OPERATION MANUAL

THE VERTIGO SOUND VSC-3

QUAD DISCRETE VCA COMPRESSOR

Thank you for purchasing a **Vertigo Sound Product.**

The VSC-3 is the legal successor of the VSC-2, which now is a modern classic and can be found in many top class studios around the world.
Vertigo Sound spent a lot of effort making a good product even better. The VSC-3 can do all the tricks the VSC-2 is known and loved for plus a bunch of new features and options.
The VSC-3 is still named Quad Discrete Compressor because it's topology stays the same.
It is so named, because it uses 4 VCAs built using only discrete components.

It's design is a nod toward the best VCA based compressors of the 70s and 80s.
The Vertigo VCA is in fact named 1979. Some of the best features of these classic Compressors have been complimented in the VSC.
This classic based topology is combined with a modern mastering grade signal path.
Some unique and innovative features lie beneath the bonnet, such as the ratio which increases with level in Soft mode.

THE BASIC IDEA AND CONCEPT OF THE VSC-3

The Vertigo Sound Limiter incorporates four discrete 1979 VCAs for two channels. Each channel has one VCA in the Audio Path and another one inside the sidechain. In stereo mode both sidechains are active (they are not summed together) and the higher signal peak on any of both channels results in the compression of both (in Stereo SC Mode).
Therefore the VSC-3 is reacting also on out of phase signals (peaks) without image shift.
Moreover, the detector (a Peak Forward Design) of each channel works in such a way, that stereo compression can be achieved even without stereolinking. This precision makes the VSC-3 also the first choice for mastering applications. Although the VSC-3 was developed as a Bus Compressor. Each channel provides all controls separately which makes it also a *Must Have* for processing while recording.

INSTALLATION AND HOOK UP

The VSC-3 generates very little heat so it is not necessary to leave an empty space for ventilation above or below the unit. But: Discrete Vcas are sensitive for all heating influences (especially differences in temperature). Don't put heat generating devices below and above inside your rack.

The unit can be used with either balanced or unbalanced sources and the outputs can be loaded either balanced or unbalanced:

INPUT

The audio input is totally isolated by a CINEMAG input line transformer. The primary winding of the transformer is wired to Pin 2 and Pin 3.

Max. Input Level is +22 dbu.

OUTPUT

The audio output is of the type *electronically floating balanced* with BURR BROWN® or 1646 IC-Type.
The output load should not be less then 600 Ohms.
If one of the output pin 2 or 3 is grounded, the signal level on the other pin raises by +6 dB.

Max Output Level is +27 dbu at 600 Ohms.

BALANCED IN/OUT

Pin 1 = Ground/Shield
Pin 2 = Audio + (hot)
Pin 3 = Audio – (cold)

UNBALANCED IN/OUT

Pin 1 = Ground/Shield
Pin 2 = Audio + (hot)
Pin 3 = Audio Common/Ground/Shield

THE THRESHOLD

Sets the level above which signals will be compressed or limited. Rotating the control clockwise raises the threshold. The Threshold is adjustable from –22 to +23 dBu. We incorporated a *Zoom In* between –6 dBu and +10 dBu to give you a more sensitive control and resolution between this commonly used *Level Area*.

Start with threshold fully clockwise. Then turn the control slowly anticlockwise until the right amount of compression is processed. Re-adjust setting if other parameters are changed.

THE RATIO

Sets the compression slope, which determines how the output signal will change in relation to the input signal once the input signal exceeds the threshold. The higher the ratio, the greater the compression, and the more *squeezed* the sound.

Examples
With a setting of 2:1, a 2 dB input change for signals above the threshold results in a 1 dB output change.

SOFT

This is not the commonly known soft knee characteristic!

Soft is better described with Tip Toe — a Ratio which increases with level — a Threshold related Ratio from 1:1 up to 8:1.

The compressor tiptoes into compression with very low ratios getting higher, analogue to the signal, providing an inaudible start of compression.

