

INTRODUCTION TO MUSIC PRODUCTION – WEEK4

CATEGORIES OF EFFECTS

- BY AKASH KODIGANTI (B. TECH - INDIA)

The audio chain as part of the production/mastering phase involves an inverted pyramid structure as said in our class. Effects can be applied in different orders and sometimes in a parallel audio chain.

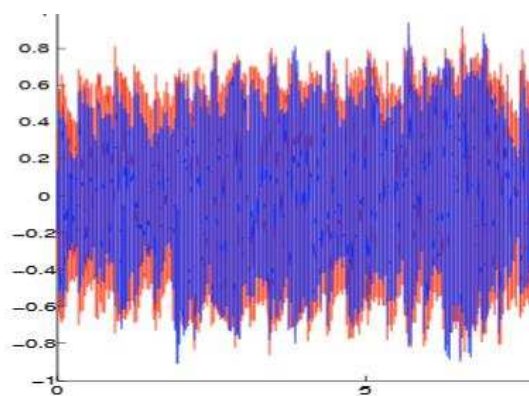
Controller Values in any MIXER has the following functions:

- ✓ Channel Volume – Dynamic Effect (Based on Amplitude)
- ✓ Sound Variation – Delay Effect (Based on Propagation)
- ✓ Sound Timbre – Equalizer Effect (Based on Filtering properties)
- ✓ Stereo Balance – Panning Effect (Based on Attenuation & Propagation)

1. Dynamic Effects:

I. Compressors:

Compressors & Limiters work the same way and these devices/plugins used to reduce the dynamics of the input signal.

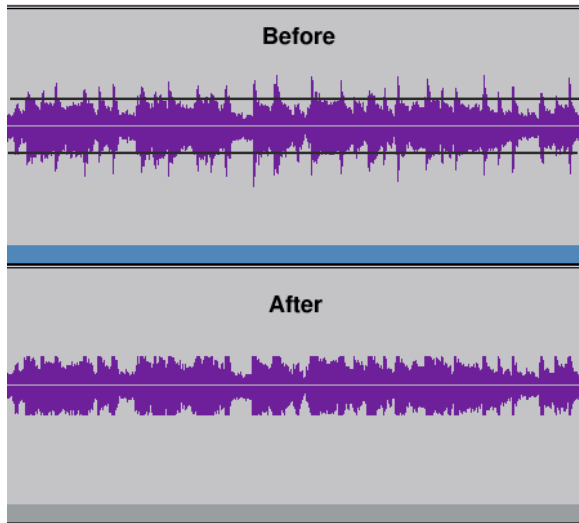


- ✓ The 'quiet parts' are boosted up
- ✓ And same levels are maintained for 'loud parts' in **Compressor** (not exactly decreasing the overall sounds).
- ✓ Compressor also helps from damaging equipment.
- ✓ Original – Red, Compressor - Blue

Fig1.1: Signal before & after applying Compressor effect

II. Limiters:

Limiters when applied prevents signal spikes by limiting to a static curve as shown here.

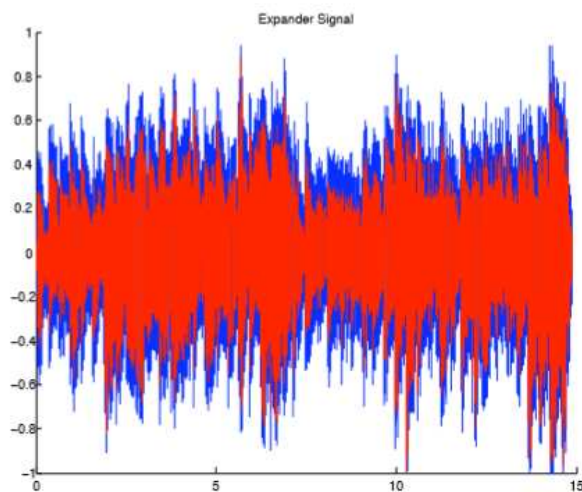


- ✓ The signal before is having spikes which may damage the equipment
- ✓ After applying limiter effect the spikes are removed and the signal is maintained at a static curve
- ✓ Limiting is used not only on single instrument but on final (multichannel) audio for CD mastering, radio broadcast etc.

Fig 1.2: Before and after applying limiter effect

III. Expanders:

Expanders are the devices/plugins that operate on low signal levels and boost the dynamics in these signals. Used to create a livelier sound characteristic.



