Expandable Modular Audio Mixer for any channels
Schematics and BOM for expandable mixer project

This project is similar to my “Modular audio mixer”, but the other is made for 4 or 8 channel mixers only. This mixer is expandable to any inputs and any outputs. The input preamplifiers of this project is same than in the simple modular mixer, but I have new line output and headphone amplifier modules. With this mixer, I have 3 stages of mainboards. The first is the required only, this is 4 channel inputs and power supply connectors. But the first board can be continued with 2nd and 3rd stages. The 2nd stage made for 2 channel inputs, the 3rd for line or headphone outputs.

English blog and PCB order: http://custompcb.blogspot.com/
Hungarian blog and PCB order: http://diyguitarpa.blogspot.com/
The Youtube Channel • Picasa gallery • Email: gitarfogas@gmail.com

Schematics and BOM for expandable mixer project

- Schematic and BOM of cheap microphone preamp
- Stereo JFET guitar (instrument, effect) preamp
- Stereo circuit with 2 single OpAmp, instrument and audio preamplifier
- Stereo low noise 2 single OpAmp instrument or hi-fi preamplifier
- Schematic and BOM of power supply
- Schematic and BOM of power filter module
- Schematic and BOM of variable line output module
- Schematic and BOM of simple headphone output module
- Schematic and BOM of balanced headphone output module

Printed Circuit Boards for instrument and hi-fi preamps
- Top and bottom PCBs and overlay of stereo JFET preamp
- Top and bottom PCBs and overlay of single dual OpAmp preamp
- Top and bottom PCBs and overlay of INA217 microphone preamp
- Two single OpAmp - stereo universal preamp
- Two single OpAmp - stereo low noise universal preamp
- Top and bottom PCBs and overlay of power filters (ver.3)
- Top and bottom PCBs and overlay of power filters (ver.2)
- Top and bottom PCBs and overlay of power filters (ver.1)
- Top and bottom PCBs and overlay of power filters (ver.4)
- Top and bottom PCBs and overlay of power filters (ver.5)
- Switch module for preamps
- The PCB of power supply
- Variable line output board
- Simple headphone amplifier
- Balanced headphone amplifier

Mainboards for any channels expandable modular audio mixer
- Schematic, BOM and PCB for any channel mixer mainboard stage1
- Schematic, BOM and PCB for any channel mixer mainboard stage2
- Schematic, BOM and PCB for any channel mixer mainboard stage3

Images and Picasa galleries about the prototype of this project
- Modelling the PCBs of this project before manufacturing
- Examples how to setup the 3 stages of mainboards
- The selectable prototype of JFET and OpAmp projects
- Audio mixer with JFET and OpAmp preamplifiers
- Microphone preamp with INA217

Schematics, BOM and PCB for any channel mixer mainboard stage1

Schematics, BOM and PCB for any channel mixer mainboard stage2

Schematics, BOM and PCB for any channel mixer mainboard stage3

The Picasa album about prototype testing

Bill of Materials

<table>
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<th>Description</th>
<th>Quantity</th>
<th>Notes</th>
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<tr>
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Notes

This circuit is made for mono microphone inputs only. The input is mono, 6.3 mm jack inserted directly to the board with unbalanced/balanced converter, and 3 inputs header for symmetrical phones with XLR output. Switch module required to select between two inputs (unbalanced jack or balanced XLR). The main amplifier of this circuit is INA217. This instrument amp is very cheap, and noiseless. Volume and gain potentiometers included. This circuit must be soldered to the first stage of mainboard of audio mixer via 2x6 pin male "L" header.
Schematics and Bill of materials for modular mixer

Stereo JFET guitar (instrument, effect) preamp

The Picasa album about JFET amplifier

<table>
<thead>
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<th></th>
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<tbody>
<tr>
<td>Notes</td>
<td>This very simple, small, cheap and noiseless preamp made for musical instruments with stereo (or mono) input. The main part of this circuit is 2N3958 dual JFET. Ideal for stereo or mono guitar effects, keyboards, or to connect another devices with stereo outputs like audio mixers. Stereo jack, gain and volume adjustable resistors are inserted to the PCB. Very cheap and very good quality for guitar. The possible gain is not too high of this circuit, but enough for guitars and guitar effects with very warm sound.</td>
<td></td>
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Schematics and Bill of materials for modular mixer

Stereo dual OpAmp instrument or audio preamplifier

The Picasa album about OpAmp amplifier

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>Notes</td>
<td>This is another really simple, good quality and cheap preamplifier with stereo jack input for guitar effects or keyboards. The possible gain is much higher than JFET circuit, and the sound is better for keyboards or mixers than the guitars or guitar effects. The dual OpAmp must be compatible with TL072. Gain and volume pots has inserted to the PCB board.</td>
<td></td>
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Schematics and Bill of materials for modular mixer
Stereo circuit with 2 single OpAmp, instrument and audio preamplifier

Notes
This circuit looks like the previous version of TL072 compatible dual OpAmp preamplifier, but for this, two single OpAmp device required, instead of one dual. The reason of this solution is the better quality, if you want to use really noiseless single LF or LT serial integrated circuits instead of relative noisy one dual TL072.