Use the Soft TipToe Modus for all applications where a harsh start of gain reduction or audible compression is unwanted. Please feel free to experiment! Try e.g, on Snare!!!
This characteristic comes close to the sound of some classic Opto-and variable MU Compressors.

MEDIUM TO HARD KNEE CHARACTERISTICS

Hard knee or *soft knee* response: each type of response gives a different limiting action.
The hard knee response is generally considered more *severe but punchy* and the soft knee response more *musical but limp.*

2:1 / 4:1 / 8:1 / 10:1/ Brick (40:1) = compressing from medium to hard knee
Brick = Limit

Ratio selection switch compensates to provide equal loudness, allowing immediate comparison.

Use both compressor channels for 1 Signal! Connect Output A to Input B and use it for processing a mono signal (e.g. vocals)-put channel A in Soft Mode and channel B to 8:1- Use channel B controls (Attack and Theshold) to create your own compression curves.

THE ATTACK

The parameter ATTACK of the peak detector sets how fast the limiter's internal circuitry reacts to changes in input level. The longer the attack time, the more of a signal's dynamics are *let through* before the limiting action kicks in. With slower attack times, the limiter responds more to average signal level. This produces a smoother sound that tends to retain dynamic character, but the trade-off is that the VSC-3 cannot react as rapidly to sudden level shifts.

Examples

Setting a longer attack time with a bass guitar allows more of the picking attack to come through.
The Attack times can be set fast enough to use the VSC-3 as an *overload protector* but in common musical use slower attacks like 3 ms or higher leave transients unprocessed and offer a quite *musical squeezing*.

There's a right setting for all situations:
0,1 ms · 0,3 ms · 1,0 ms · 3,0 ms · 5,0 ms · 10,0 ms · 15,0 ms · 20,0 ms · 30,0 ms · 40,0 ms

Start from 10 ms setting. Shorter Attacks may be musical in soft mode. Just find your sound!

Put a big amount of compression (10 db gain reduction) onto your mix and search for the best musical and rhythm action of your compressor when changing the Attack setting!
Reduce the amount of gain reduction to a sensible amount (2–4 dB) with the threshold knob.
Try this strategy with the release time and maybe jump back to this procedure (attack) again.
This approach is close to using an EQ, where unwanted signals are spotted with a high boost when switching and sweeping through the frequency band.

THE RELEASE

This control determines how long it takes for the VSC-3 to return to unity gain after going into limiting. With short release times, the limiter tracks every little change in level, producing a potentially uneven or *nervous and rippling* but *fresh* effect that decreases dynamics but increases the average output level. Longer release times tend to *squash* the signal more, producing less overall output but retaining more of the signal's dynamics.
Excessive release times can be used as an effect. In the 60s the use of lots of limiting with a long release time e. g. on drums was a popular recording technique (Fairchild 670 Release).

Start from 0,6 s setting but don't stop to experiment.
Please don't be afraid of short release times. Your program material may allow it!

There's a right setting for all situations:
0,05 s · 0,1 s · 0,2 s · 0,3 s · 0,5 s · 0,6 s · 0,9 s · 1,2 s · Auto fast · Auto slow

Put a big amount of compression (10 db gain reduction) onto your mix and search for the best musical and rhythm action of your compressor when changing the Release setting.
Reduce the amount of gain reduction to a sensible amount (2–4 dB) with the threshold knob.
Try this strategy with the Attack time and maybe jump back to this procedure (Release) again.
This approach is close to using an EQ where unwanted signals are spotted with a high boost when switching and sweeping through the frequency band.

THE MAKE UP

The process of reducing dynamics lowers the signal's overall level.
Use this control to compensate by adding output gain.
The 1979 VCAs offer + 22 dBu of make up. We incorporated a *Zoom In* between 0 dBu and + 6 dBu to give you a more sensitive control and resolution between this commonly used *Level Area*.

Use the right portion of make up to get the same loudness impression on/system out/system in setting. Compare if compression provides a sonic benefit or not.

