ELTIM high-end POWER AMPLIFIER modules

NEW

Updated November 18th, 2021

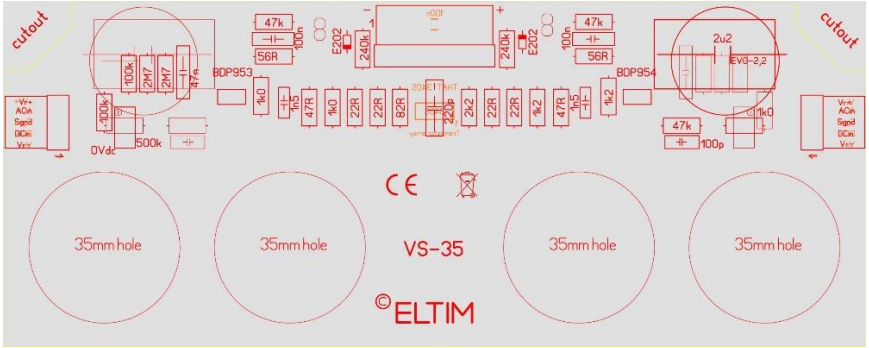
VS-30/35/40 Voltage Stage module

ELTIM Power amplifiers are, unlike other modules, split in two parts in order to obtain the highest quality possible. Our new VS-30/35/40 input modules are special versions of our VS-20 and mechanically supports large (50mm up) PS-2 and PS-3 supplies mounted capacitors at the top end for a most stable construction. In fact we only made the VS-20 PCB 80mm instead of 35mm deep and added four large holes in it.

This VS-3x is an input, or Voltage Stage (VS) part. You also require one of our CS-modules where the speaker currents are processed. Due to our completely different way of thinking when it comes to PCB design and layout, mechanical and thermal stress, magnetic interference, EMI, etc., an ELTIM amplifier built with these module looks and acts a bit different. Customers responses: rock solid bass, amazing 3D, etc.

In this Voltage Stage board we are using a 100% symmetrical transistor array with a grounded substrate and special wide range Current Regulator Diodes. Doing so, our amplifier system is very stable over a wide Power Supply voltage range. Just by selecting a suitable supply voltage you set the max. Prms output.

- Some of the highlights of this **VS-3x** Voltage Stage module:
  - Reference quality input stage module.
  - Separate (upgradeable) most basic fully symmetrical pre-driving (voltage) stage.
  - Symmetrical, 500uV matched trimmed SMD transistor array (instead of T1-T4) input stage.
  - Transistor array substrate grounded to input ground, avoiding any noise and EMI.
  - Extremely stable, wide range Current regulator diodes (CRD's) instead of LED circuits.
  - DC input on left and right side. High end capacitor between this input and RCA-inlet possible.
  - AC (>2Hz, other on request) input on left or right side.
  - High quality, audiophile MUNDORF MCAP400-2,2uF MKP input capacitor.
  - Mica 1% capacitors in local feedback and input filter circuit.
  - Best quality 1% MOX resistors, 0,1% in mirror circuit.
  - Gold plated copper/beryllium copper header contacts.
  - Double sided board with copper thickness of 35um.
  - Vr+ and Vr- available on left- and right side.
  - RF-interference blocking capacitors in strategic positions.
  - Styroflex RF-capacitor in overall feedback circuit.
  - Separated power ground and input ground tracks avoiding hum and noise.
  - L- or Stack mounted to any CS-board. On CS-40(ps) stack mount possible.
  - Mechanically supporting large supply capacitors mounted on PS-2 and PS-3:
    - VS-30 supports Ø30mm capacitors
    - VS-35 supports Ø35mm capacitors
    - VS-40 supports Ø40mm capacitors
  - Dimensions: 200x80x8mm.



VS-35 module with Ø35mm support holes.
VS-30 has Ø30mm holes, VS-40 Ø40mm ones.

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CONNECTOR FUNCTIONS

The centre connector is where one of our Current Stage modules are connected, normally in vertical (L-mount) position. For low profile solutions f.e. mounting in MODU Galaxy 40mm or Slimline 1U cabinets, this VS module can be mounted horizontal (sandwiched) as well. You only need to use another type of connector and mount it at the bottom side. In that case, use a trimmer with the screw on the top side.
Besides the needed connections for basic amplifier function, there are also connections for the NTC and the centre contact leads to the idle current potmeter of any CS-module. In this VS-3x it has no function, nor is the NTC functioning here. With later VS-modules you could adjust idle current, f.e. to switch to class A mode automatically when only low power is used or to class B when NO power is used.

