535

500 Series Diode Bridge Compressor

RUPERT NEVE DESIGNS

Operations Manual

Important Safety Instructions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. This apparatus shall not be exposed to dripping or splashing, and no object filled with liquids, such as vases or beer glasses, shall be placed on the apparatus.
16. Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.
17. This apparatus has been designed with Class-I construction and must be connected to a mains socket outlet with a protective earthing connection (the third grounding prong).
18. This apparatus has been equipped with a rocker-style AC mains power switch. This switch is located on the rear panel and should remain readily accessible to the user.
19. The MAINS plug or an appliance coupler is used as the disconnect device, so the disconnect device shall remain readily operable.

CAUTION ***AVIS***

RISK OF ELECTRIC SHOCK. DO NOT OPEN
RISQUE DE CHOC ELECTRIQUE. NE PAS OUVRIR

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK DO NOT REMOVE COVER (OR BACK)
NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL
ATTENTION: POUR EVITER LES RISQUES DE CHOC ELECTRIQUE, NE PAS ENLEVER LE COUVERCLE. AUCUN ENTRETIEN DE PIECES INTERIEURES PAR L'USAGER. CONFIER L'ENTRETIEN AU PERSONNEL QUALIFIE.
AVIS: POUR EVITER LES RISQUES D'INCENDIE OU D'ELECTROCUTION, N'EXPOSEZ PAS CET ARTICLE A LA PLUIE OU A L'HUMIDITE

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure, that may be of sufficient magnitude to constitute a risk of electric shock to persons.
Le symbole éclair avec point de flèche à l'intérieur d'un triangle équilatéral est utilisé pour alerter l'utilisateur de la présence à l'intérieur du coffret de "voltage dangereux" non isolé d'ampleur suffisante pour constituer un risque d'électrocution.

The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.
Le point d'exclamation à l'intérieur d'un triangle équilatéral est employé pour alerter les utilisateurs de la présence d'instructions importantes pour le fonctionnement et l'entretien (service) dans le livret d'instruction accompagnant l'appareil.

20. NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
    - Reorient or relocate the receiving antenna.
    - Increase the separation between the equipment and the receiver.
    - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
    - Consult the dealer or an experienced radio/TV technician for help.

    CAUTION: Changes or modifications to this device not expressly approved by Rupert Neve Designs LLC, could void the user's authority to operate the equipment under FCC rules.
21. This apparatus does not exceed the Class A/Class B (whichever is applicable) limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

ATTENTION — *Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant las limites applicables aux appareils numériques de class A/de class B (selon le cas) prescrites dans le réglement sur le brouillage radioélectrique édicté par les ministere des communications du Canada.*

22. Exposure to extremely high noise levels may cause permanent hearing loss. Individuals vary considerably in susceptibility to noise-induced hearing loss, but nearly everyone will lose some hearing if exposed to sufficiently intense noise for a period of time. The U.S. Government's Occupational Safety and Health Administration (OSHA) has specified the permissible noise level exposures shown in the following chart. According to OSHA, any exposure in excess of these permissible limits could result in some hearing loss. To ensure against potentially dangerous exposure to high sound pressure levels, it is recommended that all persons exposed to equipment capable of producing high sound pressure levels use hearing protectors while the equipment is in operation. Ear plugs or protectors in the ear canals or over the ears must be worn when operating the equipment in order to prevent permanent hearing loss if exposure is in excess of the limits set forth here:

Duration, per day in hours	Sound Level dBA, Slow Response	Typical Example
8	90	Duo in small club
6	92	
4	95	Subway Train
3	97	
2	100	Typical music via head phones
1.5	102	
1	105	Siren at 10 m distance
0.5	110	
0.25 or less	115	Loudest parts at a rock concert

WARNING — To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

535 Diode Bridge Compressor

Thank you for your purchase of the 535 Diode Bridge Compressor. We hope you enjoy using this tool as much as we have enjoyed designing it. Please read through the entire manual before attempting to setup or operate your 535 Diode Bridge Compressor.

535 Design Notes

Rupert Neve's original 2254 compressor served as an inspiration for the design of the 535. Understanding that there were limitations to the original 2254 topology, painstaking effort was taken to reproduce the desirable qualities of the 2254 while improving the original device's elevated noise floor, inflexible attack time constants, limited range of threshold and ratio controls, and low saturation headroom.

The updated compressor design employs full-wave rectification in the sidechain to help minimize the effects of intermodulation distortion in the main audio path, while maintaining the tonality that made the original 2254 famous. Using a diode bridge as a gain control element in a compressor produces a unique sonic character, and it was imperative for the new compressor to deliver what the vintage device inspired.

