

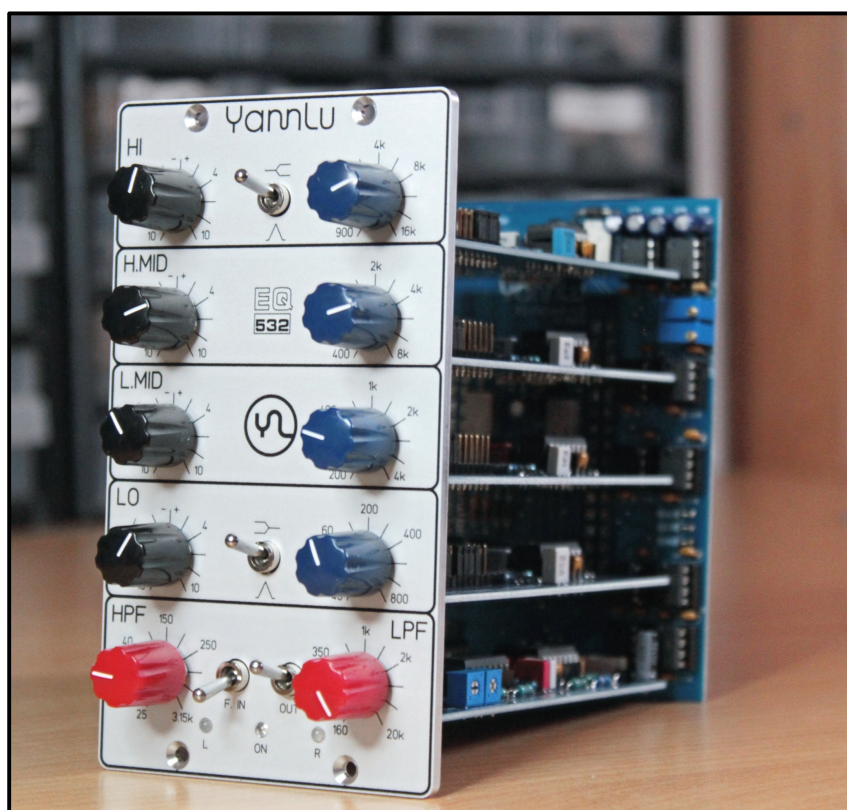


EQ-532

Stereo Equalizer 500-Series module

BUILD GUIDE (v1.3)

Upgraded : 07-May-2025



Thank you for your purchase of this EQ-532 DIY full kit! This guide contains all instructions you need to achieve the assembly of this 500-series stereo module.

It is highly recommended to follow this guide step by step. This will avoid errors and a lot of waste of time in debugging process.

If you have an issue, please first check the placement of the components with the "Silkscreen Top and Bottom sheets" at the end of this file. Are all the values matching with the labelled references (see the "Components Lists") ? Are your soldering joints good ? By the way be careful to have an iron temperature around 350°C max.

You need standard tools for electronics DIY : a good quality soldering iron and 1mm soldering wire, pliers, snips, wire cutters, screwdrivers, leads and a multimeter.

Before starting the building, double check that you got every component and identify them. Use the multimeter or color code if you have any doubt about the resistors.

DIY KIT POLITICS

The DIY kit solutions are for experienced people in electronics able to read and understand the build guide, to solder neatly and to troubleshoot their own build.

I cannot guarantee you will end up with a working device but I will naturally replace any parts that we jointly identify as faulty. Your patience and co-operation with me is vital in ascertaining whether parts are faulty due to a build error or not.

Although I'm happy to help, I can't offer support on all issues. Please understand remote troubleshooting of a wrong build can be difficult and time consuming. In a last case of unsolvable problem, I could accept to service your unit if it's shipped to me.

I assume no liability for personal injury or damage to equipment or loss of use caused directly or indirectly by the use of the YannLu Audio kit.

I'm constantly improving my designs taking into consideration the users feedbacks or my own experience and some changes might occur without notice and can't be subject to complaint. But again I'm happy to answer any question, feel free to contact me.

The pics are for illustration purpose only and the actual unit can vary according PCB versions.

