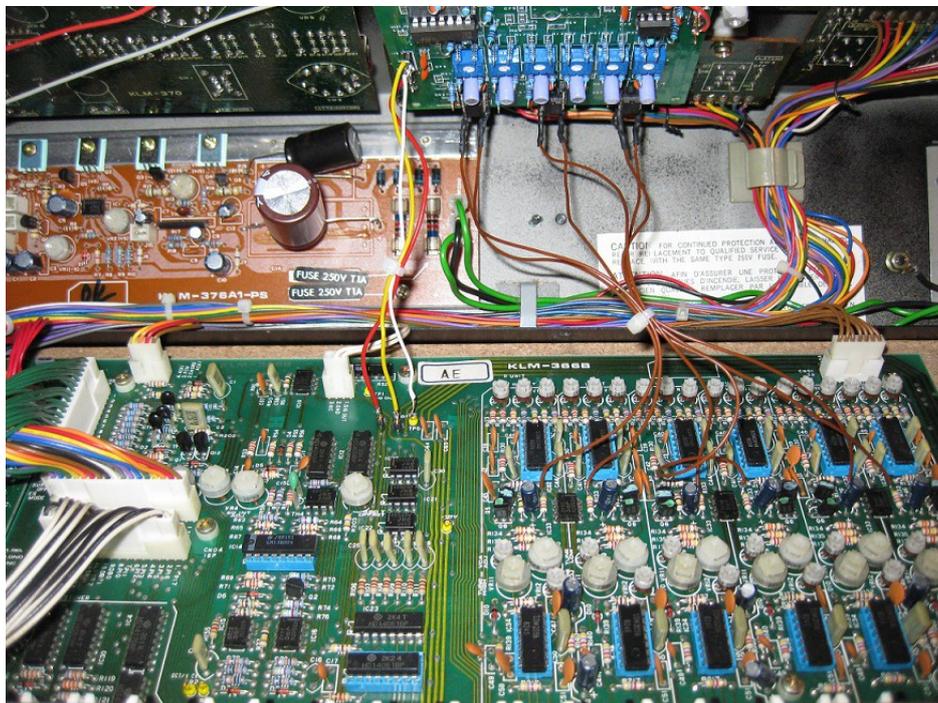


# KORG Polysix

## Panorama modification

Peter Kliegelhöfer

Munich/ Germany, June 2018



## Preface

This little do-it-yourself project allows to freely spread each of the six voices in the stereo panorama whilst the unmodified original (mono) output signal remains to be available in parallel. It is surprising how much sound can benefit from this modification, or shall we better say: *addition*.

In 2017 I originally designed a mod for Sequential Circuits' Prophet 600 synthesizer and then discovered that it can be also used, with some slight modifications, for the KORG Polysix.

Differently to the Prophet 600 mod, the Polysix mod provides stereo output at *fix* output level. The pure raw stereo signal is not influenced by the Polysix effect section, manual VCA control or manual volume control.

I find it sonically highly attractive to mix both the mono signal (with effect) and the clean stereo signal in an external mixer. This allows nice new sound experiences with the Polysix!

Internet shop "Das Musikding" offers complete D.I.Y. panorama upgrade kits for both synthesizers Polysix and Prophet 600.

Integration of this solution does not require any destructive measures on the original circuitry.

This project mainly addresses `experienced` and `skilled` technicians. The author doesn't take any responsibility for damages of any kind.

**Pull power plug first before you open and modify a synthesizer.**

Finally, this is a hobbyist project and I do not earn any money with it. However if you like this project and if you want to support me on future developments you have the possibility for a voluntary donation via PayPal: Please see link in the ordering area of "Das Musikding".

And now good luck with everything - and have fun! :-)

## Overview

This mod requires following measures:

1. Pan mod PCB assembly & Quick test
2. Pre-wiring of the pan mod board
3. Integration of the pan mod board
4. Have fun!

## Additional Information

The original D.I.Y. panorama project for the Prophet 600 was published on the German internet portal „amazona.de“. Several sound examples can be found here:

Part 1:

<https://www.amazona.de/diy-sequential-prophet-600-panorama-upgrade/>

Part 2:

<https://www.amazona.de/leser-artikel/sequential-circuits-prophet-600-panorama-modifikation/>

German internet shop „Das Musikding“ offers complete panorama mod kits:

KORG Polysix: <https://www.musikding.de/Polysix-Pan-Mod>

Prophet 600: [https://www.musikding.de/Prophet-600-Pan-Mod\\_1](https://www.musikding.de/Prophet-600-Pan-Mod_1)

## **Material**

An overview of all required material is shown in the annex.

## **Tools**

For proper construction, tools are needed. A temperature controlled soldering iron with a fine copper bit, metal driller and metal file for cabinet machining, and a hot glue gun should belong to the basic equipment of an ambitious technician and hobbyist.

