

Can the cMoyBB be customized? How?

Yes, the cMoyBB can be custom built upon request to match your headphones. To request free customization, please mention your headphones in the "Shipping Instructions" field during checkout.

Customization is strongly recommended for low impedance headphones (32 ohms and below), such as Grados and most in-ear-monitors (IEM's/earbuds). We adjust over 10 components to optimize the amplifier's gain, bass boost, input attenuation, and ground circuitry to best match your specific equipment. There is no need to contact us in advance. We will automatically make all beneficial adjustments based on your order notes.

The cMoyBB is built by default to work well with any audio signal, including headphone output signals and line-level signals. If you plan to use a line-output adapter (LOD) cable, please mention this fact as well as your headphones during checkout. LODs produce a very strong signal which may require additional attenuation.

Please see our DIY modifications page for an explanation of all modifications.

The following cannot be customized:

- Opamp Chip
- Input Jack
- Output Jack
- DC Jack
- Bass Boost Toggle Switch

Different jack requirements (such as RCA or 1/4" stereo jacks) can be fulfilled using appropriate adapter cables.

What types of batteries can be used?

Rechargeable or non-rechargeable batteries (any) are safe to use in the standard cMoyBB. This includes alkaline, Li-Ion, NiMH, NiCd, etc.

You may use non-rechargeable batteries in the rechargeable cMoyBB v2.03R for listening, but never connect a power adapter to a cMoyBB v2.03R unless using NiMH 9V's!

Can the bass boost toggle switch be replaced with a knob?

This modification is only available to do-it-yourselfers, as described in the [Assembly Guide](#). JDS Labs does not stock the required potentiometer for the modification.

What kind of cable do I need?

The cMoyBB uses standard 3.5mm (1/8") stereo input and output jacks. You will need a male-to-male 3.5mm interconnect cable (also known as a mini-to-mini cable) to connect your audio player to the amplifier.

Choose a heavily shielded cable. Look for terms such as "shielded," "noise-rejecting," or "braided." These cables use an additional grounding wire and and/or shielding sheath to avert a small amount of electromagnetic interference. Additionally, every cheap interconnect cable we have used has worn out in under a month, causing static, popping sounds, or a broken signal when the cable is wiggled. Invest in a rugged cable!

A line output adapter (LOD) is highly recommended if your audio player supports such a cable. These cables provide a stronger and cleaner signal than the headphone output jack. Look for 3.5mm interconnect and LOD cable recommendations in [our store](#).

How long is battery run-time for the cMoyBB?

Battery life depends on volume, headphone impedance, amplifier customization, and of course battery type. A typical 9V alkaline battery in a standard cMoyBB lasts approximately 25-30 hours under heavy usage. Other battery types are also safe to use (NiCd, NiMH, Li-Ion, etc.). Run-time can be calculated as:

Hours = (Battery Capacity, mAh)/(Current Drain, mA)

where Current Drain varies from 10-30mA. Battery Capacity of a name-brand 9V alkaline is about 500mAh; many NiMH 9V's have a capacity of 200-300mAh. The most inefficient configuration lasts 6.75 hours, while the best can last up to 50 hours.

The standard cMoyBB does not feature recharging capability. A NiMH battery and charger are worthwhile investments if the amplifier is to be used portably.

What is the benefit of higher voltage?

Voltage supplied to an operational amplifier sets the upper and lower signal boundaries for the opamp's output. When volume is increased beyond the maximum voltage boundaries, the opamp clips the signal and you will hear distortion. Therefore, higher voltage allows the opamp to produce higher volumes when driving high impedance headphones.

There is little benefit to increasing supply voltage for low impedance headphones (32 ohms and less). These headphones tend to demand more current rather than more voltage, so a 9V battery is adequate for most listening. Instead of extra voltage, the cMoyBB's maximum output current can be enhanced for low impedance headphones by adding a second virtual ground IC.

A summary of recommended cMoyBB configurations can be found under our [DIY Assembly Guide](#).

