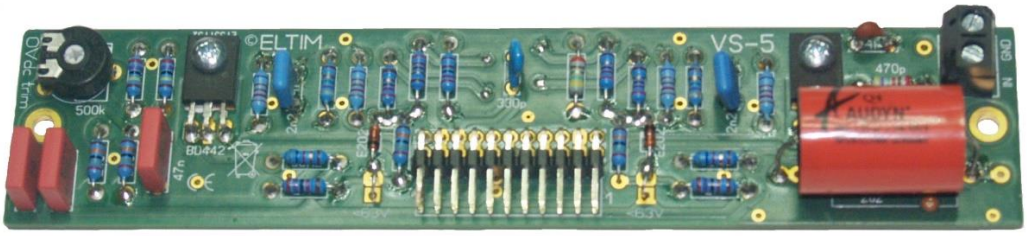
Updated August 14th, 2021

VS-5 Voltage Stage module

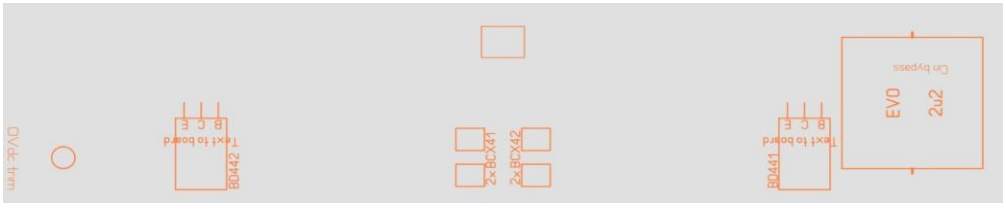
Our amplifier module range is based on a symmetrical, international well known and very reliable concept. The schematics we refer to barely could make 60Wrms, our designs can make up to 2kW if you like.
Due to our completely different way of thinking when it comes to PCB design and layout, mechanical and thermal stress, magnetic interference, EMI, etc., an ELTIM amplifier built with these modules looks and acts a bit different as you are used to though. We made a special page where comments are written.

In order to make a true difference, the power amplifier schematics is split in a voltage- (input) and a current (output) stage board in order to provide the long list of demands. Instead of commonly used LED-circuits, we use special wide range Current Regulator Diodes. Doing so, our amplifier system is way more stable, works over a wide supply range and more important: having way better sound compared to the original basic setup. You need any VS-module in combination with any CS-module to form a working amplifier.

- Some of the highlights of this **VS-5** Voltage Stage module:
  - Smallest possible width with through hole parts, matching our CS-35(ps) output module.
  - Fully symmetrical Input (voltage) stage without IC's present.
  - Central positioned (same temperature), high voltage SMD transistors T1-T4 in the input stage.
  - High voltage Epitaxial TO126 driving transistors feeding our Current Stage modules.
  - Extremely stable, wide range Current regulator diodes (CRD's) (are normally LEDs in other circuits).
  - High end input capacitor 15/22,5/27,5/30mm (or MUNDORF EVO Ø25x21mm) at the back side).
  - Capacitor can be bypassed by solder pads at the back.
  - Standard delivery: 2,2uF MKP Panasonic input capacitor, others optional.
  - WIMA MKP2 capacitors in the frequency limiting (-3dB @270kHz) circuits.
  - High quality 1% MOX through hole resistors.
  - EU made double sided FR4+ board with wide, 35um copper tracks.
  - Planes at both sides are grounded and interconnected, avoiding hum and noise.
  - L- or flat mounted to any ELTIM CS-current stage (output) board. 2x M3 for flat mounting.
  - Dimensions: 149x32x8mm, same width as our CS-35(ps) output modules.



Angled connector for L-mounting. You can select a straight header for sandwich mounting (saving some space) instead.



