

Owner's Enjoyment Manual

# The RIALTO<sup>TM</sup>

Seven Channel Home Theater Equalizer/Crossover

**AudioControl**<sup>®</sup>  
THEATER SERIES

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

Dealer Name \_\_\_\_\_

Serial Number \_\_\_\_\_

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## PRELUDE

The curtain has now risen on the world's first seven channel home theater equalizer: The Rialto. Quality equalization makes the difference between an average system and a great home theater, and you have just taken a giant step toward completing your own movie palace. Movie theaters have racks full of equalizers to improve their sound. The Rialto home theater equalizer improves the sound of your entire system in the same way with a single, compact unit.

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 pro 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 equalizer. So, even though you're dying to try it out, please take twenty minutes or so to glance over this rhetoric and learn about the Rialto home theater equalizer. Anything that has this many sliders deserves all the explanation it can get.



## HIGHLIGHTS

- **World's First Seven-Channel Equalizer**

Total equalization for the entire home theater system: Front, Center, Subwoofer, and Surround channels.

- **Wide mode for improved soundstage**

Brings out 'full' theater sound even if the front speakers are in less than ideal positioning (for example, next to the TV screen).

- **Signal level matching**

Input and Output gain matching controls allow you to get the maximum signal to noise ratio from any system - whether you are using an A/V receiver or a top-of-the-line THX separates system.

- **Audiophile quality crossover**

User programmable, 24dB/octave, Linkwitz-Riley alignment crossover for superior subwoofer performance.

- **PFM filter for speaker protection**

Exclusive Programmable Frequency Match (PFM) subsonic filter provides customized low-frequency bass protection for your speakers.

- **Room For The Future**

Stereo surrounds and independent subwoofer channels ensure compatibility with newer digital surround systems.

- **Award-Winning Quality**

Designed and built in the USA by AudioControl - an award winning manufacturer of high-quality audio components since 1977. Backed up by a comprehensive FIVE year warranty.

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## Features

### Theater-Quality Equalization

AudioControl has been designing and manufacturing the highest quality equalizers and sound processors since 1977. No other company has our expertise for bringing out the best possible sound from every audio system. The dual-bandwidth design of the Rialto gives the home theater aficionado professional control over their sound environment. We use only the finest components to ensure that you hear every subtle nuance of your favorite movie.

### Audiophile Quality 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 Rialto 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.

### Superior Woofer 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. The Rialto includes the exclusive Programmable Frequency Match (PFM) low-cut filter to protect your subs from those subsonic scourges. This module-programmable wonder allows you to match the low frequency roll-off to your subwoofers. You will have more clear, tight bass than you thought possible from your home theater system.

### Expansive Imaging

Unfortunately for many home theater enthusiasts, the “decorator” has a big say about speaker placement. Frequently you cannot place the front speakers far enough apart to create clear imaging. The Rialto’s Wide Mode draws on our knowledge of psychoacoustics to sonically move the speakers apart to their ideal positioning ... without ever lifting a speaker.

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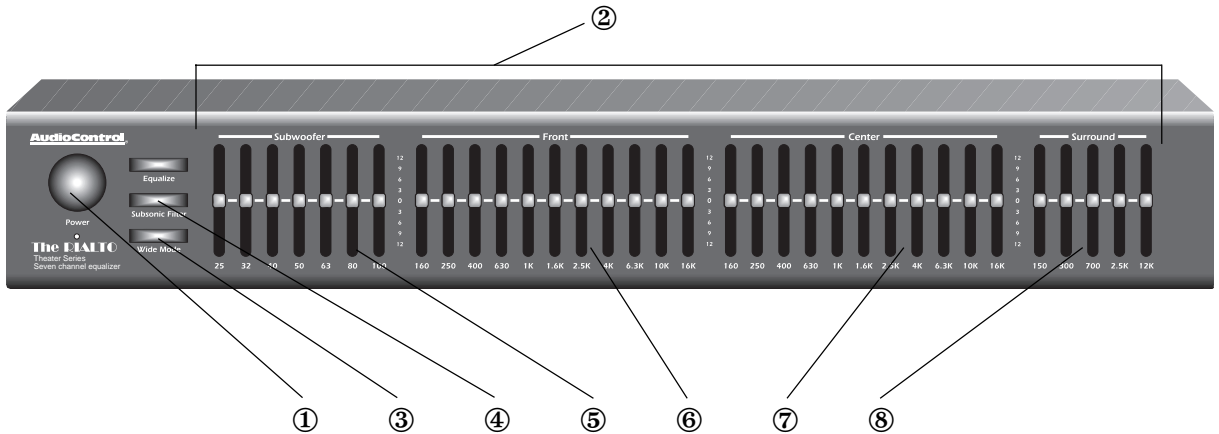
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## THE MOST IMPORTANT INSTRUCTION OF ALL:

