Owners Manual For The

Goliath XD

Subwoofer System

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Owners Record

Thank you for selecting a Legacy Loudspeaker System. These handcrafted instruments will provide you with many years of listening enjoyment.

The serial number is located on the rear of the unit. Record this number in the space provided below. Refer to this when calling your dealer regarding this product.

Model: Goliath XD
Serial No: _____
Date of purchase: _____

Register your product at legacyaudio.com/register

Share your Legacy speakers with the Legacy community. Post your Legacy experience and system photos at facebook.com/LegacyAudio. Like the page to continue receiving the latest Legacy announcements.

The Cabinetry / Our Commitment

Handcrafted
Beneath the surface of Goliath XD's elegant exterior lies rigid MDF construction. Interlocking joinery maximizes the strength of the cabinet parts.

Each cabinet is impeccably finished on all exposed surfaces with select veneers. The exquisite finish is hand-rubbed several times to assure a patina at home with the most elegant decor.

Our Commitment
A great deal of forethought, love and satisfaction is instilled in each piece of Legacy workmanship. We take pride in getting to know many of our customers on a first name basis.

Your purchase of this product is backed by the renowned "Legacy Satisfaction Guarantee".

Warranty

Legacy Audio supports its customers and products with pride. We cheerfully warrant our loud-speaker products we manufacture from defects in materials and workmanship for a period of seven (7) years. Electronic components such as internal amplifiers and digital processors are covered for three (3)years. Please register your product with Legacy Audio. Should you require service Legacy will require a proof of purchase in order to honor the warranty - so please keep your receipt.

- The warranty applies to the original owner and is not transferable.
- The warranty applies to products purchased from an "Authorized Legacy Dealer".
- The warranty on active components such as digital processors or internal amplifiers is limited to three (3) years of coverage.
- The warranty on dealer stock will extend for a maximum of two years from invoice.

The warranty does not cover transportation costs of product to or from the customer, distributor or dealer, or related shipping damage.

Exclusions from Warranty

The following situations or conditions are not covered by the Legacy Audio warranty:

- Accidental damage, electrical abuse or associated equipment failure.
- Use inconsistent with recommended operating instructions and specifications
- Damage caused by modification or unauthorized service
- Costs associated with the removal and reinstallation of defective products. Consequential damage to other products.
- Normal wear such as fading of finishes due to sunlight.

Unpacking Your Speakers

Your new speaker system has been very carefully packaged to insure that it travels to you safely. Each speaker is protected by a double-wall outer carton with heavy V-board corner protectors. Custom fitted foam end caps are used to protect the elegant cabinetry, and a custom bag is included to provide further protection. Please save this packing for future transportation. If cartons become damaged or misplaced, new ones can be purchased from Legacy Audio.

Speaker Placement

Since the human ear is rather poor at localizing radiation frequencies below 125 Hz, good results may be obtained in a variety of room placements.

Low frequency reinforcement occurs whenever woofers are placed near room boundaries. The distance from the walls, floor and ceiling correspond to the wavelengths of the frequencies, which will reflect in phase and thus reinforce bass output. Therefore, the actual dimensions of your listening room play a definite role in what ultimately arrives at your ear. In fact, rooms tend to have their own set of favored frequencies.

We can calculate what the most strongly reinforced frequencies in a room will be by the formula shown below:

Resonant Frequency = (1130 ft/sec) / (ft. between boundaries x 2)
For example, a room with an 8 ft. ceiling height has a strong resonance at: (1130 ft/sec.) / (8 ft. x 2) = 71 Hz.

Speaker Placement

Now, while such reinforcement might actually be beneficial at very low frequencies, a way to minimize excitation of these resonances is to place your subwoofer asymmetrically relative to room boundaries. For instance, if the subwoofer is 2 ft from one corner wall, then place it 1.5 ft to 3 ft from the other.

Placing the subwoofer in a corner will reduce the radiation angle and thus increase efficiency. It will also excite the maximum number of room modes and decrease distortion.

A best case scenario is to actually use two subwoofers, one to each side of the listener. The subs should be placed 90° out of phase with each other. This improves spaciousness and bass uniformity, with a reduction in room level peaks.

Speaker Connections

Once you've found a place in your room, the next step is connecting the Goliath XD to your existing system.

Option 1: Connecting one or two Goliath XD using LFE output
If you are utilizing Goliath XD as the dedicated LFE channel for a surround system, connect the LFE output from your surround processor to the XLR input 3 of your Xilica processor. Connect an XLR cable from the Xilica processor output 1 to the XLR input on the rear of the Goliath XD subwoofer.

Goliath Subwoofer Rear Panel Connections

Only a single XLR input is required to feed the two 500 watt amplifier modules, each dedicated to the voice coil of its own 15" subwoofer.

If you will be connecting a second Goliath XD to your LFE channel, connect an XLR cable from the Xilica processor output 5 to the XLR input on the rear of the right Goliath XD subwoofer.

