User's Manual

VS21 | 21" Powered Subwoofer

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Description:

The design brief for the VS21 was to create a product that offered low-frequency extension similar to the BASSBOSS vented dual 18" subwoofers in combination with the hard-hitting punch of the BASSBOSS horn-loaded subwoofers. The VS21 brings the world of extended low frequency together with the world of high-impact. You're no longer forced to choose either deep OR punchy, the VS21 offers both.

The VS21 is particularly versatile, able to satisfy the demands of hard-hitting live kick drums to the deep, rolling bass of an 808. For those whose shows span a lot of genres, the VS21 has got them all covered. The same size and shape as the Cerwin Vega L-36, the VS21 will deliver considerably much more output and deep bass.

Description
Vented, short horn hybrid single 21" powered and processed subwoofer. Frequency response ±3dB from 25-90Hz. Maximum continuous sine wave output 132dB.

Features
The VS21 features a massive displacement, long excursion 21" woofer, rear-loaded into a large acoustical volume that is tuned to a low frequency, and front-loaded onto a short horn. The vented enclosure section provides extended low frequency performance and the horn section provides increased upper frequency sensitivity and improved transient response.

Benefits
These features bring the benefits of extended low frequency together with the benefits of high-impact. Excellent transient response is delivered by the efficient performance of the horn at the upper end of the subwoofer range. Extended depth is delivered by the large acoustical volume, low tuning and the massive displacement of the long-excursion 21" woofer. The combination provides an immediate hit with the added power of full and effortless low-end extension. The resulting impression is one of a very 'big' or 'heavy' hit.

Thanks to these attributes, the VS21 is extremely versatile, able to satisfy the demands of hard-hitting live kick drums as well as the deep, rolling bass of heavy synth tracks or an 808. The VS21 offers output SPL comparable to a bigger double-18" cabinet and allows more output to be focused forward thanks to its smaller frontal area.

Amplification and Processing
Powered by a 2400W RMS amplifier, the VS21 includes all the necessary electronics to allow it to be connected directly to your mixer with nothing but signal cable in between. The built-in processing is minimal and includes a low-pass filter that provides a broad, flat frequency response. There is no need for any EQ in the signal. In addition, a sophisticated limiter system protects the woofer from thermal and over-excursion damage, allowing the user to get maximum output from the loudspeaker for as long as necessary without concern about overdriving it.

Arrays
For larger events, several arraying options are facilitated. Block arrays, side-by-side arrays and front/back Cardioid arrays (presets available in DSP) can be deployed securely thanks to the interlocking feet.

VS21 21" Powered Subwoofer | SPECIFICATIONS

Acoustical

Loudspeaker Description:	Subwoofer, single 21" powered and processed
Frequency Response (±3 dB):	25 - 90 Hz
Maximum Sustained Output:	132 dB SPL, 1 meter, half-space (ground plane)
Max SPL (Peak)*	139 dB
Nominal Dispersion (°H x °V):	360 x 360 - Cardioid mode available with multiple boxes

Electrical

Amplification:	2400 Watt Continuous RMS Class D Amplifier
Processing:	Integrated comprehensive DSP provides high pass, low pass, phase alignment and limiting
Electrical Connectors, Amp:	Neutrik Powercon input (blue) NAC3FCA
Electrical Connector, Mains:	Standard US 3-pin 120V electrical plug: NEMA 5-15. (Edison)
Voltage Operating Range:	90-130V
Current Draw, Nominal:	3A @ 120 volts (typical, 1/8 max power)
Current Draw, Peak:	20A
Current Draw, Continuous:	Limited to 16.5A after 1 second
Signal Input Connector:	XLR-F
Signal Output Connector:	XLR-M pass-through only

Physical

Enclosure Type:	Vented, short horn hybrid
Transducer:	One 21" diameter (540 mm) neodymium motor woofer. 58 mm (2.28") peak to peak excursion
with	
	waterproof fiber composite cone
Cabinet Construction:	18mm Baltic Birch plywood, dado joints, stainless steel hardware
Dimensions (HxWxD):	36" x 24" x 36" (91.44 cm x 60.96 cm x 91.44 cm) - 37.5" (95.25 cm) high with feet
Net Weight:	180 lbs. (82 kg)
Shipping Weight:	230 lbs. (104 kg)
Exterior Finish:	Rugged, weatherproof, black textured, bonded high-pressure polyurethane coating
Grill:	Perforated, powder-coated steel