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 Rialto ever being in your system.

This concludes the nagging section of this manual.

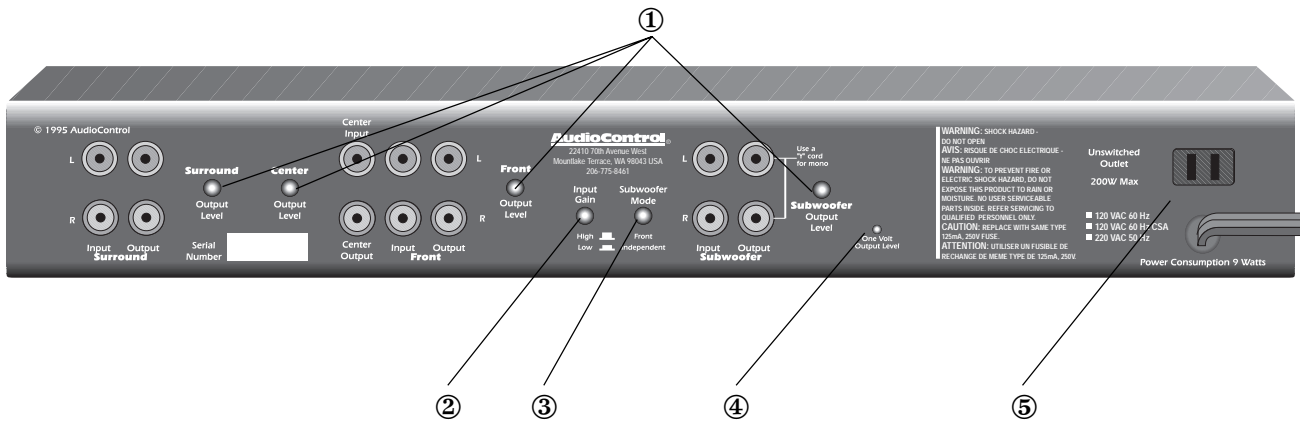
## THE CAST: Front Panel



### Front panel highlights

- ① Power switch & LED
- ② Seven channel equalization
- ③ Wide mode for improved imaging
- ④ Programmable Frequency Match (PFM) subsonic filter
- ⑤ 7 band 1/3 octave stereo subwoofer equalizer
- ⑥ 11 band 2/3 octave front channel equalizer
- ⑦ 11 band 2/3 octave center channel equalizer
- ⑧ 5 band custom-contoured stereo surround equalizer





## Rear panel highlights

- ① Output level controls for each section
- ② Input gain switch for high output processors
- ③ Subwoofer mode switch allows independent subwoofer operation for digital 5.1 bass channels.
- ④ Output voltage LED indicates optimum level for most modern A/V components.
- ⑤ Power cord and convenience outlet

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## HOOKING UP THE RIALTO HOME THEATER EQUALIZER

### Placement

The Rialto home theater equalizer can be placed almost anywhere in your audio stack. Make certain not to block the ventilation slots on any component. Also, avoid placing the Rialto directly over a large power amplifier. They can get pretty hot.

