

## **BMC054. Stereo Output**

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This module combines a 4 channel stereo mixer with a headphone output amplifier.

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## I. Overview/Features

### CONTROLS

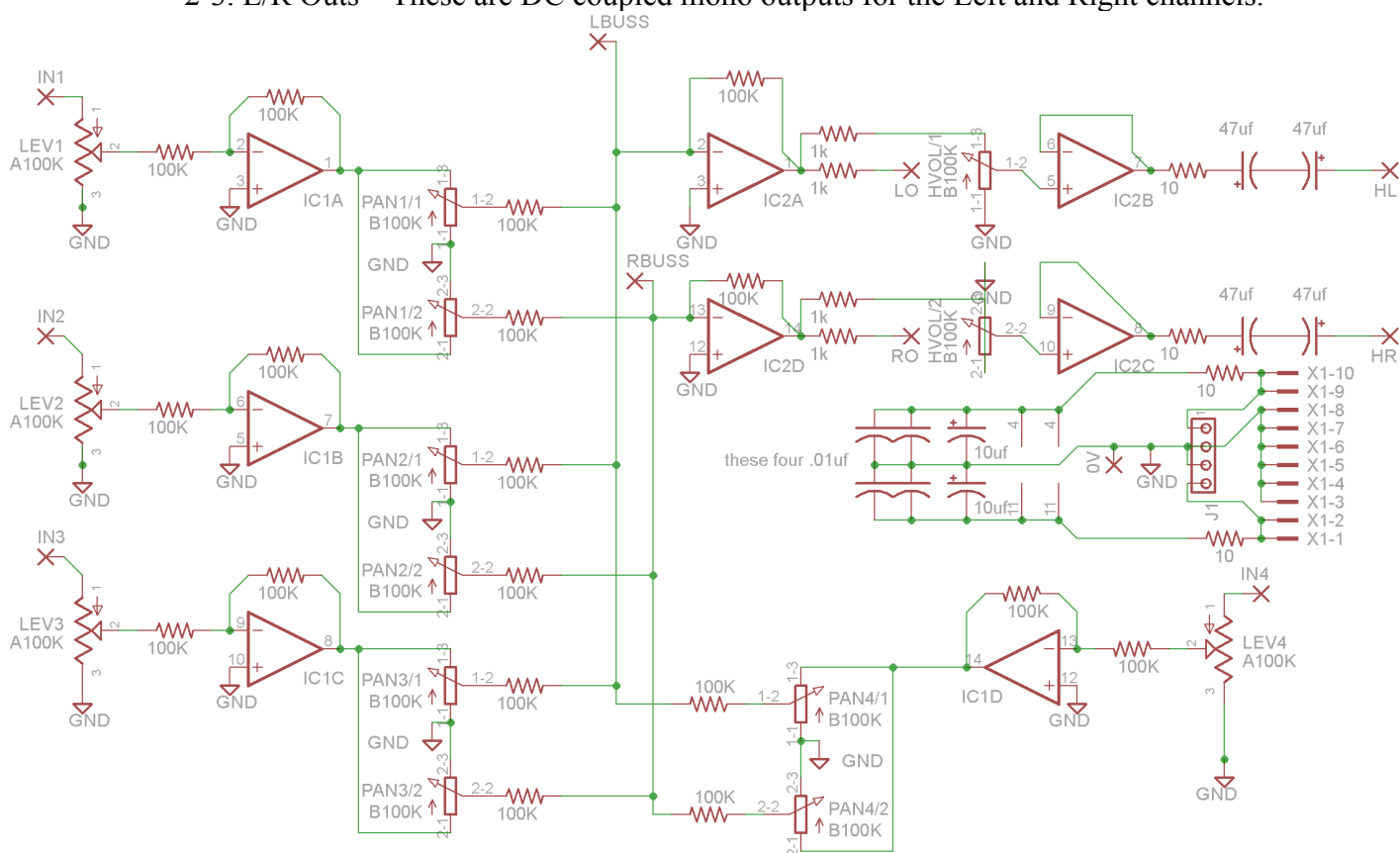
- 1.- 4. Input Level (1 per input) – These knobs attenuate the input signals.
- 5- 8. Pan (1 per input) – These knobs determine how far to the left or right the signal appears in the headphones
9. Headphone volume – This attenuates the mixed signal before being fed to the headphones.

