Field-Effect Transistor (FET)

FET compressor examples include the Universal Audio 1176 and API 527.

A field-effect transistor (FET) uses an electric field instead of thermal energy to switch the current through the channel. Applying a voltage across the gate changes the conductivity of the channel, allowing current to move through the channel.

The "bread and butter" setting on a FET compressor is the slowest attack and the fastest release times possible.

FET compressors are clean, fast, and designed to emulate a tube sound with transistors. FET compressors are loved for their aggressiveness and tendency to add harmonic distortion to the sound source when driven hard.

Diode Bridge

Diode bridge compressor examples include the Neve 2254 and 33609.

In a diode bridge compressor, the amplitude of the audio signal causes detectable changes in the amount of current flowing through a diode bridge. The CV changes as the audio signal moves the diodes away from their bias points.

Featuring a limiter and compressor on each channel, with variable recovery times and slow and fast attack modes, the 33609 shines on stereo mix duties.

Since the circuit's gain depends on both of the bias currents (determined by the sidechain control voltage) and the audio signal, there is an inherent amount of total harmonic distortion (THD) in a diode bridge circuit that can "soften" audio in a flattering way. Diode bridge compressors also allow for very fast attack settings.

Voltage Controlled Amplifier (VCA)

VCA compressor examples include the SSL bus comp.

Integrated circuits are formed on small pieces of semiconducting material, performing the same function as larger circuits made from discrete components.

VCA compressors utilize integrated or solid-state circuits for compression. Most software plug-ins are VCA designs.

Compared to optical or tube compressors, VCA compressors are cheaper to manufacture. Distortion artifacts from VCAs are also less than tube or optical compressors. VCA compressors attenuate the input signal under the control of an external CV (i.e., sidechain input).

BASIC APPLICATION

"Hearing is the act of perceiving sound by the ear. Listening is a conscious mental process, as much about the brain as the ear."[6]

George Massenburg, inventor of the parametric equalizer

Fundamentally, choose the right compressor type for the specific task at hand. Select tube and optical compressors with slower attack and release characteristics for quieter sources such as vocals or synth pads. FET, VCA, and diode bridge models work best on loud signals, such as drums and guitars.

When starting to use a compressor, set the threshold to its highest setting; set a low-medium ratio (2:1 to 4:1); a medium attack (50-100 ms); and a medium release (100-300 ms). Then adjust the threshold until gain reduction begins.

"I've found that singers can often sing more in tune if you're using little or no compression on the vocal feed going to the headphones."[7]

Steve Albini, engineer for Nirvana's *In Utero*

As you lower the threshold, start with a relatively small gain reduction, say 1 dB at the loudest peaks, and listen to how it's affecting the audio signal. How do the more audible elements sound compared to the softer ones? Lower the threshold again until the gain reduction averages 4 dB at the loudest parts, and assess again. The difference should be noticeable.

Next, try adjusting the ratio to a higher setting, say 6:1 or 8:1, and observe how the compressor reacts differently at the same threshold. Adjust the threshold again so the gain reduction averages 1 dB and assess. Same at 4 dB average.

Listen carefully. You should have experienced four (very) different compression sounds in the exercise above. Is one better than the others? Only your ears can tell you.

An equal-loudness contour is a measure of sound pressure level (SPL) over the frequency spectrum.

Speaking of your ears, equal-loudness contours indicate that *85 dB SPL* (C-weight) is the ideal (i.e., flattest) volume level for observing and assessing audio. However, if you work in a smaller studio space, then *75 dB SPL* is suggested.

85 dB SPL provides the flattest frequency response for human ears. However, this level was intended for large spaces such as concert halls.

Always exercise care when applying compression on your entire mix. Focus on individual channels and mix groups before exploring more complex techniques like parallel, multiband, and multibus compression (explained later).