BEYOND THE CLANG TONE

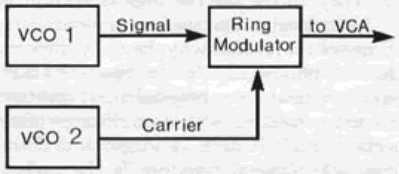
ALTERNATIVE RING MODULATION

by Stephan Bilow

If I were to mention a ring modulator to a synthesist, the first thing that would come to his mind would be clang tones. Next come all sorts of other audio-amplitude modulations. And, to the inexperienced synthesist clang tones might be the only thing related to the ring modulator. But, there are many other uses of the ring modulator.

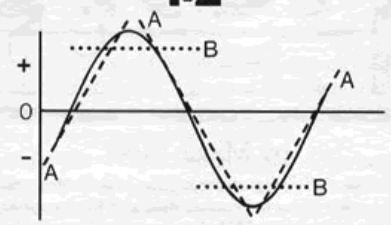
To start with, let's look at how the carrier input of a ring modulator modulates the signal. Diagram 1:1 shows the basic set up for a ring modulator with two VCO's as inputs. Before discussing diagram 1:2 let's think about tremolo. With an LFO or sub-audio

1:1



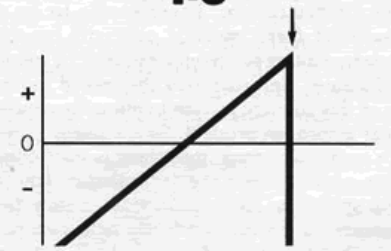
VCO controlling an amplifier, the lower the wave gets in voltage the lower the amplitude and the higher it gets the higher the amplitude. In diagram 1:2 the dotted line A represents the place where the amplitude of the signal is highest and dotted line B is the point where the amplitude is lowest. To understand this we must first understand the rate of voltage change in the waveform shown. In a sine wave the slowest rate of voltage change is around the top and bottom curves and the fastest rate of change is in the straightest areas. The signal input is made louder when the carrier has an abrupt, great change and is made quieter when the change is gradual. Therefore, by placing a sub-audio sine wave

1:2



on the carrier of the ring modulator we achieve a tremolo effect but we also have developed a background in ring modulation which enables us to explore many more possibilities. Diagram 1:3 shows a ramp wave. Looking at this diagram we can see a constant rate of change through the slope of the waveform and a great position-negative

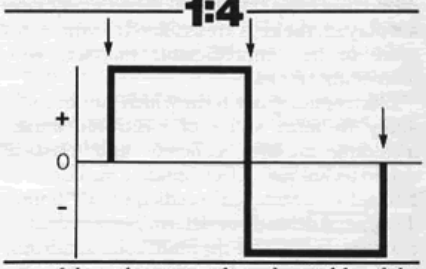
1:3



change in the straight portion indicated by the arrow. What does this show us? We will have a constant amplitude through the slope and a great sudden increase (a loud "blip") at the vertical portion of the wave. The square or pulse wave shown in diagram 1:4 is characterized by an unchanging positive voltage, then a sudden change to an unchanging negative voltage. Three arrows indicate the three points of change, at these points we will receive a "blip" from the voltage change but there will be no other sound produced due to the fact that there is no voltage change besides instantaneous jumps from positive to negative.

By altering frequency, amplitude and in the

1:4



case of the pulse wave, the pulse width, of the signal and the sub-audio carrier, a great number of interesting effects can be achieved. To even further expand on this idea try combining two carriers or even three at the same time.

In this program, realized on the Steiner-

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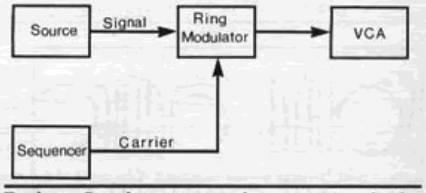

Parker Synthasystem, the output of the sequencer voltage is used as the carrier for the ring modulator. The procedure is as follows:

The ring modulator will allow no signal to pass if the carrier is a constant D.C. voltage. Should the voltage on the carrier (even D.C.) be changed, a signal will be allowed to pass

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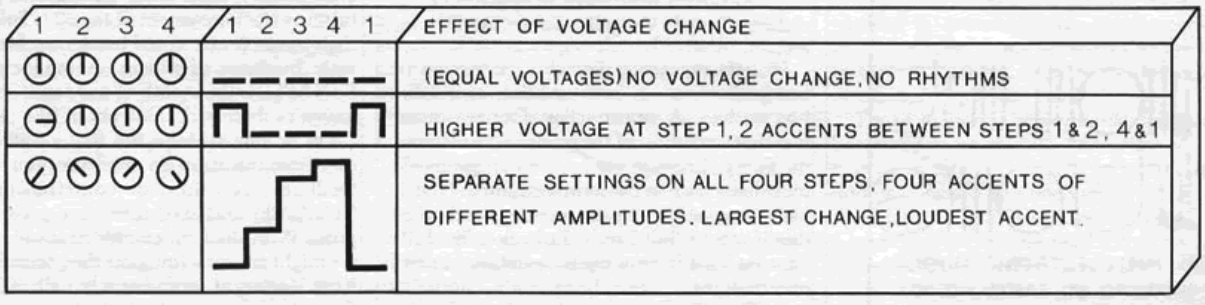

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