

Acoustic[™]
Image

CONTRA[™]
Model 310 BA

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Instruction Manual



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(Rev 3)

High technology. Higher fidelity. For all instruments.

Musical Amplification

Care

The Contra cabinet is made from lightweight but strong materials. A little caution in how it is handled will keep it looking new for years to come. Use a clean, dry cloth to clean the molded finishing pieces and the front and rear panels. The carpet covering can be vacuumed to keep it clean.

Warranty and Repair

The Contra is warranted for one year from the date of purchase. Please call Acoustic Image before returning the unit in order to discuss the nature of the problem and arrange for the return. The warranty does not cover product that has been obviously damaged through misuse. If you need a repair and your system is out of warranty, call Acoustic Image to arrange for repair.

Warranty Information

Serial Number

Acoustic Image

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Raleigh, North Carolina 27617

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919-957-3294 (Fax)

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Specifications

System	
Frequency Response	30 Hz - 16 kHz (40 Hz - 12 kHz, ±3 dB)
Max SPL	>112 dB @ 1 m
Preamp EQ	4 band, ±15 dB
Electrical	
Power Supply	Linear
Voltage	115V/60 Hz, 230V/50 Hz, switchable
Switching Audio Amplifier	
Topology	Class D (PWM)
Switching Frequency	250 kHz
Conversion Efficiency	> 90%
Output Power 4 ohm	>240 Watts
Output Power 2 ohm	>350 Watts
THD @ 1 Watt	<0.05%
THD @ Full Power	<0.5%
Hum and Noise	-85 dB
Input Impedance	10 k ohm
Low Frequency Driver	
Diameter	10 inches
Mounting	Downfiring
Voice Coil Diameter	2.5 inches
Frequency Range	30 Hz - 800 Hz
High Frequency Driver	
Diameter	5 inches
Mounting	Front Panel
Voice Coil Diameter	1 inch
Frequency Range	500 Hz - 16 kHz
Enclosure	
Dimensions	14 inches H x 16 inches D
Weight	27 pounds
Covering	Carpet/Molded Ends
Inputs/Outputs	
High Gain Input	1 Mohm/10 Mohm, Switchable
Low Gain Input	1 Mohm
Direct Out	Balanced, XLR Connector
External Speaker	4 ohm Minimum

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Design Goals

The Acoustic Image Contra (Model 310 BA) integrated amplifier and loudspeaker system is designed to accurately reproduce the sound of acoustic instruments using a compact, very portable enclosure. Flat frequency response, an extended, tight, well-controlled bass sound and clarity of reproduction are its principle characteristics. Its omnidirectional output of frequencies below 800 Hz makes it ideally suited for reproducing string bass and keyboards since most fundamentals of those instruments fall below 800 Hz. As a result, instruments amplified by the Contra can be heard all over the bandstand without monitors. While the Contra is quite visually attractive, its small size and accurate reproduction allows it to virtually disappear on stage thereby highlighting the musician and his or her musical and sonic performance rather than an equipment stack.

Trade-offs have to be made in designing any system, so some compromises have been made. In order to have a compact enclosure, a compromise was made in the absolute volume at which the Contra can play. Given that it is designed to reproduce acoustic instruments, that is a reasonable trade-off. It can play loudly enough for the acoustic bass or keyboard to be heard in a noisy club or big band but it is not designed for reproducing an electric bass or guitar in a rock club. Reaching the SPL required in high-volume playing situations may require an extension cabinet or augmentation by a larger house system. The clarity with which the Contra reproduces instruments helps overcome whatever volume limitations it has.

Description

The Contra uses a downfiring 10-inch woofer and a 5-inch forward firing high frequency driver as its speaker components. A 300-watt power amplifier is underneath the top molded piece and a preamp is mounted in the top molded piece with its controls and input/output jacks easily accessible from the top of the cabinet. The power amp is a high efficiency design that does not require external heat sinks or cooling fans. The preamp is a versatile unit that has high gain and low gain inputs, a selectable input impedance for optimizing the sound of piezo-type pickups, a four-band EQ, an effects loop, a direct out capability and input and output volume controls.

output level. An external speaker jack is located on the back panel. A Speakon type connector is used with the output wired to pole "1". Make sure the cable you use to connect an external speaker is wired to pole 1. Cables with Speakon connectors are available from Acoustic Image if you are unable to obtain them from your local music store.

