

# **Owners Enjoyment Manual**



for those who consider perfection possible<sub>tm</sub>

Dealer \_\_\_\_\_

Date Purchased \_\_\_\_\_

Serial Number



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## Congratulations

Your new equalizer is made by the only consumer electronics company in the world that specializes in equalizers, signal processors and audio analyzers. AudioControl's passion for high quality, meticulous attention to detail and professional sound heritage shows itself in the dozens of awards we have won for our designs, products and service.

This manual is designed to help you get the most from your new component. So, even though you're dying to try it out, please take a few minutes to glance over this rhetoric and learn about the Richter Scale/crossover. Anything that has this many functions deserves all the explanation it can get.

## Features

### **Audiophile-Quality Electronic Crossover**

What good is it having a subwoofer to rattle the room if you have a second-rate crossover driving it? Subwoofer manufacturers are very good at designing speakers, but most of them are fish out of water when it comes to creating an electronic crossover. The Richter Scale Series Three includes one of the best crossover topologies available: 24dB/octave, Linkwitz-Riley alignment. The sharp roll-off of this design makes certain the subwoofer only creates the low bass frequencies for which it was intended. AudioControl makes this crossover even more useful by providing plug-in programming modules to set the crossover frequency. This allows precision matching of the crossover and your subwoofer. The result is solid bass you have to feel to believe.

#### **Precision Bass Equalizer**

Problems in the bass frequencies will have an affect through the entire audio system. Excessive energy caused by standing waves will mask fine details in the high end. The six bands on the Richter Scale control this critical bass region of 22.5 Hz to 125 Hz in one-half octave steps. The controls are stereo ganged to ensure consistent adjustment of the left and right channels for more solid bass performance.

#### Lab-Grade Audio Analyzer

Knowing where your frequency response problems exist is half the battle of setting up a good sounding system. The warble-tone signal generator and precision relative sound level meter built into the Richter Scale provide an impartial judge of the peaks, dips and speaker/room interactions. The measurement microphone included with the Richter Scale is lab grade and flat within 1 dB. The warble-tone generator and sound level meter combine to create a very powerful audio analysis tool.

### Sharp Subsonic Filter for Speaker Protection

Now for a moment of realism...In spite of the great claims made in the sales literature, a subwoofer can only play so low. Trying to force a sub to run lower than is realistic will result in wasted amplifier power, overheated speakers, distortion, and worst of all, possible speaker failure. An 18dB per octave, Tchebychev alignment highpass filter provides accurate lowfrequency bass protection for your speakers without cutting into audible bass performance. You will have more clear, tight bass than you thought possible from your stereo system.

#### **Rumble Reduction Filter**

An exclusive AudioControl feature; the Rumble Reduction filter cuts turntable rumble, reduces acoustic feedback. It even reduces the thump that occurs if you lower the cartridge too quickly onto a record.

#### **Award-Winning Quality**

The Richter Scale Series Three was designed and built in the USA by AudioControl - An award winning manufacturer of highest-quality audio components since 1977. These products are backed up by a comprehensive FIVE year warranty.



#### THE MOST IMPORTANT INSTRUCTION OF ALL:

Fill out the warranty card and mail it to us. Also, record the serial number and put your sales receipt in a safe place. This is very important in the unlikely event that your new unit gets a sudden virus, or for proof of ownership if somebody takes a liking to your theater system in the middle of the night. Insurance companies have no sense of imagination when it comes to things like the Richter Scale ever being in your system.

This concludes the nagging section of this manual.

## Front panel highlights



**1. Relative SPL Meter** - A precision sound level meter to use along with the warble test tone to accurately measure your speaker and room acoustics. The meter is damped in order to average out variations in the warble tone and decrease extraneous transient sounds during testing.

**2. Warble Tone Generator** - The other half of the audio analysis system built into the Richter Scale. This test

tone generator provides a precise reference to measure your room against.

**3. Analyze Switch** - When pressed in, this button activates the warble tone generator and switches the Main Receiver / Preamp inputs over to the internal warble tone source.