### Power

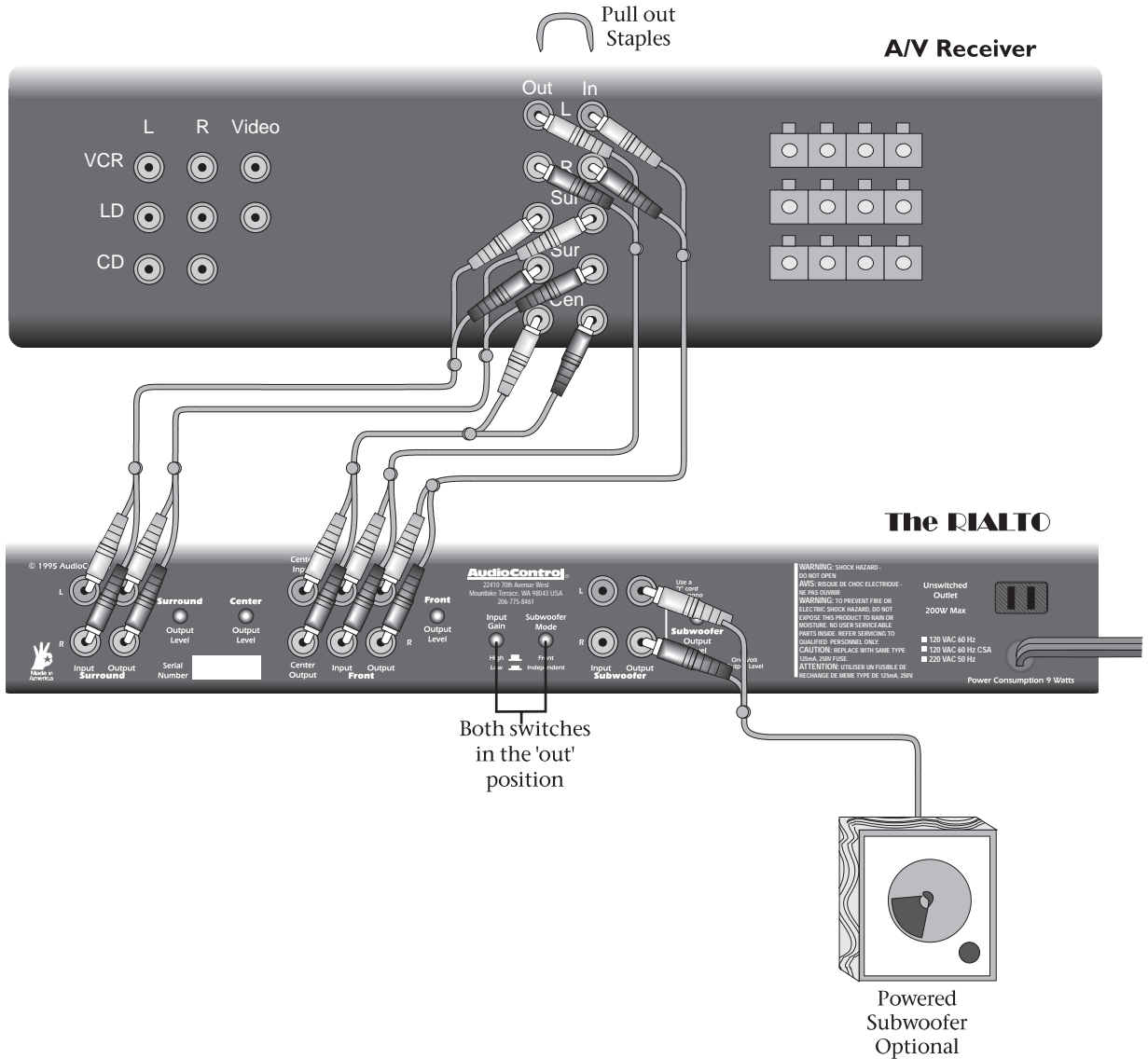
A switched convenience outlet on the back of your receiver or preamplifier is the best place to plug in the Rialto. What? You already have a disk player plugged into that socket? No sweat. That's what the outlet on the back of the Rialto is for. Plug the Rialto into the receiver; then plug the disk player into the Rialto. A disk player and the Rialto 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 time-honored way to assure this is to assign RED plugs to the Right and WHITE/GREY/BLACK plugs to the the Left (yellow is usually a video 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 Rialto's power cord on the extreme right side. This helps you bundle all power cords down the right side of your stereo cabinet and all the signal cables down the left.
- 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.

