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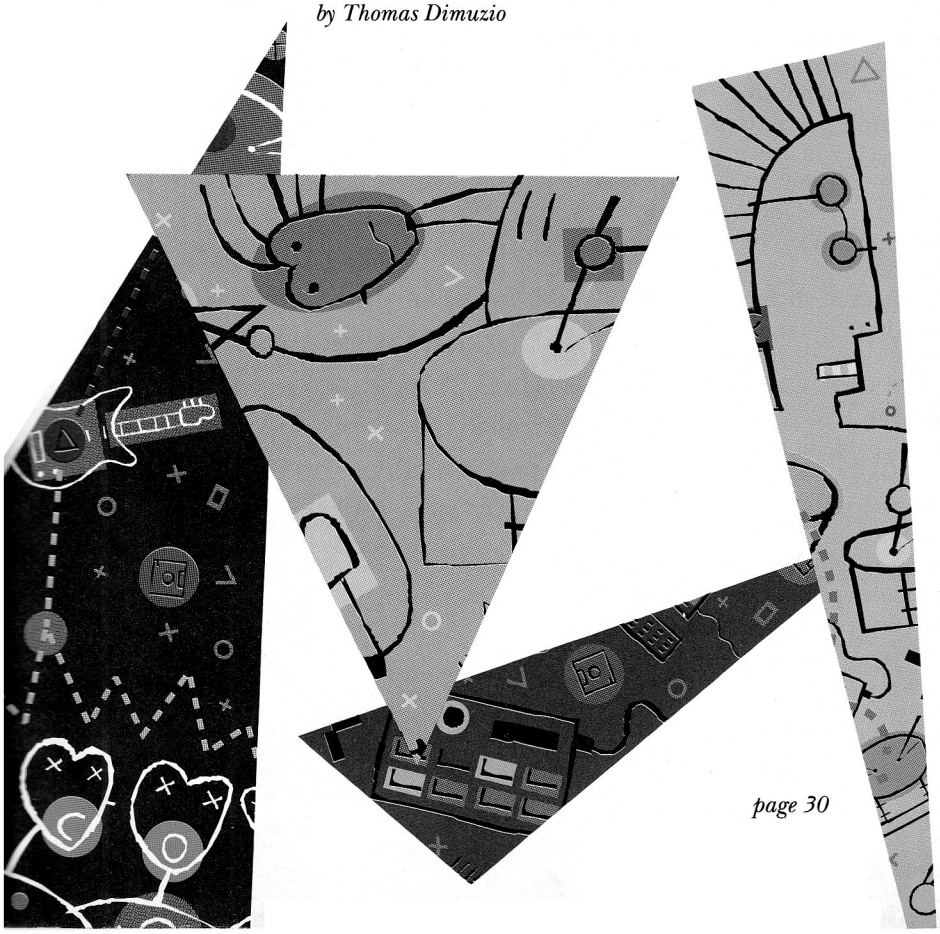

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RETRO REGENERATOR

Feedback can be your friend. Get more out of signal processors with this simple, clever, low-cost circuit.

BY DAVID SNOW

ALTHOUGH I'M ALWAYS ON THE LOOKOUT for gear with the best price/performance ratio, I'm usually compelled to sacrifice features for the sake of my budget. One of those sacrifices is knobs: Even though a device like the Alesis MIDIverb II has a large number of reverb, delay, flange, chorus, and stereo generation programs, I always want more. There isn't much you can do about modifying the MIDIverb's presets short of reprogramming its ROM (kids, don't try this at home), but as anyone who ever owned a spring reverb or a monophonic synth can tell you, there are innumerable ways to expand the application of any piece of equipment.

The May 1990 **EM** covered a MIDIverb-specific mod for adding *regeneration*, the technique of feeding a portion of the unit's output back into its input. But regeneration is just as applicable to plate reverbs, filters, vocoders, wa-wa pedals...you name it. Regeneration will turn a graphic equalizer into a nifty tone generator, and do things to spring reverbs that may be illegal in some states. The sonic results of regeneration depend upon the type of effect with which it is used: With simple delay, the input will echo, echo, echo and gradually fade away; with reverb, regeneration will introduce a metallic, artificial resonance. More commonly, adding regeneration to flangers produces an aggressive, swept-filter effect (and yes, using the exclusive secrets revealed herein you can psychedelicize the MIDIverb's ten flanging programs).

Best of all, this trick is easy to accomplish without modifying your equipment. All that's required is a mixer to combine the unit's output with its input, and a Y-connector to tap the output for monitoring (**Fig. 1**). While you could set up this configuration using mixer bus patching and a preamp or two, it's more convenient to build a small outboard mixer for this purpose and keep it hooked up to your unit. That's what the Retro-Regenerator project is all about.

THE GRAND SCHEMATIC OF THINGS

The Retro-Regenerator (**Fig. 2**) is usable with virtually any stereo effects unit. Since both halves of the stereo circuit path are identical, we'll discuss just the left side to illustrate how it works.

J1 couples the audio input into mixer IC1a, which is followed by inverter IC1b; both are set to unity gain. IC1b restores the phase of the input signal, which IC1a inverts. (*Using the inverted signal will give a different sound in many instances. You might like to install a DPDT switch to select inverted or non-inverted feedback.—GH*) IC1b's output then feeds into the signal processor's left input via J2. Output from the signal processor at J3 couples through regeneration-level pot R11a back into the mixer, while jack J4 parallels J3 to provide an output for the rest of your system. When switch S1 is in the bypass position, the feedback loop is out of the circuit.