Optional

Installation Version:	Available without handles and pole sockets
Amplification for Installation:	Complete power package including DSP in two space rack chassis
Cover:	Heavy-duty padded nylon transport covers for 1 or 2 cabinets
Transport Dollies:	Dolly cart with 4 locking casters and recesses to accept interlocking cabinet feet for transporting 1 to 3 cabinets
Online Information:	bassboss.com/vs21

**Peak output is calculated using "industry standard" techniques. These calculation methods create theoretical specifications that are inflated over what can actually be achieved. BASSBOSS real world output specifications are provided as "Maximum Sustained Output" ratings, which reflect actual measured, continuous output levels.*

Our proactive philosophy causes specifications to be subject to change whenever improvements are made.

Setup Instructions:

1. **Place loudspeaker in the desired location. Ensure that it is secure and stable.**
2. **Rotate the input attenuator knob counter-clockwise to the lowest setting.**
3. **Connect signal from the sound source (mixer) via the XLR female input jack.**
4. **Connect the XLR male output to the next available loudspeaker input via an XLR cable (if applicable.) This is a full-range pass-through connection and no processing is applied to this output.**
5. **Connect the Neutrik PowerCON (blue) connector to the blue power inlet socket. Do not force. To insert, align the indexing tabs on the connectors, insert the plug fully into the socket and rotate clockwise until the latches catch. To remove, pull back on the latch tab and rotate the connector counter-clockwise to the index stop, then pull outwards.**
6. **Work backwards from the speakers to the outlets, making all PowerCON connections before plugging in to mains power.**
7. **Connect the electrical plug to a power source.**
8. **Move the POWER switch to the ON position.**
9. **Rotate the input attenuator clockwise to achieve the desired sound level.**

The integrated DSP includes all the required processing for safe operation and alignment with the accompanying BASSBOSS top boxes. DO NOT USE third-party outboard processing with BASSBOSS powered loudspeakers. This will not improve, and will most likely degrade the sound quality and output capacity.

When connecting multiple BASSBOSS loudspeakers in a system, signal can be passed through from one powered loudspeaker to another using XLR cables. No processing is applied to the signal as it passes through from the input to the output connectors in each loudspeaker. Signal can be routed in any sequence because each loudspeaker receives a full-range signal and applies the necessary processing in order to operate as part of the overall system. It is recommended to run signal to the nearest box first and patch to the next nearest box in sequence.

When connecting BASSBOSS speakers in a system including other brands of loudspeakers, it's recommended to connect the BASSBOSS speakers first in sequence, then connect other speakers to the pass-through outputs. This ensures that no inappropriate processing is applied to either loudspeaker.

The typical power draw of one BASSBOSS 2400W amplifier module is approximately 5A. With heavy demand, the current draw can peak at 20A for brief periods but under NEMA code, a 20A breaker should sustain a peak draw of 40A for several seconds without tripping.

It's recommended to connect no more than two 2400W amplifier to an individual 20A circuit. In situations where circuits must be shared with other equipment or other brands, it's recommended to power combinations of a BASSBOSS subwoofer and a top on a circuit and to power each subwoofer and top combination on a separate circuit to reduce the chances of overdrawing a circuit and tripping a breaker.

Operation and Controls:

There are 2 control knobs on the amplifier.

1: GAIN
Provides attenuation of the input from off to full output. Use appropriate gain structure to ensure the output feeding the subwoofer doesn't reach clipping and distortion before maximum desired sound level is achieved. The amplifier has a complement of limiters and safeties to protect itself and the driver however, if audible distortion occurs, lower the level of the incoming signal.

2: EXO ADJUST
This control adjusts the effective crossover frequency allowing the subwoofer to be used with multiple sizes and styles of top boxes while minimizing out-of-bandwidth noise and phase shift in the crossover region. Rotating the EXO knob fully counter-clockwise (left) results in an effective crossover frequency of 80Hz. Rotating it fully clockwise (right) results in an effective crossover frequency of 100Hz.