In addition to full-wave rectification in the compressor sidechain path, the **TIMING** controls have been expanded. Each of the six selectable settings have been chosen for different dynamic applications, including FAST and MF mode for more transient signals to SLOW and AUTO for more generalized applications. Combine this control set with the **FAST** switch, and the available **TIMING** control settings have been doubled from 6 to 12.

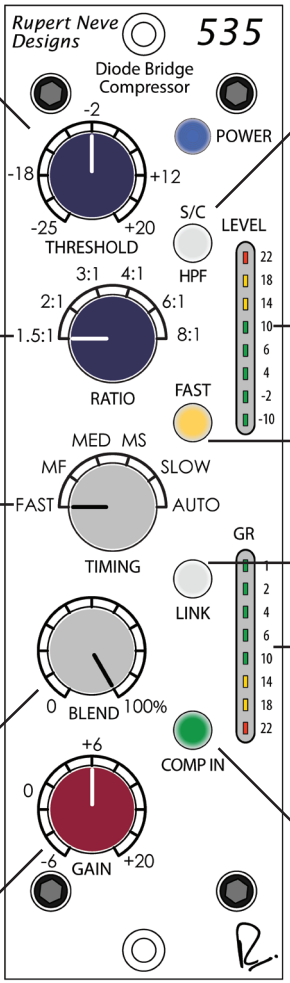
Previous Rupert Neve Designs compressors like the 543 and Portico II series have been about transparency: the 535 is about punch, vibe, and color. The character of the Diode Bridge in combination with an upgraded feature set provide a versatile update to a vintage compressor topology for the modern studio engineer.

535 Features

Threshold

The **THRESHOLD** control has 31 detents and allows the user to adjust the point at which compression begins, between -25dBu and +20dBu. Turning this control counter-clockwise will increase the amount of compression; turning it clockwise will decrease the amount of compression. If the input signal is lower than the set threshold, no compression will occur.

It is advisable to start with this control set fully clockwise, and set the other controls first. Once the other controls are set to the desired values, slowly bring the THRESHOLD control down (turning counter-clockwise), while listening carefully until the optimal amount of compression is achieved for the given source material.



Threshold
31 detent pot that sets the level at which compression begins from -25dB to +20dB.

Ratio
Six position rotary switch that sets the slope of compression from 1.5:1 to 8:1.

Timing
Six position rotary switch that sets the compressor attack and release times.

Blend
31 detent pot that adjusts the mix of compressed and uncompressed signal.

Gain
31 detent pot that adjusts output gain from -6dB to +20dB.

S/C HPF
Switch that inserts a 150Hz high pass in the compressor sidechain.

Level Meter
Eight segment LED meter that indicates output level.

Fast
Switch that divides the compressor attack and release times in half.

Link
Switch that allows multiple modules to be operated in stereo.

GR Meter
Eight segment LED meter that indicates gain reduction.

Comp In
Switch that inserts the compressor into the audio path.

Ratio

The **RATIO** control has 6 selectable positions on the rotary switch and allows the user to set the slope of the compressor curve, with pre-selected ratios of 1.5:1 through 8:1. This range of compression ratios allows the user to compress very moderately, or if desired, dole out heavy compression to achieve an intentional effect on higher ratio settings.

Timing

The **TIMING** control allows the user to change the attack and release times simultaneously for the diode bridge compressor. Each **TIMING** setting has a different attack and release time constant. Due to the nature of this topology, these time constants will adapt themselves slightly depending on several factors: compression ratio, threshold, and source material. This allows the diode bridge compressor to remain flexible with various types of source material. We encourage the user to experiment with different combinations of ratio, timing, and threshold settings to achieve the desired compression on the signal.

FAST	Fast Attack (750us), Fast Release (130ms)
MF	Medium Attack (2.25ms), Fast Release (130ms)
MED	Medium Attack (2.25ms), Medium Release (400ms)
MS	Medium Attack (4ms), Slow Release (725ms)
SLOW	Slow Attack (10ms), Slow Release (1S)
AUTO	Medium Attack (5ms), Dual Decay Release (T1 500ms, T2 1s)

Gain

The **GAIN** control has 31 detents and allows the user to add gain to the compressed signal in order to bring the signal level back up to unity with the uncompressed input signal. It is much easier to evaluate the tonal effect of the compressor when the compressed output level is matched to the uncompressed input level, thereby eliminating the misleading level difference.

