

## VR4-xx Voltage Regulator module

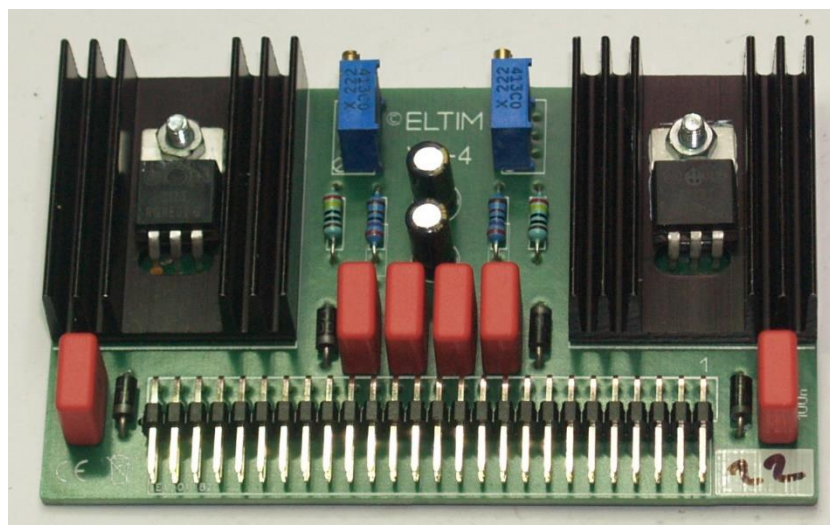
Our UN-PSxx symmetrical power supplies could improve the sound quality of your power amplifier significantly, since most manufacturers save money on these parts. Most of them also fit our VR Voltage regulator modules, where while mounted you also have regulated supplies available for preamplifier-, DAC-, etc. electronics. This VR4 can deliver up to 1,5A depending its temperature.

Since a power supply circuit is part of the AC-signal chain ( ! ) the impedance (AC resistance) of the power supply lines has to be as low as possible and as constant as possible over the full audio range.

Unfortunately, electrolytic power supply capacitors have an increasingly bad behaviour with rising frequencies. In order to compensate this effect, there should be one or more regular capacitors with small values parallel to them as we do in all our modules. The better quality used, the better the compensation.

By regulating a power supply voltage, one not only brings it down to the required voltage. Due to the regulating qualities of the circuit, the impedance of the power supply is drastically reduced and unaffected by the preceding main power supply circuitry and load demands. The impedance can be measured partially in a simple way, since the voltage drop while loading the power supply represents the value of this impedance. Check it while driving the amp with different frequencies and you will notice differences.

