processed at that rate. The advantages and disadvantages of using higher sample rates are debatable. If your project contains different sample rates then do not convert sample rates yourself, let the me do it. If you need to put your master in a movie or you require a different target sample rate than 44.1 kHz, then tell me in advance.

Dithering and Noise Shaping

Do not use noise shaping or colored dither, e.g. UV22 or POW-r when exporting your mixdown for mastering.

💡 In very rare cases noise shaping can cause high frequency artifacts during the mastering process. You can use flat dither during the mixdown, referred to as TPDF. In all circumstances dithering and noise shaping on a 24 bit file has very little effect on the sound, so leave if off if you are uncertain. The final bit reduction to 16 bit (audio CD format) is performed by me as the last step of the mastering process.

Normalizing

Do not use any kind of normalizing on your mixdown.

💡 Normalizing raises the signal level in an unnecessary fashion, and it will change the amount of headroom left in the mix. Instead the final volume level of the mix will be optimized by me.

Realtime or Offline Bouncing

In theory a realtime and offline bounce are identical. However, sometimes track automation inaccuracies, unsynchronized LFO's or a random reverb algorithm cause small differences. If you decide to do an offline bounce then listen to the full bounce before sending it to me.

Listen to Your Mixdown

Always listen to the exported file from the beginning to the end before sending. Make sure everything is playing correctly, that the beginning and end are intact, and that no artifacts or click sounds occur.

Here are some common problems and solutions:

The mix is overloading/clipping
Your master output is too loud. Simply turn down the master fader. There will be no loss of quality as long as you follow the advice given in this document.

Plug-ins are active on the master output
Make one mix with plug-ins and one without plug-ins on the master output.

The intro has a click or overlapping reverb/delay tails
This is caused by a missing reset buffer command in the sequencer or 3rd party plug-in. Add a small piece of dummy audio at the beginning of problematic tracks. This will trigger the buffer error before the actual song starts. Make sure there is at least one empty bar before the music starts.

The reverb, delay or instrument tail is missing at the end of the song
Export your song with at least one extra bar at the end.

Clicks or other artifacts in the mix
Clicks are often caused by bad edits, imprecise mute automation or automation errors. Using headphones, solo each track in the mix until you find the culprit. Random clicks are often caused by using a sound card buffer size that is too low. Use a higher buffer size and try again.

White noise in the exported audio file
Loud white noise is usually caused by a computer error or file transfer error. Restart your computer and sequencer and export again. Always pack WAV files as a ZIP file before transferring over the Internet.

Sending Files Over the Internet

Before sending a file on the Internet you should pack it as a ZIP file to maintain data integrity. You can upload your file by using http://onlinemastering.wetransfer.com or directly to my FTP server, if you have your own FTP client.

On a Mac you ZIP a file by Control+clicking or right-clicking on the file or folder and choosing "Create Archive" from the pop-up menu. In Windows you need a ZIP program such as WinZip. If you are using an online file service please do not use one that requires registration or a waiting period before downloading.

Delivering Files on a CD

Burn your CD as a data CD and not as an audio CD. An audio CD will reduce your 24 bit files to 16 bit files. Data CDs also have better error correction.

💡 Check that your burned data CD is readable on your own computer and that the data can be copied to your hard disk without errors. Doing this before sending the CD in the mail can save you a lot of time.

Projects With More Than One Song

If your project contains more than one song then send the first mix to me as soon as it is finished - before continuing with the next mix. In this way I can alert you to general mixing errors before you repeat them in the next mix.

Song Order and Other Notes

Let me know about problems in the mix and your wishes for the end result. However, rest assured, I will notice any problems automatically and enhance the sound in the right places. If your songs are part of an album or an EP then write down the song order in an email or attached document. If you have special wishes for pauses between tracks, segues or bonus tracks then let me know in advance.

Red Book Master CD or DDP

Let me know if you need a Red Book master CD or a DDP image/disc for mass production. If not, you will simply received a download link to your mastered WAV file.