At the left or right connectors the input signal is connected. Both have the same connections.
Connector signals: Vr+ and Vr- voltage, AC and DC input and signal ground.
At these side connectors you also can stack an input/output board where the RCA connectors are connected.
You could also use a better quality input capacitor on that board, connected to the DC-input of this VS-3x module and so **bypassing the on-board, small capacitor**. A Mundorf MCAP400-2,2uF will already fit though.

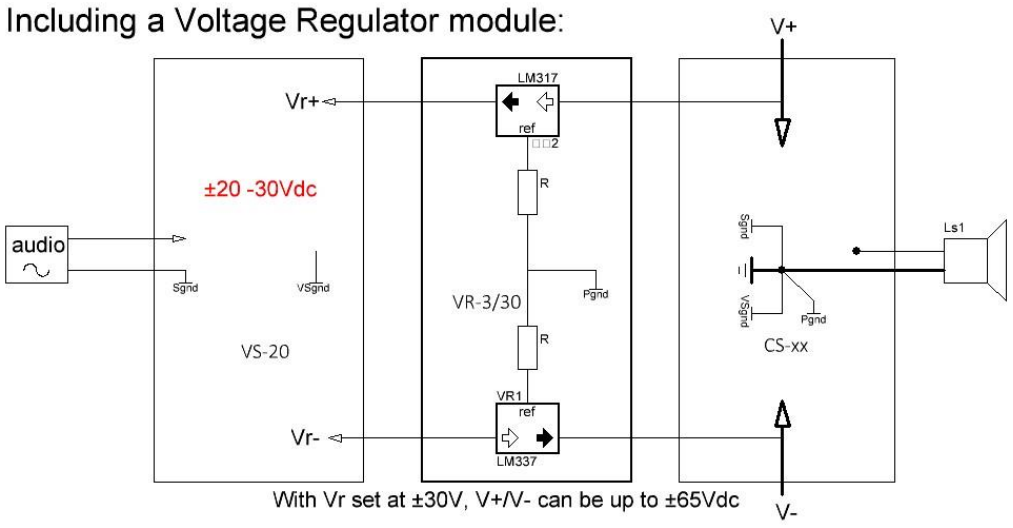
We also provide a board with **InGeniusTM** balanced XLR inputs with ultralow CMRR of 90dB. It's transformer like behaviour also allows the use of very long interlink cables, f.e. required for live performances.

At the same DC-input a DC-voltage can be fed by some electronics, monitoring the DC-level of the output of the amplifier. This servo system (in development) so controls and regulates the DC-level to 0Vdc at all times. Actually we tried this in our prototype, powering a car wiper motor used as a servo without any problems……-) This also proved that our amps are stable functioning from DC up, even while driving inductive loads with high currents.

Supply voltage

This VS-20 can handle ± 20 - 30Vdc and is limited by the THAT340 transistor array physics.
For higher supply voltages, you need to use one of our Voltage Regulator modules, regulating the amps supply voltages down to say ±30Vdc, and is just used for the VS-module and possible preceding electronics.

While using an extra VR-voltage regulator module this VS-20 input module works on regulated, very stable supply voltages. We suggest using VR-3/30, providing ±30V regulated by linear LM317/337 SMD types.
This high-quality regulating will further increase stability and effects in a higher sound quality.
While adding a VR-xx module the max. supply voltage of the total pack can be increased to ±65Vdc.



You can mount it on every power supply module we provide. Remove the diodes on the CS-module then!

NOTE: As practise showed, the structure of the THAT340 limits the max. supplied voltages. If the voltage difference between the PNP and NPN types is higher than 65V it could start to oscillate on very high (1-5MHz) frequencies in a totally uncontrolled way!
The datasheet shows a max. Vce of 36V on each transistor, but + 36V on the one and -36V (or more) on another will cause serious RF-oscillating, possibly resulting in damage to connected equipment or the amp itself! Make sure you don't feed to high supply voltages.