All opamps are limited to "swinging" within a fixed distance from the voltage supply rails. Rail-to-rail opamps are able to drive signals much stronger before clipping. Thus, a rail-to-rail opamp is another way to achieve higher volumes, without resorting to higher voltage.

Why can't a cMoy be powered from a vehicle's +12V accessory supply?

The power adapter warning mentioned in the instructions sheet applies to every cMoy, not just the cMoyBB.

Most vehicular audio systems use an audio ground which is directly connected to the vehicle's negative battery terminal. Let's call this ground 'V-', and the vehicle's positive battery terminal 'V+'.

The negative DC power input of the cMoy is not connected to its audio ground. Instead, the cMoy's audio ground is electrically biased halfway between the battery/DC input voltage. Let's call the cMoy's positive and negative voltage supply connections 'Vp' and 'Vn', respectively. In other words, a cMoy power circuit creates its own 'virtual ground' equal to $0.5 \cdot V_p$.

When you wire a vehicle's +12V supply to a cMoy, you are connecting the vehicle's V+ supply to the cMoy's Vp, and V- to Vn. This immediately presents no problems. Plug in a set of headphones and an iPod and your music will sound great. However, as soon as you plug the cMoy into your vehicle's auxiliary radio input, you are effectively shorting 'Vn' to the 'virtual ground'. This instantly fries the cMoy's power circuitry (the cMoyBB v2.02's optional 'D2' diode can sometimes prevent this damage).

Thus, if you wish to use a cMoy with a car/truck/motorcycle's auxiliary radio input, you must use a 9V battery to avoid shorting out the 'virtual ground.' The other option is to power the cMoy from the motorcycle's battery and only use headphones and a battery powered external audio player, such as an iPod. Never use an audio source powered by the vehicle!

How do you change the operational amplifier chip?

Changing the opamp is simple: Remove the old chip, then insert the new chip in the same direction. Semi-circle notches can be found on the socket and chips to indicate proper orientation.

The chip sits in a socket from which it can be removed. If you do not own an IC extraction tool, use any thin, flat tool to pry the chip from its socket. A flathead screwdriver works well; needle nose pliers can also be used.

The above method applies to opamps in the standard DIP-8 package. To install a surface mount opamp, the chip must first be soldered to an appropriate **SOIC-8 to DIP-8 adapter**. The adapter can then be inserted into the amplifier as described above.

What other opamps do you recommend?

The stock OPA2227 opamp is an excellent chip. If you wish to experiment, several alternative chips are recommended in the Bill of Materials page. Because opinions vary from person to person, it is best for you to perform your own research and audition several chips. These discussions may help:

- [Head-Fi — Best sounding opamp...](#)
- [Tangentsoft.com — Notes on Audio Op-Amps](#)
- [Blog.JDSLabs.com — SOIC Opamp Rolling and New Kits](#)

The cMoyBB requires a dual operational amplifier chip in the DIP-8 package. Most dual-opamp chips (regardless of package style) will work in a cMoy. It is also important to choose an opamp with an acceptable minimum supply voltage. The cMoyBB supplies +/- 4.5V when running on a fresh battery. Therefore, an opamp with a minimum supply voltage of +/- 5V or more would be unacceptable when powered from a 9V battery. This limitation can be overcome by using a higher voltage power adapter.

It's also possible to use SOIC-8 (surface mount) opamps, or even pairs of single-opamps in conjunction with an appropriate BrownDog™ adapter. We sell such BrownDog™ adapters in our store for your convenience. Again, it's wise to research an opamp's compatibility with the cMoy before dropping it into the circuit.

Finally, you may have noticed that we haven't recommended any specific chips. That's because audio is a subjective topic. What you enjoy hearing may differ the opinions of others. I personally enjoy the AD823, AD8620, AD825, OPA2604, and many other chips. Each opamp is unique and enjoyable in its own respect, so try as many as you can afford!