

Mastering Sessions

After completing this lesson, you should be familiar with the following concepts:

- Mastering is the stage of production in which the finished mixdown is subjected to several specialized processors which attempt to make the audio easy to listen to, and as loud as possible.
- Mastering engineers are engineers who only work on mastering sessions. They use highly prized and specialized devices to carry out their trade.
- Multi-band compressors are compressors which split the incoming audio signal into three or more bands, each of which is then compressed with its own unique ratio and threshold settings. The advantage of multi-band compression is greater control over which parts of the audio are compressed, and can help to avoid the classic problem of high-end drop out during heavy compression.
- Psycho Acoustic processors can be used to trick the human ear into believing that audio is coming from somewhere other than the speakers. These devices and plug-ins can be used on one instrument, or even a whole mix to provide a much wider stereo image.
- Care must be taken when sequencing the pieces on a CD. The first, third, and last positions are special in terms of the amount of attention listeners give these spots.

Glossary for this Lesson:

CD Burner- A drive attached to a DAW which allows you to save music and data files to a blank CD.

CD-R- A blank CD intended for use in a CD burner.

Duplication Facility- A manufacturing plant whose purpose is to make thousands of copies of a CD.

Master Channel- A channel in a DAW which allows you to apply plug-ins which affect the mixdown channel. The master channel also allows you to sum the audio to mono to check for phase for problems and to create a fade out at the end of the song.

Master Inserts- Inserts found on hardware and virtual mixers. These inserts affect all channels, and are the best place to connect devices for mastering. On a DAW, these inserts are found in the master channel.

Mastering- The stage of production in which recordings are sweetened, and made to seem as loud as they can before they are put onto a CD.

Mastering Engineer- An engineer who only runs mastering sessions.

Multi-band Compressor- A compressor which splits program material into several bands, each of which can be compressed individually.

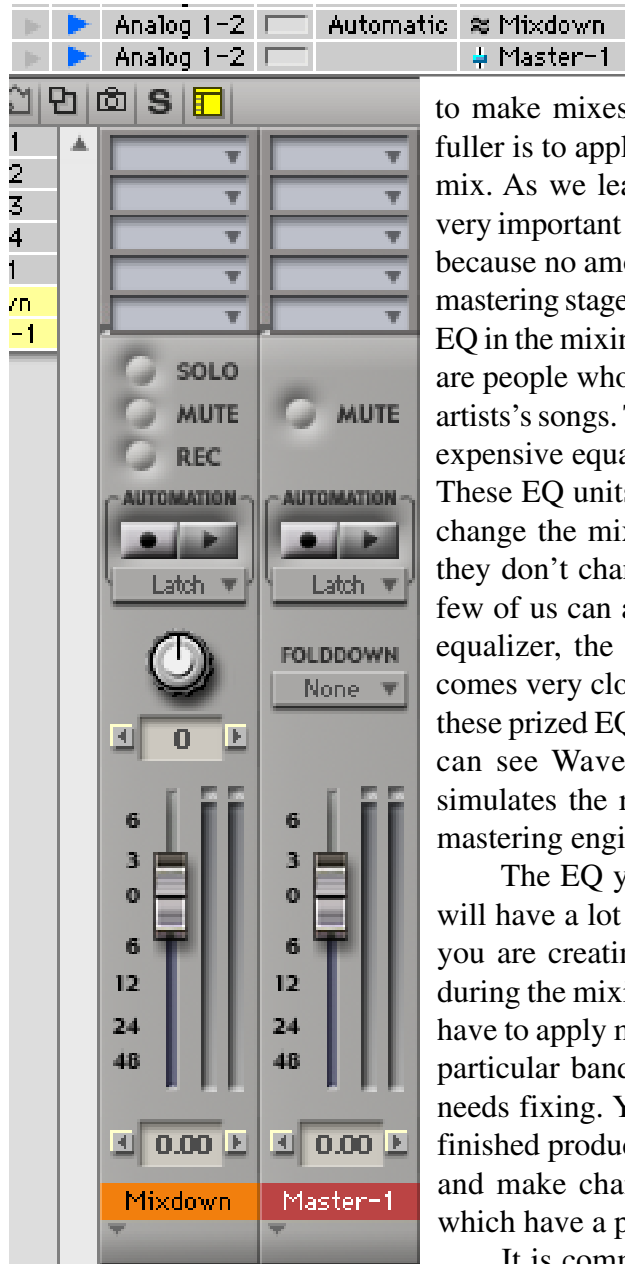
Psycho Acoustic Processor- A hardware processor or plug-in which allows an engineer to make sounds sound as though they are coming from someplace other than the speakers.