Speaker Connections

Option 2: Connecting one or two Goliath XD for use with Legacy Helix, Whisper, or Aeris

If using the Goliath XD to augment the bass performance of a Legacy Audio speaker system begin by connecting the left preamplifier output to XLR input 1 on the Xilica processor (and input 3 if using a splitter). Next connect the right preamplifier output to XLR input 2 on the Xilica processor (and input 4 if using a splitter).

Connect an XLR cable from output 4 of the Xilica processor to the back of the Goliath XD subwoofer.

If you are using a second Goliath XD subwoofer, connect an XLR cable from output 8 of the Xilica processor to the back of the right Goliath XD subwoofer for stereo subwoofer performance.

Speaker Connections

Powering Up Goliath XD

1. Power Cable: The supplied power cable will plug into the socket on the back terminal plate of the unit.

NOTE: Try to plug into the same AC circuit as the rest of your audio system, as this will avoid hum from ground loops.

2. Power Up: In the rear of the subwoofer is the power switch. Push the switch upward to turn the unit on.

NOTE : Power up the Xilica processor before the Goliath XD subwoofer to avoid sending unnecessary transients through the subwoofer.

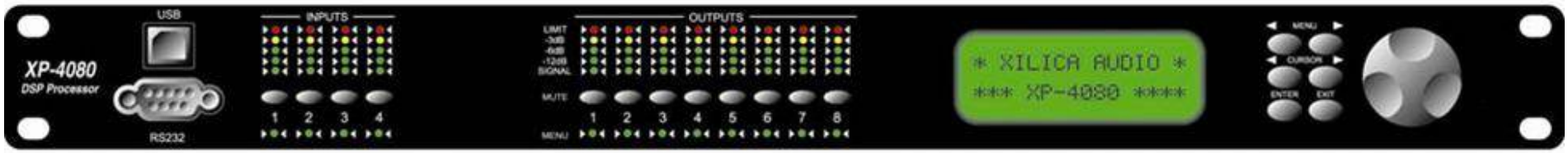
Wave Launch Processor

The high definition Digital Wavelaunch Processor hosts a LEGACY custom algorithm which automatically loads when the processor is powered on. Factory settings are 'plug and play', and do not require a computer to utilize. Connections between the preamp, power amplifier, and speakers should be as shown on previous pages.

Selecting the Program

1. Press the MENU left arrow
2. Scroll through the programs using the job wheel
3. Press enter to select the program of choice
4. Press enter again to confirm selection. The program will now load.

Users are welcome to load the included software and learn to make individual adjustments as desired. However it is recommended that any changes be saved as Program 6 or higher to avoid overwriting the factory settings.



Wave Launch Processor

DownloadingandInstallingtheXConsolesoftware

DownloadingFromLegacy Audio

Visit www.LegacyAudio.com, and navigate to the Goliath XD Subwoofer product page. Click on the details tab, and click "How to Control Legacy Speakers"

Installing

- Double click on the install file and follow the on– screen instructions to install the software

Wave Launch Processor

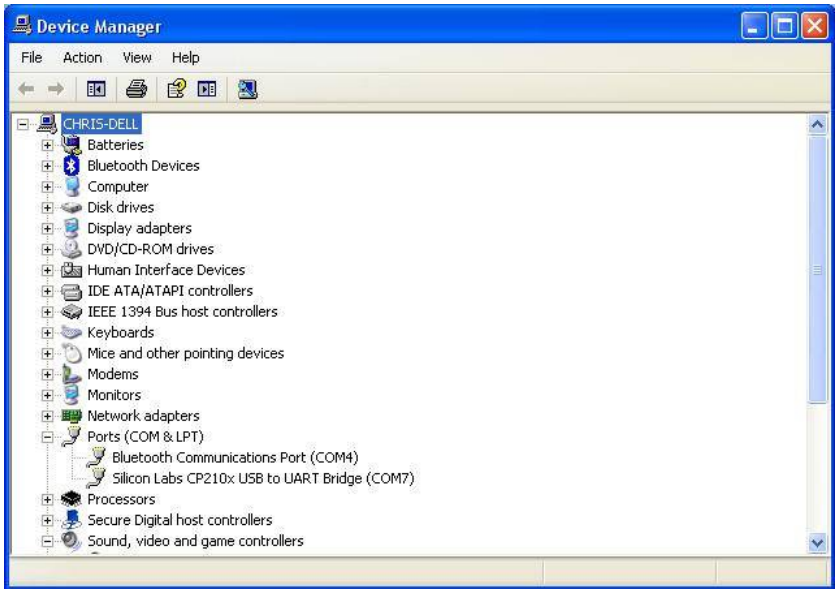
The XP processor will allow you to make adjustments to your system from a laptop computer from your listener position.

