CHIPPMANN
electronic musical instruments

CS-8 Series ol

Owners manual
HDH6 / VDL6

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The manufacturer *Schippmann electronic musical instruments* is constantly striving for improvements and developments of their products. Therefore, we reserve the right to change technical specifications which improve our products at any time without notice. This includes the look of the unit which might differ from pictures in this manual.

PREFACE

First of all, congratulations on the purchase of this 3U euro rack synthesizer module. This manual contains a condensed description of the functionality and addresses users with a certain level of elementary technical knowledge.

The current CS-8 ol series determines generally products, which are realized in a so-called "open loop" design. These are electronic circuits working without high amplification amplifiers and then stabilizing and linearizing feedback loops. In earlier times (1970s years) these technique were widely used. Typical sound properties are featured by warmth and creaminess.
In this manual the first two products will be described, namely the voltage controlled filters (VCF) **HDH6** and **VDL6**. HDH6 stands for **H**orizontal **D**iode **H**igh-pass with **6** poles in the transfer function, which means a maximum slope of 36 db/octave. Accordingly to this VDL6 stands for **V**ertical **D**iode **L**ow-pass with also a slope of 36 db/octave. Each of these filters is contructed as a true **dual** filter containing two identical and independent filters A and B. Each filter, A and B, provides 4 simultaneous outputs with different slopes, which are clearly different in sound. By mixing and/or subtracting and/or sharing of the overall 8 outputs one obtain mighty musical, creative possibilities. The module is designed with a width of 19 PU (part units, 1 PU=5.08mm) for installation into a 3 HU (height units) modular rack with a built in ±12 V power supply.

Furthermore the module is equipped with CV (**C**ontrol **V**oltage)-inputs for cutoff-frequency (**FREQ**) and resonance (**RESO**), separately for each channel that true and independent dual/stereo audio operating is possible.

Design and implementation meet highest technical standards concerning usability, sound quality, and electromagnetic immunity. The entire design and production work was done in Germany.

Made in Germany

1. WARRANTY

1.1 Limited Warranty

Schippmann electronic musical instruments warrants the mechanical and electronic components of this product for a period of two (2) years from the original date of purchase, according to the warranty regulations described below. If the product exhibits any faults within the specified warranty period that are not excluded from this warranty, *Schippmann electronic musical instruments* shall, at its discretion, either replace or repair the product. This warranty exists in addition to the general terms of business of the manufacturer *Schippmann electronic musical instruments*.

1.2 Terms of Warranty

Schippmann electronic musical instruments reserves the right to execute warranty services only if the product comes with a copy of the dealer's original invoice. Final discretion of warranty coverage lies solely with *Schippmann electronic musical instruments*. Any *Schippmann electronic musical instruments* product deemed eligible for repair or replacement under the terms of this warranty will be repaired or replaced within 30 days after receiving the product at *Schippmann electronic musical instruments*. Damages or defects caused by improper handling or opening of the unit by unauthorized personnel (user included) are not covered by this warranty. Products which do not meet the terms of this warranty will be repaired exclusively at the buyer´s expense and returned C.O.D. with an invoice for labour, materials, return shipping, and insurance. Products repaired under warranty will be returned with shipping prepaid by *Schippmann electronic musical instruments*. **Outside Germany, products will be returned at the buyer´s expense**.

1.3 Warranty transferability

This warranty is extended to the original purchaser and cannot be transferred. No other person (retail dealer, etc) shall be entitled to give any warranty promise on behalf of *Schippmann electronic musical instruments*.

1.4 Claim for damages

Schippmann electronic musical instruments does not accept claims for damages of any kind, especially consequential loss or damage, direct or indirect of any kind however caused. Liability is limited to the value of this product. The general terms of business drawn up by *Schippmann electronic musical instruments* apply at all times.

2. CE AND FCC COMPLIANCE STATEMENTS

This device has been tested and deemed to comply with the **DIN EN 60065** standards.

This device has been tested and deemed to comply with the requirements, listed in FCC Regulations, part 15. The device complies with **EN 55103-1** and **EN 55103-2** standards.

Because of the entirely analogue construction, this device does not generate radio frequencies and will not interfere with radio frequencies generated by other electronic devices.