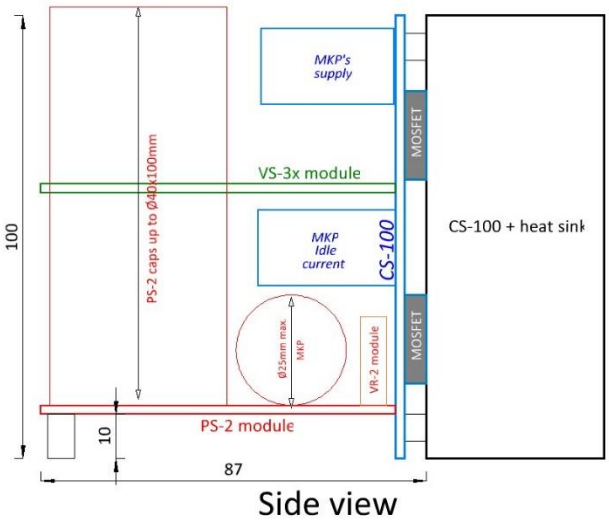
AVAILABILITY

This module is available in different ways of finish:

- As a DIY kit with bare, professional, through hole, double sided, tinned FR4+ PCB with solder masks and prints on both sides. All necessary parts, incl. audiophile MUNDORF MCAP400-2,2uF input capacitor and high quality gold plated header connectors.
  Due to the high thermal conductive PCB you need at least a 60W regulated soldering iron!

- Ready built and tested modules.

NOTE: Any ELTIM High-End amplifier design is a combination of any VS- with any CS-module, so you always need both to make it work!



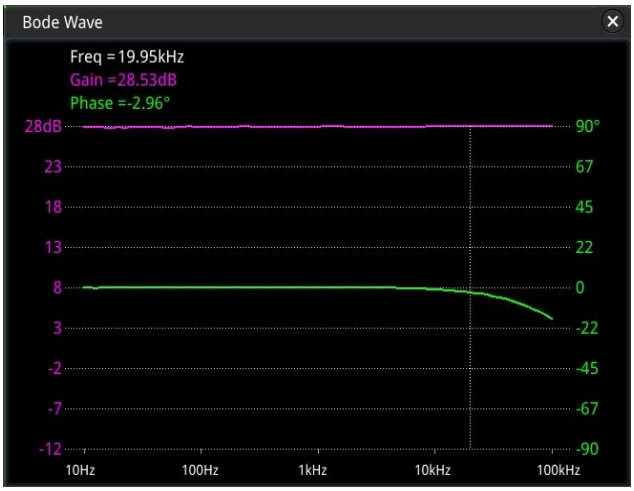
VS-30, VS-35 or VS-40 surrounds the supply capacitors on our PS-2 or PS-3 power supply modules. While doing so, these capacitors are mounted rock solid and prevent "cold" soldering's due to mechanical stress. The min. height of the supported capacitors is 50mm.

Technical specifications:

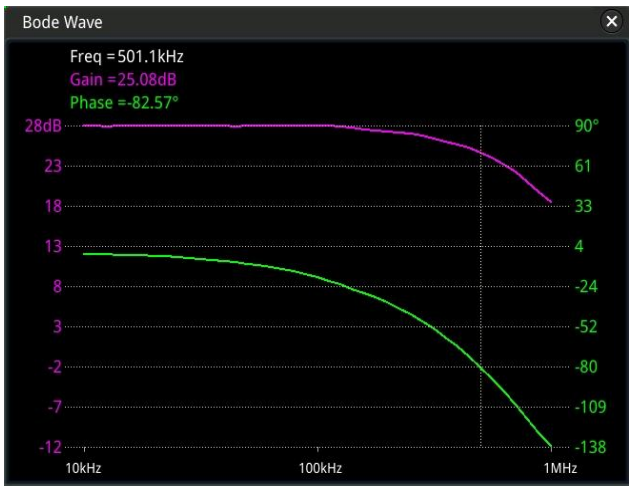
Frequency range:	DC - 170kHz within ±0,2dB
-3dB point:	> 500kHz (limited by us)
Audio band phase shift:	< -3º (20-20000Hz)
Distortion figure (THD):	< 0,005% (1W/1kHz/8ohm)
	< 0,01% (80W/1kHz/8ohm)
Slew rate:	> 65V/us (@ +/- 30V). *Limited by input filter (600kHz).*
Harmonics:	< -65dB, Nonspecific, see graph right below. W*ell below noticeable.*
Recc. input voltage:	1 Volt
Input impedance:	47kOhm
Supply voltage:	±20 – 30Vdc *(While using higher V+/V-, use one of our Voltage Regulator modules!)*
Dimensions:	200x90mm. *(same as PS-2 and PS-3)*