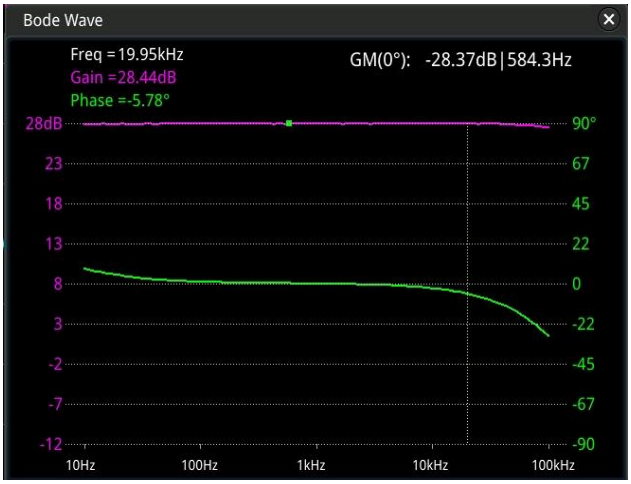
Radial mounted input capacitor 15/22,5/27,5mm fit at the front or back.
Also f.e. INTERTECHNIK Q2/Q4, MUNDORF MCAP250/400, or EVO types (at the back only) fit.
For whatever reason, the TO126 driving transistors could be mounted at the backside
where they can be provided with small finger-type heatsinks (supply voltage > ±50Vdc).

Technical specifications:

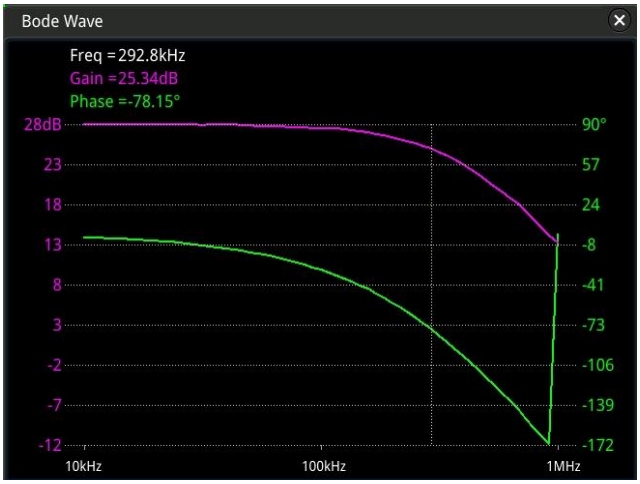
Frequency range:	DC - 80kHz within ±0,25dB
-3dB point:	> 290kHz
Audio band phase shift:	< -6º (20-20000Hz)
Distortion figure (THD):	< 0,008% (1W/1kHz/8ohm)
	< 0,02% (80W/1kHz/8ohm)
Slew rate:	> 35V/us (@ +/- 30V). *Limited by input filter.*
Harmonics:	< -64dB, NONE specific, see graph right below. *Actually well below noticeable.*
Recc. input voltage:	1 Volt
Input impedance:	47kOhm
Supply voltage:	±22 – 63Vdc or ±50 – 100Vdc *(jumpers removed).*
Dimensions:	149x32mm.

Some measurement data

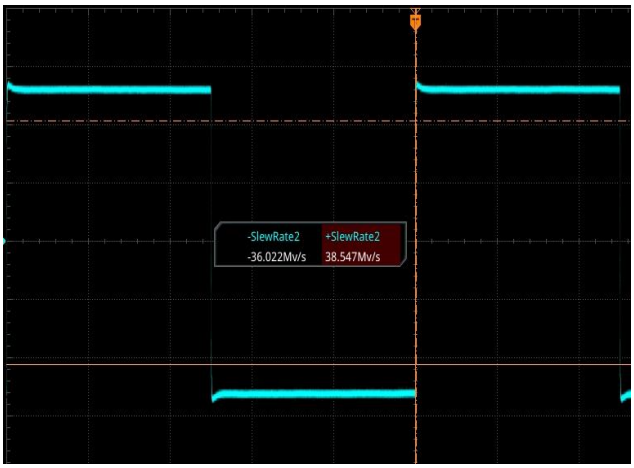
We ourselves prefer listening over measuring, since our ears and senses are way better instruments than any other equipment. However, a lot of DIY'ers want to see figures/graphs instead as shown below.
Since all our CS-current stages run way over 1MHz, the VS-input modules (except for the output power and "punch") define the sound character. Therefor the graphs below are valid, regardless of CS-module used:



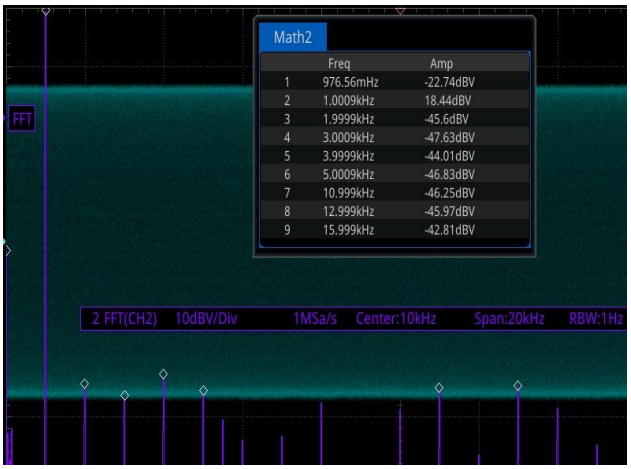
Wide audio bandwidth graph 10-100.000Hz with the marker set at 20kHz. Freq. graph within ±0,25dB.
At this 20kHz the input to output phase error is at a low -6º.



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 290kHz here.
Also often listed -10dB point is over 700kHz actually.



1kHz square wave signal without any significant irregularities.
It also shows a slew rate of >35V/us in this setup.

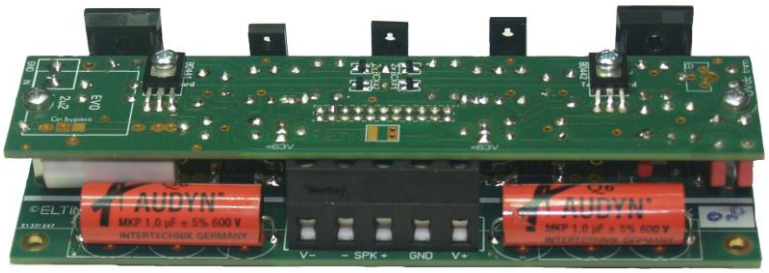


Frequency domain (20kHz wide). Harmonics < -64dB (18+46).
The irritating 3rd harmonics (3kHz) is at a low level of -66,1dB.
Even more irritating 5th is at about the same low level.

Measurement setup: VS-5 input + CS-35ps LEX16 output stage
with MOX2 resistors in feedback and EEC 10.000uF/63V and PANASONIC ECW-1,0uF over the power lines.
Supply voltage ±30Vdc, load 8ohms dummy. Idle current of CS-35ps LEX16 set at 100mA. Measurement date: 14 august 2021.
Measuring equipment RIGOL MSO5074 all in one instrument, all available options included.

Connector functions

The centre connector is where one of our Current Stage modules is connected, normally L-mounted.
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 (straight) type of connector.



VS-5 sandwich mounted on top of a CS-35 module

The input signal is connected via a screw terminal. In the input line, there is a MKP 2,2uF input capacitor, type selectable while ordering. This blocks frequencies below 4Hz. You can bypass this capacitor while connecting two solder pads at the back side. While doing so, our amps run from DC on! Make sure that there is no dc residue on the input signal then because, since our amps in principle run from DC up, this dc residue signal would also be amplified, resulting in massive woofer off-centring, resulting in damage to your woofers!!

Output dc nulling

With the trimmer on this VS-5 you have to set the DC-level of the output of the amplifier pack to 0Vdc.
We test our modules @ ±30Vdc. Since this dc-level changes with supply voltage you need to retune a bit while using significant other supply voltages.

Availability

This module is available in different ways of finish:

- Component kit with all necessary parts, incl. straight and angled connector, schematics and components location plan.
- Ready built and tested module, ready for use in combination with any of our CS-modules.
  In the order process you can select the type of header connector for L- or sandwich mounting and some recommended and fitting input capacitor. Select “NONE” if you want to mount another type.

Check our website for ordering See also our DIY Amplifier Hall of Fame.

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

Nice, but how does this modular concept sound?

Since it is difficult to judge over your own stuff, we let others speak. Sometimes even colleagues and reviewers share their experiences. Switch the language at top for Dutch and German comments.

A few words picked out: “air”, “there is no amp”, “amazing”, “better than a € 6000,- Tube amp”, etc.
Imagine, you can build this yourself in modules or as kit, have a lot of fun, learn and save quite some money compared to the prices of similar sounding branded amps. Note that this is not a simple, as cheap as possible setup as we see all over the internet nowadays. Instead, we made it as good and long-lasting as possible.

DIY

If you decide to buy it as a kit, make sure that you have the skills and knowledge to make it a success.
It doesn’t work? Put it aside for a day and check all over again. You most probably made a mistake.
If still experiencing problems, send it to us and we’ll fix it at a rate of €60,00/hour + replaced parts.

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