3. DISPOSAL

This device has been manufactured to RoHS-standards, in compliance with the requirements of the European parliament and council and is thus free of lead, mercury, and cadmium.

!! Notice: This product is still special waste and is not to be disposed of through regular household waste !!

For disposal, please contact your local dealer or *Schippmann electronic musical instruments*

4. SAFETY INSTRUCTIONS

BEFORE USING THIS PRODUCT FOR THE FIRST TIME, PLEASE READ THE ENTIRE USER MANUAL THOROUGHLY.

- PLEASE AVOID SHARP BENDING OF ANY CORDS AND CABLES.
- CORDS SHOULD NOT BE INSTALLED WITHIN THE REACH OF CHILDREN OR PETS.
- DO NOT TREAD THE ENCLOSURE OF THE PRODUCT, DO NOT PLACE HEAVY OBJECTS ON IT.
- BEFORE REMOVING THE PRODUCT FROM THE RACK, PLEASE DISCONNECT THE POWER PLUG AND ALL OTHER CABLE CONNECTIONS.
- PLEASE DISCONNECT THE POWER PLUG FROM THE OUTLET IN CASE OF A THUNDERSTORM.
- NEVER OPEN THE ENCLOSURE OF THE PRODUCT! NEVER TRY TO MODIFY THE INTERNAL CIRCUITRY! ONLY QUALIFIED SERVICE PERSONNEL IS ALLOWED TO OPEN THE ENCLOSURE.
- DO NOT PLACE OPEN FIRE ON TOP OF THE PRODUCT (CANDLES, ASH TRAYS, HOT THAI CURRIES ETC).
- NEVER EXPOSE THE PRODUCT TO WATER, BEER, OR MOISTURE.
- ADULTS ARE TO MAKE SURE THAT CHILDREN FOLLOW ALL SAFETY INSTRUCTIONS. SAME THING GOES FOR PETS.
- AVOID MECHANICAL STRESS OR IMPACT. DO NOT DROP THE PRODUCT; EVEN IF THERE IS A CONTROL LABELLED "DROP"!.
- DO NOT USE THE PRODUCT WITH TOO MANY OTHER ELECTRONIC DEVICES RUNNING FROM ONE SINGLE OUTLET, ESPECIALLY IN CONNECTION WITH EXTENSION CORDS. DO NOT ATTEMPT TO SAVE MONEY ON CHEAP SOLUTIONS. BUY PROPER HIGH-DUTY POWER DISTRIBUTORS AND CORDS!
- NEVER USE EXTENSION CORDS WITH LESS MAXIMUM LOAD THAN THE TOTAL POWER CONSUMPTION OF ALL DEVICES CONNECTED TO A SINGLE POWER OUTLET COMBINED. OVERLOADING EXTENSION CORDS CAN CAUSE FIRE.
- ***AVOID MECHANICAL STRESS ON SOCKETS AND KNOBS / SWITCHES.***
- ***PROTECT YOUR SPEAKERS AND EARS (!) AGAINST EXCESSIVE AUDIO LEVELS. THE CS-8 PHS-28 UNIT IS CAPABLE OF GENERATING EXTREMELY LOW AS WELL AS EXTREMELY HIGH FREQUENCIES. BOTH MIGHT CAUSE SERIOUS DAMAGE TO AUDIO EQUIPMENT AND EAR-DRUMS!***

5. MAINTAINANCE/ CLEANING

- BEFORE CLEANING THE PRODUCT, PLEASE DISCONNECT THE POWER PLUG FROM THE OUTLET OR DISCONNECT THE MODULE FROM ITS POWER CONNECTOR BY PULLING THE FLAT RIBBON CABLE.
- USE A DRY OR SLIGHTLY MOIST CLOTH OR COMPRESSED AIR FOR CLEANING. NEVER USE ANY CLEANER OR THINNER (E.G. PAINT THINNER OR ACETON). PRINTS AND PAINTWORK WILL IMEDIATELY BE DESTROYED!! ALSO AVOID ALCOHOL (ISOPROPYLIC), GAS, SPIRITS (SCOTCH SINGLE MALTS, FOR A START) OR ABRASIVE HOUSEHOLD CLEANERS!

