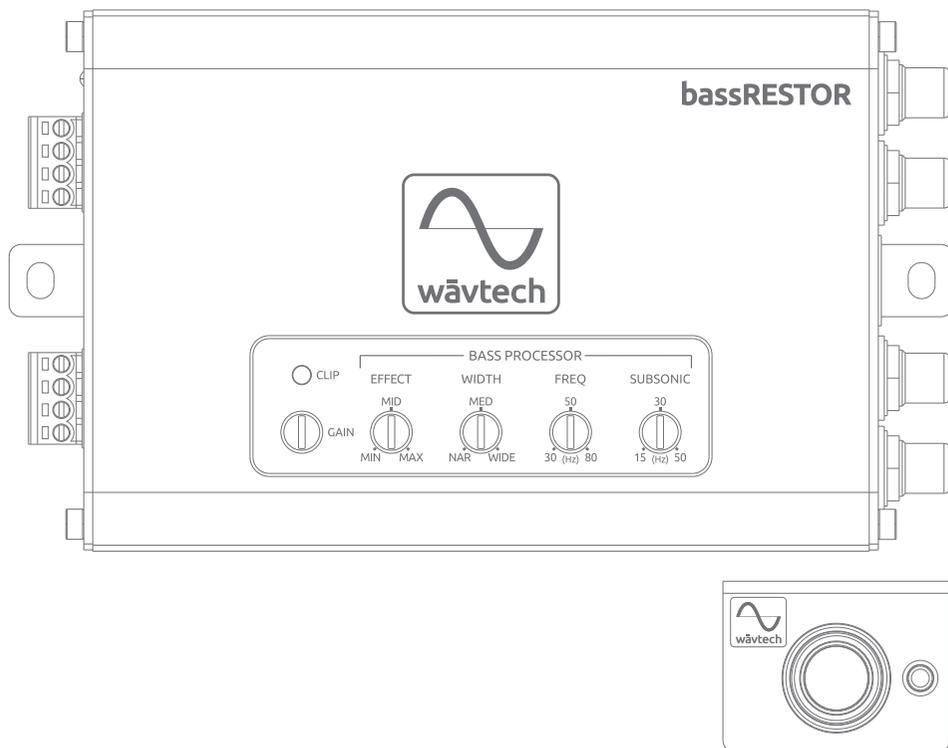


bassRESTOR

Bass Restoration Processor / LOC / Line Driver
Complete Tuning Control • Auto Turn-On • Multi-Function Remote

Owner's Manual



www.wavtech-usa.com

 WARNING	This symbol means important instructions. Failure to heed them can result in serious injury or death.
 CAUTION	This symbol means important instructions. Failure to heed them can result in injury or property damages.