- ✓ It works exact opposite to compressor effect
- ✓ The original signal – Red color
- ✓ Expander Effect – Blue color

Fig 1.3: The compressor effect input & output

IV. Noise Gates:

As compressor which attenuates signals *above* a threshold, noise gates attenuate signals that register *below* the threshold.

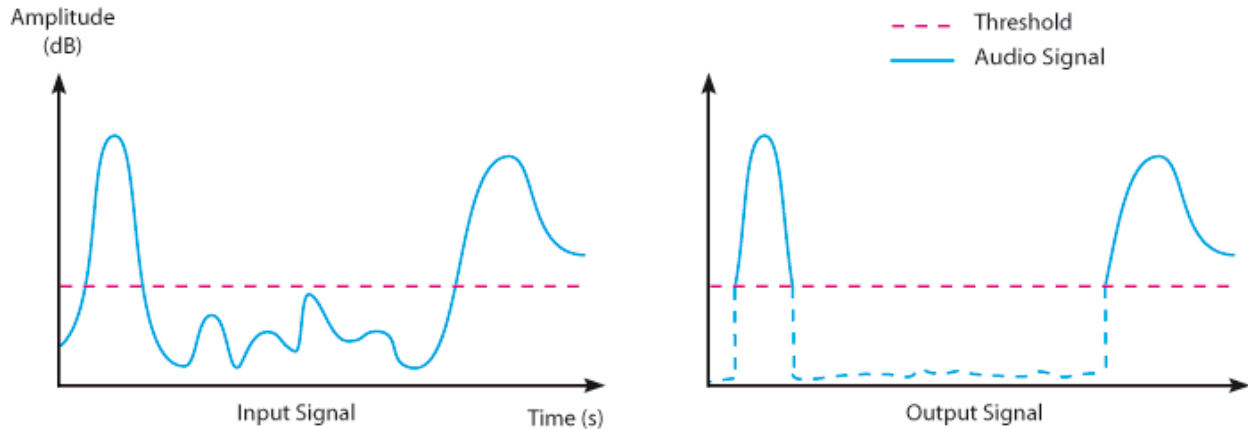
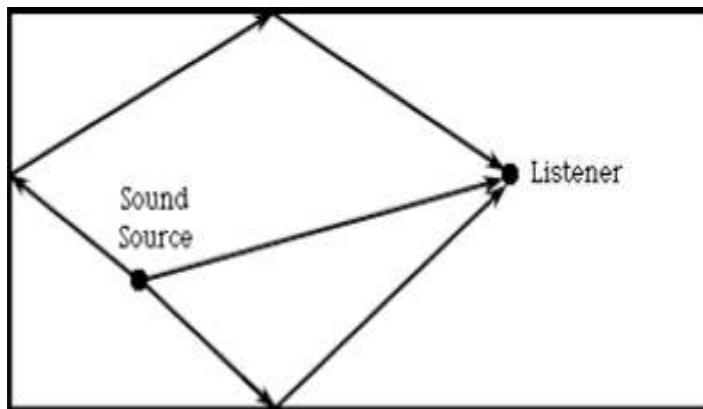


Fig 1.4: The below threshold hence removes the bottom part of the signal.

2. Delay Effects:

I. Reverbs:

Reverberation is probably one of the most heavily used effects in audio. Reverb is the result of the many reflections of a sound that occur in a room.



- ✓ From any sound source, say a speaker of your stereo, there is a direct path that the sounds covers' to reach our ears.
- ✓ Sound waves can also take a slightly longer path by reflecting off a wall or the ceiling, before arriving at your ears.

Fig 2.1 The Reverberation effect

II. Phasers:

A phaser is similar to the implementation of a bandpass filter with a notch filter replacing the bandpass filter.

A bandpass filter with a (modulated) time varying Centre (resonant) frequency and a small bandwidth. Filtered signal mixed with the direct signal.

III. Flangers & Chorus:

Flanger effect is a popular effect made from the Comb Filters (FIR & IIR filters).

Basically the effects like Flanger, Chorus, Slap-back, Echo are much similar when compared but with just delay ranges as shown

Effect	Delay Range (ms)
Resonator	0 ... 20
Flanger	0 ... 15
Chorus	10 ... 25
Slapback	25 ... 50
Echo	> 50

Fig 2.2 Difference between the Delay effects

3. Filter Effects:

I. Basic filters:

Filters by definition remove/attenuate audio from the spectrum above or below some cut-off frequency. For many audio applications this a little too restrictive.