Some measurement data

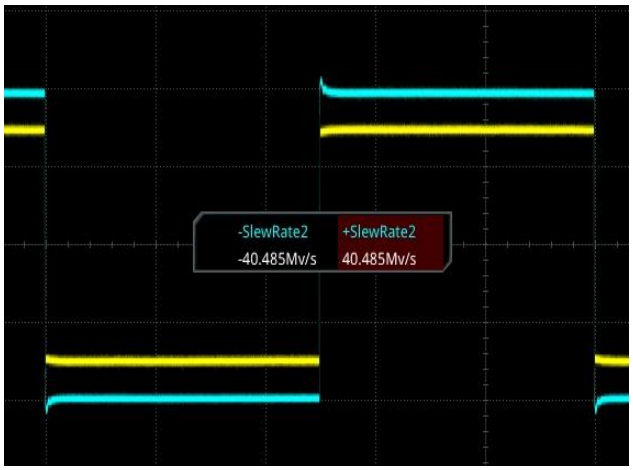
We ourselves prefer listening over measuring, since our ears and senses are way better instruments than any other equipment. Besides that, the idea is that you will listen to your amplifier and not staring blind on measuring equipment… However, since a lot of DIYers want to see figures (acknowledging our senses) instead, we show some measurement data below. We also made a video while measuring a VS-20 / CS-150 setup. Since all our CS-current stages run way over 1MHz, the VS-input modules (except for the output power and "punch") define the sound character and data. The graphs below are valid, regardless of CS-module used:



Wide audio bandwidth graph 10-100.000Hz with the marker set at 20kHz. Freq. graph straight as a ruler ±0,1dB. At this 20kHz the input to output phase error is at a minor -3º, meaning that the 3D staging (= phase!) is phenomenal.



Extended bandwidth graph 10kHz – 1MHz with the marker at the -3dB point. Nice and clean roll offs. This -3dB point as mostly given is just over 500kHz here. Also often listed -10dB point is over 800kHz actually.



1kHz square wave signal without any significant irregularities. Ye-in, Bl=out. It also shows a slew rate of >40V/us in this setup. VS-20 can do >65V/us with higher supply and signal.

Frequency domain (50kHz wide). Harmonics < -65dB (13+53). The irritating 3rd harmonics (3kHz) is at a low level of -66,7dB. Even more irritating 5th is below the scale.

Measurement setup:
VS-20 input + CS-35 LEX08 output stage with CADDOCK MP725 resistors in feedback and INTERTECHNIK Q6-1,0uF over the power lines. Supply voltage ±30Vdc, load 8ohms dummy. Idle current of CS-35 set at 50mA. Measurement date: 11 august 2021.

Measuring equipment: calibrated RIGOL MSO5074 all in one instrument, all available options included.

Ready built, bespoke amplifiers
We are also able to build your bespoke amplifier completely, based on our modules and MODU cabinets.
It will be soldered, assembled and checked by Louis personally, by hand from start to end.
Beside a high quality amp, you also have one which is pretty exclusive that way, since we only build a few per year. If you are interested in an exclusive amplifier like this, please send a mail with your demands and requirements or simply start communicating with us. With first customers this worked fantastic.

#0001, our first bespoke, hand-built amplifier
VS-3XL, CS-80 RQ, PS-80 RQ, VS3-30, IO-80bal, 220VA transformers, about without wiring!

We now installed an independent website for our bespoke, hand-built amplifiers: www.eltimaudio.com
There we listed some example models with pricing.

More specific info of every separate module you can find at our website.

Nice, but how does this concept sound?
Well, since it is difficult to judge your own stuff, we let others speak.
After first comments received, we can compress the experiences as open, detailed and tube like, natural sound. Especially the rock-solid deep bass and the fast, 3D, “airy, tube like” performance is mentioned mostly.
If you wanted to experience it yourself, we offered to send our Demo amplifier and listen for a week (€200,- pledge). Due to several very peculiar events we stopped this service, sorry.

