

## 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 genre music

### 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
  - Keeping the level of the sound even
  - Making a final musical mix more “energetic”
  - Making commercials difficult to ignore

### Compression Settings

- **Threshold** (dB)
  - Compressors actually work in two steps by **1<sup>st</sup>** holding the peak levels down, then **2<sup>nd</sup>** amplifying the whole signal back up.
  - *Threshold* sets the (**1<sup>st</sup>**) level above which the compressor starts to compress. Any sounds below this level are not affected in **1<sup>st</sup>** step.

### Compression Settings

- **Ratio**
  - How much compression does it do?
  - Compares the dynamic range before (“input”) and after (“output”) compression
  - Example: 2:1 means if the input changes 2 dB, the output will only change 1 dB
  - Typical ratios?
    - Electric guitar in pop music 4:1 to 10:1
    - Vocal track 2:1 to 6:1

### Compression Settings

- **Gain Make-up**(dB)
  - After the compressor pushes the peaks down, the gain make-up brings up the output level
- The result is that the peaks are now just as loud as they were before the compressor, but the quieter passages are now louder.

## Compression Settings

- **Attack** (set in milliseconds - ms)
  - If the level of the input rises, how long will the compressor 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
  - Longer attack times allow a little of the punch through
  - Same “attack” as in a sound envelope

## 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

## Software Compressor



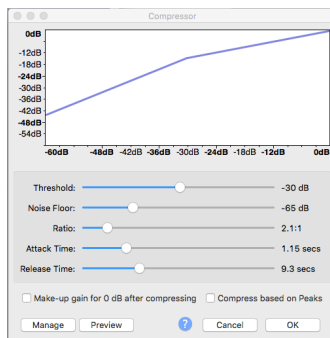
### Typical Graphical Interface

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 compression is actually being done.

## Software Compressor: Kotelnikov (Free version from Tokyo Dawn)

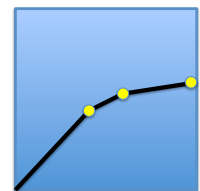


## Software Compressor: Audacity



## Other Terms

- **Soft Knee**
  - A type of threshold that is “curved”
  - Uses 2 different *ratios*, a gentle one at lower threshold, and a more severe one as the levels get higher
  - Not as perceive-able to the listener in some cases.
  - More subtle and “natural”

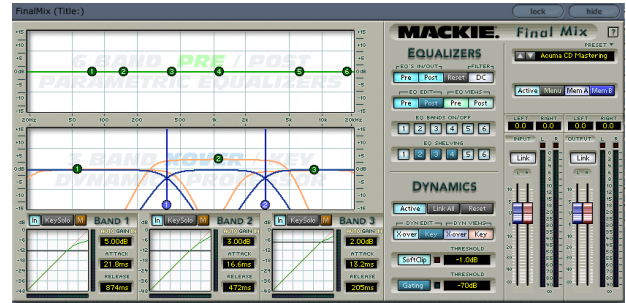


## Hardware Compressor



- "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

## 3-Band Software Compressor (with EQ)



## Settings to Start

- **Vocals** (light compression, not obvious)
  - *Threshold* set so there is 3 dB gain reduction
  - *Ratio* set between 2:1 and 6:1
  - *Attack* set fast
  - *Release* set medium

## 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

## 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

## 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)

## 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!

## 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

## 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.

## 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.