ConnectingYourComputerwiththeXP-4080Processor

- Connecting will require a long USB Device cable. These can be found at most electronic or big box stores. It is the same cable that a USB printer would use. This 16 ft cable is available at Radio Shack.
http://www.radioshack.com/product/index.jsp?productId=3584358&filterName=Length&filterValue=16-20+ft.

- Once the cable is connected, start the XConsole software. It will ask "Do you want to connect to the device?", answer "No" for now.

- You now must access the Windows Device Manager. This processes can vary depending on the version of Windows in use, but typically it is found in the Control Panel. Then click on "System." On the tabs across the top, click "Hardware" and then "Device Manager" This will bring up a list, find "Ports (COM & LPT)" and click the plus (+) next to it. You should then find a device called "Silicon Labs CP210x USB to UART Bridge" with a COM number listed next to it. This number will change on all computers, but take note of this number.



- Go back to the XConsole software. At the top of the screen click “Setup” then “Port Connections” This bring up a new dialog box. Select the COM port number you obtained from the device manger and click “OK.” The software will warn you that you must restart the software for your changes to take effect.

- Restart the XConsole software. This time, when it asked “Do you want to connect to the device?”, answer “Yes”.

- You should now be connected to the device and ready to use.

Room Equalization

Before making adjustments with your processor, a basic understanding of parametric and graphic equalization is needed.

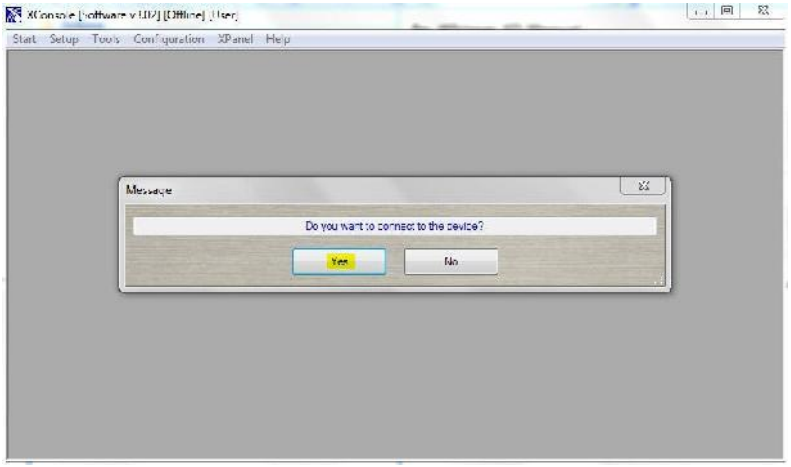
Parametric filters allow you to control the three primary parameters of a useful band-pass filter. These parameters are amplitude (boost or cut), centerfrequency (pitch) and bandwidth (tonal range). Bandwidth is typically labeled "Q" on the unit, which stands for Qfactor. The amplitude of each band can be controlled, and the center frequency can be shifted, and widened or narrowed.

Simpler graphic filters are fixed in frequency and bandwidth, so the music spectrum is divided into uniform third-octave spacings.

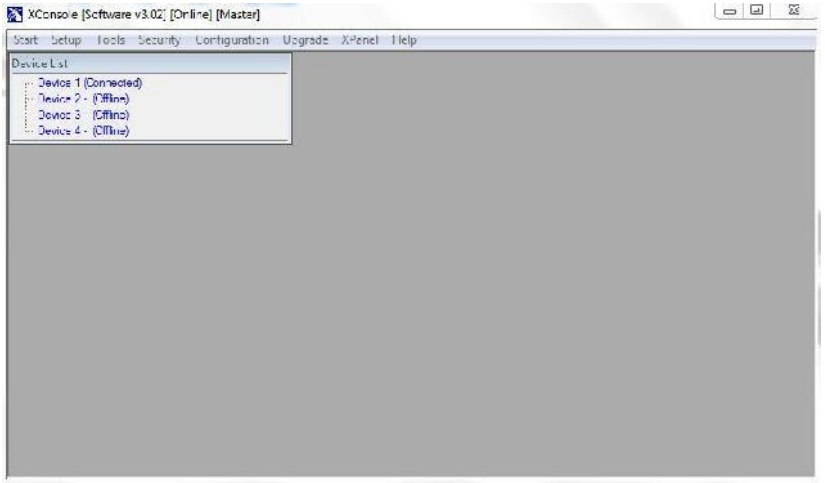
Wave Launch Processor

Making Adjustments with Wavelaunch Processor

After installing the included software, connect the processor to the computer via a USB cable. Launch the XConsole software.



When asked if you want to connect to the device, click yes.



In the Device List, click on the device that is connected. This will launch the program that is currently on the processor.

Wave Launch Processor

In the Device List, click on the device that is connected. This will launch the program that is currently on the processor.

The preset shown on the left is for 1 or 2 Goliath XD being fed a mono or LFE signal.

