



KITCHEN MASTERING — VINYL PREP

Vinyl has made a big comeback in the back half of the second decade of the 21st century. Artists are reporting high demand at 'merch' tables for vinyl and special events such as 'Record Store Day' have had an impact on the demand for vinyl as well.

If you are considering vinyl for your project, there are several things to consider while preparing for and estimating project costs relative to vinyl production.

Vinyl, unlike digital audio, has physical restrictions relative to the physical medium. Specifically, due to the mechanics of vinyl playback, cutting great acetates or 'lacquers' involves juggling these three variables:

1. Bass
2. Amplitude
3. Running Time

Any more of one of the above will impart a reduction in one or both of the other remaining variables. In particular, the low-frequencies on vinyl records must be mono to prevent the possibility of the playback needle and cartridge from flying out of the groove. Out of phase LF content will cause issues while cutting and force compromises during the process. Being that it is a physical, and somewhat noisy medium, cutting hot lacquers is rather important to maintaining a good signal to noise ratio. During vinyl preparation, we selectively apply elliptical equalization to the master on a song by song basis utilizing either linear phase or minimum phase filters at rotation points that maintain the integrity of the original mix as much as possible.

Relative to the third physical variable, the chart below lists the recommended running times (in minutes) for vinyl sides for both 33 and 45 rpm.

SPEED	MAXIMUM	RECOMMENDED
7" @ 33.33	9	5
7" @ 45.00	6	3
10" @ 33.33	14	9
10" @ 45.00	11	7
12" @ 33.33	22	12-14
12" @ 45.00	15	9

An interesting issue relative to running time, is how longer running times affect the frequency response of the program material. The main issue with has to do with the linear velocity of the cutting and playback heads as the needle moves towards the center of the record. Since the record is spinning at a constant angular velocity (33 or 45rpm), as the diameter of the cutting surface decreases (needle moves from the outer portion to the inner portion of the record), the linear velocity of the needle slows. The effect that this has on the frequency response is to lower the fidelity of the high frequency information and is perceived as a subtle 'roll-off' of high frequencies towards the inner grooves of a record. For this reason, many artists will resequence a particular vinyl side, placing the more dense and higher-fidelity track on the outer groove and place more sparsely arranged and quieter tracks towards the end of the side.

Another inherent issue with vinyl, is that due to the noisy nature of the medium, a standardized pre-emphasis curve is applied to the signal prior to cutting to the lacquer. This standardized curve, implemented in 1955, and known as the RIAA curve, requires approximately 6dB of gain per octave of gain upon cutting, and the inverse when playing back. Essentially, this standard 'pushes' down the high-frequency noise floor of the medium upon playback and improves the overall signal to noise ratio.

However, this pre-emphasis curve has a deleterious effect on loud, short-term high-frequency events, such as sibilant, fricative, and loud cymbal events, and can drive the cutting head into distortion. Therefore, during vinyl preparation, we will meticulously sift through masters and spectrally edit any offending high-frequency events so that they are much easier to cut and playback without potential distortion.

If you are considering manufacturing vinyl for your project, please consider the limitations of the medium and open a dialogue with us regarding the best course of action to maintain the highest quality for your project. We regularly work with the best cutting engineers in the country and can provide excellent vinyl preparatory services that will assist in realizing quality vinyl. Additionally, we keep tabs on which vinyl manufacturing facilities have the highest quality standards and can help to point you in the right direction.

— *Brent Lambert*