

Editing Dynamics

Compressors

And their dynamic
cousins: Limiters and
Gates

- **Dynamics**

- The range of levels from quietest to loudest

- What has the *least* dynamic range?

- Television commercials never get quiet.
- Radio mixes are designed so all the parts can be heard above the road/wind/engine noise – DJs and Talkers also compressed.

- What has the *most* dynamic range?

- Cinema
- Classical and jazz genre music

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Compression

- Making the difference between the highest level and the lowest level *less of a difference*.
- Used for?
 - Making sure a particular track, sound or instrument is always audible
 - It is never allowed to get quiet.
 - Keeping the level of the sound even
 - No surprise peaks jumping out.
 - Making a final musical mix more “energetic”
 - Making commercials difficult to ignore

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Compression Settings

- **Threshold** (dB)

- Compressors usually work in two steps by **1st** holding the peak levels down, then **2nd** amplifying the whole signal back up.
- *The threshold control* sets a level in dB. Whenever the sound rises above the threshold level, the compressor starts to compress. Any sounds below this level are not affected.
- So as you lower the threshold, more of the sound is affected.

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Compression Settings

- **Ratio**
 - How much compression does it do?
 - Compares the dynamic range before (“input”) and after (“output”) compression
 - Example: A ratio of 2:1 means if the input rises above the threshold by 2 dB, the output will only change by 1 dB. Or if the input rises above the threshold by 10 dB, the output will only rise 5 dB.
 - Typical ratios?
 - Electric guitar in pop music ratios 4:1 to 10:1
 - Vocal track ratios 2:1 to 6:1
 - So the bigger the ratio, the more effect.

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Compression Settings

- **Gain Make-up** (dB)

- After the compressor pushes the peaks down, the gain make-up brings up the track’s output level. Everything gets louder: peaks and quiet sounds.
- The peaks are now just as loud as they were before the compressor, but the quieter passages are now also louder.

- **Net result?** Now only the quieter sounds seem louder, easy to hear. And the track, on the average, seems louder in a pleasant way.

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Compression Settings

- **Attack** (set in milliseconds - ms)
 - If the level of the input rises, sets how long the compressor will wait until it starts to turn the level down.
 - Very short attack times, < 5ms, take energy out of the sound, take the bite out of an acoustic guitar
 - But give you lots of control. Keeps all peaks suppressed.
 - Longer attack times allow more of the initial punch of the sound through.
 - Same “attack” as in a sound envelope
- So the longer the attack, the more sound gets through before the compressor kicks in.

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Compression Settings

- **Release** (ms)
 - Once the compressor starts to hold down the level, if the input gets lower, how long before the compressor stops holding the output down?
 - Typically set *fast* on a vocal (depends on style)
 - Typically set *slow* on an electric guitar
 - A fast release can create a “pumping” sensation. You can start to hear the volume changes. Annoying

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Software Compressor



Typical Graphical Interface

Input level along bottom of graphic. Output is vertical. When operating, keep an eye on the REDUCTION meter. It shows you when and how much the level is being pushed down.

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Studio One Channel Strip

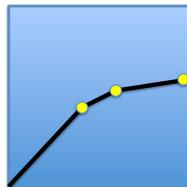


Makeup Gain
This indicator turns red when the level is being compressed down. Single control clockwise: turns the *ratio* up, and moves the *threshold* down.
The Expand tool is a type of a gate. It can reduce noise in quiet passages.

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Other Terms

- **Soft Knee**
 - A type of threshold that is “curved”
 - Not as perceivable to the listener in some cases.
 - More subtle and “natural”?



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Hardware Compressor



“FAST” Two options for attack time
“HARD RATIO” Two options: subtle or limiter-like
“OUTPUT” Gain Make-up
“ENHANCER” Puts back in some sibilance that may have been lost
“OPTO” Uses a bit of analog technology that some believe sounds more natural

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Settings to Start

- **Vocals** (light compression, not obvious)
 - *Threshold* set so there is 3 dB gain reduction
 - Or just enough to be noticeable. Many compressors have a “gain reduction” meter that will start to show how much reduction is happening.
 - *Ratio* set between 2:1 and 6:1
 - *Attack* set fast
 - *Release* set medium

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Settings to Start

- **Buss compression applied to the whole mix at the main output**
- (light compression, sweeten the mix)
 - *Threshold* set low so it doesn't *just* affect the louder parts – gain reduction -.5 dB to 2 dB
 - *Ratio* set between 1.5:1 and 3:1
 - *Attack* set slow
 - *Release* set fast – or sometimes to the temp

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Settings to Start

- **Rock Guitar** (typical fairly heavy compression)
 - *Threshold* set so there is 10+ dB gain reduction
 - *Ratio* set between 10:1
 - *Attack* set fast
 - *Release* set slow

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Settings to Start

- **Pop Electric Bass** (typical moderate compression)
 - *Threshold* set so there is 6+ dB gain reduction
 - *Ratio* set between 2:1 + on up (to producer's taste)
 - *Attack* set 10 -15 ms allows for punchy note
 - *Release* set medium to hold the notes a little (to producer's taste)

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Settings to Start

- **Percussion** (typical moderate compression)
 - *Threshold* set so there is 6+ dB gain reduction
 - *Ratio* set between 2:1 + on up (to producer's taste)
 - *Attack* set 7 -15 ms allows for percussive sound
 - *Release* set medium to fast
 - Leakage can easily cause audible problems. For example, a bass drum in the background can cause the track to pump badly. Be sure to put high-pass filter ahead of compressor!

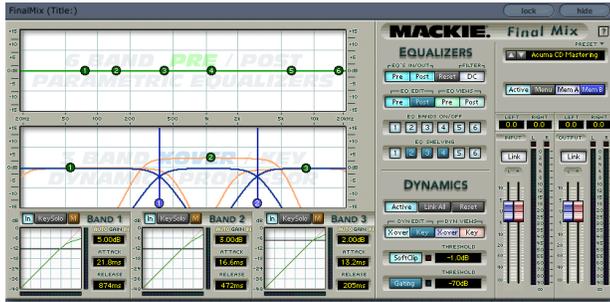
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The Multi-band Compressor

- **First** divides the frequency spectrum of the sound into 2 or 3 bands,
- **Second** applies a separate compressor to each of the frequency bands.
 - Example: compress the bass sounds one way and the narrator/voclist a different way, in the same track.
- Often used as a *final touchup* to any production. Great for *normalizing* in a comprehensive way. Clips not only have similar levels, but similar frequency balance. Lots of control! Takes practice to use well.
- Great for *revitalizing* old sound files.

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3-Band Software Compressor (with EQ)



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The Limiter

- A specialized compressor
- Used to simply keep a sound level from getting any higher than a specified value
 - Very high ratio: **10:1** up to **∞:1**
 - No make-up gain
- Great when recording: No chance of clipping
- Useful in mixes to control occasional peaks
- But effect can be audible in a bad way, especially with tracks that have more than one sound

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The Noise Gate

- Has a compressor in it
 - Threshold is set but the compressor operates only when the level drops **below the threshold**.
 - No Gain Make-up
- Great for reducing tiny, just-barely-noticeable, background sounds such as...
 - air-conditioning when recording a narration.
 - buzzing that appears in many guitar amps when the volume is turned up.
- But it can produce a “breathing” sound in the background as the noise (usually “hiss”) is pushed down between other sounds.

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