



**The
SoundLAB™**
at DISC MAKERS

MAKING A GREAT MASTER

ESSENTIAL INFORMATION FOR MUSICIANS,
ENGINEERS, AND PRODUCERS

REVISED 4TH EDITION

CHAPTER 1

The audio recording and manufacturing process

At [Disc Makers](#), scores of masters come through our doors for audio manufacturing every month. This gives us a particular expertise when it comes to the best methods for preparing your master—as well as knowing how to avoid mistakes. This guide will help clarify and simplify your transition from the artistic (i.e., writing and recording) stage of your project to the manufacturing stage. Use this to answer questions and help you produce a quality product with confidence and ease.

The audio recording and manufacturing process

The process of transforming your musical ideas into a finished product you can share and sell begins with your recording sessions and continues through the delivery of your packaged CDs, vinyl records, and digital audio files. The choices you make at each step affect the quality of your final product, so familiarizing yourself with this process at the earliest stages will help you produce the best possible results. In general, the process runs as follows:

Recording. Recording involves capturing instrumental and vocal sounds, using microphones or direct inputs, and storing them on a digital audio workstation (DAW)—or in some cases, on digital or analog tape. Some recordings are made direct to stereo, but the vast majority are recorded “multi-track,” meaning that the sounds of the different instruments are recorded and stored individually.

Mixing. Mixing is the art of blending individually recorded sounds through a console or on a DAW, controlling the level, EQ, and pan (stereo speaker placement) of each sound to create a final “mix” of your musical selections, or songs. These mixes are typically two-track stereo and are stored on the hard drive of a DAW or recorded to disc.

Master assembly. Master assembly means editing a collection of individual song mixes into a complete album master that flows from start to finish in the desired order and with the desired amount of space between selections. Due to the ease and control offered by digital waveform editing, digitally recorded songs are typically compiled on a DAW, with the material then transferred in assembled form to a DDP 2.0 (Disc Description Protocol) master, recordable CD (CD-R), or flash drive.

Audio master. The term “audio master” refers to the music files—for an individual single or a collection of tracks—that you have recorded, mixed, and are submitting for production.

Post-production mastering. Mastering is the final step in the recording process, which takes place after the mixing process (post-production) to optimize and add the final sonic touches to your recordings. When you send your master to a professional mastering studio like [The SoundLAB™](#) at Disc Makers, your overall program level is set, as are the song-to-song (AKA relative) levels. EQ, compression, and other digital processing is also used to make your recorded material sound as good as possible when played in the various listening environments of the customers who buy/hear the end product.

For CD and vinyl orders, once optimized through mastering, the resulting program is transferred to a “production master” for the manufacturing plant that will make the actual copies. Production masters are typically:

- DDP 2.0 master or CD-R for the CD plant; or
- a “master lacquer” for the vinyl record pressing plant.

Manufacturing. Manufacturing is the process of producing and packaging physical copies of the production master for distribution and sale.

- **Replicated CDs** (typically for quantities over 300). First, the production master is transferred to a “glass master.” Molds are made from the glass master, and from there discs are replicated in a multi-step process involving injection molding, stamping, and lacquering.
- **Duplicated CDs** (typically for quantities under 300). The production master is used to record or “burn” CDs in duplication towers using lasers to etch information on a recordable CD, or CD-R.
- **Vinyl records.** A master lacquer is created to make molds that are used to press the records.
- **USB drives.** The master is used to transfer data to multiple drives at a time in a USB duplication tower.

CHAPTER 2

Format options for your audio master

Audio files via upload through our web interface (WAV, AIFF, FLAC, etc.)

While there are several format options to choose from when deciding how to prepare and submit your master for manufacturing, most are provided to us via upload, as individual files, through our website.

[Our web interface](#) allows you to upload audio files of varying sample rates and bit depths. Note that audio files provided to us at a higher resolution than the standard 16-bit/44.1K for audio CDs will be converted as needed prior to manufacturing. One important feature of our web interface is that it allows you to stream your uploaded files as a proof before you finalize the submission of your master.

During the upload process, you will be asked to:

1. place your uploaded files in the proper sequence for your album.
2. indicate the spacing you would like between your songs.
3. provide the artist name, album name, and song titles that will be encoded as [CD-TEXT](#) on your final manufactured CDs. (CD-TEXT displays on many CD players.)