Blend

The **BLEND** control has 31 detents and allows the user to mix the uncompressed (dry) signal with compressed (wet) signal. Turning the control towards 0% will shift the mix to fully uncompressed dry signal, whereas turning the control towards 100% will shift the mix to the fully compressed signal. This feature allows for parallel compression by blending the direct and compressed signals, enabling a wider range of compression subtlety.

Fast

The **FAST** switch divides the attack and release times available on the **TIMING** control in half, effectively doubling the number of **TIMING** presets available to the user.

Link

The **LINK** switch allows the compressor to be linked to another 535 compressor module via a sidechain control voltage. In link mode, the compressor generating the greater sidechain voltage (resulting in higher amounts of compression) will control the compression of both audio signal paths to maintain proper stereo image while compressing.

Sidechain HPF

The **S/C HPF** switch allows the user to insert a 150Hz high-pass filter in the compressor sidechain. When this filter is engaged, the compressor will be considerably less responsive to information below 150Hz. As an example, if used on a drum kit, the low end of the kick drum would be less compressed than the snare drum or cymbals since a significant portion of the kick drum's dynamic energy is focused below 150Hz.

Comp In

The **COMP IN** switch allows the user to audition the compression. By disengaging the **COMP IN** switch, the compressor is bypassed and the user can quickly compare the sound of the dry input signal for an objective evaluation of the sonic effect of the compressor on the audio signal. **COMP IN** can be used in combination with the **GAIN** control to match the perceived level of the compressed audio signal with the level of the uncompressed input signal.

Level and Gain Reduction Metering

These two LED meters are provided to give an accurate representation of the output level of the compressor, as well as the amount of gain reduction being applied to the input signal.

Operation Guide

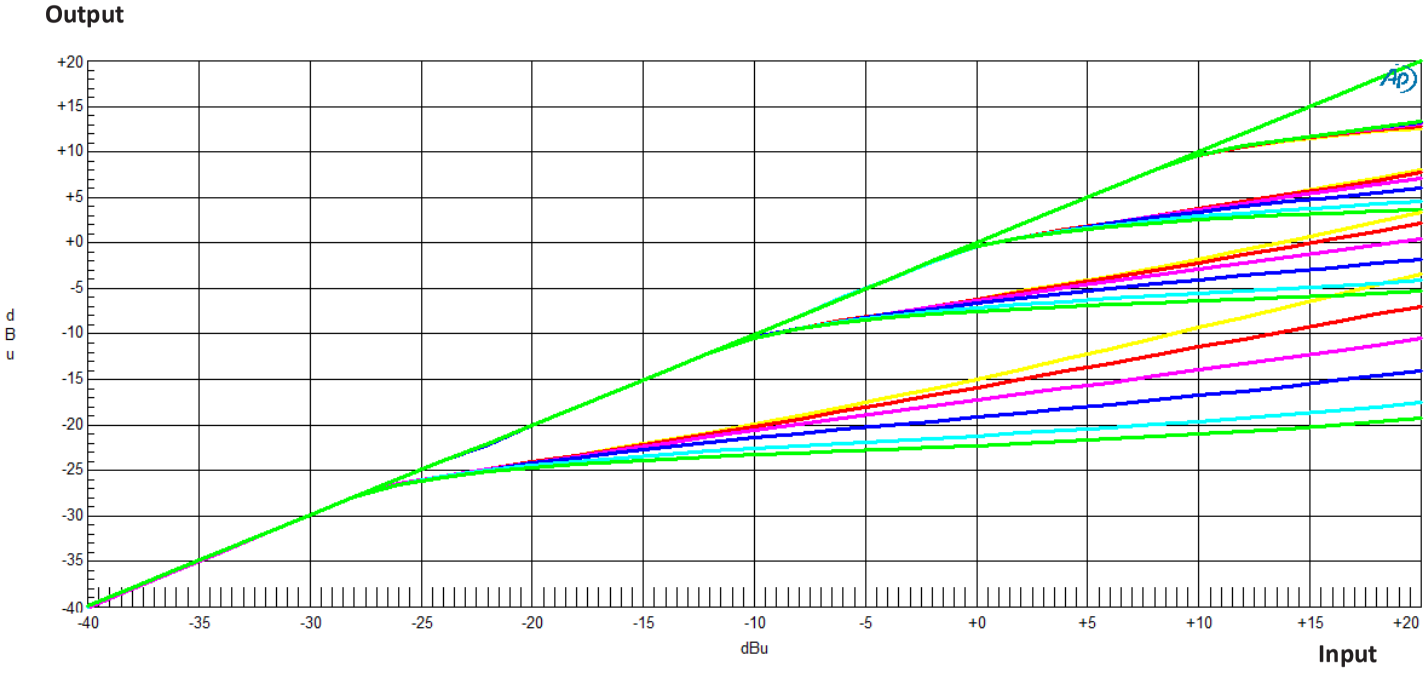
Understanding the signal paths involved in creating an accurate gain control device is an important step to using a compressor effectively. At the heart of the 535 is a Diode Bridge, manipulated by a control voltage which is generated by the compressor sidechain. The purpose of a compressor sidechain is to convert the input audio signal into the corresponding control voltage. Within the sidechain, several controls are available to the user including **THRESHOLD**, **RATIO** and **TIMING**. Using these controls, the user can manipulate the sidechain signal at key points to achieve proper control over the main audio path. The sidechain for this compressor receives audio input from a point immediately after the Diode Bridge, making it a feedback-style compressor.