# A/V receiver system

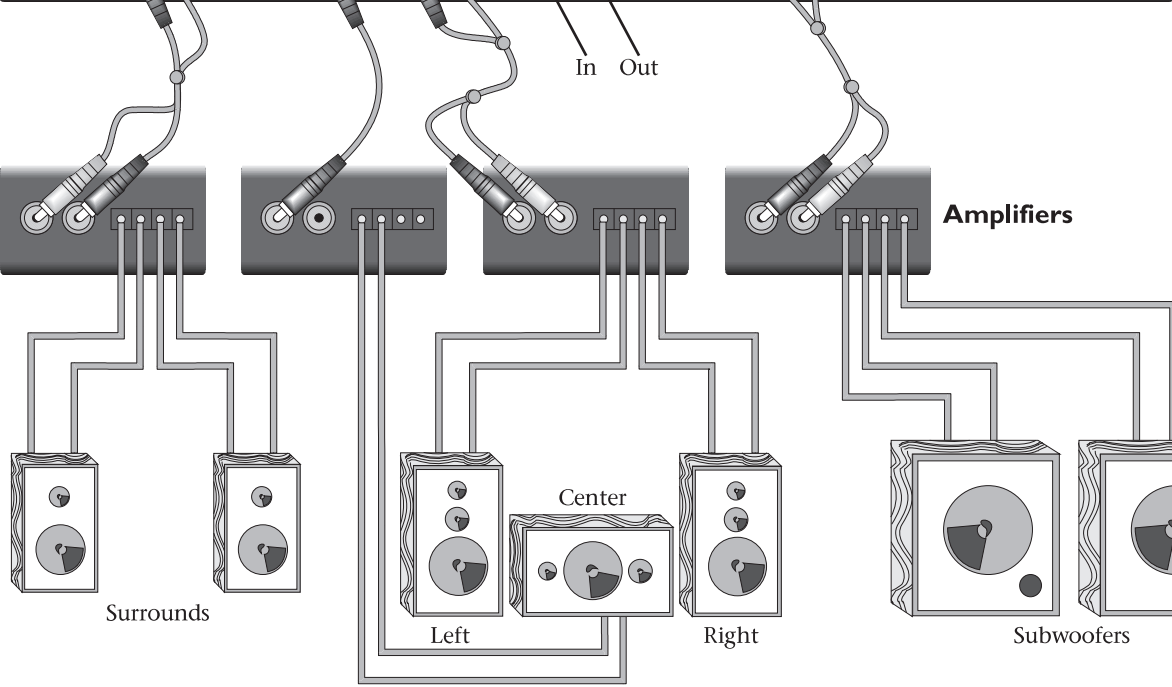


# Five channel processor/amp system with stereo subs

Preamp

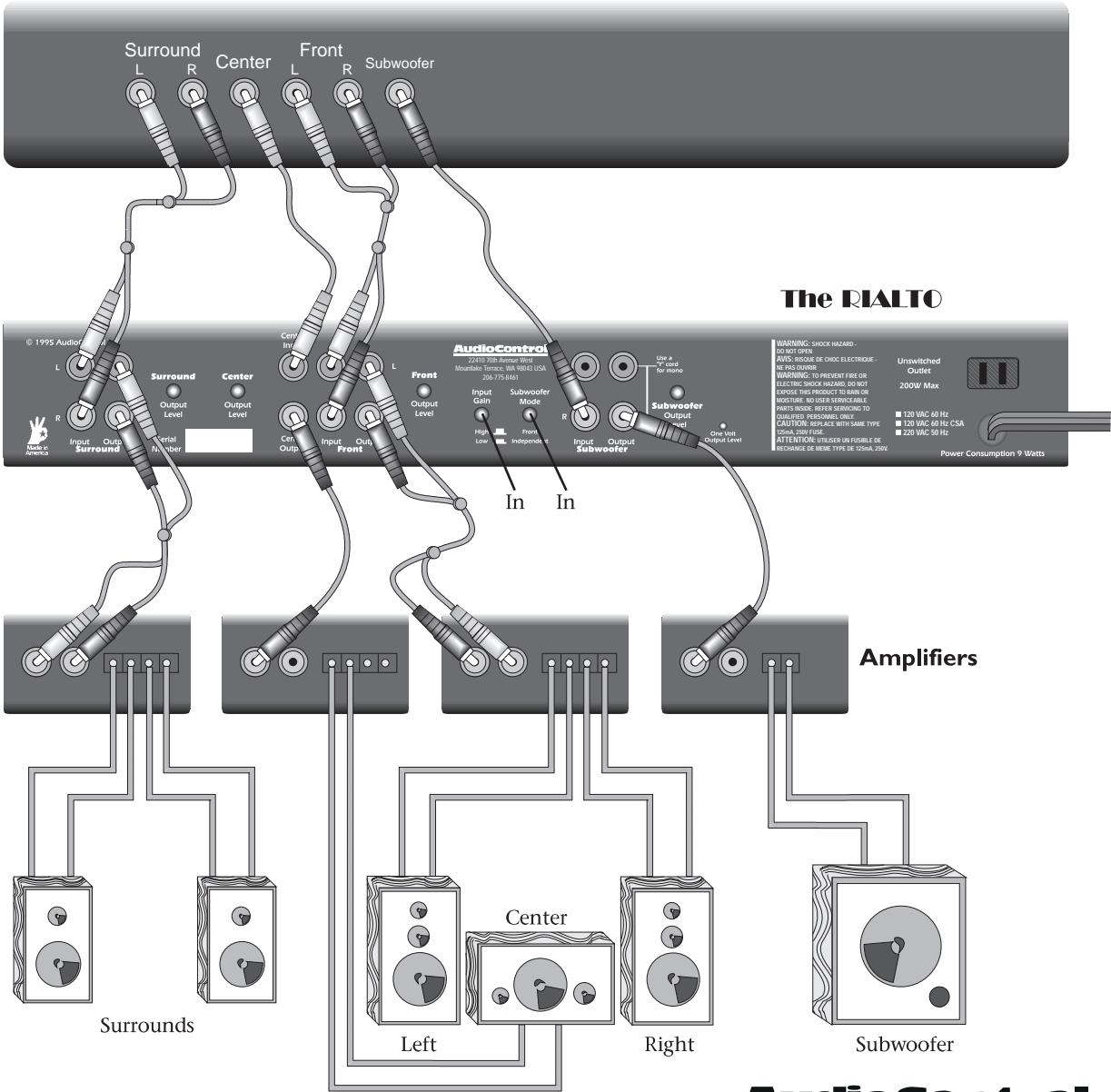


The RIALTO



Digital 5.1 surround system

Digital 5.1 surround



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## GETTING YOUR HOME THEATER IN ORDER

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

1. Placement of speakers.
2. The acoustic environment of the room.
3. The system electronics with the Rialto home theater equalizer.

Work on items 1 & 2 before fine tuning with the Rialto. 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 home theater's 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. If you have access to a high-quality real-time audio analyzer (we do make a couple of great ones if you're looking), it is very helpful while investigating various possibilities. Hint...For the best imaging, make certain that the midrange and tweeter speakers are at ear level.