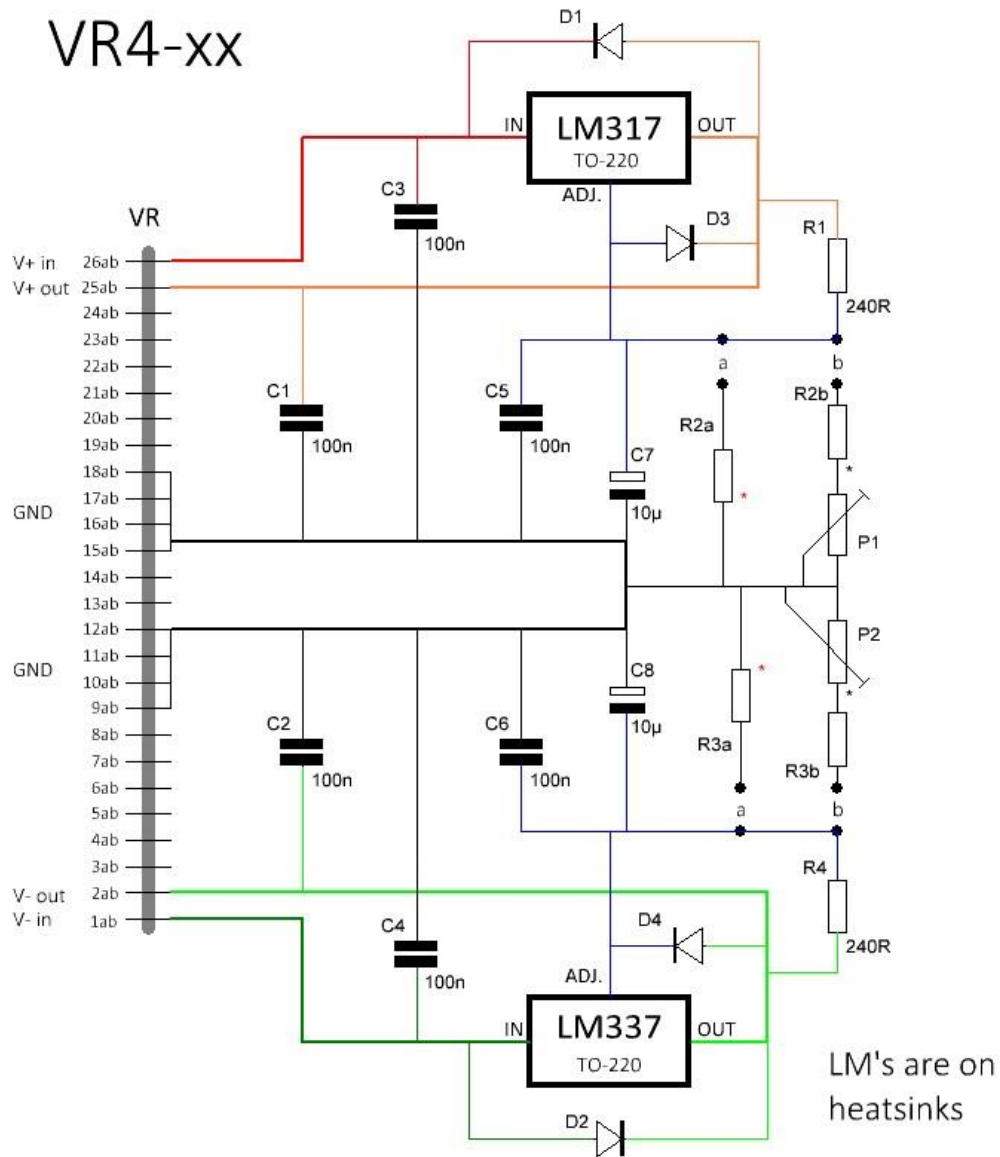
- Highlights of this [VR-4xx](#) Voltage Regulator module:
  - LM317/337 (TO220 types) controlled +/- V output, adjustable by changing a single resistor.
  - Capable of delivering up to  $\pm 1,5A$ , depending temperature.
  - "Floating" regulation, so it can be used even to regulate high voltages.
  - Full options, optimal circuitry as recommended by Texas Instruments.
  - All capacitors WIMA MKP4 types.
  - Fixed versions or adjustable with a 25-turn trimmer.
  - On board heatsinks making it (mostly) possible to use the full 1,5A capability.
  - 26 pin header, fitting most ELTIM PS-xx S symmetrical power supplies and PRE-230/330.
  - Dimensions: 90x55x17mm.



NOTE: mount the module vertically for optimal heat transfer

## Circuitry

In this VR-4 module we use the common accepted and regarded LM317 for positive Voltage regulation and the hard to get LM337 negative Voltage regulator, both in TO-220 version, capable of delivering up to 1,5A.



Instead of a fixed resistor for R2/R3 (=R2a/R3a) you can mount a combination of R2b/R3b and a pair of multturn trimpots for exact adjustment of the output voltages

We included all the parts as suggested by Texas Instruments, f.e. we added 4 diodes which are normally not necessary. Doing so though, allows you to connect >22uF of output capacitors to this circuit without damaging the LM's, see the datasheets of these. Also due to this extra, they won't break down if inductive loads like relays are connected. The listed capacitors significantly improve the dynamic response of the pack.

NOTE: We make our products not as cheap as possible, but as good as possible instead.

Ask yourself [how it is possible](#) that a lot of Far East electronics is so illogical cheap..... Do we want this?  
Besides this disturbing fact, a lot of these companies use counterfeited parts having (way) lower performances.

## Output voltage setting

The regulated output voltages can be changed by exchanging just two resistors, one for each LM. Instead of a fixed resistor you could shift resistors R2/R3 one position on the PCB and also mount 25 turn trimmers in order to set both voltages exactly equal and at the desired voltage. Doing so, there is a fixed resistor in series with a 25-turn trimmer. By using the right values, you can set the output voltage extremely well.

## Floating device

The LM's are specified as regulating from 1,5 up to 37V everywhere. This is not completely correct though! Unlike the well-known 78xx series, the LM317/337 are so called "floating" devices (free from ground contacts) just like f.e. transistors, meaning that you can regulate even high voltages, as long as the difference between input and output voltages do not exceed 37V. You only need to change the resistors R2/R3.

You can modify our VR-boards for other purposes as well as long as you consider the relation between input and output voltages. Mount other values and/or use the trimpot option, see schematics.

On request we can supply them with about any output voltage you require, but keep in mind that  $V_{diff.} = 37V$  max. As an example: you could regulate  $\pm 60V$  as long as  $V_{in}$  is 63-100V.

Second, you need to be aware that the max. dissipation is limited for a small board like this. With heatsinks mounted as we did here, the working range will be a lot wider than without them as on our VR-3 module.