Yann Lu from Belgium
Je parle français ☺
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INTRODUCTION TO THE EQ-532 STEREO MODULE

The EQ-532 is the 500-series stereo replica of the equalizer section from the Bruce Swedien's (Michael Jackson's sound engineer) famous console.

The HP/LP resonant filters and the 4-band equalizer will shape your instrument tracks, stems or mix busses. The module can also be used in a mono way of course.

You'll be thrilled by the musicality of it !

Technically all the knobs and switches operate on both Left and Right channels. To avoid some difference between channels due to the tolerance on components values, stereo inputs signal is first encoded in M (mid = mono informations, that means common to the both channels) and S (side = stereo informations, that means different or not common from a channel to the other). Then the both M and S signals are brought to the HP/LP filters and 4-band EQ sections for audio treatment. One half of the circuitry is for the M treatment and the other is for the S. Finally both processed M and S are recombined (or decoded) to Left and Right stereo channels.

FEATURES

- ✓ Perfect stereo link with internal MS matrix
- ✓ Linear phase
- ✓ Through-hole technology
- ✓ Proportional Q
- ✓ Resonant High-Pass filter : 25 Hz to 3.15 kHz (12 dB/oct) ; bump +1.5 dB
- ✓ Resonant Low-Pass filter : 160 Hz to 20 kHz (12 dB/oct) ; bump +1.0 dB
- ✓ Low band : 40 Hz to 800 Hz – Bell or Shelf mode (6 dB/oct)
- ✓ Low-Mid band : 200 Hz to 4 kHz – Bell
- ✓ High-Mid band : 400 Hz to 8 kHz – Bell
- ✓ High band : 900 Hz to 16 kHz – Bell or Shelf mode (6 dB/oct)
- ✓ Maximum 10 dB of boost/cut gain per band (center detent on 0 dB)
- ✓ Bi-color LED indicators for signal and clipping (trimmable)
- ✓ Switchable filters
- ✓ Global in/out switch (true bypass)

ASSEMBLY

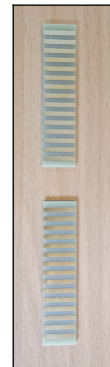
There are 8 different boards :

1x back board containing the encoder/decoder MS matrix, the true bypass relays, the outputs calibration trimmers and the connectors : 2x EDAC-15 and 5x female embase connectors to plug in the filter and band boards.

1x filter board containing the HP/LP filters circuits, the relays for the filters activation, the LEDs (power and signal) circuits, the trimmers for thresholds signal LED calibration and the switches for bypass and HP/LP filters activation.

4x band boards containing Low / Low-Mid / Low-High / High frequency band equalizers. These boards are identical except the presence of the switches (Low and High frequency bands) and the different values for the films capacitors. They also contains the trimmers for « 0dB gain » calibration.

2x 15-pin rack connector boards : the small PCBs with 15 golden traces to plug in the EDAC-15 connector (rear of the back board).



I recommend to complete the assembly of each board one by one following the « Components lists ». Use the «Silkscreen sheet » to know the position of the component.

For each board first prepare all the resistors and diodes. With the help of a bending template, bend their leads to get 10.2mm as lead spacing – 7.6mm for diodes.

Each component should be soldered by the bottom side after being placed on the components side (except EDAC-15 connectors, R34 resistor, bicolor LEDs and blue power LED). The following lists begin by the smallest components and finish by the tallest ones (except EDAC-15 connectors).