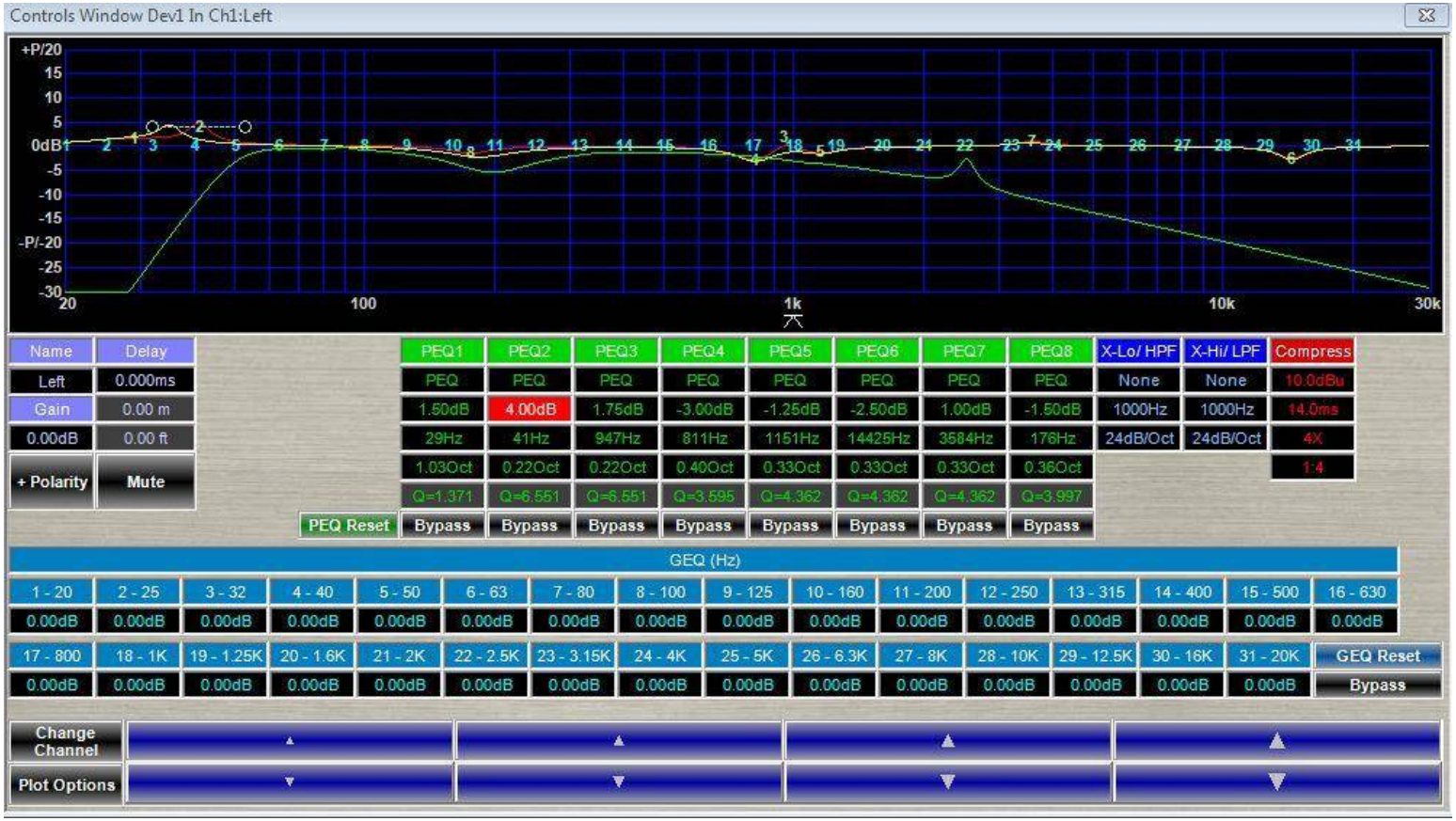
Adjustments to the processor can be made to “Out 1 Sub L" and "Out 5 Sub R" when using a second subwoofer.

The preset shown on the right is for 2 Goliath XD within a Whisper XD system.

Adjustments to the processor can be made to “Out 4: LSub" and "Out 8 RSub"