3. CARDIOID SWITCH
Toggle Switch allows selection between NORMAL mode and CARDIOID mode.

With the switch in the NORMAL (up) position, the speaker is in normal operating mode and any number of cabinets can be arrayed side-by-side facing the same way when they are all in NORMAL mode.

When CARDIOID operation is desired, one or two cabinets must be used in NORMAL mode and at least one cabinet must be placed in CARDIOID mode and its position reversed relative to the other cabinet(s) The ideal ratio is 2 cabinets in NORMAL with one CARDIOID cabinet between them vertically or horizontally.

Reduced	**NORMAL >>**	**Audience**
Level	**<< CARDIOID**	**Audience**
Area	**NORMAL >>**	**Audience**

The NORMAL mode cabinet(s) are used with the woofer facing towards the audience. The CARDIOID mode cabinet is rotated with the woofer away from the audience and the CARDIOID SELECT SWITCH in the CARDIOID (down) position.

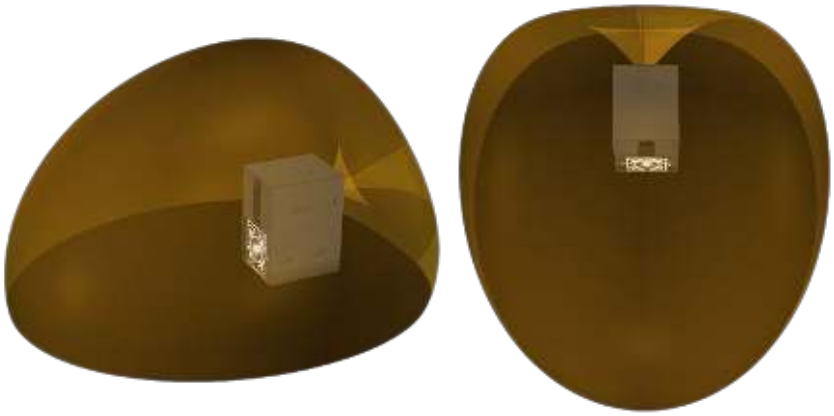
The cabinet in CARDIOID mode should have the EXO knob at the lowest level, rotated fully counter-clockwise. The EXO setting on the NORMAL mode cabinet(s) can be set to taste but all cabinets in NORMAL mode should be set the same.

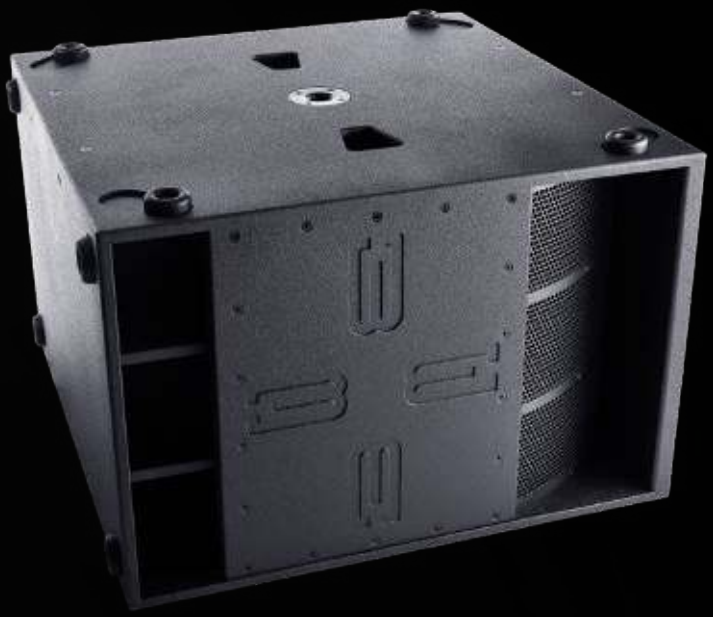
Note: When the speaker is in CARDIOID mode, the green PWR LED is disabled because it will be facing the audience. The speaker will still power up and play.

When only two cabinets are used, the cabinet in CARDIOID mode can be placed on top of the cabinet in NORMAL mode.
The cabinet in CARDIOID mode can also be placed adjacent to the NORMAL mode cabinet, with the NORMAL mode cabinets placed farther from the stage or area where reduced level is desired. When only 2 cabinets are in use, the CARDIOID mode cabinet GAIN should be reduced by 3dB. The greatest level reduction occurs on axis with a line drawn from the center of the NORMAL cabinet's baffle, through the center of the CARDIOID cabinet's baffle.