💡 The Red Book is a standard for commercial audio CDs as defined by Sony and Philips. The average CD burning software does not burn Red Book CDs, and does not live up to the commercial standard that ensures maximum compatibility. If you intend to mass produce your CD or include ISRC then you need a Red Book master CD. The master CD can be played in a regular CD player or on your computer but it should be handled with great care. Preferably you should order a separate reference CD for playback, and only let the production plant handle the actual master disc.

Another option is making a DDP disc. Unlike a Red Book audio CD, a DDP disc contains an error corrected data version of the Red Book master. If the production plant is able to use DDP, this is the safest solution. Depending on how many copies you need, a Red Book audio CD is usually converted into a DDP image at the plant, so you might as well send it in DDP format to begin with. DDP also has the advantage of being downloadable as a DDP image. After downloading the image you burn it as a data file on a DVD-R or pass on the download link to the production plant.

ISRC - International Standard Recording Code

If you need ISRC on your master CD or in your MP3, please send the codes to me by email or in an attached document. ISRC can also be embedded into a WAV or MP3 file.

💡 ISRC is necessary if your music is to be sold on iTunes. If your music is being played on the radio, ISRC is an advantage for identification purposes. As a record label you can order the first part of the ISRC from your local department of IFPI. The rest of the code consists of the items below, which means that each song has its own unique ISRC for later identification.

US-ABC-09-001-01 (country code-record label-year of registration-release-track)

MP3

It is possible to order a high quality MP3 version of your master. ISRC can be embedded in the ISRC ID3 meta tag. Let me know what bitrates you would like to have your MP3s in.

Gracenote Database

If you want iTunes and similar software to show the correct title and track names automatically, you need to submit your CD to Gracenote (formerly known as CDDB). You can read more about how to submit your CD to the Gracenote Database here: http://www.gracenote.com/about/FAQs/

CD-Text

CD-Text is a late addition to the Red Book format and is only read by CD players that support CD-Text. Many car CD players display CD-Text on a small LED but it is not universally supported. CD-Text can hold information such as the name of the artist, album title and track title. CD-Text is often confused with the information used by the Gracenote Database. iTunes and most other software does not read CD-Text but instead gets the information about the CD from the Gracenote Database.

Even if you include CD-Text on your CD it is often removed automatically by production plants unless you specifically tell them to use it. This is done as a safety precaution to avoid manufacturing CDs with random characters in the CD-Text fields. Older versions of the DDP format also have trouble with CD-Text, and the plant may ask you to supply the CD-Text data separately.

UPC/EAN

The Universal Product Code (UPC) is the barcode attached to products you buy in a shop in the United States and Canada. The barcode decimal data can be embedded in the CD, too. The European Article Number (EAN) is the European equivalent but it is also being used in other parts of the world.

You can buy a UPC by contacting the Uniform Code Council (also known as GS1-US) in the United States. You can buy an EAN code by contacting EAN International (also known as GS1). They will refer you to your local department.

Evaluating Your Master

Listen to your master in the same places where you normally listen to your music: in your living room, in your studio, in your car, on your iPod or on your computer (do not use the internal speakers of your iMac or laptop for evaluation as they have a built-in multiband limiter on the output).

Use the same volume level as you normally do. If you like to play loud in the studio, then play your master loud. If you play at low levels in your living room then set the volume

low. This will give you the best grounds for comparison. A well rounded mix and master will work at all levels.

