GRAPHIC EQUALIZERS

FOR FIXED FORMANT FILTERING . . .

BY
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The fixed formant filter is one of the basic "building blocks" the electronic musician can use in setting up a patch, whether he is trying to imitate traditional instruments or create new sounds. These devices are offered as standard equipment in some synthesizers, and as accessories that can be patched into an existing setup.

The purpose of a fixed formant filter can be deduced from its name. First of all, it is a *filter* in the traditional sense – its basic effect consists of emphasizing some sound frequencies and/or deemphasizing others. It should not distort pure tones in any way, or generate harmonics that aren't present in the input signal, though it may change the balance of existing harmonics.

Secondly, it is a *formant* filter. "Formant" is a linguistic term referring to certain bands of frequencies that are emphasized by the resonances of the vocal tract, which acts as an acoustical filter and enables humans to form articulated speech. By extension, "formant" can refer to the individual timbre-shaping characteristics of real or synthesized instruments.

Lastly, these filters are *fixed* – their characteristics must be set with manual controls and can't be altered by the keyboard or other control voltages. This is at once their chief advantage and their chief limitation. It's a limitation because most really advanced effects require filters that can be voltage controlled. It's an advantage because a fixed filter can be made much more versatile than a voltage controlled filter of comparable cost.

Thus, the primary purpose of a fixed filter is to provide a basic tone color, or "voicing", which is then modified by VCF's and all the other tools of the trade.

An examination of manufacturers' literature on fixed formant filters reveals that they are equipped with a signal input, a bank of from four to fourteen controls, each used to vary the response to a preassigned band of frequencies, and a signal output. (Some models also provide a separate output for each frequency band). Not quite coincidentally, there is a device used by sound engineers and hi-fi sophisticates called a Graphic Equalizer that has virtually identical capabilities. In fact, the main functional difference between a fixed formant filter bank and a graphic equalizer is that the former is used to *create* sound colorations in a synthesizer, while the latter is used mainly to *remove* built-in colorations in imperfect speaker systems, recordings, etc. The other important difference is that a graphic equalizer will often give you two channels of filtering for perhaps half the price that a synthesizer manufacturer will charge you for one channel!

This isn't to say that any old graphic equalizer will do everything that the most exotic Moog or Buchla fixed filter bank will do – it won't. But for the musician on a budget, it will give very useful performance for a lot less green.

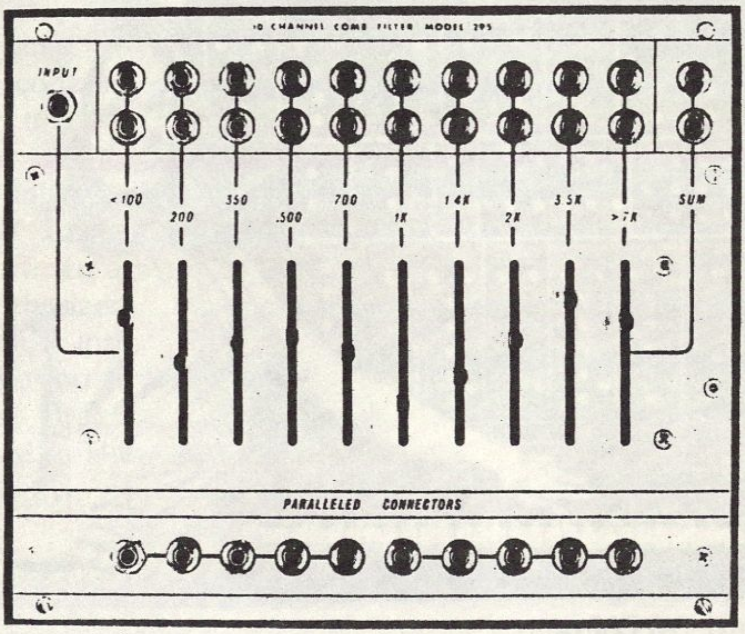
Choosing an Equalizer

Since saving money is the main reason you should be considering a graphic equalizer, we will

consider only those units intended mainly for home hi-fi and forego discussion of the much more expensive pro versions.