**4. Equalizer Switch** - This allows simple before and after comparisons of the system equalization. When pressed in, this button activates the half-octave equalizer circuitry.

**5. One-half Octave Bass Equalizer** - This six band bass equalizer gives you incredible control over the critical low frequency region of your room and speakers. The sliders are stereo-ganged so you can accurately adjust both channels at the same time.

**6. Subsonic (Highpass) Filter Switch** - Press this button to get rid of power robbing, distortion inducing infrasonics. This sharp 18dB per octave filter cuts off bass frequencies below 18Hz to protect your system against these audio demons. The Richter Scale utilizes a sophisticated, 3pole Tchebychev alignment design does away with subsonic interference without any audible side effects. Almost every stereo will benefit from this filter, so don't be afraid to leave it on.

**7. Rumble Reduction Filter Switch** - This button is dedicated to the good old days of analog vinyl sound and the turntable. One press and say "good-bye" to turntable rumble

and acoustic feedback. It even reduces the thump you hear if you lower the cartridge too quickly onto a record.

8. External Processor Loop Switch - Since the equalizer section of the Richter Scale is usually connected into the tape monitor loop of your preamp, we thought it was only fair to give you one back. This button works the same as the tape monitor on your receiver and switches the Richter Scale input between the Main Input and the External Processor Input.

**9. Crossover Low Output Mute Switch** - A quick way to shut off your subwoofer and remind you why you have one in the first place. This button mutes the low pass output of the electronic crossover built into the Richter Scale.

**10. Crossover Low Output Level Adjustment** -A variable gain control to match the subwoofer volume to the main speakers. This control is recessed because it should only need to be set when the system is initially analyzed and set up.

11. Power switch - Need we say more???

## **Rear panel highlights**



**1. Power Cord** - Plug this into the switched outlet of your receiver or preamp.

**2. Unswitched Convenience Outlet** - What??? You've run out of places to plug in your turntable or CD player. We try to make things convenient. This outlet provides a simple place to plug in your low power accessories and source units.

**3. Independent Electronic Crossover** - The ultraaccurate 24db per octave Linkwitz-Riley crossover is generally regarded as the best crossover design available. It was first publicized by Siegfried Linkwitz and Russell Riley, two Hewlett-Packard engineers, in a 1976 Journal of the Audio Engineering Society article. This crossover alignment offers flat amplitude response with a steep roll-off rate and zero phase difference (lobing error). The result is a clearer, more accurate sound system.

**4. Bridging Adapter Outputs** - Bridging is a simple means of getting more amplifier power for your subwoofer. It combines the two channels of a stereo amplifier into a single

mono amp of higher power. Refer to the appendix on Bridging for more details.

**5. External Processor Loop** - These jacks replace the tape monitor connections on your preamplifier. They are a great place to connect other signal processors or a tape deck.

6. Main Receiver / Preamp Connections - These RCA jacks connect the equalizer, filters and warble tone generator to the outside world. The signal processing (EQs, filters, etc.) are independent of the electronic crossover in the Richter Scale, so both sections need to be connected to get the full benefits of the Richter Scale.

**7. Calibrated Microphone Input Jack** - The Richter Scale is supplied with a laboratory-grade, phantom power, electret condenser measurement microphone. This mic is flat within 1dB so very accurate sound analysis is possible. Do not plug any other type of microphone into this jack or you may damage the microphone or Richter Scale.

## SETTING UP THE RICHTER SCALE/ EQUALIZER CROSSOVER

#### Placement

The Richter Scale can be placed almost anywhere in your audio stack. Make certain not to block the ventilation slots on any component. Also, avoid placing the Richter Scale directly over a large power amplifier. They can get pretty hot and frequently have large magnetic hum fields from the power transformer.

