# Staccato OSH Opamp Swapping Instruction

## General information

All audio gear need opamps for different signal operations. Opamps are used In Current to Voltage converters (I/V) or buffers. They also popular as a low pass filters or in active crossovers.

All this application can be covered by Staccato Discrete Opamps

List of **DUAL** opamps can be swapped NE5532, OPA2134, TL072, RC4580, LF353, MUSES01, MUSES02, MUSES8820, MUSES8832 AD8620, AD712, AD8066, LME49723, OPA1642, OPA1652, AD823, uPC4558

List of **DUAL SIP8** opamps NJM4558, uPC4558, NJM2132L, BA728

List of **SINGLE** opamps. AD797, TL071, OPA145, LM741, OPA627, OPA827, MUSES03

List of **QUAD** opamps: LM148, LM124, LM124A, LM224, LM224A, LM324, LM324A, LM2902, LM2902V, LM224K, LM224KA, LM324K, LM324KA, LM2902K, LM2902KV, LM2902KAV, TL064

If you cannot find your opamp on the list just please contact us for the individual verification. (jho@staccatoaudio.com)

## Use of Adapters

Still you can use two single opamps as a dual opamp. You will just need an additional Adapter DIP8(dual)-2xDIP8 Horizontal

There is also possibility to replace QUAD opamp with two Staccato dual OpAmps using our special adapter DIP14

Sometimes you can see SIP8 opamp like NJM4558L. Then you will need to use our dedicated Adapter for dual opamp SIP8-DIP8 or even two singles SIP8-2xDIP8

Most of producers are using DIP8 sockets mounted to the mainboard of the DAC, preamplifier or power amplifier. Once the regular IC opamp is placed there is a risk that micro pins in the socket are bent too much, so it can loose electrical contact. It can manifest as audible hum noise or distortion.

We recommend to replace the socket for the new one. If that's not possible or it makes too much effort we recommend to use "Socket in the Socket" See Ref. 8 and Ref 9.

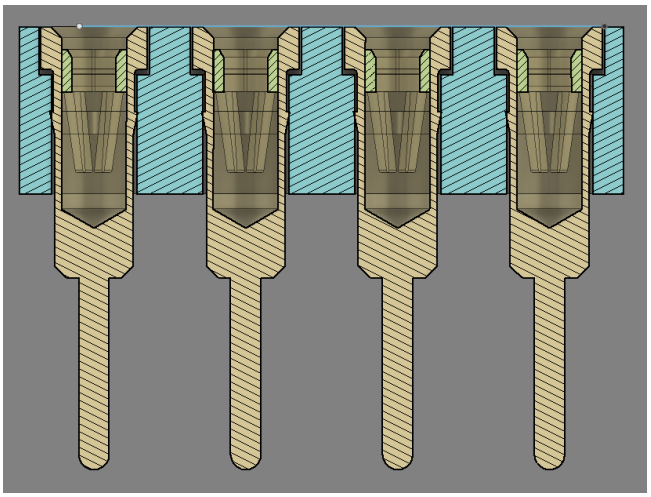
Unfortunately not many of producers are aware the precise sockets are dedicated to the round pins as you can see on the drawing below.

Ref 1. DIP8 precise socket

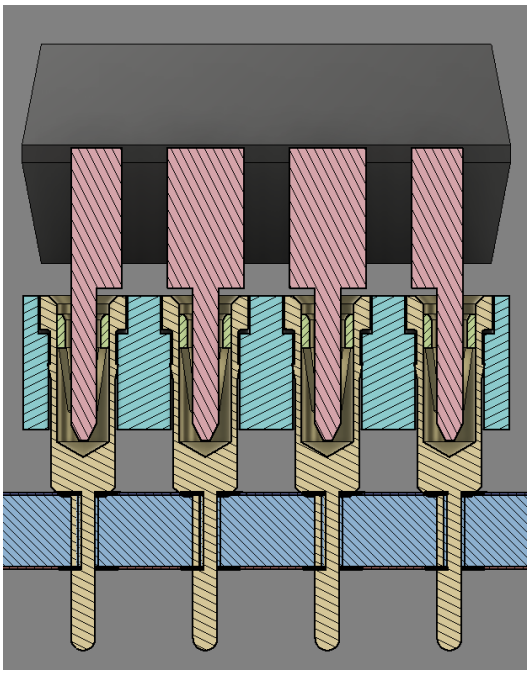
Ref 2. Round Pins for DIP8 socket.