Reduced	**<< CARDIOID (-3dB)**	**Audience**
Level	**NORMAL >>**	**Audience**
Area		**Audience**

Three-dimensional representation of cardioid output pattern.





Troubleshooting:

If, after following the above instructions for setup, you have no output from the loudspeakers:

Verify that the green power (ON) LED is lit. If not, check the following:

(Note: The ON LED is disabled when CARDIOID mode is selected. To check for power, switch to NORMAL mode to illuminate the LED)

1. Is the power cord plugged into a live outlet?
2. Is the Neutrik PowerCON connector rotated into the locked position?
3. Is the Power Switch on?

If the green power LED is on, check the following:

1. Is the signal cable connected to the input?
2. Is the signal cable connected to an operating output at the other end?
3. Is the signal flowing to the input? Check the integrity of the cable by using a different cable.
4. Is the attenuator turned all the way down or at a very low level?
5. Is the signal flowing to the input full-range? Filters in the signal may remove the operating frequencies of the loudspeaker receiving them.

Amplifier Flash Sequence Codes:

Flash Sequence Codes for Warning Indicators and Protection Modes (Seen on Amp LED)

Long flashes followed by short flashes:

1-0 GROUND NOT CONNECTED: Amp still runs. Blinks 10 times on power-up then stops. Check power cord and outlet wiring.

1-1 LINE HOT AND NEUTRAL REVERSED: Amp still runs. Blinks 10 times on power-up then stops. Check power cord and outlet wiring.

1-2 GROUND NOT CONNECTED IN 240V MODE: Amp still runs. Check power cord and outlet wiring.

2-0 GFI TRIP: Amp shuts down. Power cycle to restore.

3-0 OVERHEAT SHUTDOWN: Amp shuts down. Restarts when temperature falls.

3-3 THERMAL LIMITER ACTING: Gain reduced to limit heat buildup. Amp still runs.

4-1 FAULT FROM GATE PCB WHILE AMP WAS WORKING: Amp shuts down. Service Required.

4-2 FAULT FROM PFC: (240V option only) Amp shuts down. Service Required. (May reset with power cycle if false triggered.)

4-3 GFI MALFUNCTION: Amp shuts down. Service Required.

4-5 FAULT FROM GATE PCB: Amp shuts down. Service Required.

4-7 BROWNOUT AT POWER-UP: Amp shuts down. Power cycle to restore. Check supply voltage.

4-8 UNABLE TO START AMPLIFIER: Power Cycle to restore. Check or eliminate power conditioner.

5-0 OVER-VOLTAGE: Amp turns off or won't start. (Seen on 120V versions when connected to 240V outlets.)

6-0 UNDER-VOLTAGE: Amp turns off or won't start. (Seen when Generators are overdrawn or long extension cords are in use.)

6-6 LINE LIMITER ACTING: Amp still runs. Output reduced to limit current draw.

Need more assistance? Support is available via phone or email. Email: family@bassboss.com Phone: 855-822-7770 toll free

Safety Information:

Important information regarding safety and the use of your loudspeakers:

Never stand in the immediate vicinity of loudspeakers driven at a high level. Professional loudspeaker systems are capable of causing a sound pressure level detrimental to human health. Seemingly non-critical sound levels (from approx. 95 dB SPL) can cause hearing damage if people are exposed to it over a long period. To prevent potentially dangerous exposure to high levels of acoustic pressure, anyone who is exposed to these levels should use adequate protection devices.

When a transducer capable of producing high sound levels is being used, it is necessary to wear ear plugs or protective earphones. See the manual technical specifications to know the maximum sound pressure level.

In order to prevent accidents when setting up the loudspeakers or loudspeaker stands, make sure they are standing on a firm surface.

Ensure that all additional hardware, fixings and fasteners used for installation or mobile deployment are of an appropriate size and load safety factor.

Pay attention to the manufacturers' instructions and to the relevant safety guidelines.

Regularly check the loudspeaker housings and accessories for visible signs of wear and tear, and replace them when necessary.

Regularly check all load bearing bolts in the mounting devices.