#### Power

A switched convenience outlet on the back of your receiver or preamplifier is the best place to plug in the Richter Scale. What? You already have a CD player plugged into that socket? No sweat. That's what the outlet on the back of the Richter Scale is for. Plug the Richter Scale into the receiver; then plug the disk player into the Richter Scale. A disk player and the Richter Scale together don't begin to exceed the wattage rating for a switched outlet on a modern receiver.

### **Connection Tips**

If you're a hi-fi veteran, this part may seem repetitive, but some things can never be repeated too many times (just ask our Customer Support Department)!

• Turn off all components before making any connections and don't stand in a bucket of water.

• When making connections, make sure that "Left goes to Left" and "Right goes to Right". The obvious and timehonored way to assure this is to assign RED plugs to Right and WHITE/GREY/BLACK plugs to the left (yellow is usually a video or digital signal cable).

• Whenever possible, keep power cords away from signal cables (i.e., inputs from disk players, VCRs, etc.) to prevent induced hum. Notice that we have placed the Richter Scale's power cord on the extreme left side. This helps you bundle all power cords down one side of your stereo cabinet and all the signal cables down the other.

• Use quality interconnect cables. We're not going to get into the debate about whether \$100 interconnects improve the sound of your system. We know from experience however that really, REALLY cheap connections can cause problems. They tend to disconnect inside, causing a hum or loss of signal.



### System examples



Surround Preamp



Surround Sound Separates System Using the Crossover

Basic Hookup of Equalizer



*A/V Receiver System with mono subwoofer output* 



### **Using The Electronic Crossover**

Your search for better sound has led you down the path towards electronic enlightenment. You are bi-amplifying your stereo system. By allowing the amplifiers to concentrate on narrower portion of the audio spectrum, you gain the benefits of lower distortion, better intermodulation performance and more efficient system power handling. The programmable electronic crossover in the Richter Scale Series Three is a very flexible means of getting to your goal of audio nirvana.

The ultra-accurate 24db per octave Linkwitz-Riley crossover is generally regarded as one of the best crossover designs available. It was first publicized by Siegfried Linkwitz and Russell Riley, two Hewlett-Packard engineers, in a 1976 Journal of the Audio Engineering Society article. This crossover alignment offers flat amplitude response with a steep roll-off rate and zero phase difference (lobing error). The result is a clearer, more accurate sound system.



Example Crossover Connection

An important note to remember about the Richter Scale Series Three: The Electronic Crossover is COMPLETELY INDEPENDENT of the Equalizer and Warble Tone Analyzer portions of the unit. If you want equalization and the electronic crossover, you need to connect BOTH halves of the Richter Scale.

The crossover circuitry features a very clean highpass synthesis system to minimize the signal path of the high frequency portion. Since the highpass output is derived from the same filter used for the lowpass output; each half of the output is always in perfect alignment. There is no

chance of a component going out of tolerance and misaligning the crossover frequencies.



Inside view of Richter scale showing crossover module

The crossover frequency of the Richter Scale Series Three is programmed with a simple, plug-in resistor module. The module installed from our factory is 90 Hz. Additional modules are available from your dealer or from AudioControl directly. There are further instructions in the appendix about building your own resistor modules. Installing a new module is a simple matter of removing the top cover of the Richter Scale. Now unplug the existing module and replace it with your new crossover frequency. The module is not polarized; you can plug it in either way.



## WARNING!

Make certain you unplug the AC power to the unit before opening the chassis. Hazardous voltages are present inside.

## MAKING IT EQUAL -GETTING YOUR SYSTEM IN ORDER

There are three main areas of adjustment when optimizing a sound system. They are:

1. Placement of speakers.

2. The acoustic environment.

3. The system electronics.

Work on items 1 & 2 before fine tuning with the Richter Scale. Here are some tips to get the most out of your speaker placement and acoustic environment.

### **Speaker Placement**

We (and every speaker manufacturer we've ever talked to) can't over-emphasize the importance of proper speaker placement. Some speakers require very particular placement in relation to the back and side walls; all speakers demand careful placement in relation to your audio systems' characteristics. Start by consulting the speaker's owner's manual and don't be afraid to experiment...a lot. Pull the speakers out from the walls. Toe them in. Move them closer or further apart. The variation in imaging and response that different placement can make is astonishing. Especially with the subwoofer.