Apart from that a multimeter and an oscilloscope (ideally featuring a test signal for probes; alternatively a separate signal generator) and a short circuit protected power supply with stabilized + / - 15V DC must be on hand.

## **Polysix Service Manual**

It is further recommended to download the Polysix schematics from Internet. Schematics are part of the Service Manual which is freely available from different sources.

## Panorama PCB

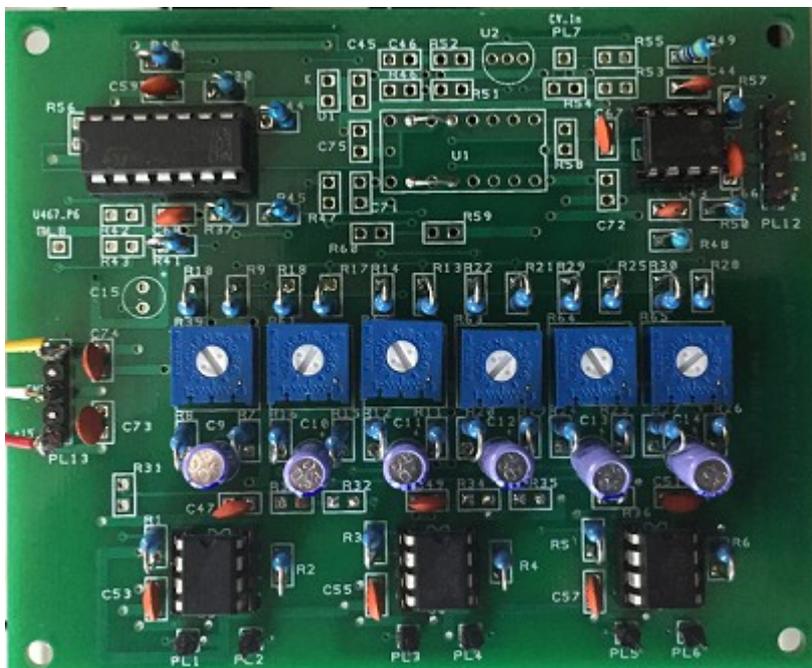
The PCB is designed for through-hole assembly, making soldering easy.

A component diagram can be found in the annex.

Please put special attention to:

- correct orientation of all ICs (pls. see notch)
- correct connection of the polarized caps (see „+“ marking)
- correct assignment of component values

Following picture shows the assembled pan mod board:



Assembled Polysix pan mod board

Some components do not have to be assembled for the Korg Polysix pan mod.

## Hints

Classic assembly, we start with flat components and work towards the taller ones, finishing with the polarized caps.

We may start with the IC sockets. Pay attention to orientation: The notch of U3 (TL084) points to the left, notch of U10 (NE5532) points to the right. Notches of U5~U7 (TL082) point upwards.

Polarized caps (C9~C14) are to be assembled with positive pole pointing upwards (note the „+“ marking on the components side).

Depending on the mechanical outline of the trim-pots, outer leads may need to be bent into shape *before assembly*. Pay attention to R39 (the trim pot on the most left hand side) where the middle lead may slip into a via instead of the regular pad.

Pins 2 and 4 of both plug strips PL12 and PL13 are not connected.

Mind the two wire bridges which have to be placed in the area of (unassembled) U1, connect pins 5-7 and pins 10-12

## Quick test

When everything is properly assembled, use a magnifying glass and do a final check: are all components at its right place, are the solder joints clear and shiny, are there any short circuits or cold solder joints, etc.

If everything is fine, put the ICs into sockets (mind notches), turn all trim-pots into middle position and connect the +/- 15V DC and GND power supply cables. Do not yet switch on the power supply.

The oscilloscope should provide a simple square wave test signal for probes. This signal is what we use for our quick test. As voltage level is usually too high for this purpose (e.g. 5Vpp) we attenuate with a 100K Ohm resistor and a non-polarized 0.47uF cap in series for DC suppression. Of course a signal generator can be also used for this purpose.

We now supply a test signal to PL1 and connect the oscilloscope probe to PL12, connection L or R. If we have a dual channel oscilloscope we can monitor both outputs L and R at the same time.

Now we switch on the power supply. **Attention:** if we do not see any signal **switch off immediately and try to find the failure.**

If a square wave signal can be seen, vary the corresponding trim-pot to the left and to the right and watch the amplitudes at the L/R outputs. We proceed the same way for all inputs PL1~PL6. Done!

## Mod Board installation

Thanks to its design everything is easily accessible in the Polysix. More than that, an existing metal frame allows easy attachment of the mod board.