SC FILTER

If the VSC-3 should react too much to kickdrum, bass or other bass signals (pumping effect) you can activate the SC Filter inside each sidechain. This Low Cut makes the VSC-3 react less sensitively to those signals. Both filter curves were set very gently, smoothly and musically to avoid a complete cut off which would leave some parts of the bass audio material unprocessed. So, the low end of your mix will be processed with less compression. The use of SC-Filters elevates the low end and bass of your audio material. You can choose between two different settings. These frequencies were chosen to provide larger flexibility and a maximum musical treatment and balance of the complete mix.

Search for the limit where the VSC-3 begins to pump-then activate your SC-Filter.

STEREO SC

The detector of each channel works so precisely that compression can be done without stereolinking but in stereo mode all upper Channel A knobs, Bypass or SC Filter A switches become the masters for Left and Right. (All controls B are switched off). So there's no complicated L-R trimming! In stereo mode both sidechains are active (they are not summed together) and the higher signal peak on any of both channels results in the compression of both (Stereo Mode). Both channels can be the compressors Master. Therefore the VSC-3 is reacting also on out of phase signals (*peaks*) without image shift.

The VSC-3 detectors work very precise. Stereo compression can be achieved even without stereo linking. Adjust all parameters the same on both channels and switch the unit into *Dual-Mode*. This stragety can widen your stereo image. This procedure might be the cure and a enhancement to your mix. If the stereo image gets too *shaky* switch back to the conventional stereo mode.

MONO SC

This is the opposite of Stereo SC mode. Like In stereo mode all upper Channel A knobs, Bypass or SC Filter A switches become the masters for Left and Right. (All controls B are switched off). So there's no complicated L-R trimming! The compressor is now reacting to the Mono summed Signal on both channels.

Mono SC mode can be useful if you want the compressor to react more to Vocals, Bass and Kick. This mode narrows the stereo image but offers more *Glue*. Try it out on subgroups like Backing Vocals ...

PEAK AND RMS MODE

Peak is the standard mode known from the VSC-2 Compressor. Set to Peak the compressor reacts as soon the signal passes the threshold value — of course depending on the chosen Attack time value.
In RMS Mode the compressor reacts to the average level of the program material. Switched to RMS the Ratio selection is inactive.

Peak or RMS?
The recommended standard choice for Mix Bus duties is Peak Mode. If the music material has a very high dynamic content the RMS Mode might be a problem solver.
Generally we suggest to use RMS more for individual instruments and vocals where an equal loudness impression is desired.

GAINREDUCTION METERING

This metering shows the amount of gain reduction being applied to the input signal. The metering is equipped with a non-linear scale and corresponding electronics to visualize the common area up to 6 dB gain reduction with utmost precision. It shows quick and exactly what is done to your material.

COLOURATION, DISTORTION AND SOUND

Colouration is one of the hidden secrets and is the basis for a unique sound and one first step creating a classic of tomorow.
In fact the 1979 VCA produces mainly second harmonics depending on Gainreduction and Make Up. The cocktail of clean precise sound and the right mix out of second and third harmonics dynamically and frequency dependent is the secret of the 1979 VCA.

If you want to use the VSC-3 adding some colouration without Gain Reduction then turn the threshold pots fully clockwise, and use the Make Up to control the amount of harmonics. (In many large consoles at that time like SSL, MCI, Quad Eight the discrete VCA remained in the signal path of the output section also when deactivating the Compressor/Limiter).

THE SIGNAL PATH: LESS COMPONENTS – MORE CLARITY

The input section of the audio path is equipped with Cinemag transformers which provide the maximum possible Common Mode Rejection of unwanted signals.

This transformers have a single *Faraday* and a 30 dB magnetic *MU-metal* shield can. The audio then already reaches the VCA. Again leaving the VCA the signal passes the device via a Burr Brown® or 1646-type output stage.

The power supply PCB, the audio PCBs and signalprocessing PCBs are completely separated, so any unwanted interaction between those is impossible (= no noise, bleedthrough, crosstalk, hum etc.) We can guarantee that no unwanted interferences are added to the audiosignal.

Deactivating the system bypasses the processor completely (real hardwire bypass).