If look inside the DIP8 socket feme pin connector you can see 4x small micro pins. The are spring type connectors meaning they got some force to keep male pins in the place. We do not recommend to transport DACs with Staccato opamps plugged in. They might fall out from the socket while high vibrations. To minimize the risk, we are adding silicone rubber to keep the opamp sit tight in the socket.

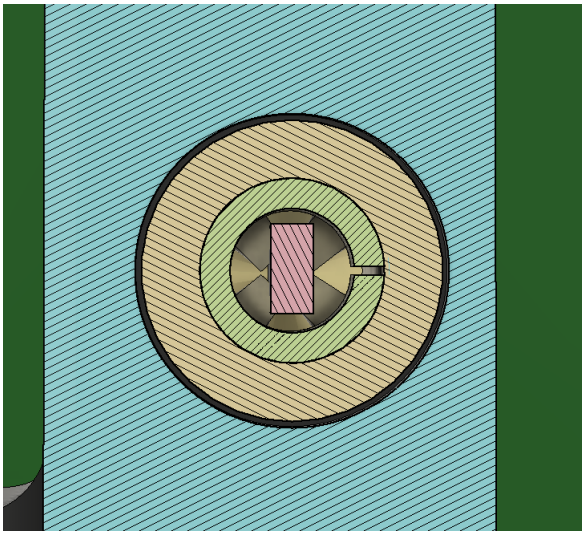
Ref 3. Micro pins inside DIP8 socket



Ref 4. DIP8 socket pins cross section.



Ref 5. Left view Opamp cross section mounting



Ref 6 . Top view cross section Opamp Pin

## How to exchange the opamp

STEP 1 Locate the opamps in the mainboard of the device

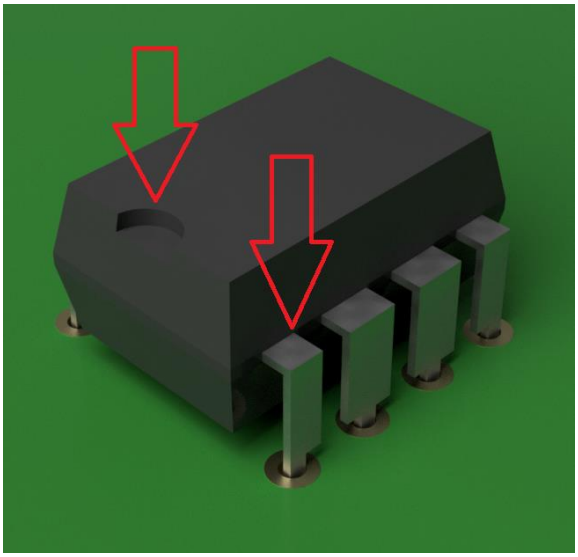
STEP 2 Back to the opamp list and check how many and which opamps

STEP 3 Locate PIN1 of the opamp

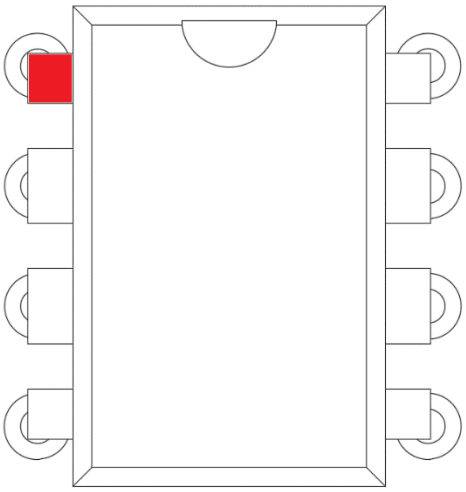
PIN 1 is located as upper left corner. Up side of the opamp is shown as a indentation in the plastic socket. Then make a sign on The PCB if the is no signs already showing PIN1.

