

## What is an 'Envelope-Controlled Filter'?

As the name implies, an envelope-controlled filter, or ECF, is made up of two fundamental parts; an envelope generator and a filter. Also implied in the name is that the envelope generator is used to control the filter.

In ECF designs, the incoming AC signal is rectified and filtered to generate an envelope, or DC equivalent of the input amplitude. Various controls (Bandwidth, Level, Attack, Decay), allow the nature of the envelope to be modified, but it generally remains a DC representation of the amplitude of the applied signal.

The filter portion of an ECF is made up a number of op-amps, usually connected in a configuration known as a 'state variable filter'. Typical implementations of that filter type provide access to low pass (LP), band pass (BP), or high pass (HP) versions of the applied signal. Controls allow selection of filter type (LP, BP, HP), and the nominal operating point (frequency) to be set by the user. In addition, those same operating points can be controlled by an electrically-isolated DC signal.

In most ECFs, this isolated DC signal comes from the envelope generator, and when it is applied to the filter, it causes the operating frequencies of the filter to be 'swept', or shifted in frequency, depending on the magnitude of the DC signal from the envelope generator. It is this ability to dynamically change the operating points of the filter that gives the ECF its enormous range of sounds, and even more possibilities are available when connecting one signal to the envelope generator and another signal to the filter.

Completing a typical design are input and output buffers and a blend control to vary the mix of clean and filtered signals. Some ECFs also provide an effects loop, as well as jacks for modification of some characteristics by plugging in expression pedals.

Information on The Grinder MB-1, the Barge Concepts ECF can be found at <http://www.bargeconcepts.com.mb.html>