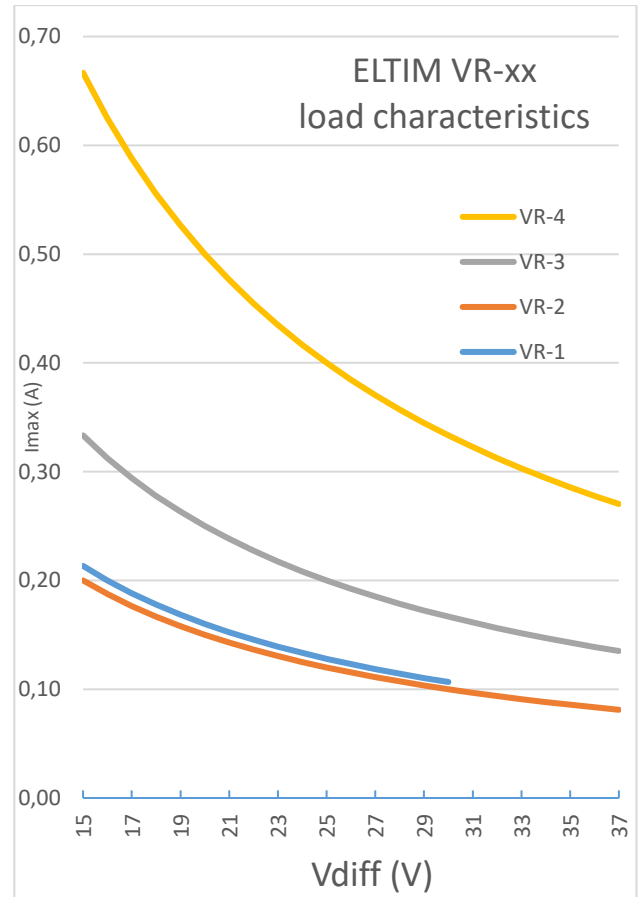
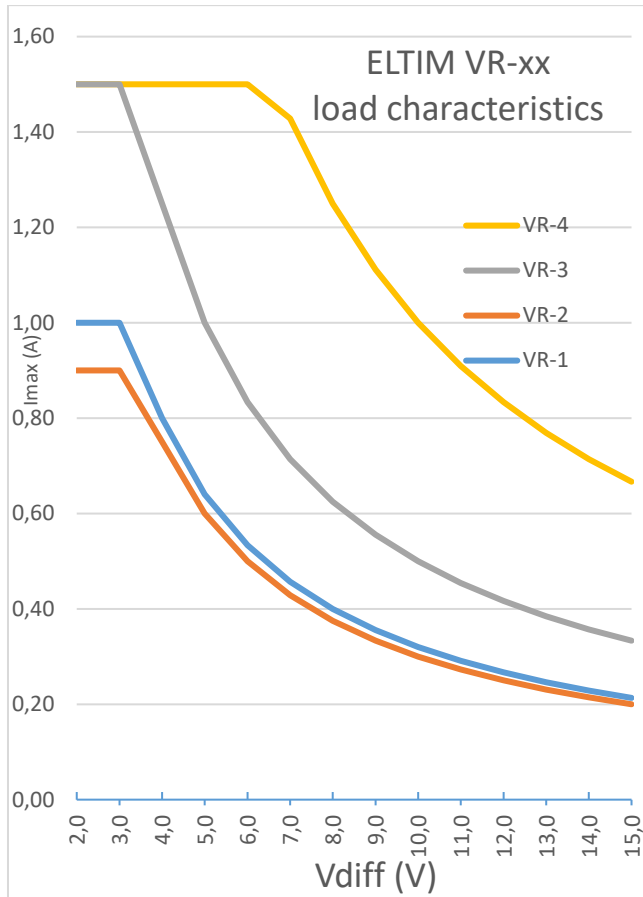
The differential voltage (meaning over the LM's) strongly influences the max. output current, see the graphs at the last page and or the datasheets of LM317/337. This current limit is caused by breaking in of the over temperature / SOA protection circuits inside the IC's.

[Check our website for ordering](#)

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## ELTIM VR-4 specifications



*Typical data for ELTIM VRx-yy modules, positive side. Negative values are the same.  
Data is long term measured where the T<sub>max</sub>. protection is just not in action.*

V<sub>diff</sub>. definition:

Difference between input- and regulated output voltage.

V<sub>diff</sub>. minimal:

±2,5V, floating

V<sub>diff</sub>. maximal:

±37V, floating

Regulating voltage range:

±1,5 – 100V to ground

Available standard voltages:

±3,3V; ±3,6V; ±5V; ±6V; ±8V; ±10V; ±12V; ±15V; ±18V; ±24V; ±30V  
Any other output voltage on request, up to 100V.

I<sub>max</sub>:

1,5A max. (Depending on V<sub>diff</sub>. and temperature, see tables)

Type of regulator IC's:

LM317 / LM337 TO-220 types with heatsinks

Protection:

T<sub>max</sub> (180°C), SOA and shortcut protections

Size:

90 x 55 x 17mm

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