### INPUTS

- 1-4. Signal input – The audio to be mixed is input here. These inputs are DC coupled.

### OUTPUTS

1. Headphone Out – This is a stereo output for use with headphones. It is AC coupled.
- 2-3. L/R Outs – These are DC coupled mono outputs for the Left and Right channels.



## II. Schematic.

Above is the schematic for this module. In the top left you see the attenuating/panning circuit for channel 1, this is repeated for channels 2-4. The input signal enters through the “IN1” wirepad. It is attenuated by an audio taper 100K pot and then goes through an inverting amplifier with a gain of 1. An inverting amplifier is used instead of a buffer so that the eventual DC coupled outputs would be in phase with the inputs. The output of the amplifier stage is sent to the stereo Linear taper 100K pot. The two gangs are both wired as variable voltage dividers, but in reverse with regards to directions. Each pot's wiper is connected to its channel's mix bus via a 100K resistor.

Each mix bus is connected to a wirepad directly, either “LBUSS” or “RBUSS” these are only used when connecting PCBs together to get more inputs and can be ignored when building a 4 input version. An inverting amplifier stage mixes all the signals and outputs to the DC output wirepad (either “RO” or “LO”) through a 1K resistor. Another 1k resistor is in series with the respective gang of the stereo pot that controls headphone volume. These gangs are wired as variable

voltage dividers and feed into unity buffer circuits. The outputs of the unity buffers go through 10 ohm resistors and a pair of 47uf capacitors in series.

The power connections are shown under the headphone outputs. There are pads on the PCB for 10 pin Eurorack style power headers or 4 pin MOTM style. The power rails are filtered by a 10ohm/10uf passive low pass filter and the op amps have additional .01uf capacitors near the power pins.

### III. Construction

#### A.Parts List

##### Semiconductors

| Name  | Quantity | Notes                |
|-------|----------|----------------------|
| TL074 | 2        | Or other quad op-amp |

##### Resistors

| Name/Value          | Quantity | Notes  |
|---------------------|----------|--|
| 10 ohm              | 4        | All resistors 1/4w metal Film for all resistors unless otherwise noted |
| 1K ohm              | 4        |  |
| 100K ohm            | 18       |  |
| B100Kohm stereo pot | 5        | 16mm PCB pins, <a href="#">like these</a> .                            |
| A100Kohm pot        | 4        | 16mm solder lugs, <a href="#">like these</a> .                         |