## Installation of the L/R jacks

Basically I don't like irreversible changes of vintage instruments. However in this particular case intervention is not dramatic and also not so visible therefore reasonable. Two holes have to be drilled at the rear side of the cabinet for the two 6.3mm mono jacks. These should sit below the (mono) output and phone output. However this is just a proposal, of course any other solution could be possible also.



Dimensions for the holes of the L/R output jacks



L/R Output jacks installed

## Wiring

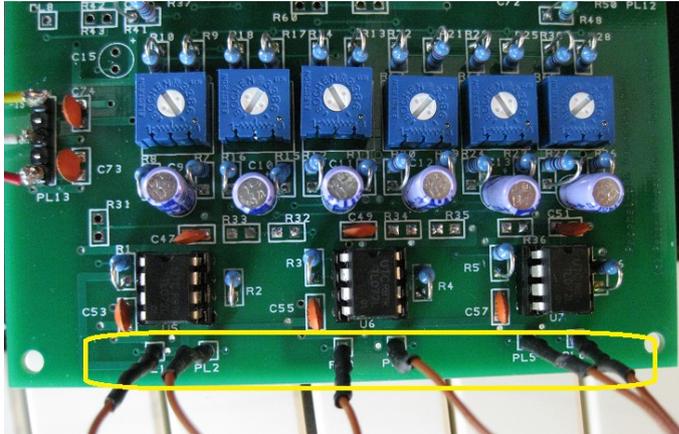
Everything needs to be properly wired. It is strongly recommended to solder all wires for power supply, audio voice signal input, and the both L / R audio outputs onto the mod board *first* before we attach it to the metal frame.

First is to prepare the wires for audio voice signal input. For this we prepare six wires which are a combination of a 22K resistor with ca. 17cm wire as shown below. Use shrinkable tubing for isolation.



Audio voice signal input preparation

Solder all six taps from the resistor side into the pan mod board as shown below:

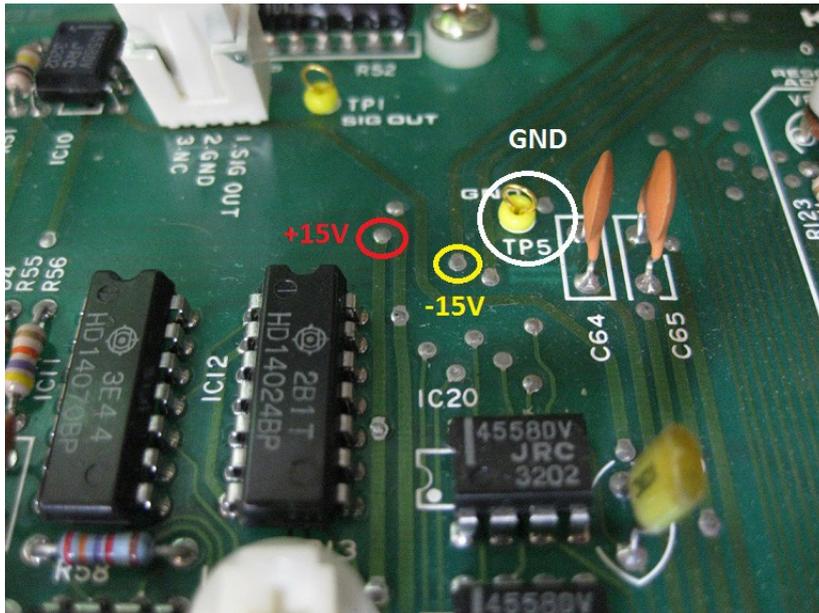


Audio voice signal input wires properly soldered

Next is the power supply: In the following it is shown where to tap /connect required voltages +15V, -15V and GND.



Power connection.



Power connection



Power connection readily wired.