IMPORTANT: Placement a dual opamp in opposite direction will cause irreversible damage of a opamp. .The transistors will blow and will see the smoke.

IMPORTANT: Damage caused by incorrect polarity is not covered by the warranty.



Ref 5. Opamp IC PIN1 location



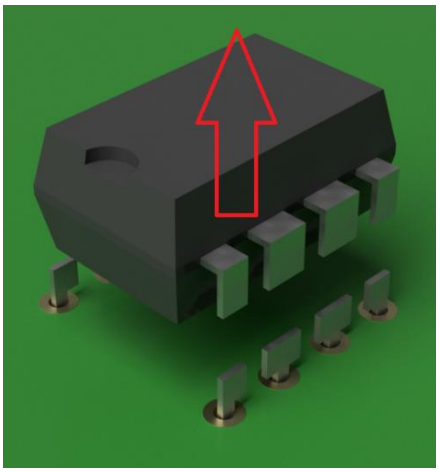
Ref 6. Opamp IC PIN1 location

STEP4

If you are lucky and you already got the DIP8 socket mounted in your device, you can skip this step and go to STEP6

In this step you will need to cut out your existing opamps. Trying to resolder THT (through hole) legs might be too dangerous and you can damage the PCB. All eight pins need to be heated in the same time and this is nearly impossible. Better and quicker way is to cut out the Opamps IC body and resolder leg after leg. To clean the rest of the tin inside the hole use desoldering copper wire. We recommend Chemtronics Solder-Wick 2mm

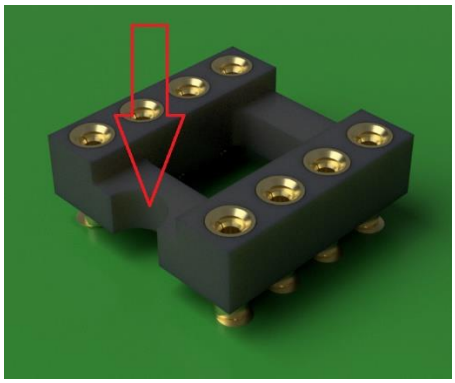

Ref 7. Chemtronics desoldering wire.



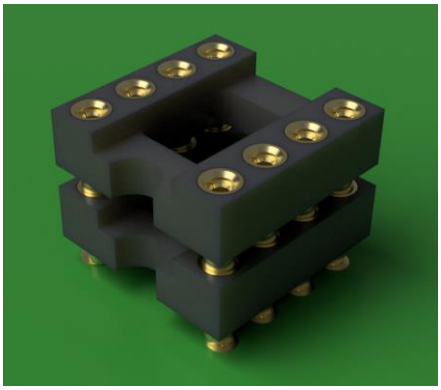
Ref 8. Opamp displacement

STEP5

Now you are ready to solder DIP8 socket to your mainboard. We recommend to use Gold plated Sockets available on our website



Ref. 9 DIP8 Socket ready for Staccato installation



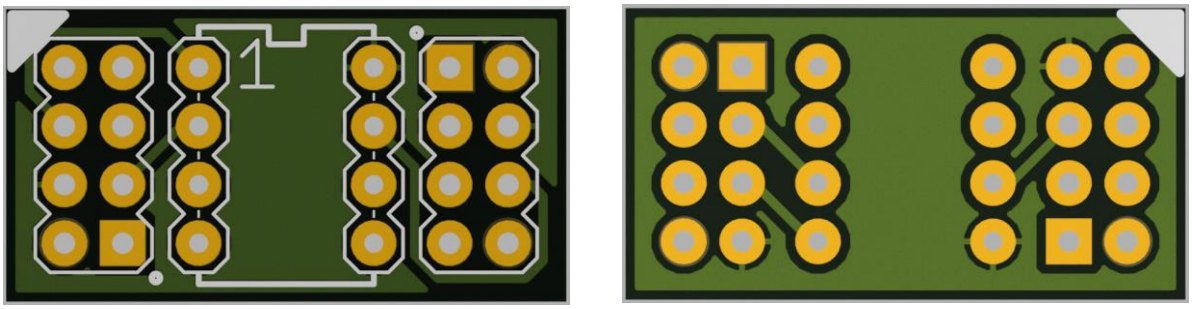
Ref 10 Additional socket when old socket loose contact

STEP 6

Now you are ready for placing the Staccato Opamp.