6. GETTING STARTET

6.1 Unpacking

The box should contain the following items:
- 1 x CS-8 ol HDH6/VDL6 3HU rack-mount module
- 1 x Ribbon cable (20 cm length with two 16 pole IDC-connectors)
- 4 x M3 screws
- 4 x polypropylene washers
- This owners' manual

If the content of the box turns out to be incomplete, please get in touch with your dealer or *Schippmann electronic musical instruments* immediately. In case of damage caused in transit, please get back to the responsible carrier and *Schippmann electronic musical instruments* immediately. We will support you in this case.

6.2 Installation

Place the unit on a clean, dry and sturdy surface, or use a suitable keyboard stand or 19" rack. For 19" rack mounting, a suitable rack (3U Eurorack with +/- 12V power supply rails) is required. The HDH6/VDL6 uses discrete all-analogue electronics. Thus certain parameters, such as **Freq**uency and **Reso**nance may be temperature-sensitive. We recommend placing the module away from heat sources such as radiators, lamps or other units that produce heat (e.g. power amps or internal power supplies).

7. CONTROLS

7.1 Front panel

Fig. 1a and 1b shows the front panel with consecutively numbered controls and jacks for the modules HDH6 and VDL6.

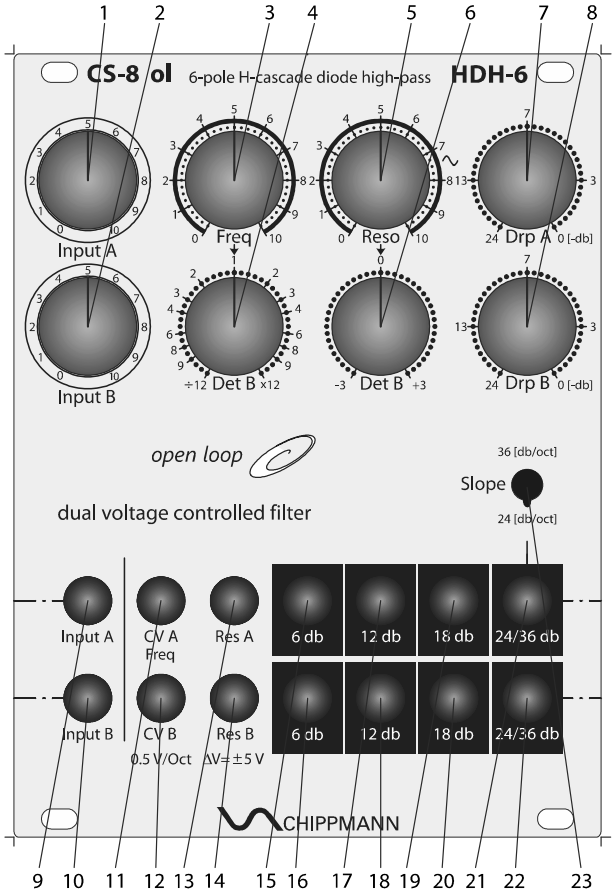

Fig. 1a HDH6 front panel

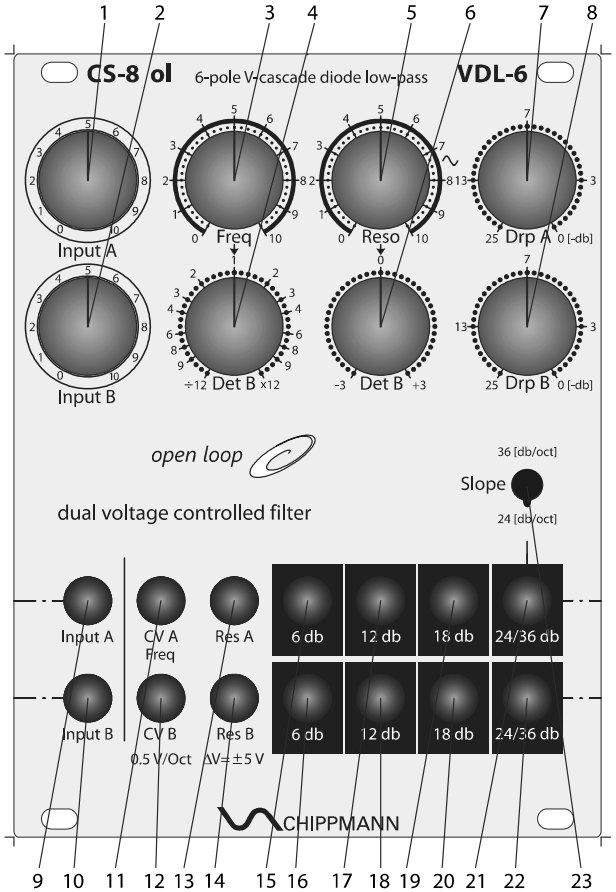

Fig. 1b VDL6 front panel

1. **Input A** control – attenuates the incoming audio signal at Input A jack (VCF A) between -∞ dB and 0 dB
2. **Input B** control – attenuates the incoming audio signal at Input B jack (VCF B) between -∞ dB and 0 dB
3. **Freq** control – adjusts the cutoff-frequency for both channels between 2 Hz and 42 kHz
4. **Det B** control – detunes the cutoff-frequency of VCF B over ±3.6 octaves (x12 resp. ÷12)