Pin pole for +15V and -15V tapping

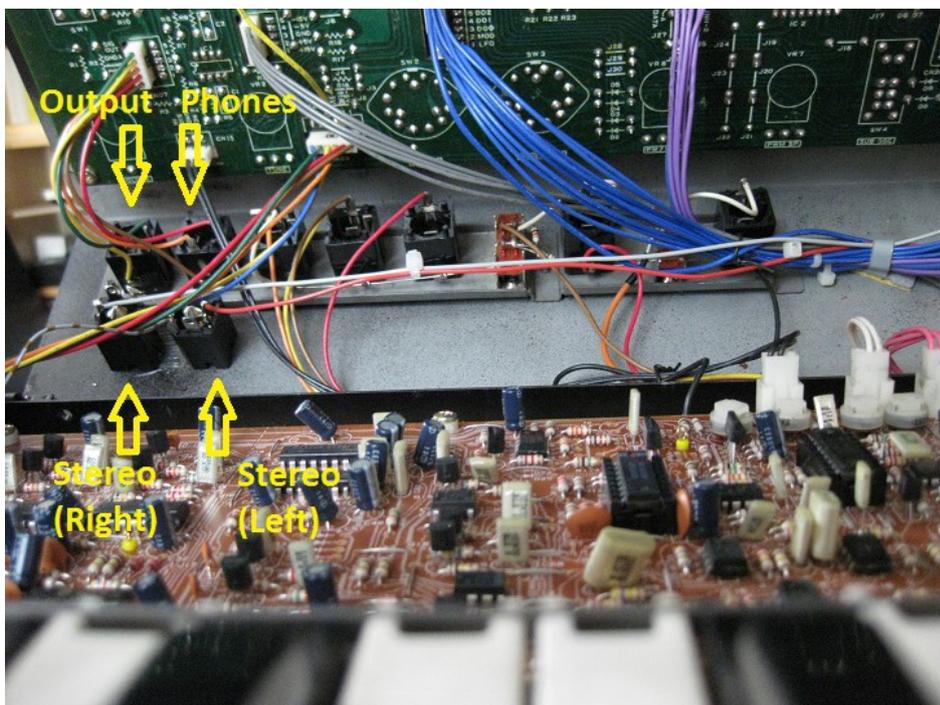
For GND connection there is already a comfortable test point “TP5” available on the voice board. For the +15V and -15V connections we have to establish taps with thin wire or thin pin poles which have to be soldered into vias. Above pictures show all required details. +15V is the most left conductive path next to the IC.

Note: there are test points for +15V, -15V and GND at the power supply board. However tests have shown that it is not ideal to supply our board from there as wires would have to be longer and disturbing noise could be injected from the surrounding circuitry.

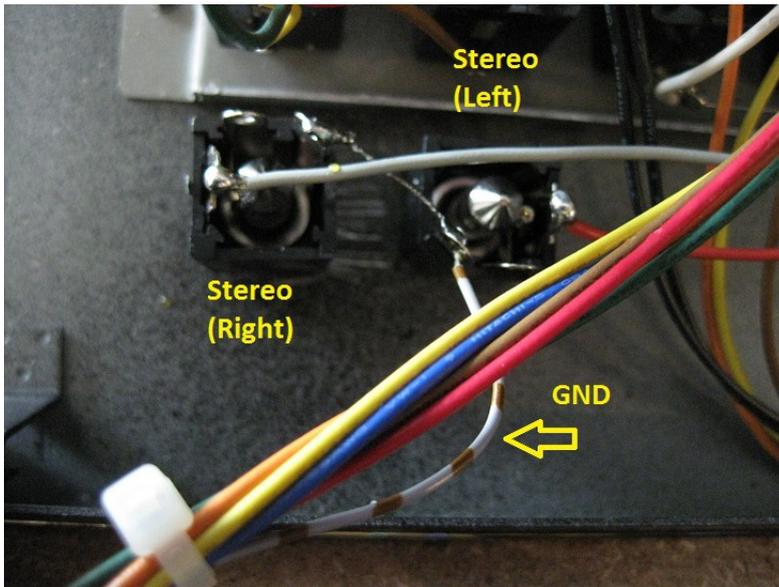
As a rule of thumb, we need to keep all wires as long as necessary and as short as possible to avoid any noise disturbances.

Carefully check with a multimeter or oscilloscope that voltages are correct!!! The three wires for -15V, GND and +15V will have to be soldered to terminal PL13 of the pan mod board. Again: mind the polarity!

Finally, preserve wires for the two mono output jacks. We need three wires for Left, Right and Ground.

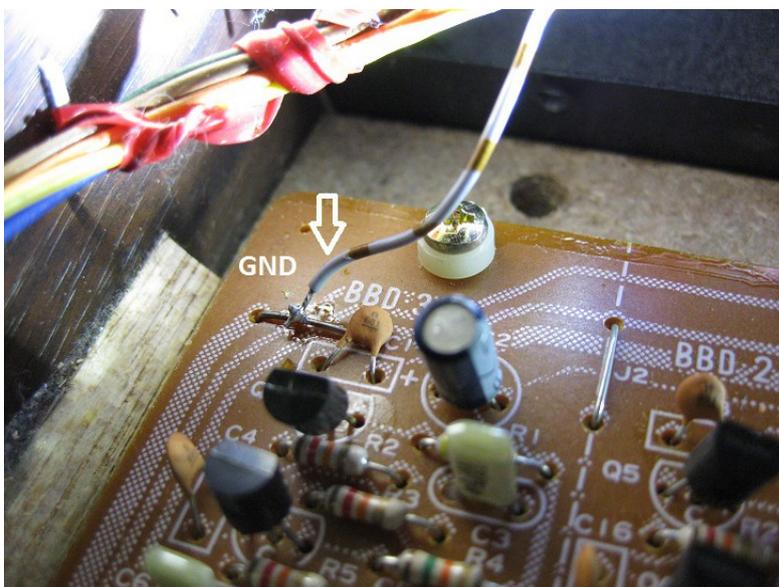


L/R output jacks



Wiring of the output jacks

Ground for both output jacks has to be connected as shown below:



Ground connection of the L/R output jacks.