This solution is really cheap, against the noise one power filter circuit included (for both OpAmps). Stereo jack input, stereo/mono and bypass switch, gain and volume potentiometers inserted to the board.

Because the circuit noise, distortion [and the gain] depending on the included single OpAmp, the solution recommended for all non-guitar instrument, and audio amplifiers for home hi-fi solutions.

Bill of Materials

<table>
<thead>
<tr>
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<th>Footprint</th>
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<th>Quantity</th>
<th>Description</th>
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<td>OpAmp</td>
<td>Module.PrjPcb</td>
<td></td>
<td>11/10/2011</td>
<td>Description</td>
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</table>

Schematics and Bill of materials for modular mixer
Stereo low noise 2 single OpAmp instrument or hi-fi preamplifier

Notes
This is the last version of OpAmp preamplifiers. This have best quality. This is the reason why two single OpAmp included instead of one dual. LT1028 or LT1028 recommended for best result, maybe one of LF or NE serial OpAmps.

The difference between this and the previous version of board, here we have two power filter, one filter for one OpAmp for the best result of really low noise and distortion. The circuit recommended for home hi-fi and instruments, included instrument effects.

Gain and volume potentiometers, bypass and stereo/mono switches included to the board with stereo jack input.

Bill of Materials

<table>
<thead>
<tr>
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<th>Value</th>
<th>Quantity</th>
<th>Description</th>
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<tbody>
<tr>
<td>OpAmp</td>
<td>Module.PrjPcb</td>
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<td>11/10/2011</td>
<td>Description</td>
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<td>OpAmp</td>
<td>Module.PrjPcb</td>
<td></td>
<td>11/10/2011</td>
<td>Description</td>
</tr>
</tbody>
</table>
Schematics and Bill of materials for modular mixer
Schematic and BOM of power supply

Notes
This is the power supply. Very simple and good quality low power circuit. Two adjustable regulators can be fixed to the heatsink. The adjustable regulator with Zener diode have cleaner output than simple 7815 and 7915 regulators.

Bill of Materials


Notes
This module required for the preamplifier boards. This is the power filter circuit. I like to use this simple circuit to filter the problems of power. These circuits have to be connected to the 12 pins headers on the preamp PCB. If you think this is not important, you can wire pin 8 to pin 13 and pin 7 to pin 12 to ignore these circuits and boards.

We have four versions of power filter PCB. No difference between schematics, only the PCB size is the difference.
This is the PCB for line level mixer outputs with volume level stereo potentiometer. Have to be connected to the stage no.3 of mixer mainboard. This stage of mixer have balance adjustment feature if required. With this board, you have two line outputs with variations:

- 2 pcs 6.3mm jack
- 1 pcs 6.3mm jack and 1 pcs 3.2mm jack
- 1 pcs 6.3mm jack and 1 pcs stereo RCA
- 1 pcs 3.2mm jack and 1 pcs stereo RCA

Notes

This is the circuit for headphone output for mixer with volume level stereo potentiometer. Have to be connected to the stage no.3 of mixer mainboard. This stage of mixer have balance adjustment feature if required. This board contains SMD circuit. TPA6120 is the one of the best class-D headphone amplifier with 120dB dynamics. This is the smallest, cheapest, and simplest application of this module.

Notes
Schematics and Bill of materials for modular mixer
Schematic and BOM of balanced headphone output module

Modular audio mixer for any channel inputs

Printed Circuit Boards for instrument and hi-fi preamps

This is the circuit for headphone output for mixer with volume level stereo potentiometer. Have to be connected to the stage no.3 of mixer mainboard. This stage of mixer have balance adjustment feature if required. This board contains SMD circuit.

TPA6120 is one of the best class-D headphone amplifier with 120dB dynamics. This module contains unbalanced/balanced converter for better result. If this feature not required, use the previous version of this schematic.
PCB for the modular audio mixer
Top and bottom PCBs and overlay of stereo jFET preamp

PCB for the modular audio mixer
Top and bottom PCBs and overlay of simple dual OpAmp preamp
PCB for the modular audio mixer
Top and bottom PCBs and overlay of INA217 microphone preamp
PCB for the modular audio mixer
Two single OpAmp - stereo universal preamp

PCB for the modular audio mixer
Two single OpAmp - stereo low noise universal preamp
Notes

We have 5 versions of power filter PCB. No difference between schematics, the one of them is landscape, the another 2 is portrait, the 4th and 5th version is very small but maybe harder to assemble.
Notes
We have 5 versions of power filter PCB. No difference between schematics, the one of them is landscape, the another 2 is portrait, the 4th and 5th version is very small but maybe harder to assemble.
PCB for the modular audio mixer
Top and bottom PCBs and overlay of power filters (ver.5)

Notes
We have 5 versions of power filter PCB. No difference between schematics, the one of them is landscape, the another 2 is portrait, the 4th and 5th version is very small but maybe harder to assemble.

This smallest version recommended for this project, because not enough space between preamp modules.