#### **The Acoustic Environment**

Every room affects speakers differently. Reflective and absorbent surfaces, room shape and volume, even placement of furniture can significantly change a speaker's sound. It is very helpful while investigating various possibilities to use the warble tone analyzer built into the Richter Scale. Hint...Place the subwoofer in your listening position and move the microphone around to different locations you are thinking about placing the sub. Look for a location that has the highest reading on the relative sound level meter.

# Doing The Deed

### **The Equalization Process**

An important fact to remember when equalizing a system is that the human ear is much more sensitive to abrupt changes in frequency response than to the overall curve. Your ear is also more sensitive to having too much of something than too little. With this in mind, try and make most of your equalization changes by cutting frequencies, rather than boosting them.

**Important Note:** Not all subwoofers are created equal. Be realistic about your expectation of them. The laws of physics apply here: An 8" subwoofer cannot physically move the volume of air of a 12" sub (large air movement = bass). Do not apply large (greater than 6dB) boosts to the subwoofer EQ bands on the Richter Scale unless you are certain your subwoofer can handle it. Some so-called subwoofers can realistically only put out solid bass down to 40Hz. Large bass equalization boosts and a good digital source may overheat or damage your subwoofer.



Example curve - Subwoofer

#### Analysis

Adjusting the speaker response in the last three octaves is nearly impossible to do with just your naked ears. That's why we built a half-octave warble tone analyzer into the Richter Scale. The warble tone center frequency is adjusted with the Warble Frequency Knob. What is "Warble Tone"? Basically, it is a rapidly sweeping sine wave tone of fixed amplitude within specific frequency limits. Is it accurate? Very!



**<u>ERICHTER SCALE</u>** 

To use the Richter Scale analyzer, you will need to connect the Main Receiver / Preamp jacks on the rear of the Richter Scale to your stereo system. The Warble Tone generator has no internal connections to the crossover, so you will not hear the test tone using only the crossover.

#### What is a Real-Time Analyzer (RTA)?

A real-time audio analyzer is a test tool that allows you to graphically view the frequency response of a room. Unlike the bouncing lightshow seen on some inexpensive components, an RTA gives you some very useful information. The real-time audio analyzer consists of four main parts: 1) The test signal generator (pink noise) to play through the speakers, 2) A reference microphone to listen to the sound coming back from the speakers, 3) Bandpass filters to break up the audio spectrum into several smaller sections, and 4) A display (similar to the VU meters on your tape deck) that displays the volume level in each of the frequency bands. The curve shown on the display is the actual frequency response of the sound coming in through the microphone.



Example hookup with the Richter Scale

Start with the microphone for the analyzer in your main listening position. It's a good idea to also take some measurements at other locations near the main seat. Standing waves in the room will make very narrow areas of high and low bass level at the resonance frequencies. If you have the mic in one of those peaks or nulls, you won't have a real picture of the room response.



Example microphone placement

Now that you have the Richter Scale connected and the microphone in place, it's time to do the deed:

- 1. Set all the equalizer sliders on the Richter Scale to the center "0" position.
- 2. Plug the measurement microphone into the mic jack on the rear of the Richter Scale.
- 3. Press "In" the Equalize and the Analyze buttons.
- 4. Set the Warble Tone Frequency knob to 250 Hz.
- 5. Adjust your system's volume control until the Relative Sound Level Meter on the Richter Scale reads 0dB.
- 6. Adjust the Warble Tone Frequency knob to 60 Hz.
- 7. IMPORTANT NOTE: If you don't have the output of the Richter Scale going to your main speakers as well as the subwoofer, SKIP TO STEP
- 8. Adjust the Low Frequency Output level on the Richter Scale to get the Relative Sound Level Meter back to 0 dB.
- 9. Set the Warble Tone Frequency knob to 125 Hz.