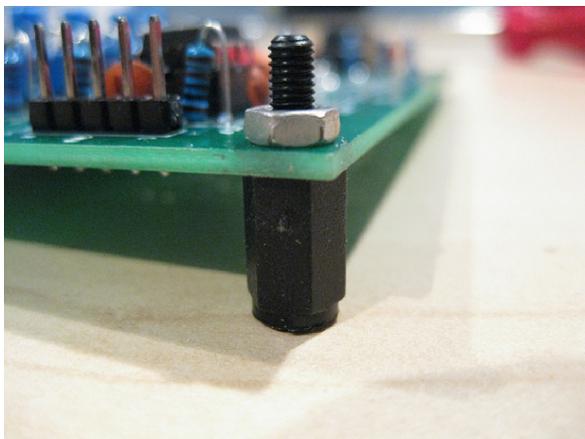
Now it's time for a coffee or tea break ;-)

When all wires are soldered to the pan mod PCB, attach the board to the metal frame as suggested in below photos. Two spacers are to be screwed into the metal frame to the left and right.

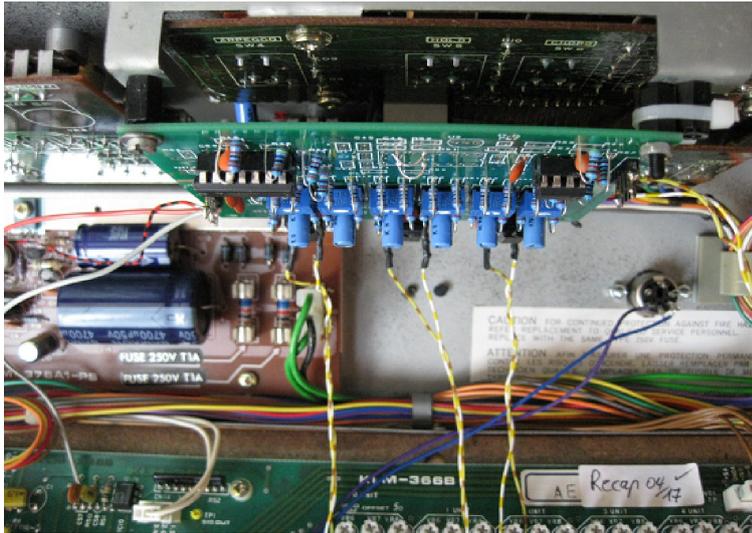


Screw spacers into the metal frame

Another spacer is to be placed onto the pan mod board's upper right.

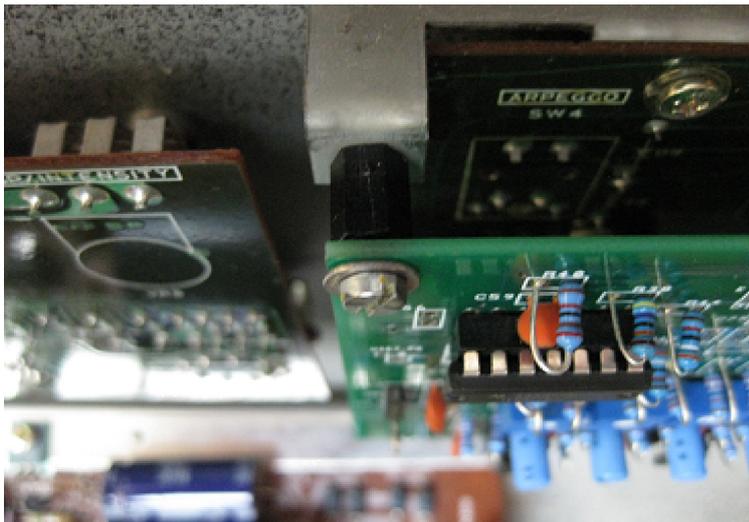


Place a spacer onto the pan mod board



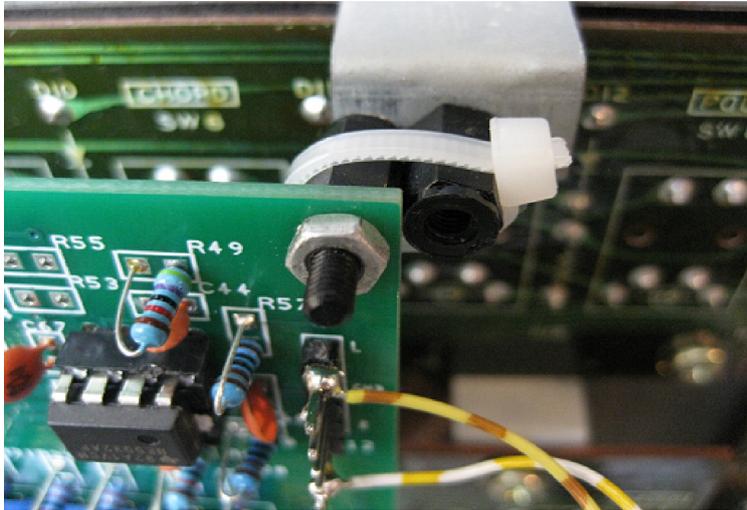
Pan mod board attachment

The left edge is to be fixed with a screw.