Sequencing- The process of determining the order in which pieces will appear on a CD.

Mastering Sessions

Your project was planned to the last detail, your tracking session went really smoothly, and you did a fabulous job of mixing your project. It would seem that you are completely finished with your project, but there is another step which is really important. **Mastering** is the stage in which recordings are sweetened, and it is also usually during the mastering stage that the order of the pieces on the album is determined if you have completed more than one piece.

The basic goal in mastering is to make pieces sound as clear, clean, and listenable as they possibly can. Mastering doesn't require the ability to do magic, but it doesn't hurt. Mastering is accomplished using the very same tools that are used on individual channels in a mix. Most digital audio programs (and hardware mixers) offer **master inserts**. These inserts function just like channel inserts, but instead of just affecting one channel, they affect all channels. These inserts are the perfect place to use different mastering devices (hardware or software). In Digital Performer, you must first create a **master channel**. Like aux channels, master channels can't hold audio. You must set the master track's output to the same output the mixdown track is set to. (See picture above)



TUNING IT UP

One of the best ways to make mixes sound sharper, clearer, and fuller is to apply additional EQ to the entire mix. As we learned in the last lesson, it is very important to get the EQ right in the mix, because no amount of creative EQing in the mastering stage will undo or cover up clumsy EQ in the mixing stage. **Mastering engineers** are people who do nothing but master other artists's songs. They often keep very rare and expensive equalizers around in their studio. These EQ units are prized for the way they change the mix (or in some cases the way they don't change the mix). Although very few of us can afford to spend \$4000 for an equalizer, the latest cutting edge software comes very close to delivering the sound of these prized EQ units. On the next page, you can see Waves's Renaissance EQ which simulates the rare and expensive EQ units mastering engineers prize.

The EQ you apply to a particular mix will have a lot to do with the type of music you are creating, and how well you EQ'd during the mixing stage. If you find that you have to apply more than ± 3 dB of EQ in any particular band, chances are that your mix needs fixing. You will end up with a better finished product if you go back to your mix and make changes to the individual parts which have a problem.

It is common for engineers to apply a slight boost to the very lowest sounds and the very highest sounds as our ears are not as sensitive to those sounds as they are to mid-range sounds.

FEELING THE SQUEEZE

As we learned in Lesson 8 in *Basic Music Technology I*, compression is very useful in making an entire mix sound louder, which is another thing mas-

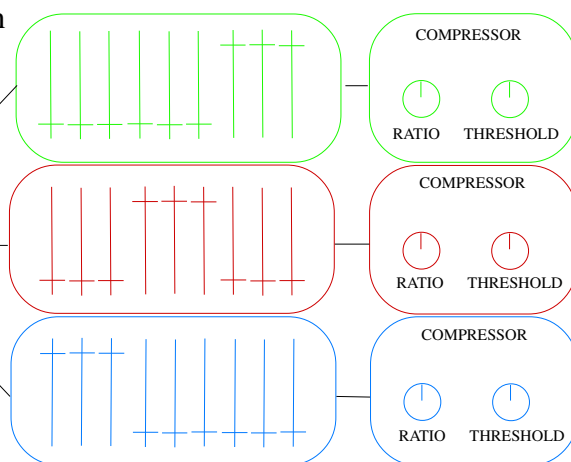


tering helps with. A special kind of compressor called a **multi-band compressor** is used in the mastering stage. A multi-band compressor is actually several normal compressors and EQ units in one device. A multi-band compressor is special in that it allows you to compress high sounds separately from low sounds.

Just like EQ units, multi-band compressors have different numbers of bands. Three band and four band are common, but some multi-band compressors have even more bands. Multi-band compressors work by splitting up an incoming audio signal into several identical copies (one for each band). Each copy is then sent to an EQ unit. These EQ units are

set up so that they cut out or turn down the volume on part of the sound. Look at the settings of each of the graphic EQ units in the picture to the right. The top graphic EQ unit is only allowing high sounds through, the middle EQ unit is only letting mid sounds through, and the bottom EQ unit is only letting low sounds through. Each

EQ unit feeds its own compressor. The outputs of the compressors are mixed together. This setup allows you to compress each band however you want.



ever, multi-band compressors make these changes based on how loud the incoming signal is, and not entirely on where you set the makeup gain knobs. Instead of being able to set EQ settings which remain set, these EQ settings constantly change throughout a mix! You can imagine how frustrating it would be to create a good mix if the EQ knobs of the mixer you were using were constantly moving by themselves!

The overall goal of multi-band compression is to apply about the same amount of compression to all bands, but to compress some bands a bit more, and some a bit less than others. Multi-band compressors aren't generally used to

heavily compress the dynamic range of a mix.