## Doing The Deed - The Equalization Process

### Level Matching

The Rialto home theater equalizer has two systems for getting the most from your surround sound processor:

1) The input level switch matches the Rialto's inputs to get the best signal to noise ratio from your processor. The high level position (In) matches best with processors that have an output voltage greater than 2 volts (i.e. Lexicon). The low level position (Out) is best for A/V receivers and other integrated preamp/processors with output voltages less than 2 volts.

2) The output level controls and the 1 volt LED indicator allow you to match the Rialto to your amplifiers. If you are in doubt about how high to set the outputs for your particular amplifiers, adjust the level controls so the 1 volt LED is flickering when your receiver/preamp volume control is almost at maximum.

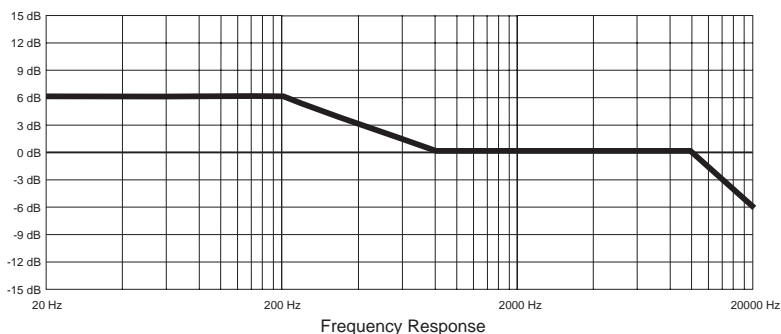
**Note:** Don't worry if you can't get the 1 volt LED to come on when the output is at maximum. Some processors just don't put out enough signal to drive the LED to lighting.

