

Bass Boost cMoy v2.03 Assembly Guide

NOTE: See Revision History for older assembly information.

Required Tools

- Soldering iron with a small tip
 - Rosin core 60/40 solder (0.032" or thinner highly suggested)
 - Diagonal cutters
 - Small flathead screwdriver
 - 6-32 (imperial) hex screwdriver
 - Heavy duty 1/4 inch hole punch (recommendations below)
 - Hot glue gun and hot glue, or other method of electrical insulation
 - Dry-Erase marker
 - High concentration Isopropyl alcohol (> 94%)
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Pre-Assembly

In addition to the reference images on this page, you will need to refer to the BOM and layout PDF's during your amplifier's construction:

- Printable Silkscreen Layer
 - Printable Enclosure Jack Cutout Pattern
 - Assembly Instructions
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PCB Assembly (15 to 45 minutes)

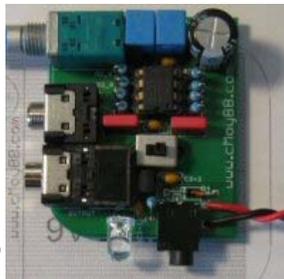
NOTE: Solder after each step, then trim off excess leads with diagonal cutters. Review the complete instructions before beginning, especially if you plan to omit, bypass, or modify any features.

1. Begin by mounting the 8-pin DIP socket on the board. Be sure to match to socket's orientation notch to the label on the PCB. Bend two adjacent socket pins on the bottom side of the circuit board to keep it in place.
2. Place capacitors C3+, C3-, and C4. These capacitors are non-polar, i.e., they can be inserted in either direction. Optional diode D2 should also be placed at this time (observe polarity!). Capacitor C5 should only be installed if also using optional component U3.
3. Place all resistors:
 - R2_L and R2_R
 - R3_L and R3_R
 - R4_L and R4_R
 - RB_L and RB_R
 - R_LED
4. Place capacitors C2_R, C2_L, CB_R, and CB_L. These capacitors are also non-polar.
5. Mount the bass boost toggle switch in location J3. Direction is unimportant. Hold the switch in place and carefully bend adjacent pins as in step 1. Alternatively, you may use four short 22 gauge wires to connect an enclosure mountable switch (as shown here), or a bass boost control potentiometer as described in the Modifications page.
6. Push the Texas Instruments TLE2426CLP IC into location U2 (and optional second TLE2426CLP into U3). The center pin will bend easily and allow you to slide the component into place.
7. Place capacitor C1. Electrolytic capacitors are polarized; the longest lead is positive (+). If you use an especially tall capacitor (14mm or taller), make sure it will fit in the enclosure before soldering. The capacitor may be rotated 90 degrees if height is a problem.
8. Insert all jacks: J1, J2, J4, J5. The extra six pins on the STX-3100-9C audio jack (component J2) are sensitive to heat damage. Solder each pin in under 1.5 seconds, with 5+ second cooling periods between soldering each pin.

9. Place the LED in spot D1, noting polarity. Bend the LED forward 90 degrees so that it is aligned with the DC jack. It will be helpful to bend the LED's pins before soldering. LEDs are also sensitive to heat damage. Solder quickly.
10. Insert the red lead of the 9V battery connector into terminal V+ and the black lead into terminal V-. If you wish to braid the battery connector wires, do so before attaching the connector to the PCB. The two holes marked "18V" are only to be used with dual battery connectors.
11. Insert the OPA2227PA operational amplifier (or other opamp) into the DIP socket, once again observing socket orientation.

Post-Soldering Tests (5 to 15 minutes)

Now is a good time to test your new cMoyBB. Connect a new 9V battery and a cheap pair of headphones to the amp. Barely turn the volume knob on and check for obvious faults: Ensure you hear silence from your headphones and that no chips or components are overheating (everything should be cool to the touch). Engage and disengage the bass boost switch and check that no problems arise.



Assuming this preliminary test passes, connect the amp to a cheap source to verify its full functionality. Once you are satisfied, disconnect the battery while the amplifier is on. This will discharge the capacitors so that no energy is stored while mounting the PCB in the enclosure.

DC offset can optionally be verified by measuring the voltage at each of the output channels with respect to the audio ground. Offset should not exceed 20mV with bass boost turned on. Typically, DC offset for the cMoyBB with an OPA2227PA opamp is below 4mV with bass boost on and below 2mV with bass boost off.

Once you have a working amplifier, you should clean the PCB. Use rubbing alcohol and an old toothbrush to scrub excess flux from the bottom of the circuit board. See Tangent's video tutorials for help. Failure to clean the PCB can eventually lead to corrosion of the PCB's 74 soldering pads.

Casing Assembly (5 to 30 minutes)



1. Print the enclosure pattern and set an Altoids tin atop the printout. Use a Dry-Erase marker to mark approximate jack locations and the edge of the enclosure's lid.
2. Punch holes at the marked locations with a hole punch. Ensure the holes will not interfere with the lid (remember to account for the audio jack nuts). Holes for the audio jacks, the LED, and the DC jack should require a single punched hole. The volume potentiometer hole will need to be enlarged by punching multiple holes. This

unsightly hole will be hidden by the volume knob.

3. Insulate the bottom of the PCB to prevent shorts against the tin. For example, apply hot glue to various spots on the bottom of the PCB, but avoid gluing soldering pads. Other insulation ideas include: foam, plastic, cardboard, or thick layers of electrical tape. [Note: This step is not shown in the video above.]
4. Slide the assembled PCB into the tin, potentiometer first and DC jack last. Even if the holes and jacks line up well, the PCB will need to be pushed into place with light to moderate force.
5. Screw the audio jack nuts onto the threaded 3.5mm jacks (J1 and J2).
6. Insert the LED grommet (see tip below).
7. Attach a piece of sticky sided foam inside the tin as a battery cushion, then connect a 9V battery.
8. Shut the enclosure lid and position the volume knob onto the RK097 potentiometer shaft. Tighten the knob's 6-32 hex screw.

Tips:

- You may find it difficult to punch holes in the mint tin with a regular 1/4" paper hole punch. For best results, use a heavy duty 1/4" hole punch such as:
 - OfficeMax[®] Padded 1/4" Hole Punch
 - Fiskars[®] 1/4" Hole Punch

Fiskars hole punches are extremely durable, but the punch retaining clip must be removed for use with this project.

- Do not use the washer or nut with the Alps RK097 potentiometer. The input, output, and DC jacks are arranged so that the amplifier will already be securely positioned without the volume potentiometer. The RK097's washer & nut are too large for the tin's lid to close easily (though it is possible). As previously mentioned, the potentiometer's hole and threads will be covered up once a volume knob is attached.
- It is usually possible to push the LED grommet in place. If not, trim off one of the two thickest plastic "legs." The grommet should still stay in place.