Upper left

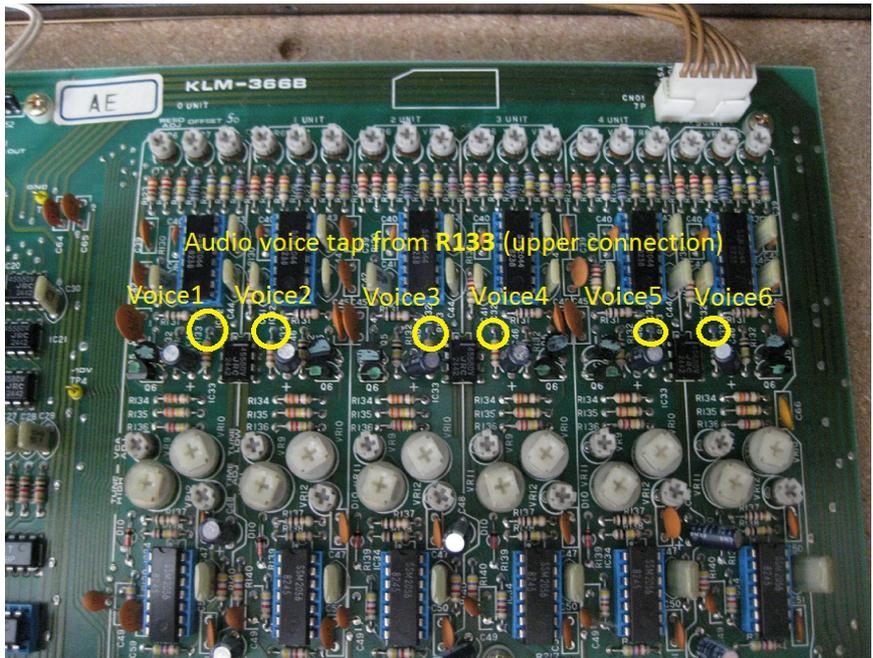
For fixation of the right edge use cable ties. You may additionally like to use some hot glue to ensure proper fixation.



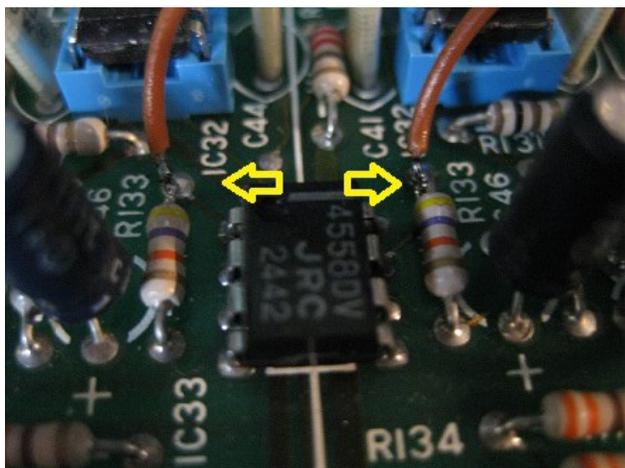
Upper right

When the mod board is solidly attached we can finalize with wiring.

Let's start with the six audio voice input connections. Wires have to be soldered to resistors *R133* on the Polysix voice board. There are six 47K resistors which are all marked „R133“. Solder wires to the *upper* connection of the resistors. One by one, from the left to the right, straight forward.



Audio voice input connection



Solder audio voice taps to upper connection of R133

Next is power supply. Voltages (+15V, -15V) and Ground (GND) are to be conneted as shown in previous pictures.

Finally the L/R mono jacks have to be connected. Both jacks share common GND. For details please see pictures above.

## Grand finale

Make a careful final check: nothing is semi-fitted, remove solder remainders from the inside of the synth (there are *always* small solder crumbs which can cause shorts...), connect audio and power supply cable, take a deep breath and ...only enjoy!