Low-pass filter: Only allowing lower pitches while removing higher as shown below.

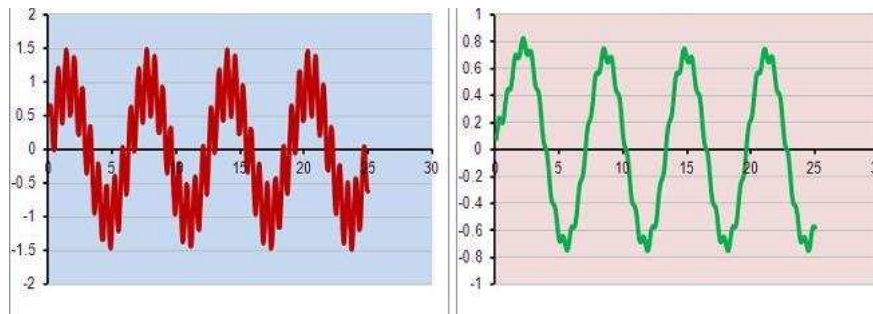


Fig 3.1 Input & output of Low-pass filtering technique

Similarly, the High-pass allows high pitches while removing lower ones and Band-pass allows only selected range of pitches (or frequencies).

II. EQs:

Equalizers, by contrast to basic filters (low-pass or high-pass), enhance/diminish certain frequency bands whilst leaving others unchanged

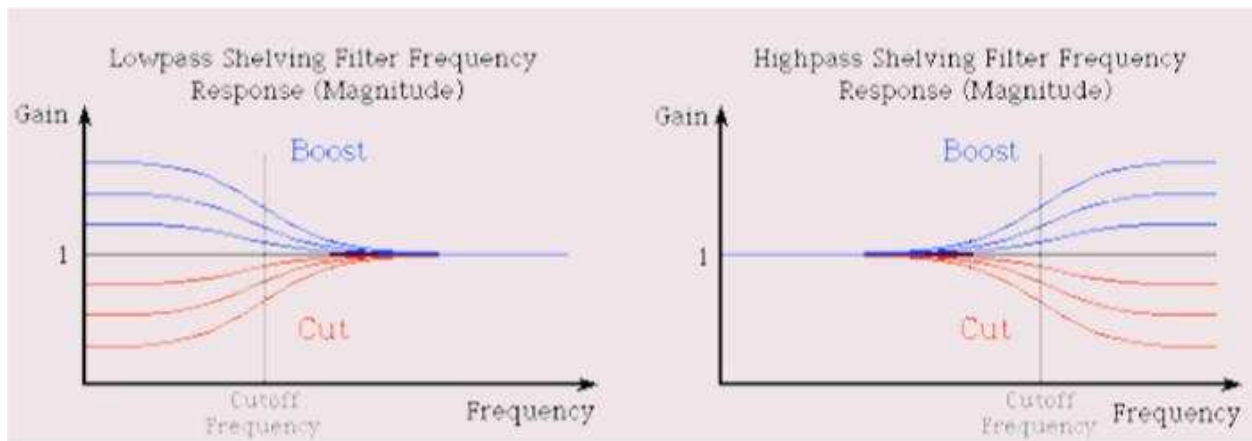


Fig 3.2 Enhancing and diminishing the lower & higher frequencies.

4. Other Effects:

I. Panning Effects:

What is Panning? Mapping a monophonic sound source across a stereo audio image such that the sound starts in one speaker (R) and is moved to the other speaker (L) in n time steps.

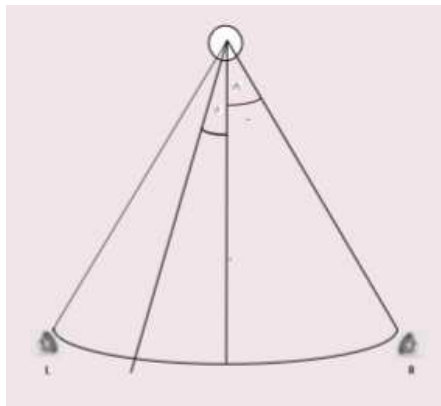


Fig 4.1 Panning effect phenomenon

- ✓ We assume that we listening in a central position so that the angle between two speakers is the same.
- ✓ This effect is the most used effect by many sound engineers and musicians.