- a. Turn off your speakers. If you have a system with separate amplifiers, this can be done very easily by turning off the power to the amps. This way you can stand to be in the same room while you're adjusting the maximum amplifier levels.
- b. Now that the speakers are off, cue up your video player to a loud part of the show. (Train crashes and explosions work well)
- c. Turn the volume of your preamp all the way up. NOTE: Since the speakers are off, you will not hear anything. This is normal.
- d. Turn all four of the output level controls on the back of the Rialto to minimum.
- e. Starting with the FRONT Output level control on the Rialto, turn the control up until the 1 volt LED begins to light up. Make a note of where the knob is and then turn the control back to minimum. An easy way to remember the position is to relate it to a clockface (i.e. 2:00, 11:00, etc.)
- f. Repeat for the other three output level controls.
- g. Turn all four output controls up to the point where the 1 volt LED began to light in steps e & f.
- h. Your output levels are now set. Turn down the volume on your preamp/receiver.

### Equalization

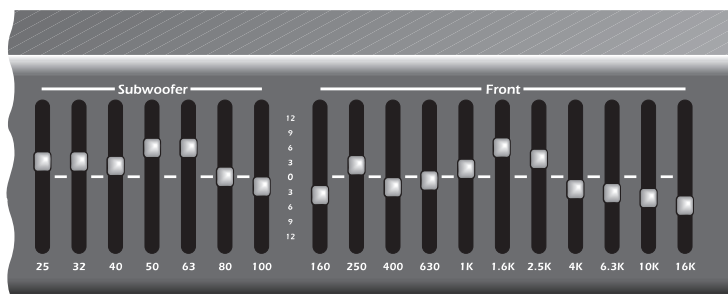
An important fact to remember when equalizing a system is that the human ear is much more sensitive to abrupt changes in frequency response than to the overall curve. Your ear is also more sensitive to having too much of something than too little. With this in mind, try and make most of your EQ changes by cutting frequencies, rather than boosting them. Through much experience, acoustic experts have determined a “curve” that is tipped with the bass (low frequency) end up is much more desirable for sound reproduction. It’s sometimes referred to as a “House Curve”, a term that comes from the fact that adjusting sound systems in theaters and auditoriums to achieve the most “listenable” sound tends to produce curves like this with the bass boosted and the higher frequencies significantly reduced.

#### A House Curve



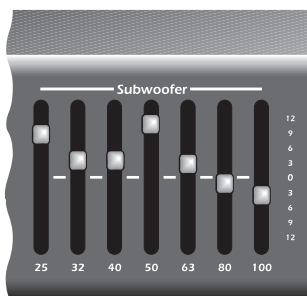


Each set of speakers in your surround system has different equalization requirements. The main front speakers reproduce the majority of the sound and have the widest frequency range. Equalize them with the “House Curve” in mind, gradually rolling off the higher frequencies.



Example settings - Front

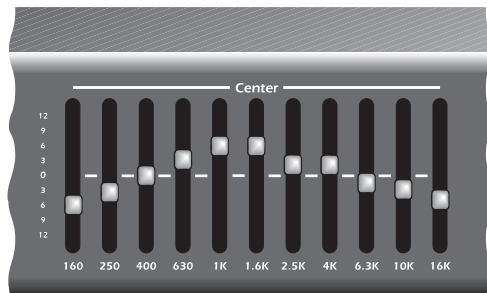
The subwoofer can be either part of the front channels (standard analog Dolby Pro-Logic) or an independent bass effects channel (digital 5.1). Your choice of subwoofer mode (Front or Independent) dictates the method of equalizing the subs.



Example curve - Subwoofer

**Important Note:** Not all subwoofers are created equal. Be realistic about your subs. The laws of physics apply here also. An 8" subwoofer cannot physically put out the bass of a 12" sub. Do not apply large (greater than 6dB) boosts to the subwoofer EQ bands on the Rialto unless you are certain your subwoofer can handle it. This is especially important if you have our digital bass restoration processor, the Phase Coupled Activator or a digital surround system. Some so-called subwoofers can realistically only put out solid bass down to 40Hz. With large bass boosts and a good digital source you may sink your sub.