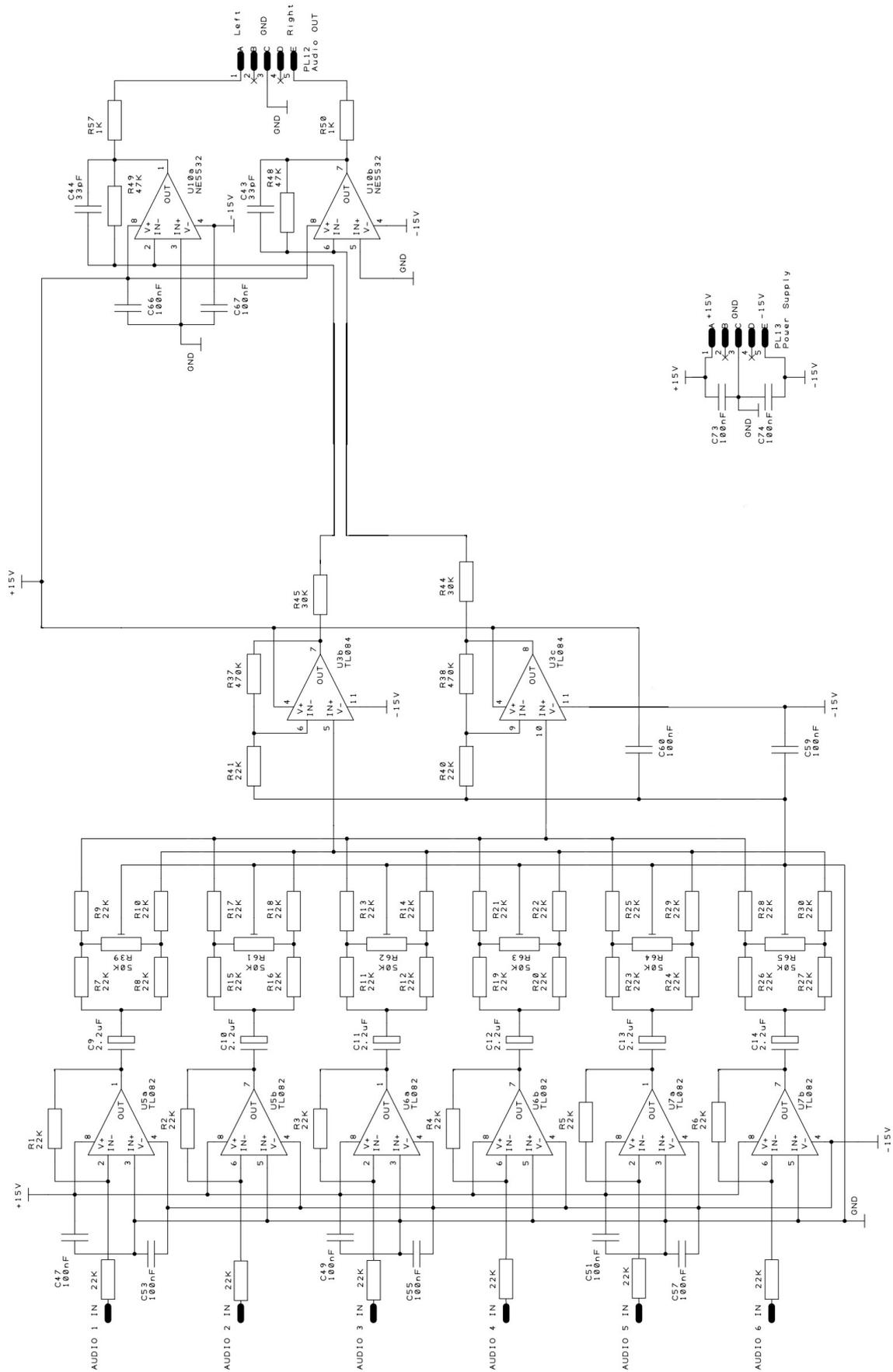
Adjust the blue trim pots for stereo spreading to your gusto. You may like to chose a simple order of : voice 1-left, voice 2-right, voice 3-left usw. as voices are played by the Polysix in sequential order.

According to my experience trim pot adjustment is usually be done only once. That's why I didn't spend any effort to make the trim pots accessible from the outside. However you may like to experiment here, everything is possible.