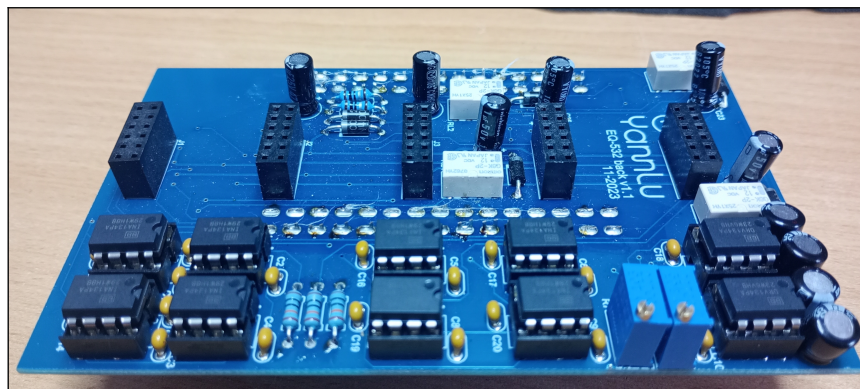
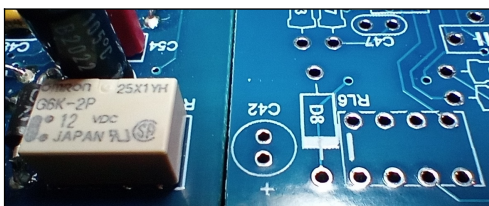
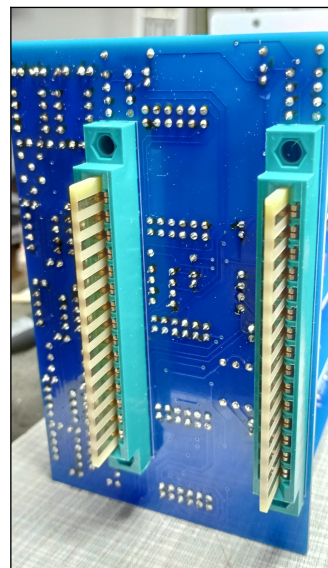
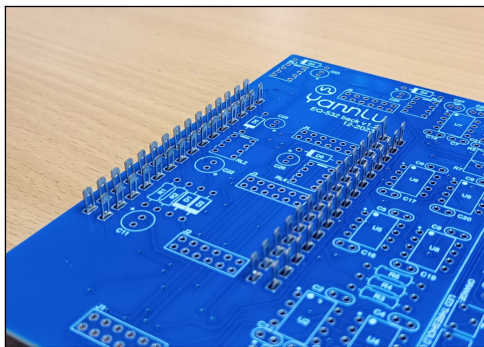
Back board

- EDAC-15 connectors (be careful to place them on bottom side of the board) ; cut the pins of the EDAC-15 after soldering.
- Resistors
- Diodes
- Ceramic capacitors
- IC sockets
- Relays ; be careful with the small line on the PCB footprint
- 2x6 embase connector (embase)
- Electrolytic capacitors ; be careful with the “+” except C28 to C30 (bipolar)
- Multi-turn trimmers

Insert ICs ; be careful with the pin-1 dot sign.

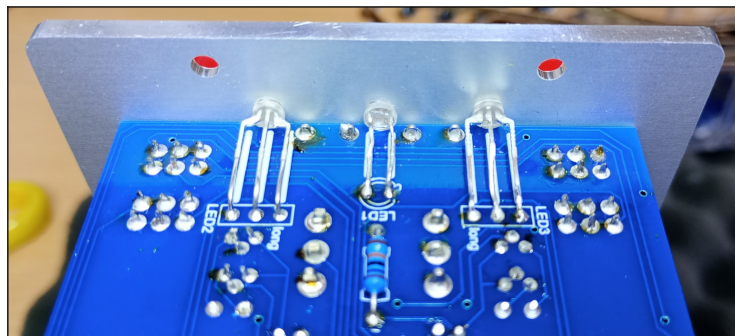
Insert the 15-pin rack connector boards in the EDAC-15 connectors

Be careful by soldering the solder joints close to the EDAC-15 connectors.



Filter board

- Resistors
- Diodes ; be careful with the polarity (line “-” is the cathode)
- Ceramic capacitors
- IC sockets
- Right-angled 2x6 male pin header connectors
- Relays ; be careful with the small line on the PCB footprint
- Films capacitors
- LEDs (bicolor and power) ; place them on the soldering side, adjust the position with the frontplate and solder them on the soldering side of the PCB ; be careful of their polarity : for the blue LED, the “c” stands for “cathode”. This is the short leg.



- Transistors : be careful with the footprint
- Vertical trimmers ;
- Potentiometers
- Switches
- Electrolytic capacitors ; be careful with the polarity (“+”)

Insert ICs ; be careful with the pin-1 dot sign.