The outer appearance of the VSC-3 and all mechanical parts are constructed in the same manner like we engineered the electronic design:
Ratio, Attack and Release controls are fixed position gold plated rotary switches for easy recall, CNC machined aluminium knobs and a rugged housing construction.

VERTIGO SOUND
– ONE NAME STEPS OUT OF THE HERD

TECHNICAL SPECIFICATIONS

- Stereo / Dual Mono / Mono switchable
- Cinemag Balanced In. That 1646 or Burr Brown® Balanced Out
- Dynamic Range: 117 db
- Frequency response: 10 Hz – 70 kHz (– 3 db)
- Max. Output Level: + 27 dBu / 600 Ohm balanced floating
- Signal to Noise Ratio at + 6 dBu = 97 db (20 – 20 kHz, unweighted, RMS)
- Noise: – 91 dBu (20 Hz – 22 khz – unweighted, RMS) at 0 db Unity Gain
- Crosstalk between channels: >100 db at any frequency
- Power consumption: max 12 Watts

SAFTEY, GROUNDING, GROUNDLOOPS AND MORE

This Appartus must be earthed!

- To avoid groundloops all Audio-Grounds (XLR-Pin 1) are separated from the outer metallcase (housing of the VSC-3)

- To keep them separated, please avoid connecting any XLR-Pin 1 with of any XLR-housing or the housing of the VSC-3. Unnecessary groundloops might occur!

- The powersupply is secured against overload and is fire-protected: Several melting fuses, overheat sensors, security resistors etc. The powersupply is of noiseless linear construction: There is no *digitally switching* type psu with unaudible but AD-Conversion disturbing HF-Noise.

- There are no signal relevant magnetic or static fields coming out of the unit. The toroidal power transformer works with reduced primary voltage, therewith the already neglectable stray field is reduced once again dramatically. The steelcase of the VSC-3 shields all the rest, electrostatic and magnetic and for that reason your studio stays 100 % clean after installing the VSC-3.

SAFETY INSTRUCTIONS

Mains Voltage either 115 V or 230 V.
Please contact the manufacturer for Mains voltage change.

Mainfuse 230 V 200 mA slow
Mainfuse 115 V 400 mA slow

Note
Check the line voltage marked on the rear panel of the VSC-3 and verify that it is correct for your country.

Caution
Never remove the cover. There are no user serviceable parts inside.

Grounding
This Appartus must be earthed!

Warning
If the ground is defeated, certain fault conditions in the unit or in the system to which it is connected can result in full line voltage between chassis and earth ground. Severe injury or death can then result if the chassis and earth ground are touched simultaneously.

Water And Moisture
Appliance should not be used near water (e.g. near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc). Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

Power Sources
The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.

Grounding Or Polarization
Precautions should be taken so that the grounding or polarization means of an appliance is not defeated.

Servicing
To reduce the risk of fire or electric shock, the user should not attempt to service the appliance. All servicing should be referred to qualified service personnel.

For units equipped with externally accessible fuse receptacle
Replace fuse with same type and rating only.

Multiple-Input Voltage
This equipment may require the use of a different line cord, attachment plug, or both, depending on the available power source at installation. Connect this equipment only to the power source indicated on the equipment rear panel. To reduce the risk of fire or electric shock, refer servicing to qualified service personnel or equivalent.

RoHS Conformity
Vertigo Sound herewith declares that all our products will be manufactured RoHS conformal.

FCC Compliance Statement
This device complies with the FCC Rules. Vertigo Sound declares a FCC grant of equipment authorization and a FCC Id is not required, but the equipment complies with FCC technical requirements.

Notes on Environmental Protection
At the end of its operating life, this product must not be disposed of with regular house-hold waste but must be returned to a collection point for the recycling of electrical and electronic equipment. The wheelie bin symbol on the product, user's manual and packaging indicates that. The materials can be reused in accordance with their markings. Through reuse, recycling of raw materials, or other forms of recycling of old products, you are making an important contribution to the protection of our environment. Your local administrative office can advise you of the responsible waste disposal point.

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