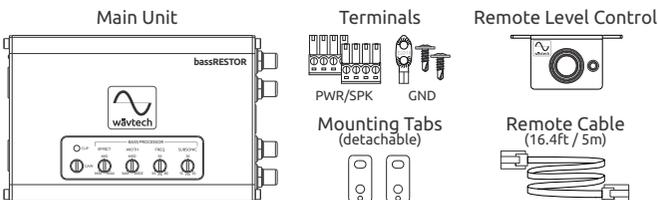
WARNING

- **DO NOT DRIVE WHILE DISTRACTED.** Any function that requires your prolonged attention should not be performed while driving. Always stop the vehicle in a safe location before performing any such function. Failure to do so may result in an accident.
- **KEEP THE VOLUME AT MODERATE LEVELS WHILE DRIVING.** Excess volume levels can obscure sounds such as emergency vehicle sirens or road warning signals and may result in an accident. Continuous exposure to high sound pressure levels may cause permanent hearing loss. Use common sense and practice safe sound.
- **FOR USE WITH 12V NEGATIVE GROUND VEHICLE APPLICATIONS ONLY.** Using this product other than in its designed application may result in fire, injury or product damage.
- **MAKE THE CORRECT WIRING CONNECTIONS AND USE PROPER FUSE PROTECTION.** Failure to connect wiring correctly or use appropriate fuse protection may result in fire, injury or product damage. Ensure proper fusing of all system power wiring and install a 1-ampere in-line fuse (not included) with the +12V lead to the unit's power supply connector.
- **DISCONNECT THE NEGATIVE BATTERY TERMINAL BEFORE INSTALLATION.** Failure to do so may result in fire, injury or damage to the unit.
- **DO NOT ALLOW CABLES TO BECOME ENTANGLED IN SURROUNDING OBJECTS.** Arrange wiring and cables to prevent obstructions when driving. Cables or wiring that obstruct or hang up on places such as steering wheel, brake pedals, etc. can be extremely hazardous.
- **DO NOT DAMAGE VEHICLE SYSTEMS OR WIRING WHEN DRILLING HOLES.** When drilling holes in the chassis for installation, take precautions so as not to contact, puncture or obstruct brake lines, fuel lines, fuel tanks, electrical wiring, etc. Failure to take such precautions may result in fire or an accident.
- **DO NOT UTILIZE OR CONNECT TO ANY PART OF VEHICLE SAFETY SYSTEMS.** Bolts, nuts or wires used in the brake, airbag, steering or any other safety-related systems or fuel tanks should NEVER be used for mounting, power or ground connections. Using such parts may disable control of the vehicle or result in fire.

CAUTION

- **STOP USE IMMEDIATELY IF A PROBLEM OCCURS.** Failure to do so may result in personal injury or damage to the product. Return it to your authorized Wävtech dealer.
- **HAVE AN EXPERT DO THE WIRING AND INSTALLATION.** This unit requires special technical skill and experience for wiring and installation. To insure safety and proper function, always contact the authorized dealer where you purchased the product to have it done professionally.
- **INSTALL THE UNIT SECURELY WITH SPECIFIED PARTS.** Be sure to use only the included parts and specified installation accessories (not included). Use of other than designated parts may damage this unit. Install the unit securely so that it will not come loose during a collision or sudden jolt.
- **ROUTE WIRING AWAY FROM SHARP EDGES AND MOVING PARTS.** Arrange cables and wiring away from sharp or pointed edges and avoid moving parts such as seat hinges or rails to prevent pinching or wear. Use loom protection where appropriate and always use a grommet for any wiring routed through metal.
- **NEVER RUN SYSTEM WIRING OUTSIDE OR UNDERNEATH THE VEHICLE.** All wiring must be routed, secured and protected inside the vehicle. Failure to do so may result in fire, injury or property damage.
- **INSTALL THE UNIT IN A DRY AND VENTILATED LOCATION.** Avoid mounting locations where the unit will likely be exposed to high moisture or heat without adequate ventilation. Moisture penetration or heat buildup may result in product failure.
- **REDUCE GAIN AND SOURCE VOLUME TO MINIMUM LEVELS FOR INITIAL SYSTEM TUNING AND BEFORE CONNECTION TO AN AMPLIFIER.** Ensure amplifier power is off before connecting RCA cables and follow proper system gain setting procedure. Failure to do so may result in damage to the amplifier and/or connected components.

Package Contents:



Accessories Required for Installation (not included):

- RCA Interconnects
- 18AWG Wire
- In-line Fuse Holder w/1A Fuse
- Battery Ring Terminal
- Wire Crimp Connectors
- Grommets and Loom
- Cable Ties
- Mounting Screws

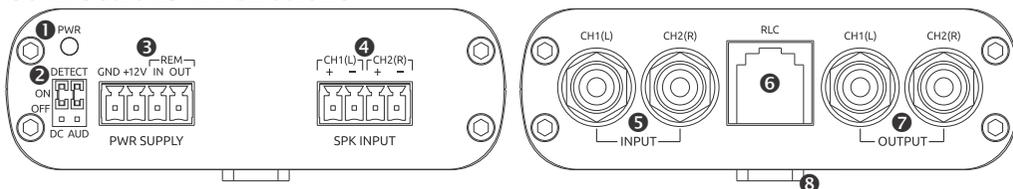
Introduction

Welcome to Wävtch, exceptional mobile audio integration products for audiophiles. Our products are engineered to provide a truly remarkable listening experience. Built for the professional installer, our OEM integration and signal processor models are simply the best solution available for unlimited sound system upgrades while retaining the factory receiver or with an aftermarket source.