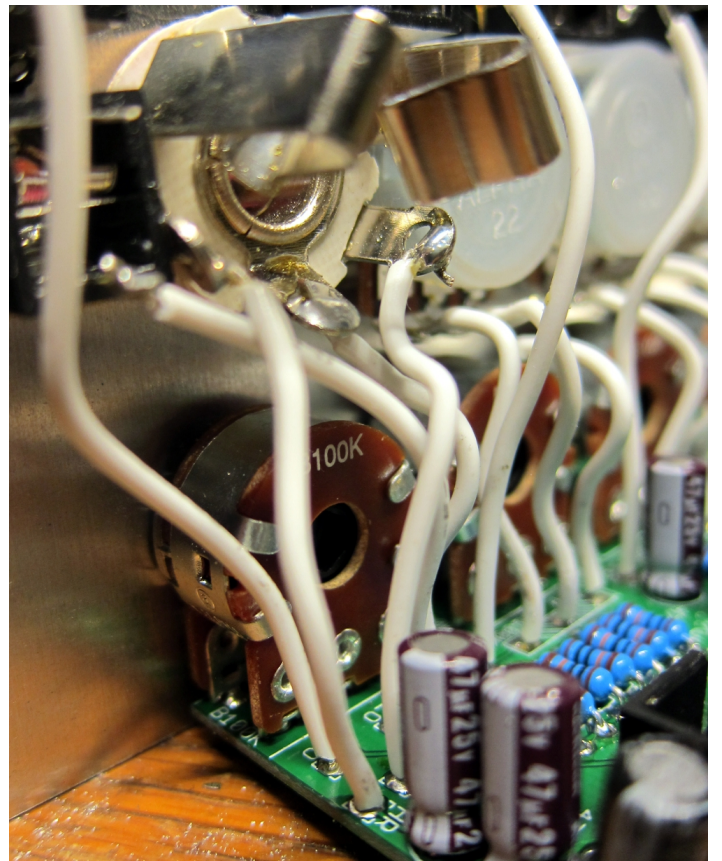
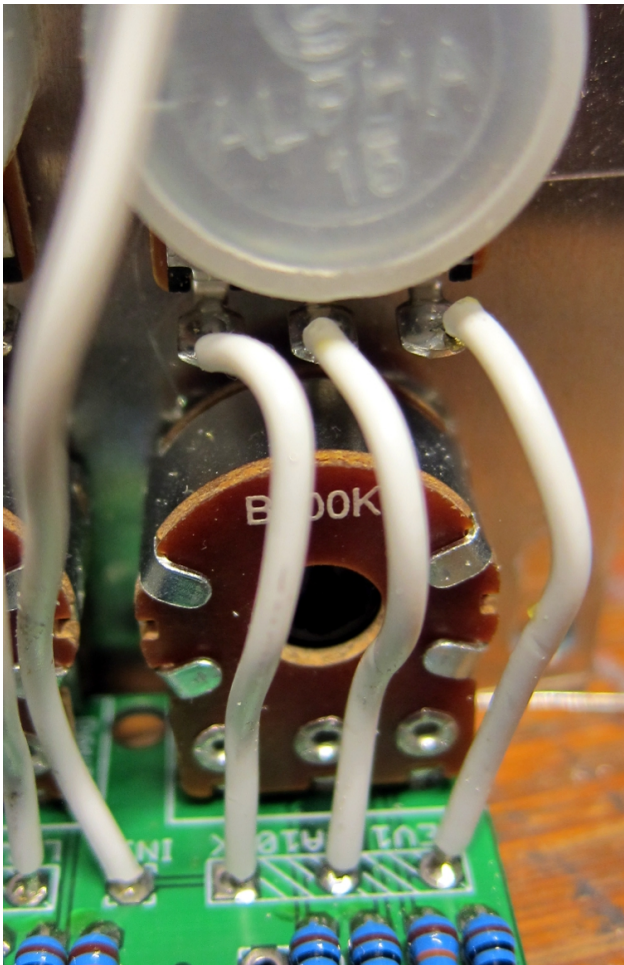
##### Capacitors

| Name/Value | Quantity | Notes                              |
|------------|----------|------------------------------------|
| .01uf      | 4        | Ceramic disc. Value not critical   |
| 10uf       | 2        | Electrolytic, at least 16V rating. |
| 47uf       | 4        | Electrolytic, at least 16V rating. |

##### Other

| Name/Value        | Quantity | Notes   |
|-------------------|----------|---|
| Power connecter   | 1        | Eurorack or MOTM  |
| 14 pin DIP socket | 2        |   |
| Mono jack         | 6        | Whatever standard input/output jack you use in your synth system. Panel mounted, solder lugs. |
| Stereo Jack       | 1        | For the headphone output. Panel mounted, solder lug.  |
| Knobs             | 9        |   |





## **D. Modifications**

### **A. Lowering maximum headphone output.**

Each gang of the headphone volume pot has a 1K ohm resistor in series with it. These are marked with blue solder pads on the image of the PCB on page 4. To decrease the maximum volume of the headphone output (when dealing with very sensitive headphones) you should increase the value of this resistor. A 100K resistor should result in half the headphone volume.

### **B. Wiring for 8 inputs.**

To create an 8 channel mixer, you will need two PCBs. One of the PCBs should be stuffed as normal, and the other should omit all of the parts that are marked in pink on the PCB image on page 4. The pink parts are associated with the mixing and output buffers.

When wiring your module, you should jumper the “LBUSS” wirepad from one PCB to the “LBUSS” wirepad of the other PCB and repeat for the “RBUSS.” For the PCB with omitted parts, only wire the Inputs and Level pots, wire the other PCB normally.

To power the 2<sup>nd</sup> PCB, you can either install a power connector header as normal, or you can jumper the PCB pads for the power connector on this board to the other board.