



Thank you for purchasing the modDemod eurorack module. To install, find 4HP of space in your eurorack and screw it in. There are no power connections.

This circuit was originally utilized in the generation of Single Side Band Modulation; a military developed Radio communications technology. A program (speech, data) would be mixed with a high frequency carrier waveform using this circuit. After filtering an RF amplifier would be used to broadcast the transmission. At this point the signal could be said to be **Modulated**, sounding unintelligible. At the receiving end, this circuit could again be used to **Demodulate** the radio transmission by re-introducing a carrier waveform of the same shape and frequency used to create the transmission. reclaimed for artistic purposes by Harold Bode (and others perhaps), it came to be know as Ring Modulation in the world of electronic music.

The modDemod features 2 identical circuits that may be used together or individually. When using them together there is no need patch the output of circuit 1 to the input of circuit 2 as they are internally patched when nothing is inserted at the output of circuit 1 and the input of circuit 2. I worked very hard to minimize carrier bleed. The amount varies from unit to unit and even circuit to circuit within each unit. HOWEVER, all units match or better the level of bleed you hear in most IC based ring modulators. For this type of circuit, that is very good!

To use this module you will need a minimum of 2 signal sources. 1 will be the Program. This signal is inserted at the Program input (sockets 1 or 4). The 2nd is the carrier, and it should be inserted at the carrier input (sockets 2 or 5). The outputs are at sockets 3 and 6. By varying the Frequency, Shape and level of these signals, many different timbres may be heard.

A very common way to use this module in electronic music systems:

insert a signal source such as a Voltage Controlled Oscillator to the input of circuit 1 (socket 1), this is your Program. Insert another VCO to the Carrier input for circuit 1 (socket 2). Apply the output (socket 3) to a Voltage Controlled Amplifier. Apply an Envelope Control Voltage to the VCA CV input. Patch a Keyboard or sequencer CV to the Frequency control input of the VCO being used as the Program. Patch a gate signal from that same KB or sequencer to the gate/ trigger input of the Envelope Generator. Vary the timbre by modulating the Frequency of the Carrier VCO with an LFO or joystick or???

In the modDemod movie:

many of the sounds you hear are made with the following patch: Shure SM-57 inserted to the input of the Doepfer A-119, and gain set so that the signal is NOT clipping. The audio output of A-119 is applied to the input of circuit 1 of the modDemod. The Envelope output of the A-119 is applied to the CV input of the Doepfer A-131 VCA. 2X Doepfer A-110 VCO are tuned to unison, with pleasant beating. The octave you select will greatly affect the timbre. Experiment. One of these VCO is applied to each of the CARRIER inputs of the modDemod. The output of your preferred CV source (joystick, ribbon controller, kb, sequencer) is applied to the Frequency control input of 1 of the 2 VCO. By varying 1 of the 2 VCO you can shift the timbre from mild tremolo distortions to other-worldly growls and howls. The output of the modDemod is applied to the input of the Doepfer A-131 VCA. The gain of this VCA is set just past noon. The output of this VCA is sent to my monitoring system. This patch is an example of the modulation/ demodulation technique.

notable methods of pre & post processing useful in tandem with the modDemod:

Amplitude Control, Filtering, Interference and Carrier Modulation. Ideally, one would have a VCA or Attenuator for both the Program and Carrier inputs. Additionally, a VCA might come in handy for the output if you need absolute silence (Carrier bleed on the modDemod is low enough to use without this VCA in many situations). A multi-mode filter, a third sound source and a modulation source are essential to some of the techniques discussed herein. The Doepfer A-132 Dual VCA, a multi mode filter and the A-119 Ext. Input are the perfect complimentary modules to the modDemod.

Amplitude Control: Using an Attenuator or VCA at the input of the Program or Carrier will give a great deal of control over the sound of the modulated signal. When used at this point, the VCA/ Attenuator will act as a DRIVE control allowing the user to vary how hard the diodes in the ring are hit and thus how much the signal is soft clipped. One user has pointed out that varying the Program level also affects how the transformers color the sound. Driving them harder seems to boost/ sweeten the midrange.

When doing modulation/ demodulation effects, using a VCA between the 2 balanced modulator circuits allows the artist to vary/ modulate signal strength. This is especially useful when adding an interference signal to the mix at the demodulation point (more on that later).

Finally, a VCA may be used at the output of the modDemod to provide a "squelch" circuit (see the Doepfer A-119 user's Manual for details on Squelch Patches) .

By the way, the modDemod makes a dirty little VCA itself! Apply a Control Voltage to the Carrier input. Mind that the Program input is AC coupled.

Filtering: Filtering of Program material at the input will provide the modDemod with a less complex waveform, and thus, the output will be less dissonant. The same is true when using something other than a Sine wave at the Carrier input.

When employing modulation/ demodulation effects, Filtering may be used to eliminate certain sidebands. Most filters available for euro rack systems are not Steep enough generate true Single Sideband, but who cares, we are not trying create an intelligible Radio transmission but rather, something that sounds wicked! LP, BP and HP are all very useful for these types of effects. eliminating frequency content from the modulated signal will allow the artist to subtly vary the demodulated signal's timbre.

Of course, Filtering at the output of the modDemod may be used to smooth the sound.

Interference: One of my favorite processing techniques. While doing modulation/ demodulation effects, another signal is added at the input of circuit 2 (the demodulator). Here, a VCA is REALLY handy (in fact 2 VCAS is even better). Using the VCAs you may modulate the the strength of the modulated signal and the interference signal. Try using the same control source on both, but with one CV inverted and level shifted. This way when the modulated signal gets weaker, the interference becomes stronger. What is really cool about this method is that the modulated signal will be demodulated at the output, while the interference signal will be modulated and rather unintelligible

Modulation of the Carrier Waveform: done manually or via control voltage, altering the frequency, waveshape or harmonic content of the carrier signal will greatly change the timbre of both modulated and demodulated signals. When utilizing mod/ Demod effects, equally modulating both the carriers creates subtle, but audible artifacts. Uneven Modulation of the carriers can get downright scary sounding!

All Make Noise covered by 1 yr. Warranty. Please contact tony@makenoisemusic.com with any questions, needs & comments... otherwise go MAKE NOISE.