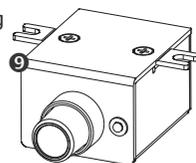
Features

- Bass Restoration Processor
 - Complete Tuning Control (Effect, Width, Freq)
 - Variable Subsonic Filter
- Multi-Function Remote
 - Total Output Level
 - Bass Effect Level with Push On/Off
- Line Output Converter or Line Driver
- Differential Balanced Inputs
- Low Impedance Outputs
- Variable Gain with Clip LED
- Selectable DC-Offset and/or Audio Detect Auto Turn-On
- Generated +12V Remote Output
- OEM Load Detect Compatible
- Locking Detachable Power/Speaker Terminals
- Panel Mount RCA Jacks
- Compact Aluminum Chassis
- Detachable Mounting Tabs

Connections & Functions



- 1 Power Indicator:** This red LED indicates when the bassRESTOR is powered on. Once illuminated, there will be a short delay before audio signal output is enabled. During initial power connections, it may illuminate for a brief period.
- 2 Auto Turn-On Detect Jumpers:** By default, the bassRESTOR is set to detect both DC-offset and audio signal for turning itself on/off automatically. These jumpers allow either mode to be independently defeated for cases where only one turn-on mode is preferred or to bypass both modes when a switched +12V trigger is available and connected to the REM IN terminal.
- 3 Power Supply Terminal:** For +12V battery, chassis ground, remote input and remote output wire connections. A minimum of 18AWG wire is recommended for power and ground connections. Always protect the +12V power wire with a 1-amp fuse.
- 4 Speaker Level Input Terminal:** For left and right channel speaker level (a.k.a. high level) connections to the source. In the default setting, input signals ranging from 4Vrms to 40Vrms will produce up to 10Vrms RCA output from maximum to minimum gain. If after adjusting all other settings the bassRESTOR's output is not enough to maximize system levels at the desired source volume range, internal jumpers are available to increase input sensitivity by two times (+6dB) for 2Vrms to 20Vrms.
- 5 RCA Input Jacks:** For left and right channel low level (a.k.a. line level) signal connections to the source. In the default setting, input signals ranging from 1Vrms to 10Vrms will produce up to 10Vrms RCA output from maximum to minimum gain. If more output is desired after making all other system adjustments, the input sensitivity range may be increased by two times (+6dB) via internal jumpers for 0.5Vrms to 5Vrms. Additionally, these differential inputs may be set to unbalanced via internal jumpers if required for a particular source or to mitigate potential for coupled noise if left floating.
- 6 Remote Level Control Jack:** This RJ45 jack is for connecting the remote level control to the main unit with the supplied cable. A standard ethernet cable may also be used.
- 7 RCA Output Jacks:** For left and right channel line level signal connections to your amplifier(s). Each output is capable of driving multiple amplifier input channels in parallel. Use quality interconnects to ensure stable connection and minimize the possibility for induced noise.
- 8 Mounting Tabs:** These mounting tabs are pre-attached and should be used to properly secure the bassRESTOR during installation with screws or cable ties. They are removable if the unit can be safely secured by another method.
- 9 Remote Housing:** This 2-piece housing design provides both convenient mounting and simple disassembly for customization. The integrated screw mount tabs are pre-scored to aid removal if securing by another method, and the lower housing can be detached by removing the two top screws. For custom panel mounting, the housing can be completely disassembled by also removing the main knob, outer ring, shaft nut, circuit board screw and relocating the LED. If the housing is removed, it is recommended to protect the exposed PCB with heat shrink.



Installation & System Wiring

It is important to read this manual thoroughly before starting your installation and always plan accordingly. Before installing any Wävtech product, disconnect the negative (ground) wire from the vehicle's battery to avoid damage to the vehicle or yourself. Following all guidelines will help provide years of enjoyment with your Wävtech bassRESTOR audio interface.