ELTIM demo amplifier

We stopped our demo service by sending, because some people returned it badly packed and some even believed they needed to modify it, which we needed to remove again…….

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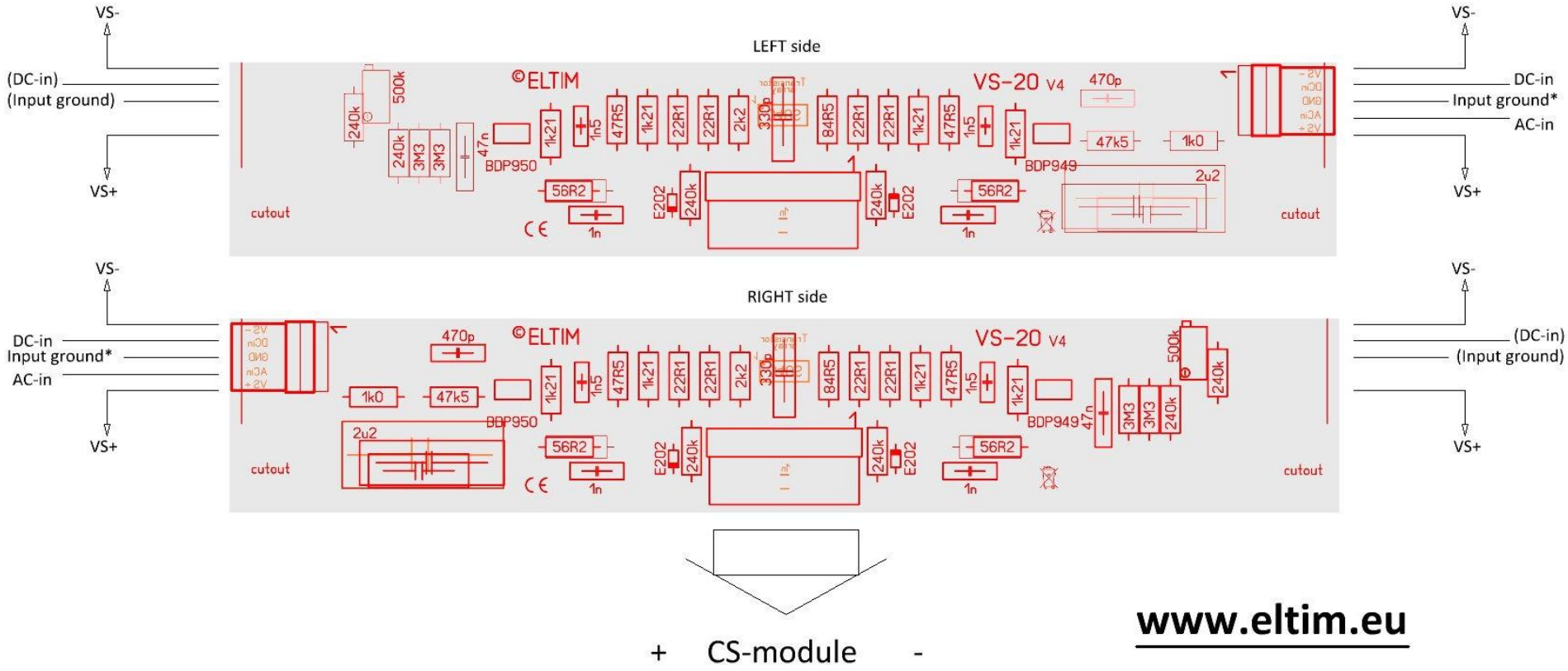
VS +/- is available at both sides for extra electronics like our IO-modules, etc. It is the same voltage as fed to the VS-module.
NOTE: if you decide to use a module in "reverse polarity mode" (see notes on infosheet) VS+ and VS- CHANGE polarity as well !

DC-input can be used if the received signal is free from DC, f.e. because the preceeding equipment has an output capacitor already.

Input ground is connected to the neg. lead of the input signal. Via our CS-boards it leads to the centre tap of the transformer as it should be.

AC-input leads to the internal 2,2uF capacitor, mostly used. It's connected on the side where the2,2uF cap is mounted ONLY !
On the other side , (DC-in) and (Input ground) are available, meant for other purposes like DC-servo control unit, etc.

* Input connector ground connection is recommended by a wide copper strip, directly to the Power grid Earth connection.



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