

MASTERING BASICS

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I started doing mastering work for friends not because I was any golden ears engineer -- it was more because I had a CD burner and enough disk space to hold a whole CD -- which none of my friends had.

So when faced with the job, I asked the few people I knew what you had to do to master. To my shock and amazement, there wasn't a whole lot to the whole process. They talk about 'mastering wizards' like Bob Clearmountain, and I have no doubt that there are people out there that not only have the gear and the ears to do a better job than I do. But what mastering comes down to is three steps:

1. Make it sound good.
2. Make all tracks sound more or less the same level and EQ wise.
3. Make it loud.
4. Sequence it.
5. Give the customer a test copy.
6. Go back to step one until the customer is satisfied.

Now that may be the oversimplification of the century, but there really isn't much you can do to mastered tracks without screwing up how they sound, so it's best to do as little as possible.

1. Make It Sound Good

There's the rub, eh? Well there are a few rules of thumb.

RULE 0: Good monitoring

You've already got near field monitors, a beefy amp and an acoustically optimized control room, right? You don't? Well here's a secret -- a great monitoring setup is nice, but more important is to know how your setup colours the sound. How do you find this out? The best method I've found is to just do the best you can to make it sound good on whatever your listening to in the studio, and then try it in a number of different systems. Take it to the car, the living room, the boom box, even your alarm clock radio. If it sounds bad in any of those settings, then you need to try and figure out what you need more of and what you need less of.

What you'll find out is your first instinct is to make the bass and high treble too loud. This might sound dope in the studio, but it really makes cheap speakers sound like ass. Too much bass and car stereos will make a rude farting noise. Too much harsh treble can grate like fingernails on a chalkboard.

The big secret is this -- you need to mix so each frequency band is present but not louder than any other. If someone blew out their ears at one too many Def Leppard concert, they can jack the treble. If they want to make their jeep rock, they can jack the bass. And people who just leave the tone controls alone will get a nice solid mix that can survive even Kmart boomboxes.

Beyond that you just need to listen and screw around with EQ for a while. Listen for overall tonal balance, and then go fishing for the right frequency band to boost or cut. Some

common problems are rumbly bass, which you fix with some very gentle cutting. And there is a kind of sound that I call 'boxey' which sounds like it's being played on bad speakers. This problem can be fixed by gently cutting the frequencies between 1000hz and 4000hz.

If the mix sounds too trebly, don't just cut the treble. If possible, use a cut -- again, start out gentle (-3db) and cut a band between around 4000hz and 12000hz. That is where most of the high frequency information lies. Above 12000hz is what's sometimes called the 'air' band. You can leave this intact, or boost it gently. A lot of the spatial information and nuance lies above 12000hz.

And I recommend always using a low cut filter centred as low as you go -- I usually go to around 16hz. No speaker can reproduce any audible signal in that range, and leaving signal down at that frequency robs you of power in the audible frequencies. With the 'rumble band' filtered out you can sometimes pull down the overall signal by -6db, which means that you can make the audible part of the program material twice as loud.

2. Making It Sound Even

Just with the EQ changes made it's useful to burn a CDR or run off a cassette and listen to it. Now listen to it for jarring differences of signal level. You want to try and make all the tracks sound like they're meant to be heard one after another, so if there's a big jump or drop in volume between tracks, then the listener has to adjust the volume.

It's pretty easy to match track volumes empirically. If you have Sound Forge, you can choose tools->statistics on a track. It will tell you the RMS volume of the track. This is the power measurement of the track, as opposed to the level measurement. Then, on each successive file, use the Process->Normalize command. Sound Forge does a pretty good job of peak limiting when it raises the signal level. If the RMS level of the tracks match up, then the volume change between them will be fairly smooth.

3. Making It Sound Loud

You can just normalize, but that usually doesn't do what you think it will. There seem to always be peaks in the files that are much louder than the overall track. I usually deal with this visually in the sound editor when using a compressor to tame peaks. You want to set the compressor threshold at a point where it will level peaks by maybe -3db. For peak limiting on the computer, I tend to set the attack and release to zero and then lengthen the release and attack until I stop getting clicky artefacts. You want the attack to stay pretty short, but the release you need to tweak until it sounds smooth. And smooth usually means increasing release time.

The threshold will vary from file to file -- quieter tracks will need a lower threshold.

After you get things compressed, then really all you do is normalize. It's recommended to normalize to a little below digital full code -- normally about -.02 or -.03 down. This has something to do with the math of how digital to analogue converters and CD players work.

4. Sequence It

Use your favourite CD mastering software to build a CD image. The cheapest way to go is to buy Wavelab -- CD authoring is built in, and gives you control over sequencing, track gaps, etc.

5. Let the Client Have a Test Copy

You will be surprised at what kind of critiques you'll get from clients. Assuming you haven't left out tracks or put them in the wrong order, they'll listen and have all sorts of ideas about what could be better. Listen to their ideas, and be prepared to try and interpret what they want. If you can set it up, have them come into the studio and let you tweak things until they're happy. Ultimately that's what matters -- if they go away happy they'll be back.

And you may disagree with a customer on what to do with particular tracks. The thing to do then is to say, "I hear what you're saying, and I'm going to try and get as close to that as I can. But my feeling is that if I do X Y and Z you may like the result better." For the most part, if the customer actually makes good music, then their ears aren't going to be violently different than yours. But beware Death Metal and Grindcore bands. They want it loud first second and third. With them, you can do it the right way, and then turn your speakers way up when you play it for them. It will sound loud to them, and make them go home happy, but it won't be too loud to play back on normal stereos.

And it is possible to work on music that you don't personally enjoy. A funny thing happens when you're mastering -- you're listening not to the content, but to the sound of it. I've mastered Gabber, and for the time I was working on it, I could hear when it was good and bad. If I'd heard it in any other context, it would never sound good, because fundamentally I don't like it very much.