The two most frequently used file types are WAV and AIFF. They are identical in audio fidelity, and both are almost universally supported by any audio software package. Both WAV and AIFF files can be created in various levels of quality. At minimum, these files should be 16-bits with a sample rate of 44.1K. This is the industry standard “CD quality” audio.

FLAC files are also accepted, which are reduced-size lossless audio files, but you should avoid using lossy files (e.g., MP3) as significant audio content will be absent from the file.

DDP masters

DDP stands for Disc Description Protocol. It is an image file format that was specifically created for use as a manufacturing-ready master to be provided to CD replication facilities. A DDP master can be easily and securely uploaded through our website.

A DDP master is typically created by a mastering engineer using special software after the mastering of your album is complete and you have given final approval. Though there are some low-cost software options available for creating a DDP master, we highly recommend you have your DDP produced by a professional to ensure it is prepared correctly.

A DDP master contains your audio master, laid out exactly as you specify to your mastering engineer, with all song-to-song spacing, song order, and CD-TEXT information encoded. A DDP master also contains robust error-checking features that allow us to ensure the master file we receive via upload has not suffered any data corruption.

The Disc Makers Master Uploader App

Our [Master Uploader App](#) (MUA) is an app you can download from our website that allows you to create a manufacturing-ready master from individual audio files or a physical CD. You can import individual audio files or a physical audio CD master, adjust the song order and spacing (for individual audio files only), add CD-TEXT information, and proof your master prior to uploading to us by playing the album back in the app or burning a test CD. Once you are satisfied with the layout of your master, an image file is securely uploaded to us and stored on our servers for use in the manufacturing of your CDs.

CD-R masters

If you have a physical CD master that is laid out exactly how you want your final manufactured CDs to play, you can mail that to our facility. Due to the additional costs of processing a physical master, there is a small charge incurred for this master format.

DAT and analog tape

While these formats are increasingly rare, we do still get masters sent to us on tape. Note that these formats require additional care related to packaging and shipping and will incur additional costs to prepare the files for mastering. Always make a back up! Never send your only copy of your master analog or DAT master.

CHAPTER 3

Preparing your master

If your goal is to produce a killer CD, there are certain steps that must be taken in the preparation of your master.

First, your mix should come out of—and go back into—total silence. To do this, record for at least 15 seconds at the beginning and end of the song (for individual tracks) or audio program, with levels set at minimum. Check each track for clicks, bumps, thumps, and other strange sounds that sneak into almost every recording. Make sure your mixer's output is as clean and quiet as possible by listening to each track open all the way on headphones. Is there a hum or hiss that could be reduced or removed with proper grounding or a cleaner power supply? Experiment to find the optimal output level for your mixer.

Dynamic range

The dynamic range (the difference between the quietest and loudest sounds on the tape) of a digital recorder is in excess of 90 dB, but that's not true for all music formats, so make sure the dynamic range of your mix is not greater than that of your planned release format, particularly vinyl LPs.

What to provide on a digital master

Before you submit a final master to Disc Makers, take time to sit down and listen to it from beginning to end. Hear for yourself what is on the master and make sure you know what to expect when you receive your manufactured copies. If, at this point, there is anything you want to change, go back to the studio and fix it. Whatever is on your master will be on your finished product.

Make sure that all songs are in the proper order with the correct spacing between them. Decide now whether you are satisfied with the way the master sounds, taking into account the acoustics of the room in which you are listening. Any unexpected post-production required at the mastering and manufacturing stage will add to the cost of your project and the time required to complete it.

CD master preparation

When you submit a CD master to Disc Makers, you want to submit an audio CD that sounds just like you want the final CD to sound. The songs must be in the proper order, with the desired spacing between them.

Be sure to place a CD track or "index" marker at the start of each selection on your CD. These index markers will be transferred to your CDs and will make it easy for listeners of your CD to jump to each selection

as desired, including songs that fade into one another or have no discernible break.

- Listen to the CD carefully. It should sound exactly the way you want your finished product to sound.
- Make sure the disc surface is clean and scratch free. Use only a soft-tipped marker to label the CD, never a ball point pen.
- Place a CD track marker at the start of each selection.

Handle all masters carefully, both before and after recording. Touch CDs only by the edges and keep them free of fingerprints and scratches that can cause data errors. Make sure your master is clearly labeled with your contact information.