5. **Reso** control – adjusts the resonance of the phaser (Q-factor) between zero (1) and self-oscillation (∞) for both filters
6. **Det B** control – "detunes" the resonance (Q-Faktor) of VCF B about ± 1/3 of the total range
7. **Drp A** control – adjusts the gain loss (drop) of the filter outputs within the pass band of the filter with increasing resonance for VCF A
8. **Drp B** control – adjusts the gain loss (drop) of the filter outputs within the pass band of the filter with increasing resonance for VCF B
9. **Input A** jack (input) – audio input VCF A
10. **Input B** jack (input) – audio input VCF B
11. **CV A** jack (input) – non inverting CV-input for controlling the cutoff-frequency VCF A (0.5 V/oct., non-calibrated)
12. **CV B** jack (input) – non inverting CV-input for controlling the cutoff-frequency VCF B (0.5 V/oct., non-calibrated)
13. **Res A** jack (input) – CV-input (±5V) for controlling the resonance of VCF A
14. **Res B** jack (input) – CV-input (±5V) for controlling the resonance of VCF B
15. **6 db** jack (output) – 6 db/oct. audio output VCF A
16. **6 db** jack (output) – 6 db/oct. audio output VCF B
17. **12 db** jack (output) – 12 db/oct. audio output VCF A
18. **12 db** jack (output) – 12 db/oct. audio output VCF B
19. **18 db** jack (output) – 18 db/oct. audio output VCF A
20. **18 db** jack (output) – 18 db/oct. audio output VCF B
21. **24/36 db** jack (output) – 24 or 36 db/oct. audio output VCF A
22. **24/36 db** jack (output) – 24 or 36 db/oct. audio output VCF B
23. **Slope** 2-pos. toggle switch – selects the slope at the output jacks 21 and 22 (24 db/oct. or 36 db/oct.)

7.2 Backside

Fig. 2 shows the back of the module with consecutively numbered elements.