- 10. Adjust the 125 Hz equalizer slider on the Richter Scale until the Relative Sound Level Meter is reading 0 dB. If you are boosting any of the equalizer sliders, listen for any signs of woofer overdrive (distortion, flames, ripping cones or howling dogs on the next block).
- 11. Repeat steps 8-9 for the remainder of the slider frequen cies.
- 12. Since each equalizer band interacts with the adjacent bands, repeat steps 8-9 again on all the eq bands from 125 Hz down to 22.5 Hz. Very few woofers can put out a "flat" response, but try to get less than 2 dB variation from one equalizer band to the next.
- 13. Congratulations! You're done. Now you can listen to the fruits of your efforts.

## APPENDIX A -Why Equalize?

- 1. Your receiver is insulting your intelligence. Manufacturers think that more than two knobs (Bass & Treble) will confuse you, so they deny you the ability to bring out the best in your system.
- 2. Your room is special. Everyone's is. Speakers have to be designed to compromise for a wide range of listening environments. An equalizer can compensate for overly reflective or absorptive surfaces and help speakers perform their best.
- 3. Your speakers can do better. Everyone's can. An equalizer can help deepen the bass, smooth the midrange and extend high end frequency response. After buying a good equalizer, many audio lovers say it's like getting a new set of twice-as-expensive speakers. But for a lot less.
- 4. The source material isn't perfect. Did you know that bass is actually removed from many recordings so they sound good on smaller systems or over the radio? Used properly, an equalizer can clean up many of these problems with the flick of a slider.

5. There's a company that specializes in 'Making good stereo sound better'. AudioControl has been designing and building the highest quality equalizers and sound processors since 1977. Nobody else has put that much research and effort into the art of equalization.

## APPENDIX B -Room Acoustics

In the real world, every residential space is acoustically bad in some way. The only acoustically "perfect" rooms are anechoic test chambers; and unless you're very, very weird, it unlikely you will be working in such a space.

#### **How Sound Works**

To understand the problem, let's first review how sound works and the effects of a room on sound waves. The human hear perceives sound because it is responding to both the vibrations of the air and pressure waves produced by sound waves. We response to the vibrations, detect it as frequency and then respond to the pressure and detect it as level or intensity. All sound producing devices produce a series of 'waves' in the air, water, steel or anything but a vacuum. Remember, in space, no one can hear you scream.

### **A Rooms Effect On Sound Waves**

As shown here, sound waves react with every surface, barrier or boundary they encounter. There are only two possible reactions: Reflection or Absorption. If the energy contained in the waves is absorbed it will be converted into another form of energy - usually heat. Surfaces that are absorptive, such as fiberglass, draperies or curtains, reduce the amount of energy in the system.



Surfaces that reflect or refract the energy waves will produce a series of 'counter waves' of energy. There are always multiple reflections, at differing angles, in every reflective situation.

Whether a surface is absorptive or reflective will vary greatly with frequency also. A suspended ceiling or a window will have great affects on higher frequency, but they are almost completely transparent to the lower bass frequencies. As a general rule; the more mass in a surface, the better it will reflect low frequencies.

For our purposes, we are only concerned with those reflective waves that can product energy peaks and dips in the perceived frequency response of the sound system in the room.

Remember, that despite what you may have read or have been told elsewhere...All rooms are bad in some way. All rooms have audio compromises.

#### **Room Modes and Wavelengths**

Room resonances (or standing waves / modes) are one of the most significant problems affecting perceived sound quality and loudspeaker spectral presentation. These resonances are caused by reflected energy bouncing around the room from the various surfaces (walls, floor, ceiling). Every room will have length, width and height standing wave modes. The question we need to answer is - How bad and where will the problems produced by these reflections be?

#### Let's Do A Little Math

No groaning please, it's just simple division.