CHAPTER 4

Post-production mastering

Many people don't understand the post-production mastering process and see it as an unnecessary expense. Having committed months of devoted work to a project, and having taken advantage of the pre-mastering tools at your disposal, it is often difficult to understand how a total stranger could improve the final product. After all, if your mix didn't sound right, you wouldn't have left the studio.

Post-production mastering occurs after your recording is mixed and before CD and vinyl LP manufacturing are done. It is the last creative process in the recording/mixing phase of an album and the first step in the manufacturing process.

Every major- and indie-label release is mastered to prepare it for radio play and retail sale. The reason? A good mastering engineer puts the whole album in perspective, subtly enhancing and balancing the connection between songs and the focus of the project as a whole.

In the studio, you record one song at a time, resulting in songs that all peak at different levels (volume) and have different EQs, etc. A mastering engineer attempts to unify the album with skillful use of EQ, gain, and compression to give it a consistent sound from track to track, and to make sure that it will translate the way you want it to when your fans listen to it. This mastering process also allows the engineer to raise the overall level so your album is as hot as it can be, if that is your desire.

Mastering can also be helpful for fixing problems such as “pops,” out-of-phase tracks, and overall noise reduction.

Note that it is crucial to get the tones and mix you want during the recording process, before you get to the mastering stage. In mastering, the engineer usually has the entire, finished mix on two tracks, and while the mastering process can take a good mix and make it brilliant, it is not the forum for fixing individual tracks and mistakes that occurred during the recording process.

One advantage of using a third-party audio post-production facility is that an unbiased sound professional has the opportunity to evaluate your master and determine how to get the most out of your production in an acoustic environment created for the specific purpose of mastering music. After you've spent weeks or even months in the same recording studio listening to your music over and over again, a fresh pair of ears can put the project into perspective and make your album sound its best.

Our [SoundLAB](#) mastering engineers typically use a set of processors that include:

- Compressors, limiters, and expanders. These processors adjust the dynamics of a mix.
- Equalizers. EQs help the mastering engineer target specific frequencies within a track—or over your entire program—in an effort to adjust and enhance the tonal balance of your mix and recording.

To improve your recording, a mastering engineer can:

- Raise the overall level.
- Even out song levels and EQ individual tracks for cohesion.
- Correct minor mix deficiencies with equalization.
- Enhance flow by changing the space between tracks.
- Eliminate noises between tracks.
- Make your music sound great on any sound system.
- Add your [ISRC](#) codes.
- Add CD-TEXT information (artist, title, and track names that can be displayed by some CD players).

Your master is the template for thousands of your CDs to be produced for commercial release. If you are not mastering your audio recording, you are skipping what could be a crucial step in making your CD the best it can be.

The SoundLAB at Disc Makers previews masters at no charge to determine what benefits can be achieved, and offers affordable packages that include signal processing, equalization, limiting, and compression to raise your master to optimal commercial industry standards.

CHAPTER 5

Frequently Asked Questions

Can I use the Master Uploader App if I'm uploading content to be mastered by the SoundLAB?

Yes. The files created by the Master Uploader App can be used by The SoundLAB for your mastering project, however, if you have 24-bit master files, you should use our Online File Uploader to preserve the higher quality of your 24-bit files.

Why is CD mastering necessary?

In the recording studio, you record one song at a time, and the focus of the recording or mixing engineer is to make each song great. The result, however, is generally a collection of songs that all peak at different levels and may have different EQs. In the post-production audio mastering phase, a professional engineer unifies the album by using EQ, compression, and other processing to give it a consistent sound from track to track.

What does audio mastering do for my album's sonic quality?

Mastering can raise your album's overall level through the careful use of compression, so your album can compete with any major label release. The mastering engineer also ensures that your music will sound great—whether it's being played through a car stereo, a portable CD player, or a top-of-the-line stereo system. The sound of your album will be optimized, making it sound punchy, warm, and full, while raising the overall level (volume) and highlighting details that aren't already apparent. Mastering is also helpful for addressing issues such as "pops," out-of-phase tracks, and overall noise reduction.

What formats of audio master do you accept?