Staccato OSH opamps have PIN1 showed as white triangle in the left upper corner and number “1”. It can be easy recognizable because the white triangles are at both sides of base PCB.

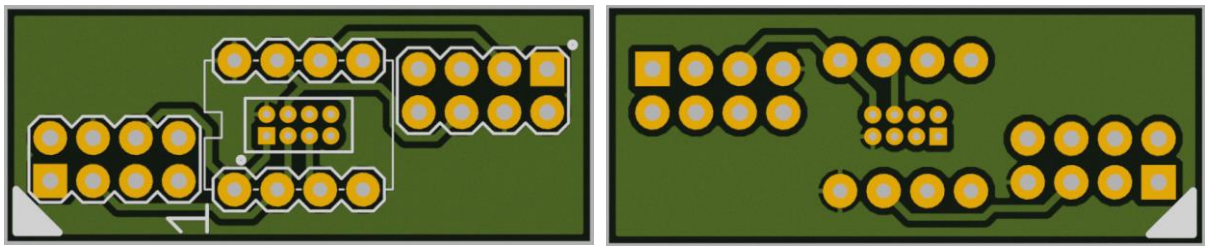
Small dots visible on the PCB is just showing the correct placement only for the single opamp. It’s only use for manufacturing purpose.




Ref 11. OSH-D opamps base plate top and bottom view

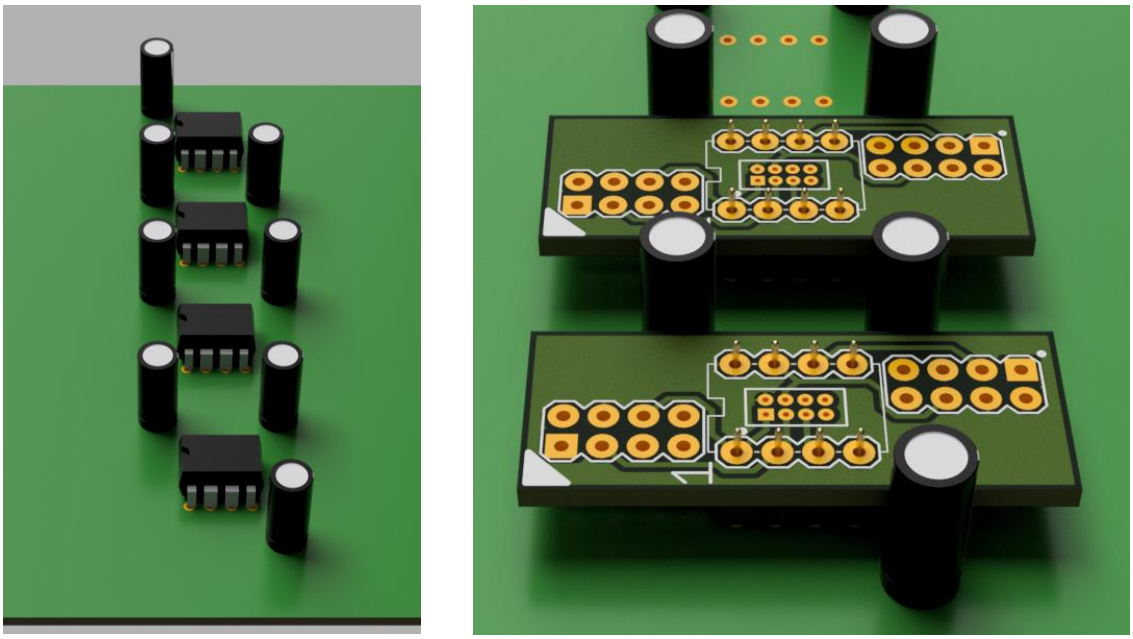
STEP 7

If your device has quite height capacitors around opamp you might need to use our special design for this kind of situation which OSH-DV opamp.