Wave Launch Processor

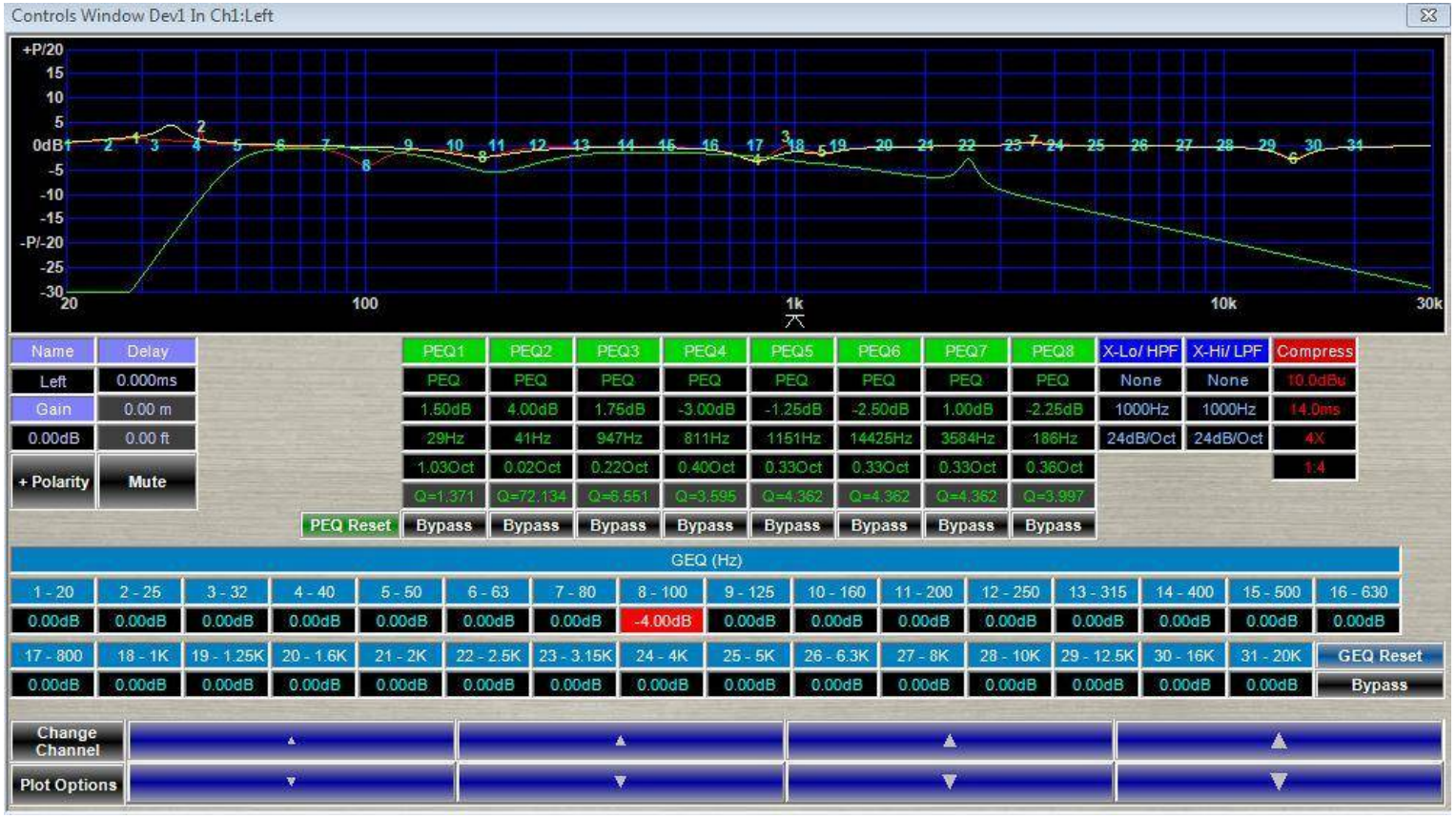
Making a boost with the parametric EQ



In this example, we have selected Parametric EQ 2 (PEQ2) by clicking in its box, which will turn red to indicate your selection. Once highlighted, locate the blue boxes with up and down arrows, at the bottom of the interface. These arrows are used to increase or decrease the gain, frequency and Q of the selected parametric EQ. This column shows a 4.00 dB boost at 41 Hz with a Q of 6.551. A larger Q affects a narrow range of frequencies, while a smaller Q affects a broader range of frequencies. We can adjust gain, frequency and Q by clicking in the corresponding box. Once highlighted, locate the blue boxes with up and down arrows, at the bottom of the interface. These arrows are used to increase or decrease the gain, frequency and Q settings.

Wave Launch Processor

Making a cut with the graphic EQ



In this example, we have selected Graphic EQ 8 by clicking in its box which will turn red to indicate your selection. Once highlighted, locate the blue boxes with up and down arrows, at the bottom of the interface. These arrows are used to increase or decrease the gain of the selected graphic EQ. This column shows a 4.00 dB cut at 100 Hz. Only gain is adjustable in the graphic EQ section because graphic equalizers have a fixed frequency and Q.

After adjusting, you may close the window, and make adjustments to other connected Legacy subs and speakers.

Adjusting using the EQ plot

Adjustments made to both the parametric and graphic EQ are reflected in the graph occupying the upper portion of the screen. You can select them by clicking on their number, and dragging up to boost, and down to cut. Dragging to the left decreases the frequency, while dragging to the right increases the frequency.

Recommendations

Boosts greater than 6 dB can result in ringing, driver overload, or mechanical buzzing.

Boosting and cutting with a smaller Q will affect a broad range of frequencies, and can be helpful for brightening an otherwise dull recording.