Ground Connection (GND): The GND terminal must be connected to a metal part of the vehicle that is welded to the vehicle body with ground plane back to the main battery ground attachment point (a.k.a. chassis ground). This wire should be a minimum of 18AWG and as short as possible to minimize potential for noise to enter the system. The chassis ground connection point should have all of the paint removed and be scuffed to the bare metal. The ground wire should be terminated by a ground specific interlocking terminal such as the included EARL terminal or ring terminal securely bolted to the vehicle with star or lock washer and nut to prevent from coming loose. Avoid using factory ground points to reduce the chance of induced noise from other components.

Power Connection (+12V): The constant power connection should be made at the vehicle battery when possible. For direct battery connection, a 1-amp fuse must be installed in-line with the power wire within 18" of the battery and securely connected to the positive battery terminal bolt with a ring terminal. If connecting to another available constant +12V power source, a 1-amp in-line fuse must be added at the connection point. The power wire should be a minimum of 18AWG. Do not install the fuse until all other system connections have been made.

Speaker Level Input (SPK): Connect the speaker wires from the source unit to corresponding terminals on the interface. Use the SPK input if your source unit is not equipped with RCA outputs. Always ensure the correct polarity of each channel when making these connections, as failure to do so can severely effect sound performance.

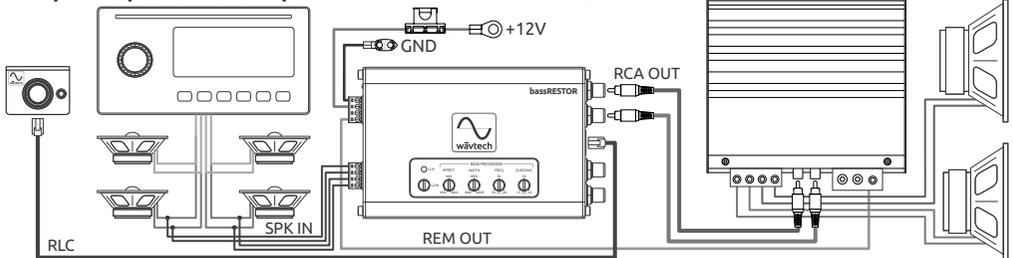
Remote Input (REM IN): If a switched +12V or remote trigger wire is available, it is recommended to connect it to the REM IN terminal. If unavailable, the bassRESTOR also has an auto turn-on circuit that simultaneously detects audio signal from SPK and RCA inputs as well as DC-offset from SPK inputs. While auto turn-on will work well in most applications, a +12V trigger may be required for satisfactory results under certain vehicle or system conditions. Additionally, DC-offset and/or audio signal detect functions can be independently defeated via the external jumpers if necessary.

Remote Output (REM OUT): Use the remote output to provide a +12V trigger to turn on amplifiers or other components. This +12V output is generated internally by the interface when turned on either by REM IN or signal sensing, and will provide over 500mA of constant current for external devices.

Remote Level Control (RLC): Connect the remote to the bassRESTOR's RLC port with the supplied 16.4ft/5m cable. Plan cable routing before mounting the remote to ensure proper length. If additional length is required, a standard 8-conductor CAT5 or CAT6 ethernet cable or extension may be used. The cable may also be shortened and re-terminated with a RJ45 connector and ethernet crimping tool.