Ref 12. Staccato OSH-DV opamp base plate

Too small distance between the capacitors

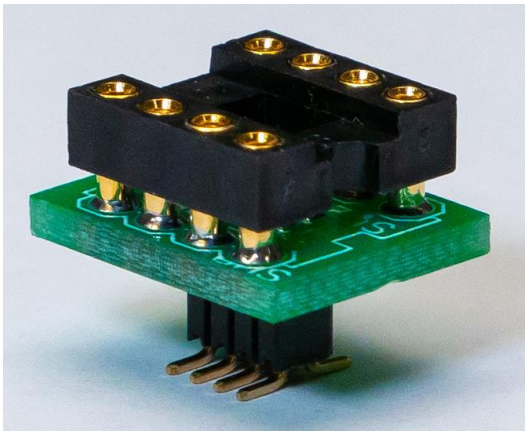


Ref 13. Small distance between capacitors where only Staccato OSH-DV can fit

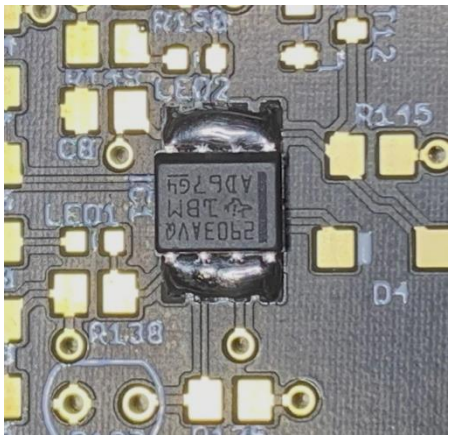
## Swapping SOIC8 (SMD) Opamps

Yes we have also a solution for small tiny opamps hide in a smaller enclosure. The functionality is the same but sometimes SMD opamps could sound different than it's older brothers (THT version)

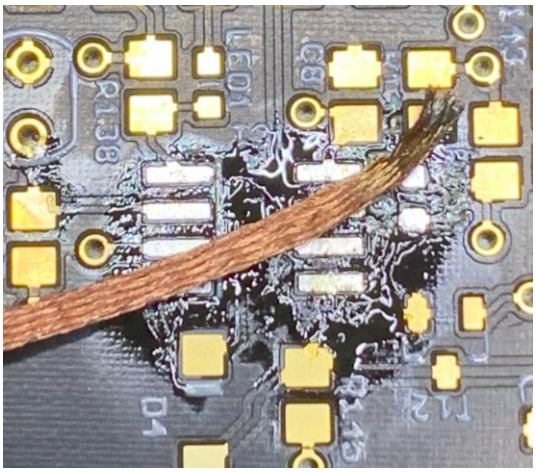
You are probably not surprised that you need our smallest adapter SOIC8-DIP8 This time you can also cut out the legs of the opamp or take some more efficient method used by qualified electronic serviceman. This method is based on thermal capacitance of tin. Making short circuit on both sides of the opamp you will be able to take it off easly. Please remember the tin should be keep melted.



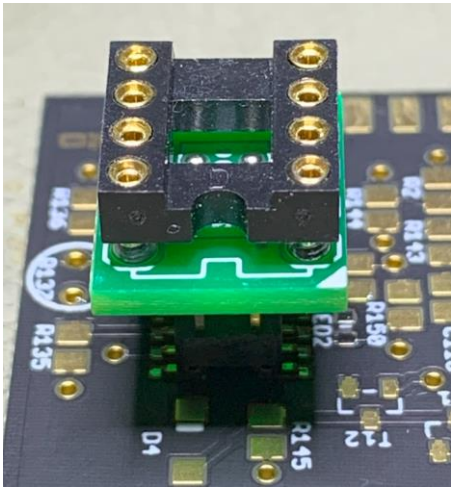
Ref 12. Staccato SOIC8-DIP8 Adapter




Ref 13. Tin bridge




Ref 14. Desoldering wire used for clean SMD pads




Ref 15. SOIC8-DIP8 Adapter mounted