 $f = Speed of sound \div (2 x Length)$ 

'f' is the standing wave mode frequency

1130 feet per second is the speed of sound (at room temperature)

For example, if the room is 15 feet long, the math is:

 $f = 1130 \div (2 x 15)$ 

f = 37.66 Hz

So the primary resonance frequency (standing wave mode) along the length of the room will be at 37.66 Hz. There will also be additional modes at multiples of this frequency (75.32, 112.98, 150.64 Hz). Where a room causes real problems is when the dimensions of the room (height, length, width) are even multiples of each other. This causes standing wave modes in several directions to occur at the same frequencies.

### APPENDIX C -Building Your Own Crossover Modules

An electronic crossover divides your music into two or more frequency bands. Since speakers can only be designed to accurately reproduce a limited range of frequencies, a crossover must be used to send the appropriate information to each speaker.

The correct selection of crossover frequencies greatly depends on your choice of a subwoofer. Please check with the subwoofer manufacturer for their recommendation regarding a good crossover point.

The Richter Scale comes with a programmable 24dB/ octave Linkwitz-Riley crossover. It is preset at the factory at 90Hz. This frequency is easily be changed by removing the top of your unit and replacing the existing resistor module in the socket. New modules are available either from your authorized AudioControl dealer or directly from our factory. If you are feeling adventurous and are handy with a soldering iron, you can easily make your own resistor modules. Here's how... To calculate the proper resistor value for the custom module, use the following formula:

#### 7200

Frequency (Hz) = Resistor value (kilohms)

For example, if you need a crossover point of 150Hz:

7200 ÷ 150Hz = 48 kilohms

For a 24dB/octave crossover module, you need eight resistors and a 16 pin DIP component header. The resistors used to build the module should be 1/4 watt, 1% tolerance, metal film.

NOTE: If you would like more information about building crossover modules, check out Technical Note# 1005 - Building Crossover modules at www.audiocontrol.com



### APPENDIX D -Bridging your amplifier

One more feature built into the Richter Scale Series Three is a set of outputs on the crossover that allow you to combine the channels of a stereo amplifier into a single mono amp. This concept will work on almost any amplifier not already



equipped with bridged outputs (i.e. amps without common speaker output grounds). Check your amplifier's owners manual or get out the handy multimeter to verify if the amp meets these conditions. In the bridged mode, each channel of the amplifier sees half of the load impedance (i.e. 2 ohms versus 4 ohms). The amp outputs one channel in-phase with the system and the other channel 180 degrees out of phase. This allows one channel to provide the positive half of the signal and the other channel to provide the negative. The voltages are summed at the subwoofer for a theatrical fourfold increase in power, as demonstrated by the following calculations:

The formula for output power of an amplifier (single channel) is:

(Peak Voltage x 0.707)<sup>2</sup> ÷ Load Impedance (Ohms) = Output Power (Watts)

For a normal amplifier (rated at 25 watts per channel) driving a nominal 4 ohm load, the output power is:

(14 volts x 0.707)2÷4 Ohms) = 24.49 Watts



For a bridged amplifier (rated at 25 watts per channel) driving a nominal 4 ohms load, the voltage is doubled and the output power is quadrupled:

(28 volts x 0.707)2÷4 Ohms) = 97.97 Watts



As this example illustrates, a 25 watt amplifier can provide 100 watts of power in the bridged mode, for a noticeable increase in bass performance. CAUTION - Limitations in the amplifier power supply and heatsink dissipation will always reduce the available power. Therefore, the realized power output increases will generally be less than four times the amplifier's power output.

Although bridging is the best way to maximize bass output, check the amplifiers manual to make sure if it is capable of driving a 2 ohm load, and that it is not already bridged internally.

and now a word from our legal department...

## The WARRANTY

People are scared of warranties. Lots of fine print. Months of waiting around. Well, fear no more. This warranty is designed to make you rave about us to your friends. It's a warranty that looks out for you and helps you resist the temptation to have your friend, who's "good with electronics", try to repair your AudioControl product. So go ahead, read this warranty, then take a few days to enjoy your new Richter Scale before sending in the warranty card and comments.