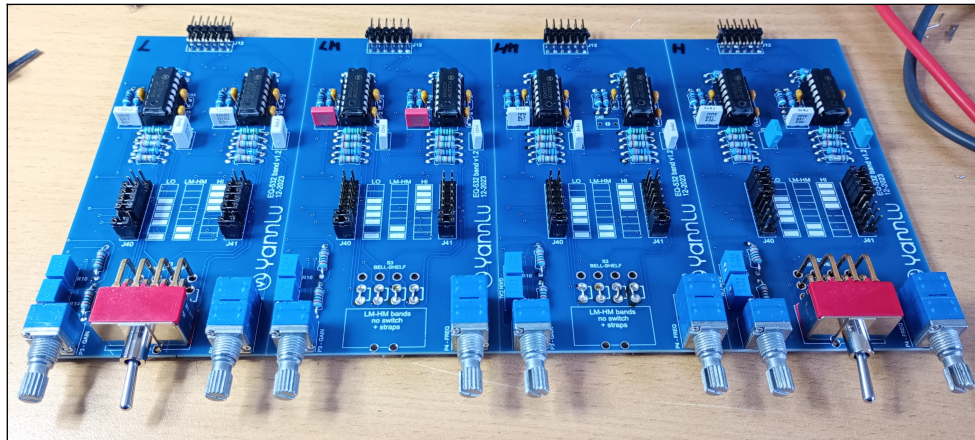
Band boards

- Solder straps (leads cut from the components) instead of the switches
(Low-Mid and High-Mid band boards only)
- Resistors
- Ceramic capacitors
- IC sockets
- Right-angled 2x6 male pin header connectors
- Films capacitors ; be careful with the values ; they are different according the frequency band
- Vertical trimmers ;
- 2x8 straight pin header
- Potentiometers
- S3 Switches (Bell/Shelf) ; **Low and High band boards only**



Insert ICs ; be careful with the pin-1 dot sign.

Insert the jumpers (different positions according the band ; same on both channels)



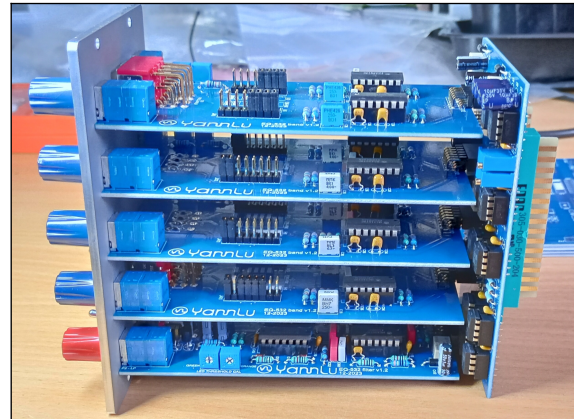
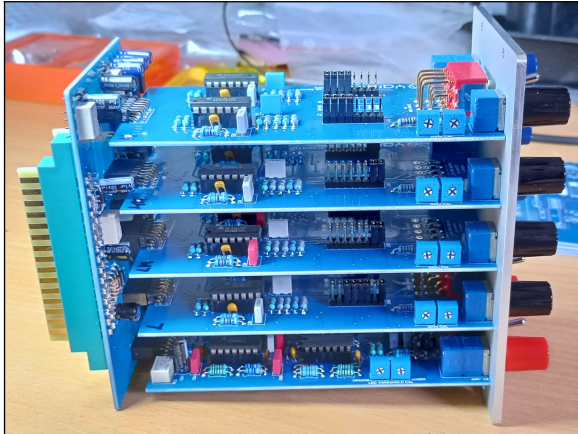
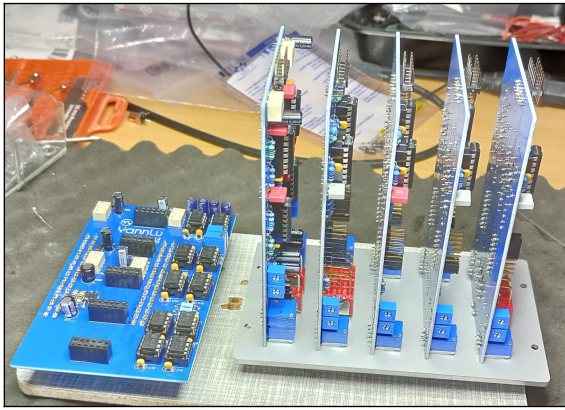
Plug the filter and band boards to the back board.