You might want to begin by setting all bands to a small amount of compression, and then increase the compression on the mid and low bands. Many engineers do not compress the high band at all, while oth-

ers apply a very small amount of compression to the highest band since compression tends to make people hear fewer high sounds. You might also want to set

the release controls higher on the mid and low band compressors as they will allow you to apply heavier compression to these bands. If you have used the compressor correctly, the mix should become tighter and more lively sounding. As with all plug-ins and hardware processors, experimentation is the key to mastery. The more time you spend with multi-band compressors, the more skilled you will become at using them.

A PSYCHO THRILLER

While perhaps not as exciting as watching someone being attacked in the shower, **psycho acoustic processors** can add a lot of sparkle and depth to your mix. The most common processors are those which adjust the stereo spread of the mix. Waves's S1 (shown below) allows you to make the stereo field seem to be wider or narrower. Other processors such as BBE and SRS also allow you to expand the stereo field. Whatever sort of processor you choose, (if you choose to use one) be sure that you do not apply it so heavily that it upsets the balance of the mix you worked so hard to achieve.

SETTING THE LIMITS

You are already familiar with limiters. The limiters used in mastering are not really very different from those used in mixing, but limiters used in mastering are usually capable of applying very heavy limiting without sounding like they are pumping. You

want to try to make a mix sound as loud as it can without sounding like it is being limited. This can sometimes be very difficult to achieve, but with the right tools, it is just a matter of trusting your ears. If you are unsure if you are applying too much limiting, try applying a little bit more and see if the sound gets worse. Make adjustments until you are happy with the sound you achieve.

THE ORDER OF EFFECTS

You may wish to experiment with using these processes and effects in different orders, but there are some things to note. First, you should put the limiter last when you are working on a DAW. This is because DAWs have a very specific limit on the level of volume they can handle. If the volume of your mix exceeds 0dB, you will get digital distortion, and it will be ugly. Furthermore, most duplication facilities will refuse to make copies of a disc with these kinds of digital errors on it. Putting your limiter last in your chain of mastering processors insures that you will never exceed a preset level.

Another important thing to note is that some psycho acoustic processors can actually cause changes in the dynamic level of certain frequencies. You may wish to place these processor before a multi-band limiter.

A DIFFERENT KIND OF SEQUENCING

Once you have mastered each and every piece which is going to go on an album, you may want to take time to play through them one at a time to hear the results of your work. You may be very surprised by what you hear, however. It may seem that some pieces are louder than others, and you may find that the EQ needs adjusting in some of the pieces. Before you go any farther, you may need to go back and remaster some or even all of the pieces to make small adjustments. Once they all sound equal in volume and equalization, you must do some **sequencing**. Although we spent some time



learning about sequencing earlier in this book, this kind of sequencing is very different. Here, sequencing refers to determining the order in which the pieces will appear on the finished CD. There are hundreds of things to take into account when sequencing the tracks for an album, but some of the most basic are the tempo and feel of the song, the key of the song, and what each song is about.

You might also want to consider some “special slots” on the album. For instance, the first track should be a track which is fairly upbeat, and which represents the overall feel of the album. For instance, if 11 of your twelve tracks are driving rap metal music, you probably wouldn’t want to put the lone acoustic love ballad first. Also, the second and third spots on the album are special places. You should save these spots for very strong pieces which you feel represent your best work. When listening to an album, your audience will have come to understand and get comfortable with your style by this point in the album, but they will still be fairly fresh. You will notice that a rather disproportionate number of hits on the pop chart at any given moment are either the second or third cut from an album. (The first slot is also a prime location.) Finally, you should also pay special attention to the last song on the album. Some

pieces have a certain indescribable quality about them that makes them excellent songs for finishing off an album. Listen to the final cut on several albums, and you will begin to notice this quality.

WHERE DO WE GO FROM HERE?

After the mastering process, a finished CD is burned using a **CD burner**, which is a special drive which uses a laser to create a CD from a **CD-R**, which is a recordable CD. This finished CD will then be sent to a **duplication facility** where large machines actually press CDs and print and package them.

Words To Know:

CD Burner
CD-R
Duplication Facility
Master Channel
Master Inserts
Mastering
Mastering Engineer
Multi-band Compressor
Psycho Acoustic Processor
Sequencing

Let's Review

1. What is mastering, and why is it necessary? In a commercial facility, who does mastering?
2. What are master inserts and master channels, and how are they useful during mastering?
3. What is sequencing, and what is important to consider while sequencing?
4. What are multi-band compressors, and how do they work? What is the advantage of using multi-band compressors?
5. Why is the order of effects in the master channel so important?
6. What happens to commercial CD projects when they are finished?