Most home equalizers have frequency bands an octave or more wide. Octave bands are narrow enough to be very useful, but not quite as capable as the *half*-octave bands offered by some fixed filter bands. Octave equalizers are made by Soundcraftsmen, SAE, MXR, and others. SAE also makes a half-octave graphic equalizer which offers an unusually wide ±16 dB adjustment range on each band; however at $550, it's quite a bit more expensive than octave units (most of which give ±10 or 12 dB of control). Cerwin-Vega offers a $470 hybrid unit with half-octave bands below 250 Hz and octave bands above, something you'll appreciate if you're especially fussy about your bass sound. It, like several others, can be mounted in a standard 19" wide equipment cabinet to make a roadworthy package.

If you buy a stereo equalizer, be sure it has separate controls for each channel – a few units tie both channels to a common control and effectively rob you of half their flexibility. For extreme effects, you can connect the two channels of a stereo equalizer in series, and double the control range. Keep input signal levels low when boosting heavily, however, or you run the risk of overloading the circuits and generating distortion. There may also be objectionable noise buildup with the channels in series, so check this in the store if you anticipate using the equalizer this way.



BUCHLA FILTER BANK

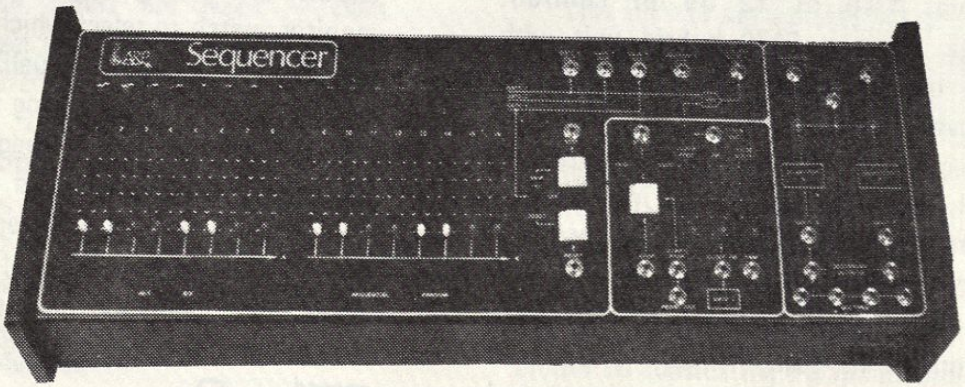
Most home equalizers have a tape monitor feature that you can use as an input selector. By patching one oscillator into the normal input and another into the tape input, you can use the tape monitor switch to select which one you want to process with the graphic equalizer.

Keep in mind when using the equalizer that, wwhile many are very ruggedly constructed, most are basically intended for use in a hi-fi system and aren't designed to survive the constant banging around that touring musicians subject their equipment to. A solid, well-designed case and a little care can do wonders in this regard.

NEW NEW NEW NEW

OZNIE

The Oznie from Process Electronics Corporation looks like a new standard. 3 VC filters, fixed filterbank, 4 VCO's, 4 envelope generators, 5 mixers, and a 5 octave keyboard, in addition to the regular stuff (NA, RM, Mults, Inv. etc.) $3,250.00 Oznie, Box 7, Centerville, Pa. 16404



ARP SEQUENCER

Beginning April 1st, ARP will offer a 16 note portable sequencer. Its features include: individual note routing to five different gate outputs, random sequences, VC pulse width on the internal clock (for leggato or stacatto effects), VC Clock rate, and foot-pedal control jacks. In addition the ARP contains two "quantizer" circuits which convert all pot tunings to an even chromatic half-tone making tuning much easier. According to Bob Hoffman at ARP "Feeding a synthesizers sample and hold voltages into the quantizers gives you a Bach-like score that's super-fast and a gas!" The sequencer will retail at $795.00.

SYN-KEY

Here is a four octave programmable synthesizer. Is has a card reader that takes miniature versions of IBM cards. They are plastic and you can carry 'em around in your wallet. Retail: $1995.00. For more information: SPG 117 W. Hintz Road, Wheeling, Illinois 60090.

ROLAND GOES SOLID

Roland Synthesizers are beefing up their line with some really nice equipment. The first of which is the SH-5. For a $1395.00 Retail one gets 2 VC Oscillators, two low frequency Oscillators with keyboard delay and flashing speed indicator lamps, two interesting filter circuits, 4 octaves of ivories and more. They are available through Beckmen Musical Instruments Inc. 2925 S. Vail Ave., L.A., CAL. 90040. They will have a semi-modular system pretty soon, (Look for it in **Synapse.**)