Place the front panel.

Screw nuts on the pots. Do not tighten them too much.

Place knobs : be careful that knobs are hard to remove once they are put on their shaft. It is better to place after test and calibration procedures.

Connect your 500-series module into a “Lunchbox” type or equivalent 500-series rack enclosure. It is ready to be tested !



TEST AND CALIBRATIONS

For calibrations procedures you need to access easily with a screwdriver to the both sides (left and right) of the module. So place your module in the center slots of your rack and remove the other modules from it. If you don't want to remove the other modules, you can also deport your module outside the rack by using 2 extender cables. Be careful with the polarity of them ! You can find these extender cables here :

<https://www.soundskulptor.com/en/accessories/12-xt500-500-series-extender.html>

<https://www.diyrecordingequipment.com/products/500ext-500-series-extender-kit>

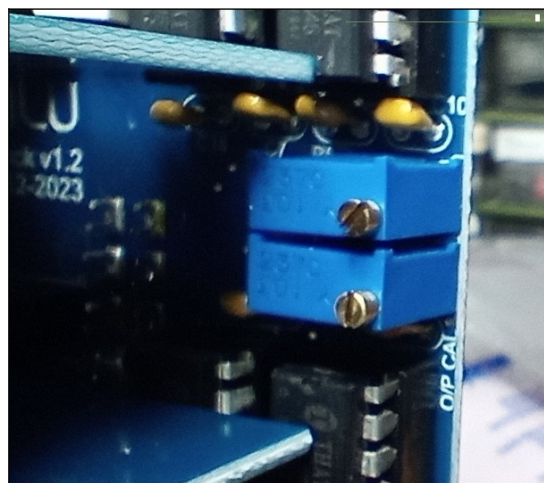
For measurements I recommend to get the audio freeware <https://www.roomeqwizard.com/>

It features generators, levels meter and spectrum analysis perfect to calibrate your stereo module.

Power on your 500-series rack. The blue LED should be on.

Output volume calibration

- Set the BYPASS switch to the OUT position (down).
- Inject a -20dB_{FS} white noise to the both inputs of the stereo module.
- The both outputs should receive the same level (true bypass).
- Set all the gain pots to 0dB (center).
- Set the BYPASS and FILTERS switches to the up position.
- Adjust the trimpots **R5** (Left channel) and **R7** (Right channel) to obtain -20dB_{FS} on the outputs.



Signal LED thresholds calibration

- Set all the gain pots to 0dB (center)
- Set the BYPASS and FILTERS switches to the up position.
- Inject a -20dB_{FS} * white noise to the both inputs of the stereo module.
Left channel : Turn counter-clockwise the **R77** trimpot until the green LED is on.
Right channel : Turn counter-clockwise the **R79** trimpot until the green LED is on.
- Inject a -3dB_{FS} * white noise to the both inputs of the stereo module.
Left channel : Turn counter-clockwise the **R75** trimpot until the orange LED is on.
Right channel : Turn counter-clockwise the **R81** trimpot until the orange LED is on.

* These level values are examples. Up to you to choose different values for LED thresholds.



0dB gain pots calibration (4-band EQ)

- Set all the gain pots to 0dB (center)
- Set the BYPASS and FILTERS switches to the up position.
- Set the LOW and HIGH curve switches on the “Bell” mode.
- Inject a -30dB_{FS} white noise to the both inputs of the stereo module.

On a spectrum analyzer, measure that the curve stays flat when turning the frequency pot (one band at the time).

If there is a peak or a valley, adjust the trimmers **R14** (left channel) and **R16** (right channel) to keep the curve flat.



Test the HP/LF filters by activating the switch F.IN (down position).

Now your EQ-532 stereo module is calibrated and ready to use. Have a lot of fun !