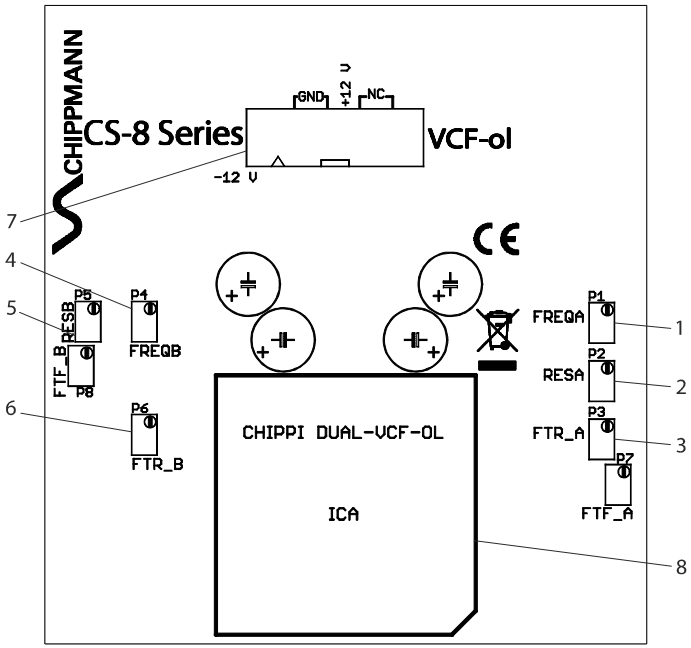

Fig. 2 backside of the module

1. **Freq A** trimmer **P1** –calibration of cutoff-frequency VCF A
2. **Res A** trimmer **P2** – calibration of starting point of self-oscillation VCF A
3. **FTR A** trimmer **P3** – calibration of the resonance-modulation feed-trough of VCF A
4. **Freq B** trimmer **P4** – calibration of cutoff-frequency VCF B
5. **Res B** trimmer **P5** – calibration of starting point of self-oscillation VCF B
6. **FTR B** trimmer **P6** – calibration of the resonance-modulation feed-trough of VCF B
7. **16 Pin power supply-box header**
8. **IC A -** pinned dual VCF module PCB

7.3 Initial operation

The power connector's (8) pin-out in top view (refer to fig. 2) is assigned as follows:
Bottom to top, left to right. Thus pin 1 is located at bottom left, pin 2 above pin 1 etc. Pin 15 is at bottom right, pin 16 at top right.

Pin 1, 2 = -12 V (labeled with a triangle)
Pin 3-8 = GND (regarding ground, 0 V), located outward on all jacks
Pin 9, 10 = +12 V
Pin 11-16 = not connected

To hook up power to the module, connect one of the IDC-connector of the included flat ribbon cable to the box header (refer to fig. 2). Observe guide key for the polarity of the connector in order to avoid pin reversal. The red tag of the cable is to match the triangle-label.

7.4 Calibration

All trimmers are 12 gauge trimmers, i. e., 12 turns are needed to cover the entire range. the trimmers P1, P2, P4 and P5 increase their parameters when turned clockwise. The feed-through trimmers P3 und P6 are zero-adjustment trimmers and should better be untouched!

Note: This is a complex full analogue working circuit, where scattered parts will heat up more or less. Moreover big capacitors with large time constants need time to charge. This causes to a so-called transient where the device achieves its final state.
Clear text: "Frequency" and "Resonance" will drift more or less after a cold start and achieves after 3 minutes about 95% of the as last set values.

8. MODULE DESCRIPTION

8.1. Layout and functions

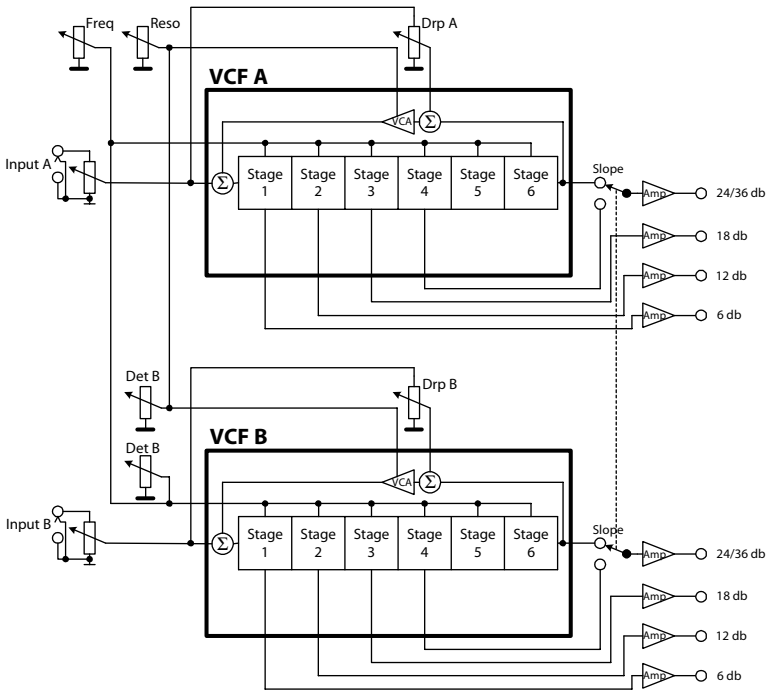

Fig. 3 Structure of HDH6/VDL6

Fig. 3 shows the structure of the filters HDH6/VDL6. The CV-control jacks 10-14 for cutoff and resonance were omitted.