Caution: Loudspeakers produce a static magnetic field even if they are not connected or are not in use. Therefore make sure when erecting and transporting loudspeakers that they are nowhere near equipment and objects which may be impaired or damaged by an external magnetic field. A distance of 3 feet (1m) should be maintained between loudspeakers and sensitive equipment such as CRT monitors or magnetic storage media.

Never attempt to carry out any operations, modifications or repairs that are not expressly described in this manual.

Contact your dealer or BASSBOSS support if the product is not functioning properly.

BASSBOSS strongly recommends this product be installed by a qualified, professional installer who can ensure correct installation and certify that it is installed in compliance with the regulations in force.

The entire audio system must comply with the current local standards and regulations regarding electrical systems.

Important Notes:

To prevent the occurrence of noise on signal cables, use shielded cables only. Avoid routing signal cables close to equipment that produces high-intensity electromagnetic fields such as transformers, power cables and loudspeaker wires. Do not coil excess power cable. Do not coil or wrap power cables and signal cables together.

Thanks for being BASSBOSS Family!

WARRANTY INFORMATION

Our extensive “Sound Defense” transferable warranty covers all **BASSBOSS** products.

STANDARD CABINET WARRANTY

BASSBOSS loudspeaker cabinet integrity, including all joinery, fasteners, handles and wood, is warranted against defects in materials and workmanship for a period of six (6) years from the date of purchase. This warranty does not cover items that are intended to wear and can be replaced if worn or damaged. Examples of items not covered by this warranty are cabinet feet, grills and the finish or coating applied to the cabinet.

ENHANCED COMPONENT WARRANTY

BASSBOSS amplifiers and electronic components are covered against failures due to defects in materials and/or workmanship for a period of three years from the date of purchase.

NO WORRIES WOOFER WARRANTY

Transducers, including burned or open voice coils in subwoofers, are covered for two years from the date of purchase.

OUR SUPPORT

It is our goal to provide trouble-free loudspeakers. That objective begins as part of the design phase and continues on through to any service you may require. In order to be able to provide the lowest possible failure rate, the best possible warranty service and the fastest turn-around time, we request that you contact us immediately if you notice any problem with your system, and before you attempt any repairs. We can provide the best and fastest solution if we know the details of the problem before any repair attempts are made. Often **BASSBOSS** technicians can troubleshoot problems that may arise and no repair or further service will be necessary.

Warranty support is a service, and part of that service includes helping you prevent failures and minimize repair and shipping costs. Please do not ship products without first obtaining a return authorization number by calling 855-822-7770 toll-free or by emailing family@bassboss.com. **BASSBOSS** service technicians will provide assistance and instructions on shipping and packaging requirements specific to your service needs.

WARRANTY LIMITATIONS

During the warranty period, if your loudspeaker malfunctions or fails due to any defect in components or manufacturing, the failed parts will be repaired or replaced. This warranty does not extend to damage resulting from improper installation, misuse, neglect or abuse. Warranty coverage and eligibility will be determined upon inspection by **BASSBOSS** personnel. This warranty does not cover labor other than that authorized and performed by **BASSBOSS** personnel. Service will be performed upon the return of the failed unit, together with its original sales receipt or other proof of purchase, to **BASSBOSS** or an Authorized Service Facility.

Purchaser is responsible for all costs of shipping and handling. Cosmetic damage is specifically excluded from this warranty. This warranty is rendered void if service, repairs and/or modifications are attempted or made by anyone not specifically authorized by **BASSBOSS** to perform said services. Please contact **BASSBOSS** or your local **BASSBOSS** dealer before attempting any repairs and before shipping parts in for service. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state. For more information concerning BASSBOSS service and warranty policies please contact us at (855) 822-7770 toll-free.

EXPORT WARRANTY

BASSBOSS products can be purchased worldwide. In countries without local **BASSBOSS** distributors, product requiring service must be shipped back to the US for warranty repairs. In most cases, the entire cabinet will not need to be shipped. Generally only the individual affected parts will need to be shipped to the factory for servicing. Please contact **BASSBOSS** before attempting any repairs and before shipping parts in for service.

SHIPPING AND PACKAGING

Please package your returns safely and securely. **BASSBOSS** does not cover damage that occurs in transit. Freight insurance is highly recommended.

FCC Compliance Notice:

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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 instruction manual, 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 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.

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