COMPONENTS LISTS

BOARD	TYPE	Label	PART REF
BACK	CONNECTOR	J6	EDAC-15 (bottom side)
BACK		J7	EDAC-15 (bottom side)
BACK		J1	FEMALE EMBASE 2X6
BACK		J2	FEMALE EMBASE 2X6
BACK		J3	FEMALE EMBASE 2X6
BACK		J4	FEMALE EMBASE 2X6
BACK		J5	FEMALE EMBASE 2X6
BACK	RELAY	RL1	RELAY 12V
BACK		RL2	RELAY 12V
BACK		RL3	RELAY 12V
BACK		RL4	RELAY 12V
BACK	IC	U1	THAT1256
BACK		U2	THAT1250
BACK		U3	THAT1256
BACK		U4	THAT1250
BACK		U5	THAT1250
BACK		U6	THAT1250
BACK		U8	THAT1250
BACK		U9	THAT1256
BACK		U7	DRV134
BACK		U10	DRV134
BACK	RESISTOR	R1	1R 1%
BACK		R2	1R 1%
BACK		R3	100k 1%
BACK		R4	100k 1%
BACK		R6	100k 1%
BACK	TRIMMER	R5	multi 10k top
BACK		R7	multi 10k top
BACK	DIODE	D1	1N4004
BACK		D2	1N4004
BACK		D3	1N4004
BACK		D4	1N4004
BACK		D5	1N4004
BACK		D6	1N4004
BACK	CERAMIC CAP	C1	100 nF
BACK		C2	100 nF
BACK		C3	100 nF
BACK		C4	100 nF
BACK		C5	100 nF
BACK		C6	100 nF
BACK		C7	100 nF
BACK		C8	100 nF
BACK		C9	100 nF
BACK		C10	100 nF
BACK		C12	100 nF
BACK		C13	100 nF
BACK		C14	100 nF
BACK		C15	100 nF
BACK		C16	100 nF
BACK		C17	100 nF
BACK		C18	100 nF
BACK		C19	100 nF
BACK		C20	100 nF
BACK		C21	100 nF
BACK	ELECTRO CAP	C11	47 uF
BACK		C22	47 uF
BACK		C23	1 uF
BACK		C24	1 uF
BACK		C25	1 uF
BACK		C26	1 uF
BACK		C27	10 uF Bipolar
BACK		C28	10 uF Bipolar
BACK		C29	10 uF Bipolar
BACK		C30	10 uF Bipolar