Input: The audio inputs are signed with *Input A* and *Input B*, these are pure AC inputs. The controller *Input A* (1) and *Input B* (2) are tied capacitively decoupled to their input jacks of the same name. The controller attenuate the incoming audio between 0 and 1.

Freq: The influencing variables on this parameter will change the cutoff-frequency. That is the frequency where the phase-shift at stage 6 is 180°. The damp at this frequency will increase for higher stages. The controller *Freq (3)* affects both filters and provides a range from 2 Hz to 42 kHz. By additional external CV-voltage at *jack 11 resp. 12* the cutoff-frequency can be driven up to 80 kHz. This could be useful to full open the **VDL6** to get at stage 6 minimum damp at high audible frequencies or to get at stage 1of the **HDH6** maximum damp at lower frequencies. Vice versa relationships we get at corner frequencies around 2 Hz or less (possible by additional negative CV-voltages) to obtain maximum damp at stage 1 for the **VDL6** for higher frequencies or to get minimum damp at stage 6 of the **HDH6** for lower frequencies. For diode filters the damping starts very early and affects the audio spectrum slowly more and more. So, the damping curve is very smooth, different to typical de-coupled 4-pol-filters. The controller *Det B (4)* (detune) only affects the cutoff-frequency of VCF B and provides a detuning of about ±3.6 octaves (x12 resp. ÷12). The regarding control inputs for the cutoff-frequency are the jacks *CV A* for VCF A and *CV B* for VCF B with a sensitivity of about 2 octaves/volt resp. a scale of about 0.5 V/oct.. These inputs are non-calibrated.

Reso: The influencing variables on this parameter will change the self-resonance of the filters up to self-oscillation. With increasing resonance the filters become more and more selective around the cutoff-frequency and gain the frequencies of the incoming audio at this point. The controller *Reso (5)* provides a range of no selectivity (*Reso* = 0) up to self-oscillation (*Reso* > 7). The regarding control jacks are *Res A (13)* and *Res B (14)*. For a full sweep of this parameter a voltage range ΔV of 5 volts is necessary. Depending on the controllers' position *Reso* in one case -5 V are necessary to bring the resonance back to zero for full clockwise position and +5 V to achieve "10" for counter clockwise position of *Reso*. The controller *Det B (6)* affects only VCF B and "detunes" the resonance about ±1/3 of the full range.

Drp A, Drp B: Many filters are bringing along to increasing resonance values a concomitant damp of frequencies within the pass band. This gain loss or **drop** can be adjusted with the controllers *Drp A (7)* resp. *Drp B (8)* for the filters A and B, separately, between -24 db and 0 db for **HDH6** and between -25 db and 0 db for **VDL6**. Fig. 4a illustrates the high-pass function, the resonance and the drop for the **HDH6** whereas Fig. 4b shows that for the **VDL6**.