Boosting and cutting with a large Q will affect a narrow range of frequencies, and is useful for making precise adjustments.

For the Ambitious: Technical measurements

We highly recommend free measurement software, Room EQ Wizard. This software allows you to measure the in room response of your system. While we obviously cannot provide the technical support for this software, all one needs is a calibrated microphone and a soundcard with microphone preamp and you are off and running.
http://www.hometheatershack.com/roomeq/

Fine Tuning

Adjusting Goliath XD

Gain: This will allow you to adjust the volume level played by the subwoofer. It only controls the subwoofer level, not the level of any of the other loudspeakers in the system. Be sure to adjust the Gain in the row corresponding to your subwoofer.

Filter: Clicking this button allows you to access the EQ capabilities of the subwoofer. The crossover point and slope can also be adjusted on the right via the X-Hi/LPF section. Follow the instructions on the previous pages for making adjustments.

Polarity: This control is essential in the proper setup of your subwoofer. If not set up properly, your main speakers and subwoofer can actually work against each other. If operating out-of- phase the subwoofer and mains will cancel, creating nulls at some frequencies (primarily upper bass).What is desirable is to have the subwoofer and the mains operating in phase, relative to the primary listening position. Here is an effective method of accomplishing this:

While seated at your listening position, click the Polarity button on your subwoofer output.

Using pink noise or a 50-60 Hz test tone, listen for the strongest output. Next, play music program material and optimize the level and polarity settings, adjusting for the smoothest output.

Designer's Notes (From Bill Dudleston)

•Goliath XD is a carefully engineered subwoofer, capable of integrating with the finest speakers.

• Unlike many woofers that suffer from overshoot, Goliath XD applies a special EMF countering circuit, which increases power handling and radically reduces low fre-quency distortion.

• An enormous stacked magnet structure is custom fabricated to provide excellent sensitivity. This unit is bolted in compression to secure nearly 80 lbs. of motor structure.

• Two separate high current 500 watt amplifiers (1,000 watts total) maintain control of Goliath XD's multiple 15" sub-bass pistons.

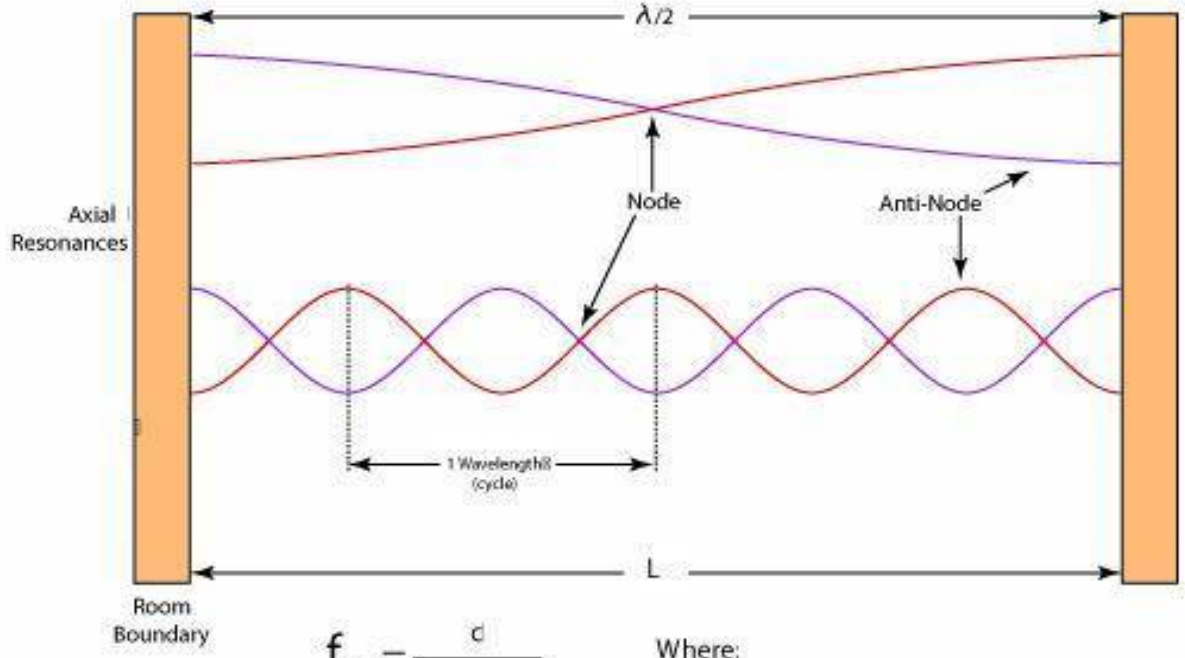
• The subwoofer alleviates the deep bass demands from compact satellite speakers, thus preventing low frequency strain due to long excursion.

• The Xilica processor allows for precise control over Level, Crossover Frequency and Phase, allowing Goliath XD to integrate precisely into your system.

