

BMC101. Electret Microphone

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If you have any questions, or need help trouble shooting, please e-mail Michael@Bartonmusicalcircuits.com

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I. Overview/Features

This module consists of a small electret microphone with an amplifier, envelope and gate extractor. The sound quality reminds me of the built-in microphone of a boom-box I had as a kid. It can be used as a simple way to process speech, vocal or acoustic sources through your modular, create acoustic feedback loops with an external signal or to turn "finger drumming" into gates.

CONTROLS

1.Gain knob – This sets the gain of the microphone. The setting of this knob will affect the signal going to the envelope generator/gate generator.

2.Envelope knob – This sets the release time of the envelope generator.

3.Gate knob – This sets the sensitivity of the gate generator.

OUTPUTS

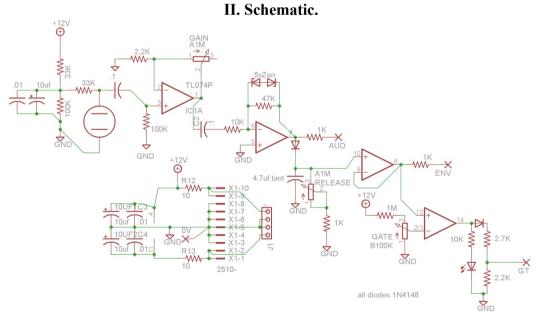
Audio – Audio output from the microphone. Output limited to +/-5V by Zenner diode clippers.
Envelope output – Control voltage related to the amplitude of the audio signal. 0 to +5V range.
Gate output – Normally outputs 0V and goes up to +5V when the envelope signal is above a level set by the gate knob.

SOUND SAMPLES

<u>VOICE and low pass</u> – The audio output goes to the low pass input of the sallen-key vcf, and the envelope output goes to the cv input.

<u>GUITAR and high pass</u> – I play an acoustic guitar a couple feet away from the microphone and play with the envelope and filter settings using the same sallen-key vcf but in high pass mode.

<u>FINGER DRUMMING</u> – Left channel is the audio output and right channel is a VCO with it's frequency controlled by the envelope output and it's amplitude controlled by the gate out being sent to an envelope generator.



On the left we see a voltage divider of a 33K/100K resistors creating a ~5V supply for the microphone. This voltage is filtered by .01uf and 10uf capacitors. A 33K ohm resistor connects the microphone element to this voltage while the other terminal of the microphone connects to ground. As the diaphragm of the microphone moves, the impedance between the microphone terminals changes and the voltage where the 33K resistor meets the microphone changes.

A 0.1uf capacitor connects to the microphone and passes AC signal from the microphone on to an op-amp gain stage. This gain stage has a 1Megaohm potentiometer in it's feedback path to

provide variable gain for the audio signal. Another .1uf capacitor connects this stage to a second gain stage with a set gain of -5. This stage has zener diodes in it's feedback path, this will limit the output of the stage to \pm -5V. The audio output jack connects to this op-amp through a 1K resistor.

A diode passes positive voltage from this signal to a 4.7uf tantalum capacitor. The capacitor discharges through a 1Mohm pot in series with a 1K resistor to ground. An op-amp buffer outputs the voltage on this capacitor to the Envelope output jack through a 1K resistor.

This signal then gets sent to an op-amp wired as a comparator with it's threshold voltage connected to the wiper of a 100K pot with one terminal grounded and the other connected to +12V through a 1Meg resistor. The output of this op-amp lights an indicator LED through a 10K current limiting resistor and then provides a gate output through a diode and 2.7K/2.2K resistor voltage divider.

III. Construction

A.Parts List

Semiconductors

Name	Quantity	Notes
TL074	1	DIP package
Electret Microphone Capsule	1	I used <u>This One</u>
1N4148 diode	2	
5V Zener diode	2	1N4732, 1N4733 or similar
LED	1	3mm LED

Resistors

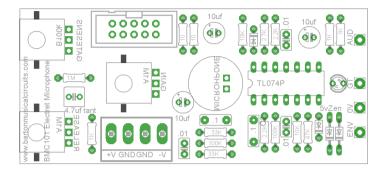
Name/Value	Quantity	Notes
10 ohm	2	1/4W Metal film for resistors unless otherwise noted
1K	3	
2.2K	2	
2.7K	1	
10K	1	
33K	2	
47K	1	
1M	1	
A1M Potentiometer	2	9mm mounted pot <u>like these</u>
B100K potentiometer	1	9mm mounted pot like these

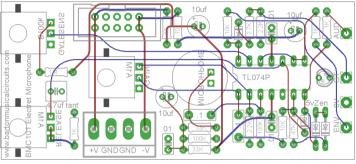
Capacitors

Name/Value	Quantity	Notes
.01uf	3	Ceramic disk
.luf	2	Film boxed caps
4.7uf	1	Tantalum
10uf	3	Eletrolytic

Other

Name/Value	Quantity	Notes
Power connecter	1	
Jack	3	
14 pin DIP socket	1	





B. The PCB

Above are renderings of the PCB with and without traces. The PCB is 82mm x 37mm.

Wiring is simple, the wirepads for the three output signals should connect to the tip connectors of the jacks, and the 0V wirepad connects to the sleeve of any jack.

To the right is an image of a complete module.

I prefer the response with the microphone capsule placed as close to the PCB as possible, but you can experiment with having it closer to the panel or through the panel.