The power amplifier in the Contra is capable of driving speaker loads as low as 2 ohms. The speaker system inside the Contra is 4 ohms. Therefore, extension speakers with a minimum impedance of 4 ohms can be safely connected to the unit. The Acoustic Image Contra EX Model 310 BE speaker system uses the same speaker components as the Contra and as a result is an excellent choice for an extension speaker. It is important that the extension speaker be matched in efficiency and sound quality to the Contra. Otherwise, the sound quality of the combination will be noticeably changed. It is also important that the extension speaker be wired in phase with the speakers in the Contra. If you find that there is a drop in the bass output when an extension speaker is connected, then it is likely that the two speakers are out of phase. Reverse the polarity of the connecting cable and listen again to see if the bass output improves.

The power amp in the Contra is short circuit protected. If a short is connected to the external speaker jack, the output signal of the Contra will be interrupted until the short is removed. If there is an intermittent short, the output of the Contra will be interrupted for about one second each time the short appears.

Speaker Placement

The omnidirectional low frequency output of the Contra makes speaker placement relatively noncritical. It will easily be heard all over the bandstand no matter where it is placed. The best results are obtained when the cabinet is closest to the floor. Placing the cabinet on a stand off of the floor will degrade the sound quality relative to placing it directly on the floor.

Sound Lifter

In some cases, such as a hollow stage or small, "boomy" room, the output of the Contra can have too much bass. One way to cut the bass to bring it into balance is to use the included "Sound Lifter" to lift the front of the Contra cabinet to reduce the coupling to the floor and thereby reduce the bass output. The lifter can be placed under the front part of the cabinet or it can be placed under one of the feet if it is necessary to get the cabinet further off the floor. In extreme cases, the Contra can be placed in a chair to completely decouple it from the floor to reduce bass boominess.

distortion. The trade offs inherent in the design limit the volume that can be reproduced without distortion. The quality of the sound is the most important design parameter, not the absolute volume at which the system will play. Given that the Contra is designed to reproduce acoustic instruments, this is a reasonable trade off. If more volume is needed, an extension cabinet can be used.

Tone Controls

A four-band EQ is included in the Contra preamp. Bass, mid, treble and brite controls are provided. The bass control is a shelving-type control that affects frequencies below 250 Hz. It has a maximum boost/cut of 15 dB. The mid control affects frequencies between 300 Hz and 3000 Hz. Its maximum boost/cut is 15 dB. The treble control is a shelving-type that affects frequencies above 3000 Hz with a maximum boost/cut of 15 dB. The brite control affects frequencies between 6000 and 16,000 Hz with a maximum boost/cut of 15 dB. The controls have a center detent at the flat position. You should experiment with the controls to achieve the frequency balance that sounds best to you. In general, small values of boost and cut are best. The Contra is designed with flat frequency response so only minor corrections should be required to compensate for room effects or "peaky" pickups in order to maintain the balanced response desired for acoustic instrument amplification. You should avoid operating all controls simultaneously at their maximum settings because noise levels are adversely affected.

Effects Loop

The Contra has the output and input capability ("Send" and "Return") to allow for effects boxes such as reverb units to be used in conjunction with the system. The Send output is affected by the input volume and tone controls. The Send output can be used as a preamp output for driving other power amplifiers. The Return input can be used to directly connect an external preamp to the Contra's power amp.

Direct Out

An XLR jack is provided for a "Direct Out" connection that allows the system's output to be fed to mixing boards of house PA systems. As a result, the instrument amplified by the Contra can be recorded or further amplified by the house system. The Direct Out signal is affected by the input volume and tone controls.

External Speaker Jack

An extension speaker can be connected to the Contra to increase its



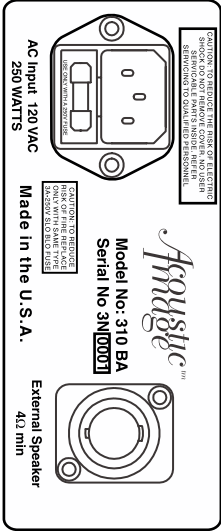
*The Contra
(Model 310 BA)*

AC power and external speaker jacks are located on the back of the cabinet in the top molded piece. A standard, three prong detachable AC power cord is used to provide power to the unit. A fuse is built in to the AC power receptacle.