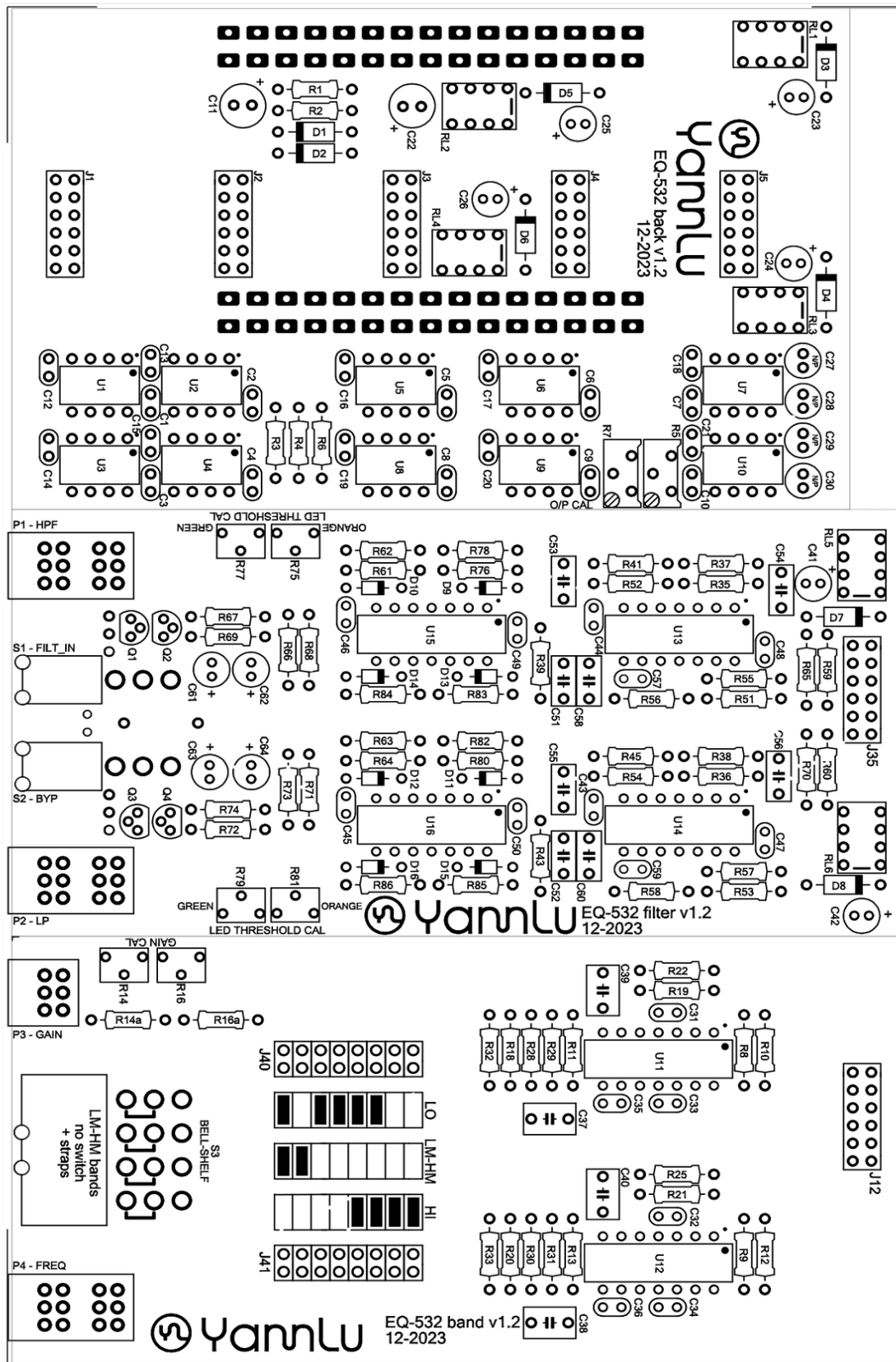
BOARD	TYPE	Label	PART REF
FILTER	CONNECTOR	J35	Right-Angled 2x6 male HEADER
FILTER	RELAY	RL5	RELAY 12V
FILTER	RELAY	RL6	RELAY 12V
FILTER	ANALOG IC	U13	TL084 or MC33079
FILTER		U14	TL084 or MC33079
FILTER		U15	TL074
FILTER		U16	TL074
FILTER	TRANSISTOR	Q1	BC549
FILTER		Q2	BC549
FILTER		Q3	BC549
FILTER		Q4	BC549
FILTER	RESISTOR	R34	100k 1% (bottom side)
FILTER		R65	100k 1%
FILTER		R70	100k 1%
FILTER		R35	10k 1%
FILTER		R36	10k 1%
FILTER		R37	10k 1%
FILTER		R38	10k 1%
FILTER		R55	10k 1%
FILTER		R56	10k 1%
FILTER		R57	10k 1%
FILTER		R58	10k 1%
FILTER		R59	10k 1%
FILTER		R60	10k 1%
FILTER		R61	10k 1%
FILTER		R62	10k 1%
FILTER		R63	10k 1%
FILTER		R64	10k 1%
FILTER		R66	10k 1%
FILTER		R68	10k 1%
FILTER		R71	10k 1%
FILTER		R73	10k 1%
FILTER		R83	10k 1%
FILTER		R84	10k 1%
FILTER		R85	10k 1%
FILTER		R86	10k 1%
FILTER		R67	2k2 1%
FILTER		R69	2k2 1%
FILTER		R72	2k2 1%
FILTER		R74	2k2 1%
FILTER		R76	2k2 1%
FILTER		R78	2k2 1%
FILTER		R80	2k2 1%
FILTER		R82	2k2 1%
FILTER		R39	390R 1%
FILTER		R41	390R 1%
FILTER		R43	390R 1%
FILTER		R45	390R 1%
FILTER		R51	390R 1%
FILTER		R52	390R 1%
FILTER		R53	390R 1%
FILTER		R54	390R 1%