Designer Notes: Room Resonances

*The following information is not essential to operating your subwoofer but is provided for enthusiasts who wish to further their understanding.

Three types of acoustical resonances occur in all bounded (non-anechoic) listening environments; tangential, oblique, and axial. Simple axial resonances occur directly between 2 parallel boundaries and have very strong impact on the pressure response in a room. Peaks as great as 6dB, with dips averaging -15 to -45dB occur in most rooms. Troublesome dips as great as -60dB can occur in poorly designed acoustical environments. Resonances cannot be equalized away, as they are positionally dependent. Boosting power to compensate a node will add overwhelming output at the complimentary anti-node.

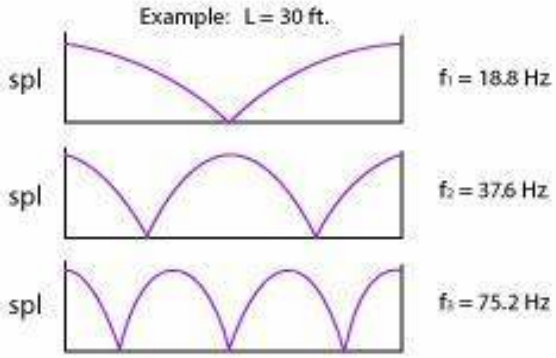


$$f_{res} = \frac{c}{2nL}$$

Where;
c = velocity of sound in air
L = distance between 2 fixed parallel boundaries
f_{res} = frequency that resonance occurs
n = integer; 1, 2, 3…

$$f_{res} = \frac{1{,}130 \text{ ft/sec.}}{(2)\,(1)\,(30 \text{ ft})}$$

Example: L = 30 ft.