"Conditional" doesn't mean anything ominous. The Federal Trade Commission tells all manufacturers to use the term to indicate that certain conditions have to be met before they'll honor the warranty. If you meet all of these conditions, we will warrant all materials and workmanship on the Richter Scale for five (5) years from the date you bought it, and we will fix or replace it, at our option, during that time.

#### Here are the conditional conditions:

1. You have to fill out the warranty card and send it to us within 15 days after purchasing the Richter Scale.

2. You must keep your sales receipt for proof of purchase showing when and from whom the unit was bought. We're not the only ones who require this, so it's a good habit to get into with any major purchase.

3. The Richter Scale must have originally been purchased from an authorized AudioControl dealer. You do not have to be the original owner, but you do need a copy of the original sales slip.

4. You cannot let anybody who isn't: (A) the AudioControl factory or (B) Somebody authorized in writing by AudioControl to service the Richter Scale. If anyone other than (A) or (B) messes with the Richter Scale, that voids your warranty.

5. The warranty is also void if the serial number is altered or removed, or if the Richter Scale has been used improperly. Now that sounds like a big loophole, but here is all we mean by it:

Owner's Enjoyment Manual

Unwarranted abuse is: (A) physical damage (don't use the Richter Scale to level your projection TV); (B) improper connections (120 volts into the RCA jacks can fry the poor thing); (C) sadistic things. This is the best product we know how to build, but if you strap it to the front bumper of your Range Rover, something might break.

Assuming you conform to 1 through 5, and it really isn't all that hard to do, we get the option of fixing your old unit or replacing it with a new one.

#### **Legalese Section**

This is the only warranty given by AudioControl. This warranty gives you specific legal rights that vary from state to state. Promises of how well the Richter Scale will perform are not implied by this warranty. Other than what we have covered in this warranty, we have no obligation, express or implied. Also, we will not be obligated for direct or indirect consequential damage to your system caused by hooking up the AudioControl Richter Scale.

Failure to send in a properly completed warranty card negates any service claims.

### What to do if you need service

First, contact AudioControl, either by phone 425/775-8461, email at service@audiocontrol.com or FAX 425/778-3166. We'll verify if there is anything wrong that you can fix yourself, or arrange to have it sent back to our factory for repair. Please include the following items with the returning unit:

1) A copy of your proof of purchase (that sales receipt we've been harping about). No originals please. We cannot guarantee returning them to you.

2) A brief explanation of the trouble you are having with the Richter Scale. (You'd be surprised how many people forget this.)

3) A return street address. (No PO Boxes, please)

4) A daytime phone number in case our tech has a question about the problem you are having.

You're responsible for the freight charges to us, but we'll pay the return freight back. We match whatever shipping method you send it to us, so if you return the unit overnight freight, we send it back overnight. We recommend UPS for any shipments.

## **Block diagram**



## **Response Graphs**



## Specifications

| Number of channels 2                                    |
|---|
| Frequency response 18 Hz -100 kHz ±1dB                  |
| Total harmonic distortion 0.005%                        |
| Signal to Noise ratio (at full output) 120 dB           |
| Equalizer Filter "Q" 4                                  |
| Input Impedance100 kilohms                              |
| Output Impedance  |
| Maximum output level7 V <sub>rms</sub>                  |
| Low Output Level Control ±18 dB                         |
| Electronic crossover                                    |
| Crossover Frequency                                     |
| Subsonic Filter 18 Hz, 18dB/Octave Tchebychev Alignment |
| Size 2.5" H x 17" W x 8.25" D                           |
| Power draw 12 Watts                                     |
| Weight9 lbs   |
| Options 19" Rack mounting brackets (1.5U Height)        |

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This manual was written, designed, and printed while fighting a life-and-death struggle with giant banana slugs and drinking a double-grandé, vanilla latté.

# **AudioControl**®

For Those Who Consider Perfection Possible<sub>tm</sub>

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