BOARD	TYPE	Label	PART REF
FILTER	TRIMMER	R75	single vertical 50k
FILTER		R77	single vertical 50k
FILTER		R79	single vertical 50k
FILTER		R81	single vertical 50k
FILTER	DIODE	D7	1N4004
FILTER		D8	1N4004
FILTER		D9	1N4148
FILTER		D10	1N4148
FILTER		D11	1N4148
FILTER		D12	1N4148
FILTER		D13	1N4148
FILTER		D14	1N4148
FILTER		D15	1N4148
FILTER		D16	1N4148
FILTER	CERAMIC CAP	C43	100 nF
FILTER		C44	100 nF
FILTER		C45	100 nF
FILTER		C46	100 nF
FILTER		C47	100 nF
FILTER		C48	100 nF
FILTER		C49	100 nF
FILTER		C50	100 nF
FILTER		C57	100 pF
FILTER		C59	100 pF
FILTER	ELECTRO CAP	C41	1uF
FILTER		C42	1uF
FILTER		C61	1uF
FILTER		C62	1uF
FILTER		C63	1uF
FILTER		C64	1uF
FILTER	FILM CAP	C51	100 nF
FILTER		C52	100 nF
FILTER		C53	100 nF
FILTER		C55	100 nF
FILTER		C54	47 nF
FILTER		C56	47 nF
FILTER		C58	12 nF
FILTER		C60	12 nF
FILTER	POTENTIOMETER	P1	C50K 4-gang
FILTER		P2	C50K 4-gang
FILTER	SWITCH	FILT_IN S1	SPDT vertical
FILTER		BYP S2	SPDT vertical
FILTER	LED (bottom side)	LED1	Blue LED
FILTER		LED2	Bi-color LED (green-orange)

BOARD	TYPE	Label	PART REF
BAND	CONNECTOR	J12	Right-Angled 2x6 male HEADER
BAND		J40	2x8 pin HEADER
BAND		J41	2x8 pin HEADER
BAND	ANALOG IC	U11	TL084 or MC33079
BAND		U12	TL084 or MC33079
BAND	CERAMIC CAP	C31	100 nF
BAND		C32	100 nF
BAND		C33	100 nF
BAND		C34	100 nF
BAND		C35	100 pF
BAND		C36	100 pF
BAND	RESISTOR	R8	10k 1%
BAND		R9	10k 1%
BAND		R11	10k 1%
BAND		R13	10k 1%
BAND		R14a	20k 1% (not necessary if P3 is B10K)
BAND		R16a	20k 1% (not necessary if P3 is B10K)
BAND		R28	2,4k 1%
BAND		R29	2,4k 1%
BAND		R30	2,4k 1%
BAND		R31	2,4k 1%
BAND		R19	3k01 1%
BAND		R21	3k01 1%
BAND		R10	330R 1%
BAND		R12	330R 1%
BAND		R18	330R 1%
BAND		R20	330R 1%
BAND		R32	37,4k 1%
BAND		R33	37,4k 1%
BAND		R22	9,1k 1%
BAND		R25	9,1k 1%
BAND	TRIMMER	R14	single vertical 200k
BAND		R16	single vertical 200k
BAND	POTENTIOMETER	P4	C50K 4-gang
BAND		P3	B20K or B10K 2-gang (center detent)

			LOW BAND	LO-MID BAND	HI-MID BAND	HIGH BAND
BAND	FILM CAP	C37	56 nF	12 nF	5,6 nF	2,7 nF
BAND		C38	56 nF	12 nF	5,6 nF	2,7 nF
BAND		C39	120 nF	22 nF	12 nF	5,6 nF
BAND		C40	120 nF	22 nF	12 nF	5,6 nF
BAND	SWITCH	S3	4PDT ON-ON	/ (straps)	/ (straps)	4PDT ON-ON

SILKSCREEN TOP



SILKSCREEN BOTTOM