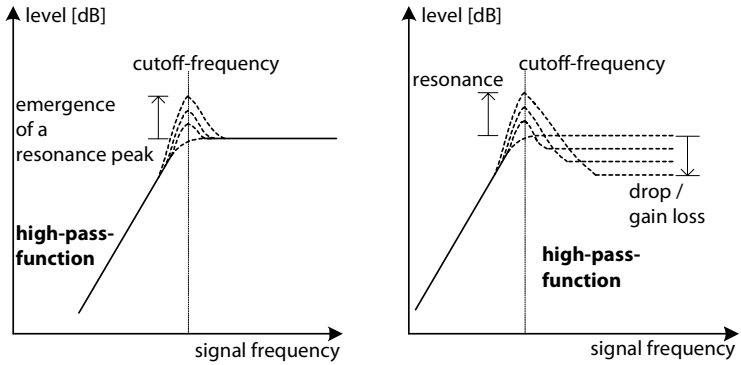

Fig. 4a HDH6 high-pass function, resonance and drop

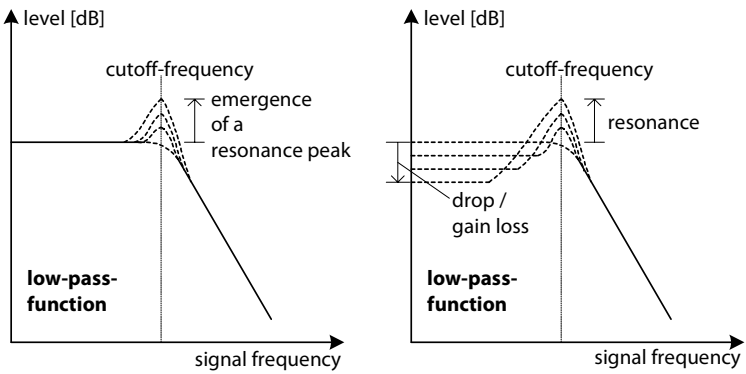

Fig. 4b VDL6 low-pass function, resonance and drop

Note: With turning the controller *Drp A/B* from full CCW to the right (0 db) the distortion of the audio output will increase very fast even with little resonance values. Thus, a very sensitive and specific control of the character of the output signal is possible with that.

6 db, 12 db, 18 db, 24/36 db A/B-output jacks: The jacks (15-22) provides the different slopes at the filter stages 1, 2, 3, 4 and 6 (see Fig.3). The ***slope switch (23)*** selects for both filters VCF A and VCF B commonly the stage 4 (24 db/octave) or stage 6 (36 db/octave) for the output jacks 21 (VCF A) and 22 (VCF B). Fig. 5 illustrates for the **HDH6/VDL6** different slopes.

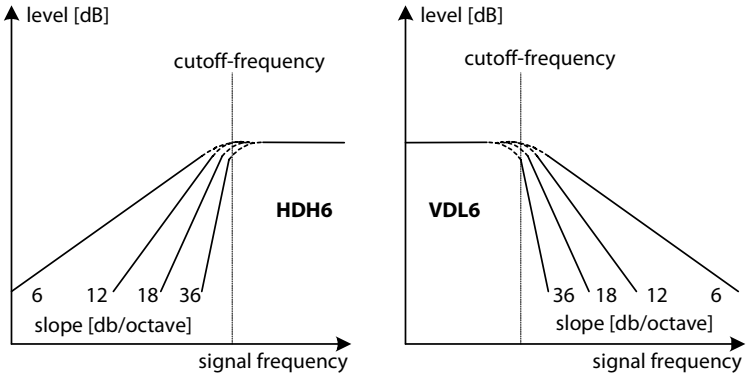

Fig. 5 HDH6/VDL6 slopes

Note: Subtracting of an output with a higher slope from one with a lower slope, regardless whether within the same filter A or B (intra) or between two filters (inter) (e.g. 6 db (A) minus 12 db (B)) will result into band-passes. With the inter-variant the band with can be adjusted by the two cutoff-frequencies, additionally.
Restriction: With these subtractions for the **HDH6** the new won low-pass slope is always 6 db/oct., whereas the high-pass slope will have the slope of the higher slope output (e.g. 6 db - 18 db = band-pass 18/6 db/oct.). With the **VDL6** the relationships turns around (e.g. 6 db - 18 db = band-pass 6/18 db/oct.)

9. TECHNICAL SPECIFICATIONS AND RATINGS

9.1 Specifications (generally)

Input- and output jacks:	mono jack sockets 3.5 mm (1/8")

All input jacks provides a switching contact to ground.

Power supply:	-12 V / +12 V (polarity protection)
Power consumption:	typ. 200 mA (for each supplies ±12 V)
Ambient temperature:	0 °C – +55 °C 7 32 F - 131 F
Net weight (module only):	approx. 200 g
max. dimensions (W x H x D):	19 PU (96.2 mm) x 128.5 mm x 54 mm
Installation depth (behind the panel)	<37 mm

9.2 Ratings

Maximum input voltage at jacks (9-14): ±15 V

!! Permanent DC-voltage at jacks 9 and 10 are NOT allowed - these are pure AC-inputs !!

Output noise at the stages (filter open, resonance=0/resonance=high):

6db/Okt.: <10/30 µVrms ≅ -100/90 dbV
12db/Okt.: <10/30 µVrms ≅ -100/90 dbV
18db/Okt.: <10/20 µVrms ≅ -100/94 dbV
24db/Okt.: <10/20 µVrms ≅ -100/94 dbV
36db/Okt.: <15/15 µVrms ≅ -96/96 dbV