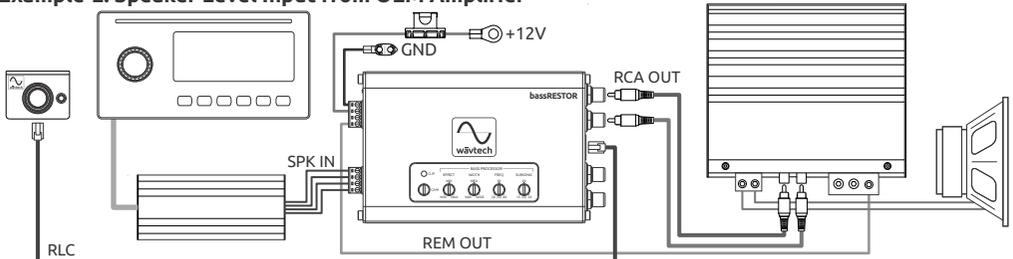
System Examples

Example-1: Speaker Level Input from OEM Radio



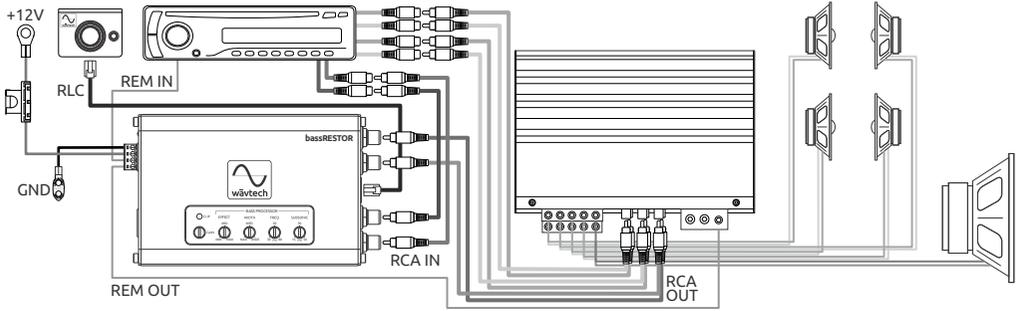
Note: When using a receiver's internal power IC to drive speakers directly, note that its speaker outputs will likely clip below the maximum master volume level. Adjust gain settings accordingly for optimum unclipped volume range.

Example-2: Speaker Level Input from OEM Amplifier



Note: In vehicles where the factory radio has a fixed level or digital output to a factory amplifier, signal for the bassRESTOR's speaker level input should be connected at the amplifier's output.

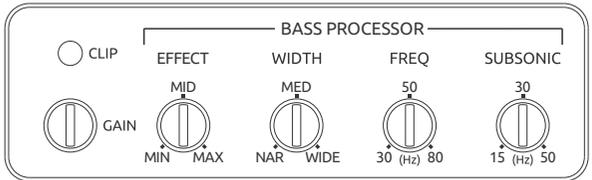
Example-3: RCA Input from Aftermarket Radio



Note: If the source's output signal is full-range and the bassRESTOR is being used for subwoofer(s) only, a low-pass filter will need to be engaged at the amplifier to filter out unwanted higher frequencies. Additionally, unless the amplifier already has an adequate subsonic filter, set the bassRESTOR's subsonic filter appropriately to prevent over-exursion.

Top Panel Adjustments

- 1 Clipping Indicator:** This yellow LED indicates when the output signal is at maximum level before distortion (clipping) occurs. It will be dimly lit just before the onset of clipping, and full bright at clipping. Since the bassRESTOR can produce up to 10Vrms at maximum output, it is likely that gain will need to be reduced below the illumination point to match your amplifier(s) maximum input capability, optimize source volume range or compensate for bass restoration applied after initial gain setting.
- 2 Gain Adjustment:** This adjustment is for matching the output signal level of the bassRESTOR with the maximum unclipped signal provided by your source and the maximum input capability of your amplifier(s). Follow proper gain setting procedures to ensure optimum source volume range without clipping at any point in the signal chain. If using music to set system gains, it is recommended to utilize a variety of bass content and recording levels to ensure proper headroom and minimize the ability to overdrive the system. Readjustment may be necessary after any changes to other settings.
- 3 Bass Processor:** This section provides full adjustment over all parameters of the bass restoration process as well as a subsonic filter. Unlike traditional equalization, this provides tuning flexibility for how bass restoration is dynamically applied to music content as well as for differences between vehicles and subwoofer systems.
 - 4 Effect:** Provides adjustment for the maximum amount of boost that can be applied by the bass restoration process, which depends upon the music content being played as well as the width and frequency settings. Effect is essentially a limiter to prevent overdriving subwoofers when set properly. If gain has already been adjusted, adding more effect may cause the output to clip and require reduction of gain to achieve final desired unclipped output level. After effect level is set, it is recommended to only use the remote's outer ring for on-the-fly bass level adjustments.
 - 5 Width:** This adjustment sets the bandwidth of frequencies enhanced by the bass restoration process. A wide setting will include more adjacent frequencies for a broad bass enhancement, while a narrow setting will only add frequencies closer to the chosen center frequency. Note that changing the width may also require readjustment of the effect and/or gain settings to prevent clipping or overdriving the system.
 - 6 Frequency:** This adjustment is for setting the center of the frequency range enhanced by the bass restoration process, between 30Hz and 80Hz.
 - 7 Subsonic:** Provides adjustment of the subsonic filter cut-off point (F_c) below which all frequencies are filtered out. Very low frequencies can waste amplifier power but this setting is especially important for preventing damage to subwoofers from large amounts of bass restoration and potential for over-exursion in ported enclosures below the tuning frequency.