- DDP file set (on CD-R, DVD-R, flash drive, or via upload)
- Data files (WAV, AIFF, FLAC, etc.) on CD-R, DVD-R, flash drive, or via upload.
- Audio CD
- Digital Audio Tape (DAT)
- 1/2" or 1/4" Analog Tape

Do I get to review my CD after post-production mastering and before manufacturing?

Yes. We'll send you an audio reference CD or electronic proof online for you to listen to and review. It's the perfect time to compare how much mastering can do for your album. Listen to your original CD master after listening to your audio reference and you'll hear the difference.

Will you preview my master for free?

Absolutely. We're so confident that our mastering can make a huge difference in the majority of recordings, we offer a FREE master review—upon request—when you place a new CD replication order. A SoundLAB engineer will preview your audio master to determine whether or not your album would benefit from post production, with no sales pitch.

What else do you need besides my audio master to do post-production mastering?

You must complete and submit a [SoundLAB questionnaire](#) (and a [Track Listing Form](#) for physical audio masters). The questionnaire gives you the opportunity to provide us some important information that we can reference when mastering your project (e.g., overall volume, EQ, editing, and spacing preferences; other artists or recordings you like the sound of).

What if I'm not happy with the audio mastering after it's done?

If you're not satisfied, you pay nothing and we'll just do a straight transfer of your original master.

Do you have to order replication or duplication to use the SoundLAB?

No! The SoundLAB at Disc Makers' world-class mastering services are available to all artists, even if you are not ordering a replication or duplication package with us.

Is mastering relevant if I'm distributing my album digitally?

Without a doubt, yes. Any deficiency in the mastering on your songs will be readily apparent, especially when compared to releases from major labels. Things like lack of level, EQ issues, noise, etc. can be quite noticeable when your songs are played alongside releases from major label artists.

My engineer just gave me this CD. I don't know what's on it besides the order and length of the songs. Should I send it in anyway?

No, listen to it first! Do not send in a master if you do not know exactly what's on it. Most problems in mastering are easily avoided by spending a little time in the studio listening to the entire program one last time.

At what level should I digitally record my material?

It depends on where you're going next. If you are not mastering the project, have your peaks go up to zero. Remember, it'll be exactly the same on the replicated disc. If you are having your project mastered, leave some headroom for the mastering engineer, anywhere near the -6 dB range should be adequate.

Can I compile my master from MP3, AAC, or other lossy files?

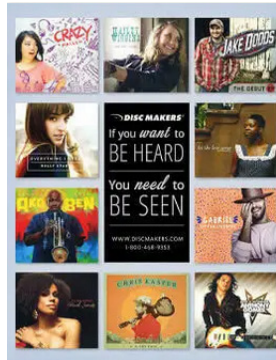
Technically, you can, but it is not recommended. These file types are heavily compressed, which lowers the audio fidelity. Use WAV (.wav.) or AIFF (.aif) files to avoid a loss in audio quality.

RESOURCES



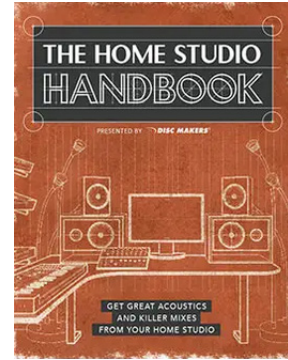
THE SOUNDLAB AT DISC MAKERS

Audio mastering for independent artists



DISC MAKERS CATALOG

Making your CD has never been so easy or affordable! Request a free catalog to see our entire line of audio, video, and print products and services.



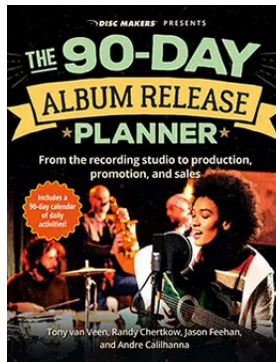
THE HOME STUDIO HANDBOOK

Your blueprint to getting great acoustics, awesome tones, and professional sounding mixes.



THE MUSICIAN'S GUIDE TO VINYL

The new and revised second edition tells you everything you need to know about recording, mixing, mastering, and designing a vinyl LP.



THE 90-DAY ALBUM RELEASE PLANNER

Learn how to successfully record, release, and promote your album in three months with this step-by-step guide.



DISC MAKERS BLOG

Dig into recording advice, marketing and promotion tips, and pro insights into navigating the music industry as an independent music artist.