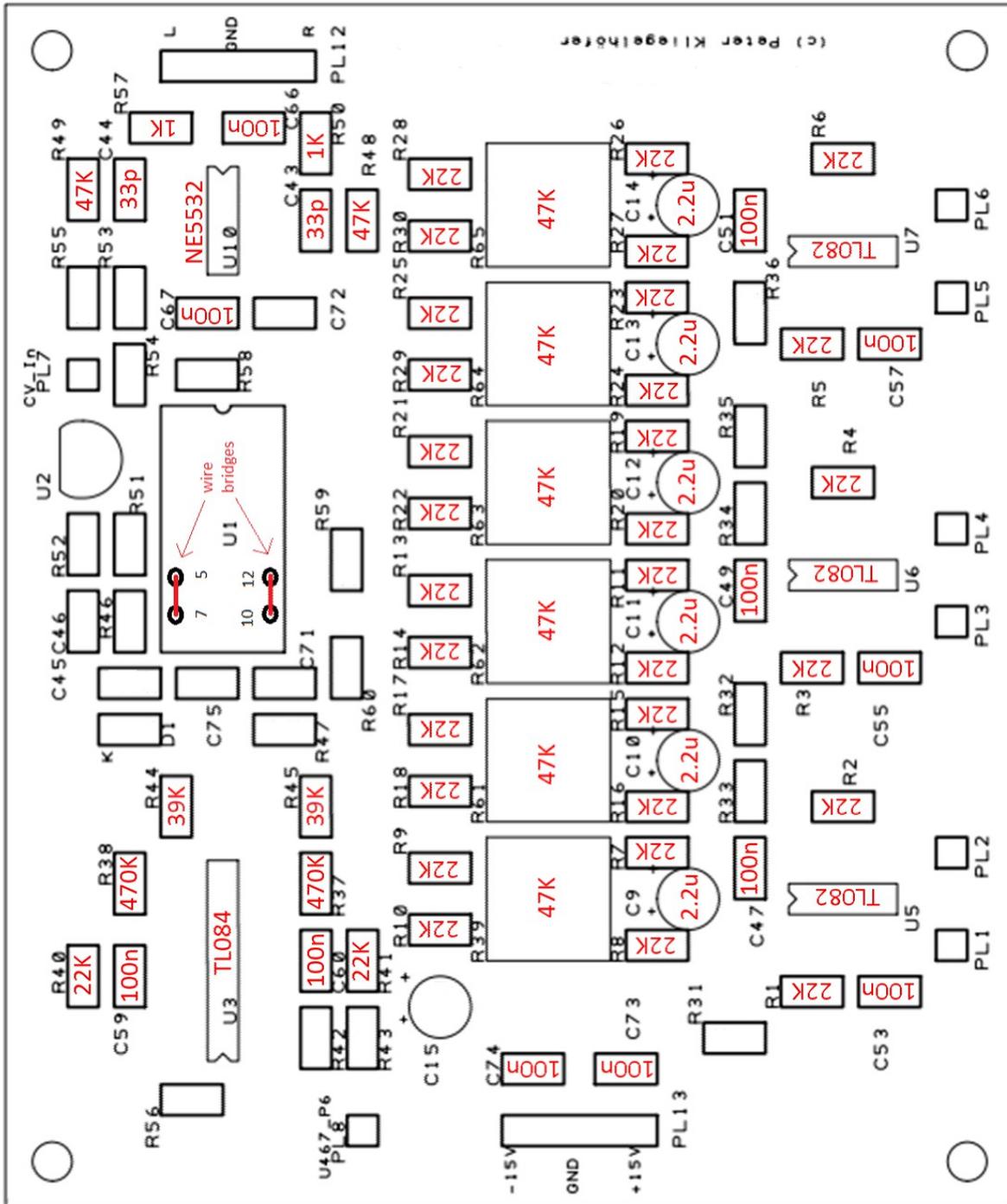
The output level of the stereo signal is intentionally a bit higher vs. the mono signal. The mono signal is independently available at the original jack.

Job done ;-)

# Schematics



# Component diagram



## Bill of Materials

Component	Value	Amount	Description
PL12-13		2	Terminal strip RM2.54, 5-pin
C43,C44	33pF	2	Ceramic cap, RM2.54
C47,C49,C51,C53,C55, C57,C59,C60,C66,C67, C71,C73	100nF	12	Unpolarized cap, 50V, RM2.54
C9-14	2.2uF	6	Polarized cap, 35V, RM2.54
R1-30,R40,R41, R (external)	22K Ohm	38	Metal film resistor, 1%, 0.25W, axial
R44,R45	39K Ohm	2	Metal film resistor, 1%, 0.25W, axial
R50,R57	1K Ohm	2	Metal film resistor, 1%, 0.25W, axial
R48,R49	47K Ohm	2	Metal film resistor, 1%, 0.25W, axial
R37,R38	470K Ohm	2	Metal film resistor, 1%, 0.25W, axial
R39,R61-65	47K Ohm	6	Trim potentiometer, linear, type 3386P
U3	TL084	1	Quad OPA, DIL-14
U5-U7	TL082	3	Dual OPA, DIL-8
U10	NE5532	1	Dual OPA, , DIL-8
		1	Panorama Mod PCB
		1	Precision socket DIL-14
		4	Precision socket DIL-8
		2	Mono jack, 6.3mm
		3	Bar spacer, plastic, 10mm body length, M3 in- and M3 outside thread (8 mm length), screw, washer

Alternatively to TL084, TL074 or TL064 may be used.

Alternatively to TL082, TL072 may be used.