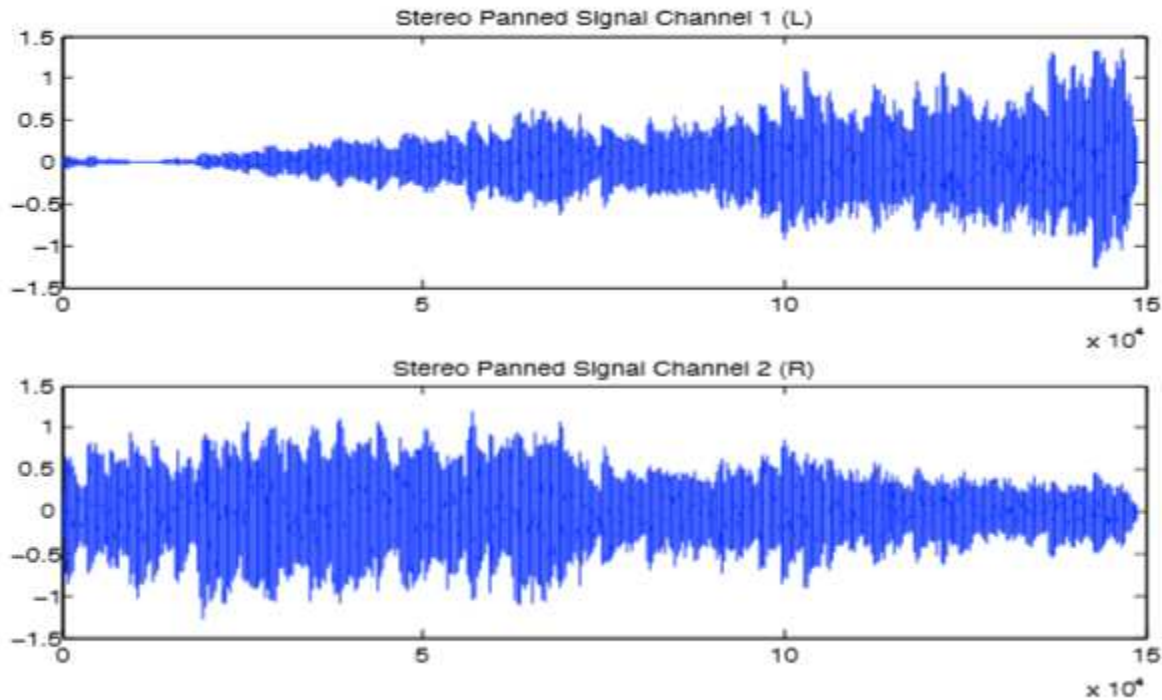


Fig 4.2 Left & right channel volume levels as when heard first Right then panned to left.

Additional information:

1.Reverb vs. Echo vs. Delay

Delay — can produce a similar effect but there is one very important feature that a simple delay unit will not produce: The rate of arriving reflections changes over time. Delay can only simulate reflections with a fixed time interval.

Echo — implies a distinct, delayed version of a sound, E.g. as you would hear with a delay more than one or two-tenths of a second.

Reverb — each delayed sound wave arrives in such a short period of time that we do not perceive each reflection as a copy of the original sound. Even though we can't discern every reflection, we still hear the effect that the entire series of reflections has.

2. Ordering of effects in a studio environment:

Selection of effects and the ordering is a matter for the sound you wish to create. There is no absolute rule for the ordering.

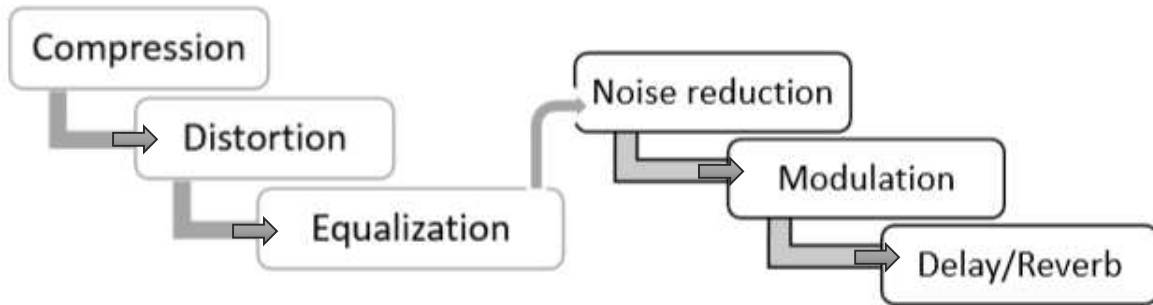


Fig2: The best practice of sequential steps followed by music masters