Loudness Potential

Each mix has its own loudness potential. The final loudness of a master is not only determined by the mastering process but is a matter of arrangement, production, recording and mix quality.
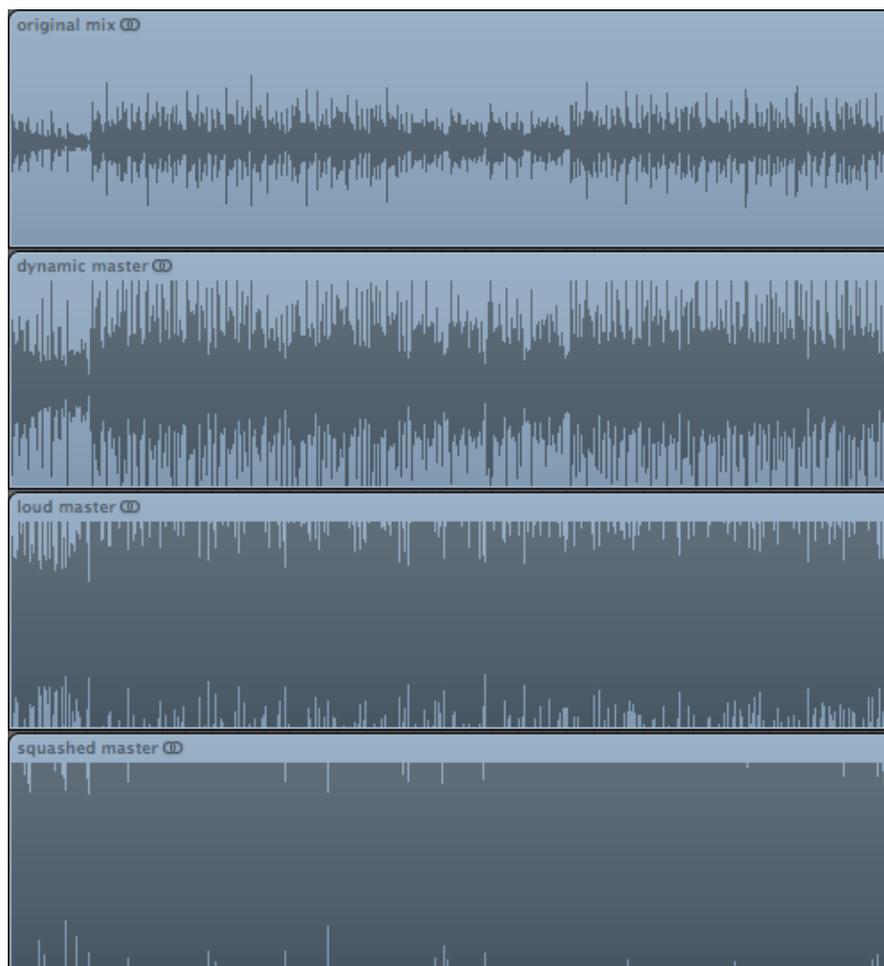
Various dynamic degrees of processing

💡 A simple arrangement with few, but well-chosen sounds, has more loudness potential than a big arrangement with a lot going on simultaneously. I can let you know when your song has reached its loudness potential. Pushing the envelope beyond this limit will gradually deteriorate the sound quality, causing audible distortion and squashed dynamics.

The illustration above shows various degrees of dynamic processing. The original mix has lots of dynamics, but perhaps lacks dynamic control and loudness.

A dynamic master sounds coherent, pleasant, and has plenty of the original dynamics retained, but it will not compete with most commercial pop music in terms of loudness.

A loud master is a good compromise between a great sounding song and competitive loudness. It will sound good while being relativtly loud in comparison with other pop music.

A squashed master will probably sacrifice some sound quality and dynamics in order to be extremely loud - the side effects being minor distortion and a lack of dynamics, but it will sound as loud or louder than most other pop music.

Important Information About the Sound in iTunes

iTunes can sound identical to your sequencer or any other neutral media player. However, first you need to turn off certain preferences. If not, iTunes can make your master sound lower or different in terms of frequencies.