The cabinet is cylindrical in shape with a flat spot on one side for mounting the high frequency driver. It is made of lightweight materials to enhance portability. The cylindrical shape provides the stiffness that makes it strong despite its light weight. High quality materials are used in the construction of the unit. The top and bottom of the cabinet are covered with molded finishing pieces to enhance the look of the system. The rest of the enclosure is covered with durable carpet to present an attractive look for the cabinet. A strap handle is attached on the top and rubber feet are attached to the bottom for ease in handling the cabinet.

Operation

Power

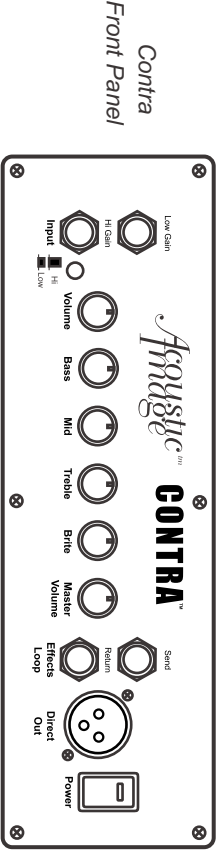


The detachable AC power cord is plugged into the receptacle on the back of the cabinet and into a wall receptacle. A power switch in the panel on the top of the unit turns on power to the preamp and power amp. The fuse used with the system is a 3-amp slo-blo type that is mounted inside the AC receptacle on the back of the cabinet. To replace the fuse, remove the AC cord and pull out the small drawer that is part of the receptacle located below the power "prongs." The fuse is attached to the drawer. A spare fuse is also attached to the drawer. Replace the blown fuse with the spare, replace the spare and then push the drawer back in to the receptacle until it locks in place.

The Contra is designed to work with either 115 volt, 60 Hz AC power or 230 volt, 50 Hz AC power. A switch located under the molded top of the unit selects either 115 volt or 230 volt operation. To access the switch, remove the two screws that hold the handle and top in place and lift the top to expose the top baffle of the cabinet. The switch is located on the baffle. The correct AC power cord must be used for connection to the appropriate wall plug. If you do not have the correct one, one can be purchased from an electronics or computer store. Be sure the switch is in the correct position for the intended application.

Operation at 230 volts with the switch in the 115 volt position will damage the unit.

Preamp Operation



Inputs

The Contra preamp has two inputs (high gain and low gain) that are accessed using a standard 1/4 inch plug. The high gain input is used for situations where a "passive" pickup is the signal source. The low gain input is used where an "active" pickup is used or where the signal is coming from a source where a gain stage has amplified the signal prior to input to the Contra. The high gain input has a selectable impedance for optimal loading of piezo-type pickups. The "Hi" setting of the switch selects a 10 megohm impedance; the "Low" setting selects a 1 megohm impedance. Which setting sounds best depends on the particular pickup design. Some are designed to be terminated in the highest possible impedance while others sound better terminated in a lower impedance. You should experiment to find the sound you like best. To decide which is best, listen to the bass/treble balance as the switch is changed. Typically, terminating in the higher impedance will raise the relative level of the bass frequencies.

The two inputs are separately buffered. This enables the user to plug two instruments into the unit and play them separately or together. As long as one of the instruments has its own volume control, the relative volume of each instrument can be controlled. This feature is useful to players who have to "double" on two instruments. For example, a bassist may be playing in a situation where both upright and electric bass are required. The player can plug the upright into the high gain input and the electric in to the low gain input. The volume control on the electric bass is used to control the relative volume of the two instruments. Now the player can play each instrument as needed without having to plug and unplug instruments.

Controls

The preamp controls are as follows: input volume, bass, mid, treble, brite and master volume.

Volume Controls

The input volume controls the level of the signal at the input stage of the preamp. The master volume controls the level of the signal at the output of the preamp (at the input of the power amp). Both controls should be initially set at "12 o'clock." The input volume should then be used to control the overall output of the unit. The maximum volume at which the system will play is restricted in order to avoid distortion. With both volume controls at maximum, the unit is on the verge of