The 535 compressor sidechain has been upgraded with a Full-Wave rectifier rather than the Half-Wave detector of past Diode Bridge designs. This guarantees lower overall intermodulation distortion and faster available attack times in comparison to the original. This compressor was designed with the ability to "color" the audio passing through it; this can be achieved in the following ways:

The first method is using higher input levels, which cause the Diode Bridge gain reduction element to produce its own harmonic content, regardless of whether the compressor is compressing the audio signal or not. This harmonic threshold has been set to +20dBu (to correspond with the maximum **THRESHOLD** control setting), allowing most signals to pass unaffected. However if desired, the user can drive the compressor input harder in order to bring out the more aggressive tonal characteristics. These harmonics are independent of frequency, and they increase exponentially beyond +20dBu. We encourage the user to experiment with varying input levels to find the right tonal shaping for the given source material.

The second method is using higher **RATIO** and faster **TIMING** control settings. Faster **TIMING** settings will smooth the compressor control voltage less, and therefore induce more harmonic content, as peak to peak control voltage ripple will be greater. This will translate to more color in the main audio path. Slower **TIMING** settings will smooth the control voltage significantly, and thereby reduce the harmonic content added to the audio path, resulting in more transparent compression. The harmonic content created in this way is what contributes to the Diode Bridge Compressor's renowned warm character.

Ratio Curves



Legend

RATIO Settings

- 1:1 (BYPASS)
- 1.5:1
- 2:1
- 3:1
- 4:1
- 6:1
- 8:1

The ratio curves shown above were taken with THRESHOLD set to the following values:

-25dBu
-10dBu
0dBu
+10dBu

Operation Guide Continued

Having covered some of the ways in which this compressor can be used to color the audio signal, it is important to note that this compressor can also be utilized in more transparent applications. There are several methods that can be used individually or in combination for increased compression subtlety:

- Lower **RATIO** control settings (1.5:1, 2:1, 3:1)
- Slower **TIMING** control settings (MS, SLOW, AUTO)
- Engaging **S/C HPF** to remove low frequency compression
- Utilizing the **BLEND** control to mix the uncompressed signal with compressed signal (parallel compression)

The range of attack and release times that can be achieved across the various **RATIO** settings is quite wide, and is useful for dialing in the proper compression envelope. Due to the nature of the charge and discharge characteristics of the timing networks in this compressor, there is an inherent flexibility in the timing range for each of the six switch positions on the **TIMING** control.

Limited Warranty

Rupert Neve Designs warrants this product to be free from defects in materials and workmanship for a period of one (1) year from date of purchase, and agrees to remedy any defect identified within that period by, at our option, repairing or replacing the product.

Limitations and Exclusions

This warranty, and any other express or implied warranty, does not apply to any product which has been improperly installed, subjected to usage for which the product was not designed, misused or abused, damaged during shipping, damaged by any dry cell batter, or which has been altered or modified in any way. This warranty is extended to the original end user purchaser only. A purchase receipt or other satisfactory proof of original purchase is required before any warranty service will be performed. **THIS EXPRESS, LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, TO THE EXTENT ALLOWED UNDER APPLICABLE STATE LAW. IN NO EVENT SHALL RUPERT NEVE DESIGNS BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THIS PRODUCT.** Some states do not allow the exclusion or limitation of consequential damages or limitations on how long an implied warranty lasts, so this exclusion may not apply to you.

Warranty Service

If you suspect a defect in your device, please call us at 512-847-3013 or contact our support staff (support@rupertneve.com) for troubleshooting. If it is determined that the device is malfunctioning, we will issue a Return Material Authorization and provide instructions for shipping the device to our service department.

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