Go into the menu: iTunes > Preferences > Playback. Make sure Sound Enhancer and Sound Check are not activated. Quit and restart iTunes.
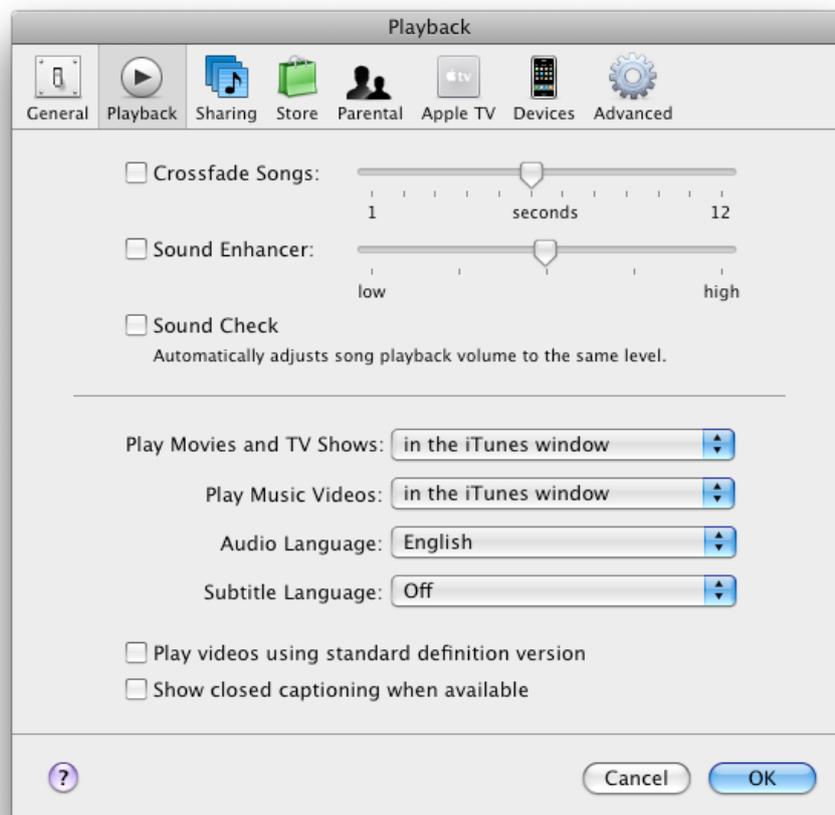
Turn off "Sound Enhancer" and "Sound Check" in iTunes
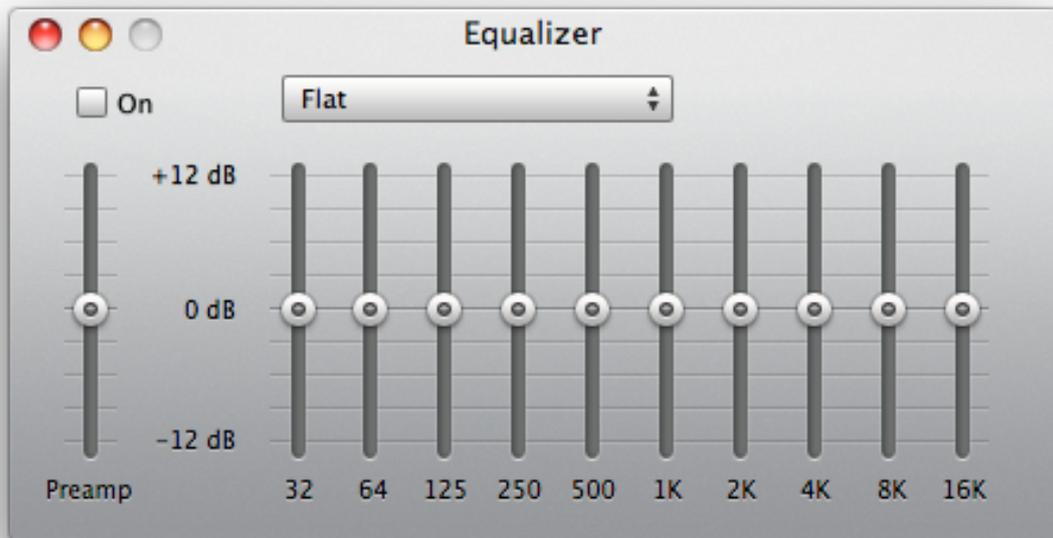
Choose the Windows menu and open the Equalizer. Make sure it is turned off.

More Questions?

Contact me on holger@onlinemastering.dk.