Compressors / Limiters / Noise Gates / Delays / Reverb / Effects – A Few Basics

1. **What is a Compressor?** Dynamic range is the difference between the loudest level and the softest level. A compressor can reduce the dynamic range by making louder levels softer, and softer levels louder.

2. **What is a Limiter?** Basically, a Limiter is a type of compressor used mainly to ensure that levels remain at a constant level. Example: If you adjust a Limiter to a specific "higher-level" setting – then no matter how much the input level varies – the output will not go above the adjusted level setting. A Limiter can also be adjusted to a specific "lower-level" setting and the output will not go below the adjusted level setting. A Limiter adds specific limits on the dynamic range of signals.

3. **What is a Noise Gate?** Noise Gates are used to control unwanted noise in your sound system. After a Threshold point is set, and signal drops below this point – the Noise Gate prevents signals from reaching the output by reducing the gain to below zero. A properly adjusted Noise Gate can tighten up and add "punch" to percussion sounds. Adding a Compressor / Limiter and a Noise Gate to drum recordings is a common practice in the studio.

This is a screenshot example of a Noise Gate used in the Apple DAW "Logic Pro"

Additional study and hands-on training with Sound Processors will be very beneficial to a technician's development!

As stated earlier, the knobs/controls and functions of sound processors are pretty much the same with Analog and Digital. Once you learn on an Analog processor, it will be easy to "translate" to a Digital processor. The big difference is that you will turn the knobs using a "mouse," not by "hand."

This is a "Digital" Compressor / Limiter used in the Apple DAW "Logic Pro"

Digital Delays

A Digital Delay samples input signals through Analog to Digital converters, and is recorded to a digital storage buffer (temporary storage medium) – and is played back according to the settings set by the user. When mixed with live or recorded music, instruments, or vocals the delay creates an "echo" type effect.

Tech Notes Regarding Time Delayed Speaker Systems

Eventually, you will encounter "Delayed" speaker systems in larger Venues or Theaters. Here is a quick Example: There are "Main" speakers at the stage area and more speakers further out in the "house" area. If these "House" speakers are over 50-60 feet away – the listeners at these speakers will hear an "Echo" effect (which is from a delay between the Main and House speakers). Adding a Delay on the House speakers and setting it up with a 50-60 millisecond delay (since the speakers are 50-60 feet away) will allow the audio from the Main speakers to hit the ears of the listeners at the House speakers simultaneously.

This is a screenshot example of a Digital Delay used in a DAW. The above screenshot is from the Apple DAW "Logic Pro"

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Reverb

Reverb effects are widely used in Live Performances, Recording Studios, and Musical Instruments. The Reverb effect is created when sound is "reflected" off a surface and causes the build-up of multiple "reflections." This sound occurs in a space with sound waves going in all directions. The sound waves decay and eventually can't be heard. There are many types of Reverbs, such as Plate Reverb, Spring Reverb, and Digital Reverb—typical Reverb Pre-Sets (shown right).

Reverb – Notes / Information / Tips

→ Creates space, the illusion of a room, adds depth and environment.

→ Reverb is not Echo, an Echo is repeats, reverb is the reflection of sound inside a confined space. Understand and "Hear" the differences.

→ When adding reverb to a "mixdown" of multiple individual tracks it can make the tracks sound like they were all recorded at the same time, and in the same space / environment.

→ It is recommended to "EQ" the signal prior to going into a reverb unit.

→ There is such a thing as using too much reverb. Let's say you used lots of reverb on the vocal tracks – you may want to try using less on the instrument tracks (and vice-versa). Use reverb wisely, be creative without over doing it.

→ Reverb effects are pretty much a standard on all instrument amplifiers.

Example of a Digital Reverb used in a DAW. This screenshot is from the Apple DAW "Logic Pro"

What is a DE-ESSER?

A De-Esser is a device that attenuates or reduces "Sibilance." It's a form of Compressor. Sibilance is described as those harsh frequencies that occur in speech or vocals using certain consonant syllables such as S, T, SH, X, and Z. When set up correctly a De-Esser helps to control Sibilance. Sibilance occurs mainly in the upper midrange frequencies (sometimes the higher frequencies). A good starting point would be around 5kHz to 8kHz. It is recommended only to use a De-Esser when needed, not just to have another sound processor in the mix.

Guitar / Bass / Keyboard Effects Pedals

There are thousands of guitar and bass guitar effects on the market today. In the past, you could only purchase "Single" effects pedals or "Multi" effects pedals. Now it appears every guitar amplifier has tons of digital effects built-in to the amp that you can "dial-up" as needed. Even so, there is still a demand for "Single" and "Multi" effects pedals (see below).

Example of some Guitar and Bass Guitar Digital Effects used in a DAW. This screenshot is from the Apple DAW "Logic Pro"

A Few Notes Regarding Effects – Digital Mixing Boards

These days, effects are commonly built-in to Mixing Boards (some Analog, usually standard on most Digital Boards). The best thing about the built-in effects on Digital Mixing Boards is that they may come stocked with "pre-sets" A pre-set is precisely what it means – some high-tech audio guru has already pre-programmed multiple "Pro-Level" settings for users to choose from. All you have to do is choose a pre-set and press a button. For example, if you aren't sure how to set up a Compressor / Limiter – you dial up one of the many "pre-sets available on the Mixing Board – and do a little "fine-tuning" (if needed) to get even closer to that particular "sound" you were looking for.

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