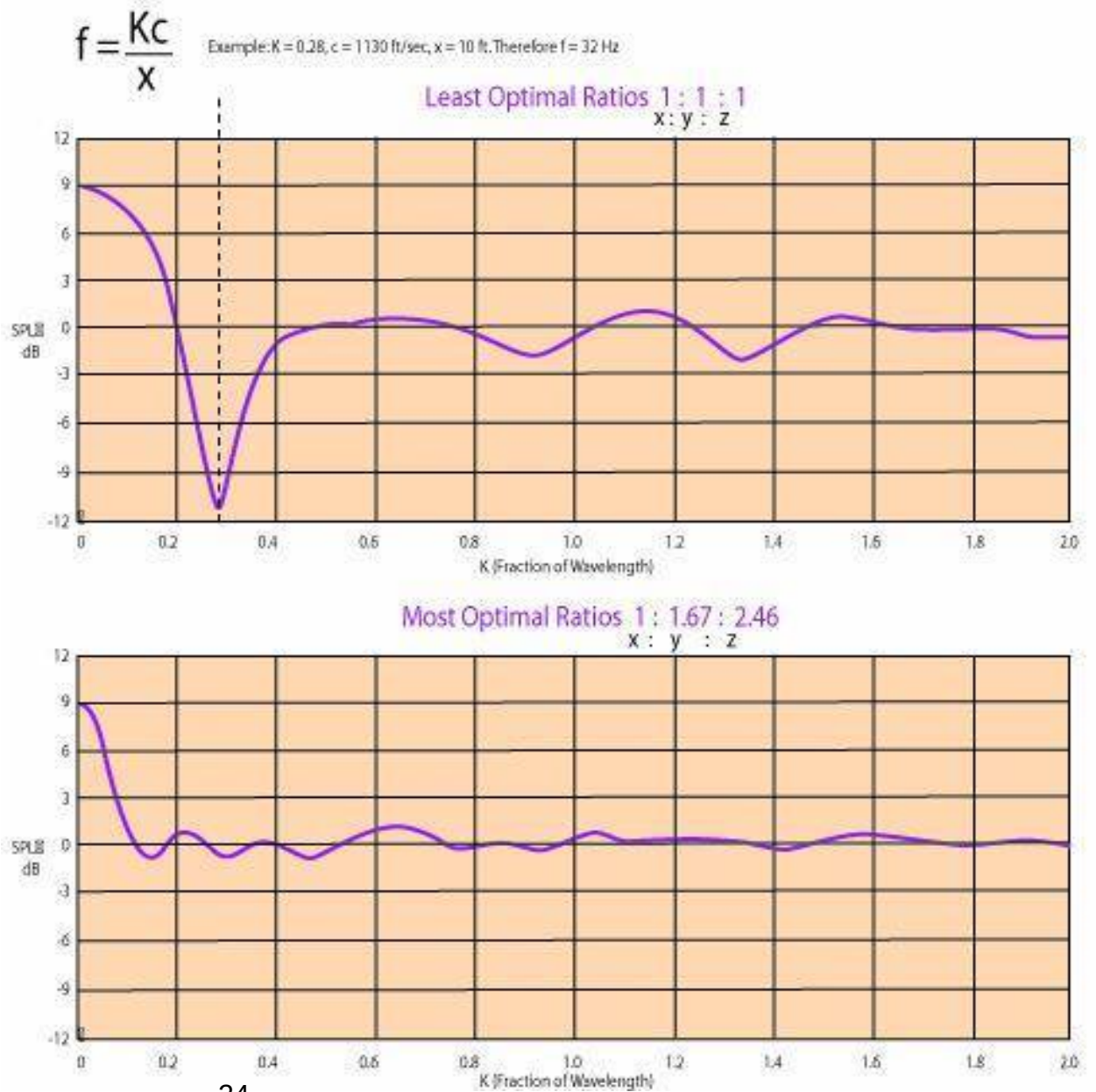


Designer Notes: Subwoofer Boundary Reinforcement

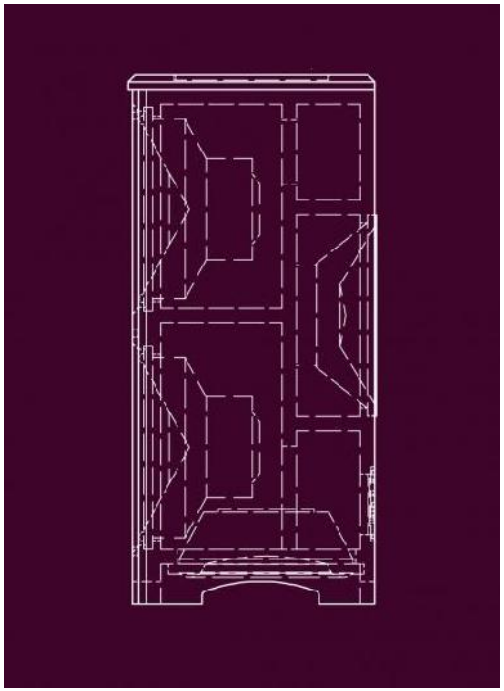
Corner Placement
The plots to the right summarize the boundary influences on a corner placed subwoofer. Shown are frequency response effects for a cubical room (Least Optimal) compared to a room with "Golden" ratios (Most Optimal).

The top graph demonstrates the strong cancellation caused by excessive architectural symmetry. Note 9dB of gain below K=0.2 followed by a large energy suck-out between K=0.2 and K=0.4. This cancellation notch is more than 11 dB deep and an octave wide.

The lower graph represents the same dimensional ratios found in classic architecture such as the Greek Parthenon. Note again, 9dB of low frequency gain is realized but with less than +/-1dB of ripple above K=1.2.



Specifications



System Type:	Mutually coupled, dynamically stabalized
Subwoofer:	(2)15″ Silver/Graphite/Rohacell composite diaphragm
Radiator:	(2) 15″ mass loaded, bottom & rear firing
Low Frequency Alignment:	8th Order/Back EMF Canceling
Internal Amplification:	(2) 500 Watt ultra efficient ICE®Power modules
Frequency Response:	12-150 Hz +/- 2 dB, Includes 24 bit processor
Impedance:	10k Ohms
Phase Adjustment:	Continuous time adjustment
Blend EQ:	16 parametric bands
Max SPL:	130 dB @ 1m
Low Pass Filter Slope:	Linkwitz-Riley 6/12/24/48 dB per octave
Crossover:	30 Hz-200 Hz
Inputs:	XLR balanced
Dimensions (H x W x D):	18.125″ X 40.125″ X 19.125″
Weight Per Cabinet:	190 pounds

CE Declaration of Conformity

Legacy Audio
3023 E. Sangamon Ave.
Springfield, IL 62702 USA
800-283-4644

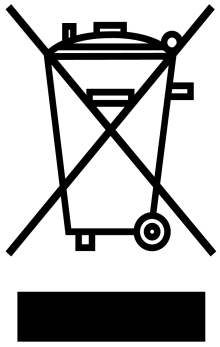
States that this product is in conformity with the with the essential requirements and other relevant provisions of:

Low Voltage Directive 2006/95/EC
EMC Directive 2004/108/EC

CE

All information contained in this manual is accurate to the best of our knowledge at the time of publication. In keeping with our policy of ongoing product improvement, we reserve the right to make changes to the design and features of our products without prior notice.

WEEE Compliance



Product Disposal—
Certain international, national and/or local laws and/or regulations may apply regarding the disposal of this product. For further detailed information, please contact the retailer where you purchased this product or
the Legacy Audio Distributor in your country. A listing of Legacy Audio Distributors can be found on the Legacy Audio website www.legacyaudio.com
or by contacting Legacy Audio at:
3023 E. Sangamon Ave.,
Springfield, IL 62702, USA—
Phone: +1 217 544-3178.

Notes:

3023 E Sangamon Ave.
Springfield, IL 62702
Phone: 800-283-4644
Fax: 217-544-1483