

Definitions of common studio equipment terms

EQUALIZER

Equalizers are one of the most important tools to shape the sound quality of a recorded or live signal. Equalizer designs are multi-faceted and can get pretty complex. Here is a list of standard definitions:

Shelving- The term 'Shelving' describes a filter band that adjusts all frequencies above or below a center frequency. Two controls are involved- frequency and cut/boost. A hi-shelf EQ typically has a frequency of 8khz and a cut/boost control of +/-12dB. A low-shelf EQ has a frequency of 80Hz and a cut/boost control of +/- 12dB.

Parametric- A parametric band on an equalizer consists of three control parameters- Frequency, Cut/Boost, and Bandwidth (expressed as 'Q'). Bandwidth specifies how 'narrow' the EQ is working- how wide beyond its center frequency it is effective. A 'Q' of 1 means that it is 1 octave wide, while a setting of 4 means 1/4 of an octave. The higher the 'Q' the narrower the actual spread. The lowest 'Q' is usually 0.25 (4 octaves).

Hi-Pass and Low-Pass- fixed frequency and fixed bandwidth filters (e.g. 12khz at -6dB per octave, or 80 hz at -12dB per octave). Used to filter low frequency rumble or high frequency hiss. Usually appears as an on/off button on a mixing board.

COMPRESSOR: A compressor is an 'automatic' level control device that sets audio levels based on certain parameters, such as threshold, ratio, attack, release, and gain. These parameters allow the user to set how much compression will be applied how quickly for how long to an incoming signal.

Threshold- sets the point of signal strength required to trigger the compressor. The lower the threshold the earlier the compressor engages.

Ratio- The ratio determines the input/output ratio for signals above the threshold. For example, a 4:1 ratio means that a signal overshooting the threshold by 4 dB will leave the compressor 1 dB above the threshold. The highest ratio of ∞ :1 (infinity to 1) is commonly achieved using a ratio of 60:1, and effectively denotes that any signal above the threshold will be brought down to the threshold level (unless some attack is in force).

Attack and release- these parameters provide a degree of control over how quickly a compressor acts. The 'attack phase' is the time period during which the compressor is increasing gain reduction to reach the level that is determined by the ratio. The 'release phase' is the period when the compressor is decreasing gain reduction to the level determined by the ratio, or, to zero, once the level has fallen below the threshold.

Gain- also called *Makeup Gain*. Allows user to add signal strength to compressed signal.

Over the last five decades a variety of different compressor designs have emerged that have become known for particular musical qualities, such as the LA-2A, 1176, Fairchild 670, dbx160, and others. Each design has a specific sound and a skilled engineer knows how to use each compressor for its particular dynamic qualities.

Typical compressor settings

Light- a ratio setting of 1.1:1 to 1.5:1. These settings are subtle and retain most of the dynamic range of the input signal with only slight restriction of the transient characteristics of the signal. These settings are appropriate for vocals as normally encountered in Ballads that have quiet passages in the verse section with much louder portions of signal typically found in the chorus sections of a song. The lower ratio settings give greater range within the performance. These settings are useful for dramatic readings and spoken word performance.

Medium- Ratios ranging from 1.6:1 up to 2.5:1 will be effective when more control over transients is necessary. Examples for applications where this might be desired would be program content that is less uniform in loudness and less variance is needed between the quieter and louder portions of the signal being processed. A medium tempo song with a vocalist who generally stays “on” the mic is an example where one of these settings would be useful.

Heavy- Ratios from 2.5:1 up to 10:1. These settings provide the greatest control over signal transient content. The range within the performance is restricted with these settings allowing the least divergence from the loudest to the quietest portions on the signal being processed. These settings are very useful when control is more important than the dynamics within a performance. Also useful for drums that have too much attack or electric bass that is thin or uneven.

Peak Limiting- Ratios above 10:1. A Peak limiter allows very little transient energy to rise above the threshold. Useful to limit recording levels but lethal to the sound quality if not set properly.

Remember that the threshold setting affects how much compression is applied. A lower threshold of -20dB with a ratio of 2:1 may yield more compression than a higher threshold of 0dB and a ratio of 4:1.

EXPANDER

An Expander is a processing device used to increase the dynamic range of the signal (as opposed to a compressor which decreases the dynamic range). Expanders can make quiet sounds quieter and loud sounds louder. *Downward expansion* provides a hybrid result, i.e., signals above the Threshold are untouched while those below the Threshold are attenuated at a ratio set by the Ratio control. Downward expansion is used for noise reduction. Setting the Threshold level to just below quietest usable level and adjusting the Ratio to 3:1 will cause the Expander to decrease the signal below the point set by the threshold as soon as the signal stops. This level decrease will occur at the rate set by the ratio setting, in this case 3:1, effectively eliminating any unwanted noise from coming through.

DE-ESSER

A de-esser is a special type of compressor designed to operate only at predetermined frequencies to reduce the effect of vocal sibilant sounds such as S's at the beginning and ending of words, for example. A typical De- Esser has a variable threshold range from -40 dB to +20 dB. The frequency of operation is determined by selecting the most effective frequency with the Frequency Range controller (typically from 1kHz to 8kHz). Annoying “S” sounds can be completely removed leaving the desired signal intact with the proper adjustment of the frequency and threshold controls.