The Retro-Regenerator requires a ripple-free, bipolar, 8 to 15V power supply; two 9-volt batteries will work, since current drain is low. I assembled my unit in an afternoon for less than $10 using junkbox items and a few odds and ends from Radio Shack. Circuit construction isn't critical since we're not dealing with high-gain, high-frequency circuitry, but keep it neat, avoid bundling wires, remain calm, stay to the right and pass to the left, and drink plenty of fluids. For that classically ugly art deco look, house it in an unpainted aluminum chassis decorated with labels from a Dymo label gun.

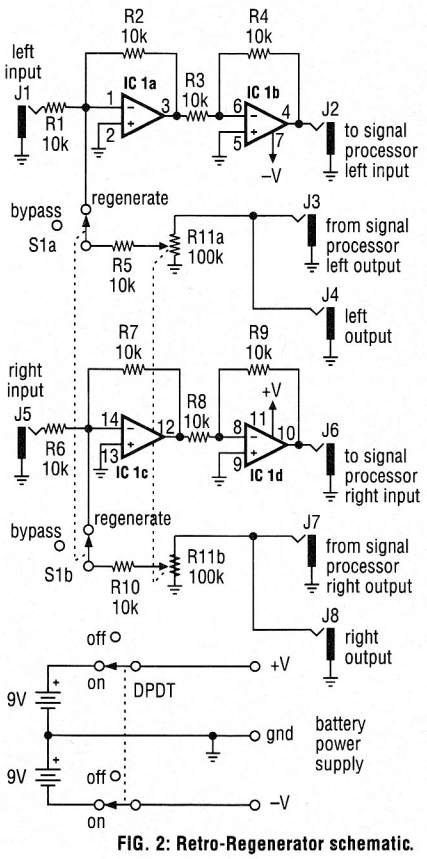

FIG. 2: Retro-Regenerator schematic.

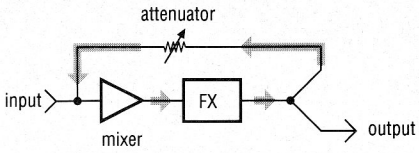

FIG. 1: Basic regeneration loop.

T'T'TALKIN' 'BOUT MY REGENERATION

A few guidelines will help you get the most from the Retro-Regenerator. First, unless you want to fry your tweeters and vaporize your eardrums, you should avoid runaway regeneration, which happens when the regenerated signal has a gain of more than one (in other words, each pass of the signal through the feedback loop increases in level). It is possible to achieve musically useful effects using runaway feedback (*as any recent David Myers tape will illustrate—CA*), but all levels, at the Retro-Regenerator and the monitoring system, have to be carefully set. Second, in many cases (and particularly with the MIDIverb) the most pronounced regeneration effects occur with the signal

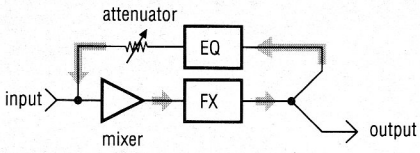

FIG. 3: Regeneration with equalization in loop.

processor output set as high as possible, although this increases the risk of going into uncontrolled feedback. So, to reconcile these competing considerations, here's a typical "calibration" procedure using the MIDIverb as an example:

1. Keep your power amp volume low.

2. Set the MIDIverb Input pot to its minimum setting (7 o'clock position), set the Mix pot midway (12 o'clock position), and the Output pot to maximum (5 o'clock position).

3. Set the Retro-Regenerator's regeneration pot to its maximum setting.

4. With your input source at the maximum volume at which you intend to play, slowly open the MIDIverb input pot to the point just before the effect goes into feedback.

5. Use the level pot on the Retro-Regenerator to introduce the amount of regeneration you want without worrying about annoying squeals and howls.

If you don't want to keep the MIDIverb at its maximum ouput level, set it a couple of notches down and readjust the input level upwards for maximum effect, as just described. Some MIDIverb programs are more prone to feedback than others and may require readjusting the input level as you switch from one to another. Also, variations in the input amplitude will affect the tendency to feed back as well.

Some Retro-Regenerator applications might not be obvious at first: Besides conventional flange, chorus, and delay enhancements, it works nicely with reverse reverb and bloom programs. It is also possible to insert signal processors (equalizers, delays, pitch shifters, etc.) into the feedback loop (**Fig. 3**) for more bizarre effects. So go ahead, be unpredictable! There are so many products being designed with cookie-cutter, corporate conceptions about music in mind that it's refreshing to throw a monkey-wrench into the works once in a while...electronic music used to be experimental, after all. Here's your chance to create sounds you haven't heard before.

David Snow'*s interest in electronics was sparked by an issue of* Popular Electronics *he read ten years ago while a doctoral student in composition at Brandeis University. They kicked him out of the PhD program after a couple of years, but he seems to have turned out okay anyway.*

PARTS LIST

RESISTORS

R1-R10	10k (¼ watt, 5% carbon)
R11	100k stereo control (Radio Shack #271-1732)

SEMICONDUCTORS

IC1	RC4136 or XR4136 quad op amp

OTHER COMPONENTS

J1-J8	¼-inch open circuit phone jack
S1	DPDT toggle switch
Misc.	Circuit board, enclosure, hookup wire, knob, etc.