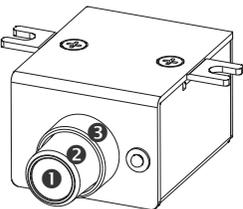


Note:

The bassRESTOR is capable of full-range signal output. When used for a subwoofer system, a low-pass filter (usually built into amplifiers) will need to be applied and adjusted appropriately to remove unwanted higher frequencies. If the subsonic and a low-pass filter's cut-off points are set too closely together, only a narrow frequency range will pass through and will result in reduced output.

Remote Adjustments

- Bass Restoration On/Off:** By short pressing the main knob, the bass restoration circuit can be activated or completely bypassed. This function provides quick ability to defeat the effect for music content that already has enough bass without changing the bass effect level setting from the outer ring. The LED will be illuminated only when bass restoration is on.
- Total Output Level:** Rotating the remote's main knob provides attenuation adjustment over the total RCA output level, from full output 0dB down to -30dB. It can be used as a subwoofer level or master volume control and functions whether or not bass restoration is active.
- Bass Effect Level:** Rotating the outer ring allows on-the-fly adjustment over the amount of bass restoration applied, from the maximum effect limit set at the main unit (0dB) down to no effect (-∞).



Specifications

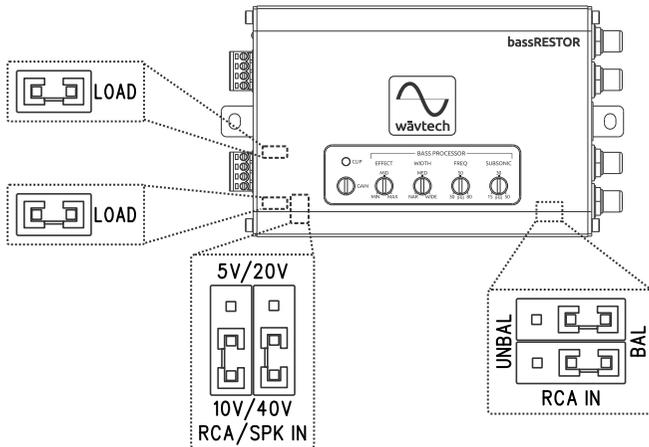
Frequency Response	Max Flat (+0/-1dB)		18Hz to >75kHz
	Extended (+0/-3dB)		15Hz to >100kHz
Input Impedance	Spk Input		180Ω / 20kΩ
	RCA Input		20kΩ
Input Sensitivity	Spk Input (max-min gain)		2-20Vrms / 4-40Vrms
	RCA Input (max-min gain)		0.5-5Vrms / 1-10Vrms
Max Input Voltage	Spk Input	peak, <5sec cont.	40Vrms
Output Impedance	<50Ω		
Max Output Voltage	at 1% THD+N		>10Vrms
THD+N	Spk Input at 10V output		<0.05%
	RCA Input at 10V output		<0.1%
S/N	Spk Input	at 1V output	>96dBA
		at 4V output	>107dBA
		at 10V output	>115dBA
	RCA Input	at 1V output	>95dBA
		at 4V output	>106dBA
		at 10V output	>114dBA
Bass Restoration	Effect		up to +18dB
	Width		Narrow - Wide
	Frequency		30Hz - 80Hz
Subsonic Filter	Slope		up to -24dB/oct. @ 15Hz
	Frequency (F ₃)		15Hz - 50Hz
Remote Level Control	Total Output Level (Main Knob)		0dB to -30dB
	Bass Effect Level (Outer Ring)		0dB to -∞
Turn-On Trigger	Remote	via REM IN	>10.5V
	DC-offset	via Spk Input	>1.3V
		via Spk Input	<100mV
	Audio Signal	via RCA Input	<10mV
Turn-off Delay		up to 60sec	
Remote Output	Current Capacity		>500mA
	Voltage		Within 3% of B+
Current Draw	Max Draw (w/o REM OUT)		<300mA
	Sleep Current		<1.2mA
Operating Voltage	Power On (B+)		10.5V-18V
	Power Off (B+)		<8.5V
Product Dimensions	Main Chassis (HxWxL not incl. terminals, jacks)		1.1"x3.5"x5.2"
			29x90x133mm
	Remote Housing (HxWxD not incl. knob, tabs)		1.1"x1.5"x1.8"
			28x38x45mm

