

MOX - Discrete Opamp Assembly

Assembly guide

These pages are a photo-guide to assembling the discrete dual opamps. These boards are designed to stack on top of each other to plug into a standard DIP8, dual opamp footprint. They will even plug into DIP8 sockets if you use the recommended 18-21 mil contact (thin!) right-angle headers (100 mil spacing). If you don't need to use sockets, then wire links could be substituted.

I've divided this guide into "top" and "bottom" sections because this is the way I chose to stack up the boards; "top" corresponds to pins 5-8 on a DIP8 opamp, and "bottom" corresponds to pins 1-4. When you plug the finished opamp in a board, the components are all jutting out to the right.

Parts list

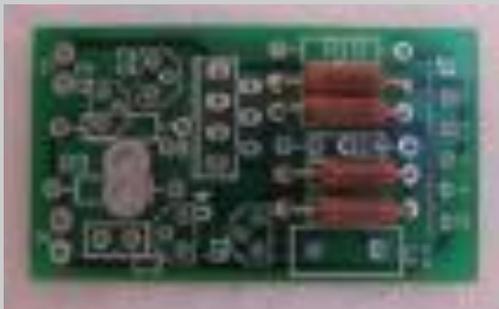
The table to the right lists the components for an opamp board. In assembling a single dual opamp, two such boards will be built up. They will not be mirror images!

There are some parts marked N/A--these were removed from the final boards and need not be placed. There is space for R10 on the boards; this is the 4k7 resistor to ground. Normally, this would be soldered on the underside of the MOX board, but if you wish to connect the opamp board to ground, you may place it.

Please pay special attention to the orientation of the transistors. The silkscreen/pads for the four three-terminal transistors is backwards for MPSA42/92. If you wish to use BC550/560, it is correct.

In a few images, you can see a scrap piece of resistor lead that I used to pin the board for photography. This is not a component that you need to assemble.

R1	100
R2	N/A
R3	392
R4	(none - trim)
R5	10k
R6	100
R7	N/A
R8	180 (182)
R9	100
R10	4k7 - usu. on MOX board
Q1	MPSA-92
Q2-4	MPSA-42
ZIP	2SK389
C1	N/A
C2	100pF
C3	100nF



TOP - Step 1

The first step should be to place resistors R1, R3, R5, and R6 on the boards.

TOP - Step 2

The second step is to add the active components. Q1 is the MPSA92, Q2-4 are MPSA42. Observe the arrows in the picture -- the rounded side of the package should point in that direction. The large 7-pin ZIP pads are for the 2SK389 dual JFET. You should be careful to ground yourself when handling it and observe normal anti-static cautions. You may need to gently bend some of the legs -- when you have it properly oriented it will slip into the pads. You should not have to apply force.

I recommend that you first place these components, then double check their orientation before soldering. It will be almost impossible to desolder them if you have made an error! (Should you discover an orientation error too late, I recommend you cut the component off with flush-trim snips and solder to top pads or discard the board -- unless you are very good with an iron, you are more likely to damage the board and/or the replacement components)





TOP - Step 3a

Place R9 on the top side. If you will be joining the boards with a spacer+screw I recommend that you bend the leads slightly so that the resistor clears the upper screw hole better.

TOP - Step 3b

Place R8 on the bottom side. You should cut the leads so that you won't need to trim after soldering; otherwise, it will be hard to trim the lead that comes out near the 2SK389.



TOP - Step 4

Place C2 and C3. I have included the picture to the right for reference, but DO NOT solder the right angle header yet. Set the board aside for the moment and assemble the "bottom" board.

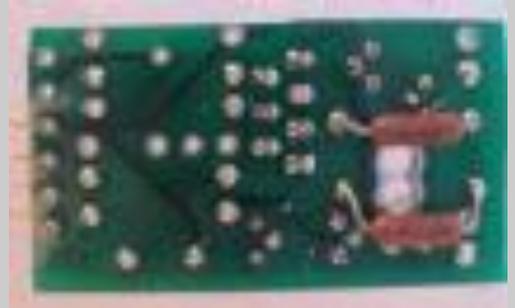
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BOTTOM - Steps 1 & 2

Follow the directions for TOP steps 1 & 2 -- the process is identical.

BOTTOM - Step 3

Place R8 and R9 on the bottom side. Note how R9 is bent to clear the bottom hole--this is required if you are using screw+spacer to join the boards.



BOTTOM - Step 4

Place C2 and C3. Place the right-angle header*; it should occupy the bottom four pads and protrude up from the top (see pic). Place ~1" lead cutoffs from your resistors into the lower "P" and "N" pads on the left side of the board and solder.

*depending on the size of your components, you may wish to save the right angle header until the final assembly steps.



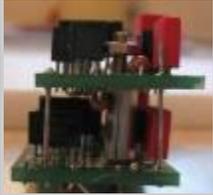
BOTTOM - Step 4 continued

This is an alternate detail view of the "P", "N" leads. The next step is to assemble the entire dual opamp.

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DUAL - Step 5

Run a screw (#2) up through the "bottom" board, then add a 3/8" spacer. You should now be able to slide the top board onto the "P", "N" leads and screw. The "top" board is offset by 100 mils; the leads will be protruding through the far pads. (see pic) Do not solder the "top" right-angle header yet.

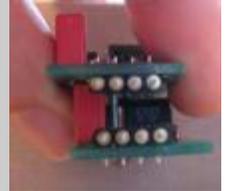


DUAL - Step 5 continued

Here is a closeup of the spacer assembly. Due to poor planning there was not room for the nut--if you plan ahead and bend the resistor (R9) slightly you will avoid this problem.

DUAL - Step 6

Now mount the "top" boards right-angle header. It will occupy the middle four pads and protrude from the bottom side of the "top" board. (see first pic on this page and one to right). I suggest that you actually insert this header into a DIP8 socket along with the header which was previously attached to the "bottom" board. This will act as a soldering aid to ensure the boards are lined up squarely.



Double check that you are using the correct pads, then solder the header. Finally, solder the "P" and "N" leads and trim. Congratulations, you have completed a discrete dual opamp!