PCB OVERLAY

OVERLAY ON TOP LAYER
PCB for the modular audio mixer
The PCB of power supply

TOP LAYER

BOTTOM LAYER

OVERLAY ON TOP LAYER
PCB for the modular audio mixer
Variable line output board

Notes
This is the PCB for line level mixer outputs with volume adjustment stereo potentiometer. Have to be connected to the stage no.3 of mixer mainboard. This stage of mixer have balance adjustment feature if required. With this board, you have two line outputs with variations:

- 2 pcs 6.3mm jack
- 1 pcs 6.3mm jack and 1 pcs 3.2mm jack
- 1 pcs 6.3mm jack and 1 pcs stereo RCA
- 1 pcs 3.2mm jack and 1 pcs stereo RCA

You can use more than one output PCB if required.
Modular audio mixer for any channel inputs

PCB for the modular audio mixer
Balanced headphone amplifier

Mainboards for any channels expandable modular audio mixer
Mainboards of modular audio mixer
Schematic, BOM and PCB for any channel mixer mainboard stage 1

Bill of Materials

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Notes

This is the first stage of expandable modular audio mixer. This stage is required. Contains 4 connectors for 4 inputs only with balance adjustment potentiometers. These potentiometers can be ignored if not required. Power supply, +48V source for microphone phantom power, balanced inputs must be connected to the headers of this board. The unbalanced or stereo inputs always soldered to the preamplifier modules as 6.3 mm stereo input jack. This board have line output on H5 header, but output module with level adjustment available. This stage can be connected to stage2 or stage3 if required with P1 female connector on the edge of the PCB.
Mainboards of modular audio mixer
Schematic, BOM and PCB for any channel mixer mainboard stage2

Bill of Materials

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<td>1487</td>
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<td>P6, P7</td>
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<td>Conn 10P10SK</td>
<td>1692</td>
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</table>

Notes
This is the second stage of expandable modular audio mixer. This stage is not required. Contains 2 connectors for 2 inputs only with balance adjustment potentiometers. These potentiometers can be ignored if not required. Power supply, +48V source for microphone phantom power have to be connected to the first board called stage1, but balanced inputs must be connected to the headers of this board (P12, P13). The unbalanced or stereo inputs always soldered to the preamplifier modules as 6.3 mm stereo input jack. This stage can be connected to stage3 if required with P1 female connector on the edge of the PCB, the another connector on the left edge [P21] must be connected to the previous stage. This board (with male connector P21) can be connected to the stage1, stage2, or stage3 on any queue. On the 12 pins headers of this board (P6, P7) can be connected input preamplifiers only. On the mixer, this board with any preamplifiers can be used anytime and anywhere.
Mainboards of modular audio mixer
Schematic, BOM and PCB for any channel mixer mainboard stage3

Notes
This is the third stage of expandable modular audio mixer. This stage is not required. Contains 1 connectors for 1 output module only with or without balance adjustment potentiometers (see two versions of PCBs). Use the correct PCB with balance feature if required. Power supply must be connected to the first stage only. Input modules cannot be user on this board. Two output modules available for this project, the one is the adjustable line output, the second is the stereo headphone amplifier. Any output board can be connected to these PCBs. The male header P21 must be connected to the first, second, or third stage of mixer on anytime and anywhere in the queue. The female header P1 is the output connector for 3rd or 2nd stage of this project.

Bill of Materials
Mixer mainboard stage3, Prj/Pcb

<table>
<thead>
<tr>
<th>Component</th>
<th>Footprint</th>
<th>Value</th>
<th>Quantity</th>
<th>Description</th>
<th>Model/footprint</th>
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| Notes
This is the third stage of expandable modular audio mixer. This stage is not required. Contains 1 connectors for 1 output module only with or without balance adjustment potentiometers (see two versions of PCBs). Use the correct PCB with balance feature if required. Power supply must be connected to the first stage only. Input modules cannot be user on this board. Two output modules available for this project, the one is the adjustable line output, the second is the stereo headphone amplifier. Any output board can be connected to these PCBs. The male header P21 must be connected to the first, second, or third stage of mixer on anytime and anywhere in the queue. The female header P1 is the output connector for 3rd or 2nd stage of this project.
Images and Picasa galleries about the prototype of this project
Images about the prototypes of this mixer project
Examples how to setup the 3 stages of mainboards

8 input channels, 2 output channels, one balanced for line output, and one for headphone.

6 input channels, 2 output channels for balanced line outputs, and 2 for headphones.

4 input channels, 4 output channels for balanced line outputs, and 2 for headphones.

Images about the prototypes of this preamp project
The selectable prototype of jFEt and OpAmp projects

The Picasa gallery about this circuit
Images about the prototypes of this preamp project
Audio mixer with jFET and OpAmp preamps

The Picasa gallery about this circuit

Images about the prototypes of this preamp project
Microphone preamp with INA217

The Picasa galleries about this circuit:
- Planning and collecting parts
- Images about the prototype
- Testing the INA217 board
English blog and PCB order: http://custompcb.blogspot.com/
Hungarian blog and PCB order: http://diyguitarpa.blogspot.com/
The Youtube Channel • Picasa gallery • Email: gitarfogas@gmail.com