Notes:

- RCA/Spk input sensitivity ranges are selectable per channel via internal jumpers (5V/20V, 10V/40V).
- Built-in speaker level input loading is defeatable per channel via internal jumpers (LOAD)
- DC-offset and/or audio signal detect functions are defeatable via external jumpers (DC, AUD).
- All specifications are subject to change without notice.

Internal Jumper Locations and Settings

While all Wävtech models provide external controls for main adjustments, there are also a few internal configuration jumpers available to resolve certain special vehicle or system conditions. The bassRESTOR's internal jumper locations and default settings are shown in the illustration below. To access these jumpers, simply remove the two top screws from each end panel and loosen two bottom screws on one side in order to easily remove the chassis top cover. It is recommended to detach the power supply connector first to ensure that the unit is completely powered off while making any jumper changes.



Notes:

- Input sensitivity range jumpers (5V/20V, 10V/40V) affect RCA and SPK inputs per channel and should be moved together if changed. The default range setting is 10V for RCA and 40V for SPK inputs.
- Load bypass jumpers (LOAD) are independent for each SPK input channel and must be removed or moved to a single pin in order to disconnect the internal loading from that channel.
- Both RCA balanced-unbalanced input jumpers (BAL/UNBAL) should be moved together if changed.

Warranty & Service Care

Wävtech warrants this product to be free from defects in material and workmanship for a period of one (1) year when purchased from an authorized Wävtech retailer within the United States. This warranty will be extended to a period of two (2) years when the installation is performed by an authorized Wävtech retailer. A valid sales receipt is required to verify eligibility of purchase and installation.

This warranty is valid only to the original purchaser and is not transferrable to subsequent parties. This warranty is void if the product serial number has been altered or removed. Any applicable implied warranties are limited in duration to a period of express warranty as provided herein beginning with the date of the original purchase at retail, and no warranties, whether expressed or implied, shall apply to this product thereafter. Some states do not allow limitations on implied warranties, therefore these exclusions may not apply to you. This warranty gives you specific legal rights. You may also have other rights which vary from state to state.

If your product needs service, you should contact Wävtech Customer Service to receive a Return Authorization (RA) Number. Any product received without an RA number will be returned to sender. Once your product is received and inspected by customer service, Wävtech at its sole discretion, will repair or replace it with a new or remanufactured product at no charge. Damage caused by the following is not covered under warranty: accident, abuse, failure to follow instructions, misuse, modification, neglect, unauthorized repair or water damage. This warranty does not cover incidental or consequential damages. This warranty does not cover the cost of removing or reinstalling the product. Cosmetic damage and normal wear are not covered under warranty.

For Service within the United States:

Wävtech Customer Service: (480) 454-7017
Monday – Friday, 8:30am to 5:00pm MST

Serial Number: _____

Installation Date: _____

Place of Purchase: _____

Important Notice for International Customers:

For products purchased outside the United States of America or its Territories, please contact your local distributor concerning specific procedures for your country's warranty policy. International purchases are not covered by Wävtech, LLC.

Wāvtech[®]

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