

Mastering
for vinyl

A R A N L A V I
MIXTERING ENGINEER

Mastering for vinyl

Since the resurgence of vinyl in the mid 2000's, vinyl sales are growing every year and have shown no signs of slowing down, therefore mastering for vinyl has gone from being a specialised rarity to a common extra that artists and record label ask for in addition to their digital masters.

A vinyl record is a different thing from a Wav file used for digital distribution, but does it require a separate, dedicated master, or are the two formats made from the same mastered file ?

The short answer to the question is yes, we recommend on making separate masters for digital distribution and vinyl records on most occasions..

Why?

Vinyl has notable characteristics that mastering engineers need to be aware of when mastering for the format:

1. Sibilance

Due to the physical constraints of vinyl records, excessive sibilance on modern records tends to manifest itself as distortion on turntables.

In order to avoid distortion on your vinyl, sibilance has to be properly addressed during mastering before the lacquer (or DMM) cutting process.

2. Out of phase low frequencies

Music with strong sub bass frequencies which appears only on one side of the stereo image or contains a different information on the left & the right channels (i.e Sides \ difference) may potentially run into vinyl cutting challenges.

Vinyl grooves represent the mono\center information as lateral movement and the stereo\side component as vertical movement.

If there is an extreme amount of low end stereo imaging on your music, it is more likely to produce out of phase information.

This may cause the cutting stylus to cut with excessive vertical movement, alternating between deeper grooves and severe groove lifts.

An out of phase low end may cause groove lifts with depths less than 1 mi (the minimum accepted depth of a modulating groove). It could even cause grooves to momentarily disappear.

While a steep high pass filter around the 20Hz range is enough to prevent severe groove lifts from happening, very often with modern music the stereo low frequencies has to be reduced, summed into mono or filtered out using an elliptical filter, this process has to be done with extra careful attention, it can significantly alter the sound of the master when not used properly.

3. Length & track order

Even the length and order of songs can influence the sound quality of your record.

Both of these factors come into play in the inner diameter of the record, where sound quality starts to deteriorate.

The farther in you are, the more brittle the highs sound. The overall sound becomes less pronounced at the top end compared to other parts of the record.

At 33.3 RPM's, the outermost groove has a groove speed of 20 inches per second while the innermost diameter runs at a mere 8.3 inches per second so the cutting stylus has to fit much more sonic information in a shorter, smaller amount of groove space which causing a compromise on the fidelity of your top end.

Longer music content takes up more groove space, bringing you farther inside the record causing the deterioration to become more noticeable.

These sonic characteristics are also more apparent depending on the music. Music with a lot of energy and pronounced highs (e.g fast upbeat songs, loud rock tracks, etc.) are more prone to these issues.

This is the nature of the format, you can never completely eliminate this deterioration, you can however, lessen its impact by keeping the running time per side at optimal length (20 minutes max) and place the songs with a lot of energy and pronounced highs in the beginning of each side to enjoy the benefits of the longer groove speeds while placing the less intense with a more mellow high frequency range songs at the end.

4. Can I use my super loud digital masters to cut a record?

In theory, yes, you can, We would advise otherwise though.

Vinyl records has a Level and length of time ratio:

The louder the signal, the bigger the groove..

The bigger the groove, the more space is used

The more space is used, the less available playing time left

Loud digital masters will have to be significantly reduced in level before the lacquer cutting process.

Heavily clipped or limited digital masters will almost certainly sound substantially worse on vinyl because of the extra distortion introduced when the stylus can't track the excessively jagged groove.

In some cases the lathe may even be damaged because **the average level (loudness) determines how "hot" the record is cut, rather than the peak level.**

In practice, it means that Heavily clipped or limited digital masters will leave plenty of unused headroom above the average signal on the vinyl for peaks and transients, which is why most people choose to make more dynamic masters for vinyl release, and obviously it will sound better as a result !

Significantly lowering the cutting level in order to “deal” with a loud digital master can potentially bring down your record’s signal to noise ratio to unacceptable levels.

The surface noise can increase dramatically, therefore compromising the overall fidelity of your music.

In order to avoid a noisy, lifeless and distorted vinyl pressing we strongly advise not to use your loud, clipped and limited masters made for digital distribution to cut a vinyl.

Delivery:

We deliver a fully assembled SIDE A & SIDE B masters optimised for lacquer cutting, rather than delivering the individual masters, in order to lessen the margin of error on both the sequence and spacing.

We also include a proper PQ log for each side to lessen the time it will take for the vinyl cutter to identify where the band marks (track starts) are throughout the record.

The masters will be delivered in the session’s native sample rate and Bit resolution to keep them as close as possible to the recording’s first generation.

*The lead times on the pressing plants are very long, at best, it will take three months before you could even hear a test pressing, that obviously puts some pressure on the artists and record labels when trying to set up a release date, Delivering a master for vinyl cutting in a less than ideal way will raise the chances you will end up unsatisfied with the delivered test pressing and have to wait (at least) three more months to get a new test pressing which is a risk better be avoided.