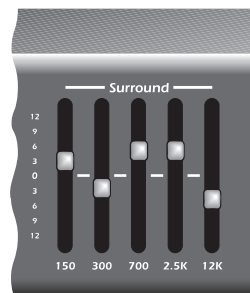
If you have a good match between your main front speakers and the center channel, the curves should be very similar. That is why the bigwigs of surround recommend a matched set of speakers for the left, center and right channels. Since the center speaker produces primarily dialog (voice), you may want to boost the midrange (1KHz through 4KHz) on the center channel equalizer controls to bring the voices forward.



Example curve - Center

**Important Note:** If you are using dipolar surround speakers, make certain you are in the null area of the speakers when equalizing. The response will sound very different outside of the null area.

Since the surround channel speakers are generally small, 2-way designs, boosting the 2.5kHz equalizer control will help fill in their crossover notch. Also, try dropping the 12kHz if the surrounds seem a bit bright.



Example curve - Surround

## Analysis

To get the most unbiased opinion of your theater's sound system, you should use a real-time audio analyzer to check the frequency response. If you want a very useful light show as a permanent part of your theater system, the AudioControl R-130 one-third octave real-time analyzer is the ticket. It will give you thirty bands of precise analysis to get your sound system into perfect alignment. Otherwise, your home theater contractor will usually have a portable analyzer (such as the AudioControl Industrial SA-3050A) that they can bring in to get the system set up.

To set the Rialto with a real-time audio analyzer, you will need to connect your pink noise generator into the Rialto one channel at a time. Start with the microphone for the analyzer in your main listening position. If the analyzer has the ability to average several readings, move the mike around and get an average of a couple listening positions (i.e. both ends of the couch) to set the Rialto. Use the average and smooth out one section at a time (front, sub, center, and surrounds).

### The RIALTO

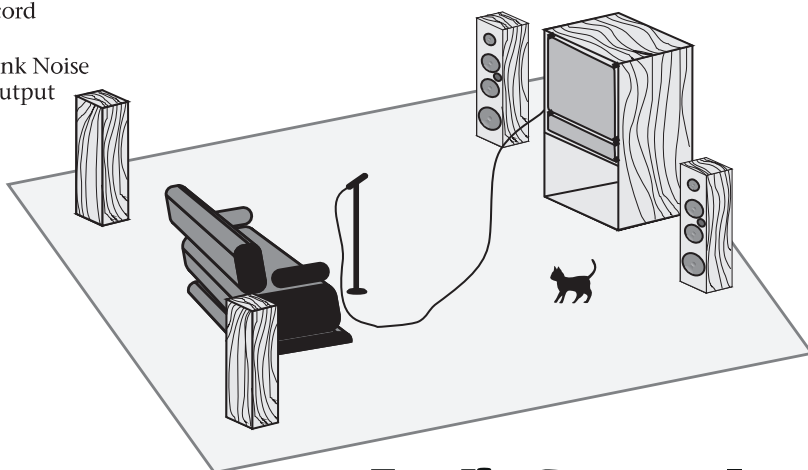


Connect pinknoise source to one input set at a time to analyze.

'Y' cord

Pink Noise Output

AudioControl Industrial  
SA-3050A Analyzer



### **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.*

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## WHY EQUALIZE?

1. **Your home theater 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.

2. **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 movie lovers say it's like getting a new set of twice-as-expensive speakers. But for a lot less.

3. **The source material isn't perfect.** Did you know that bass is actually *removed* from many recordings so they sound good on smaller systems? Used properly, an equalizer can clean up many of these problems with the flick of a slider.

4. **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.

5. **There's a company that specializes in 'Making good systems 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.

## Building Your Own Crossover/PFM 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 Rialto comes with a programmable 24dB/octave Linkwitz-Riley crossover. It is preset at the factory at 90Hz. This frequency is easily 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...

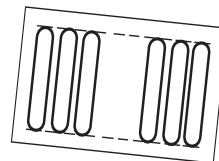
To calculate the proper resistor value for the custom module, use the following formula:

$$\frac{7200}{\text{Frequency (Hz)}} = \text{Resistor value (kilohms)}$$

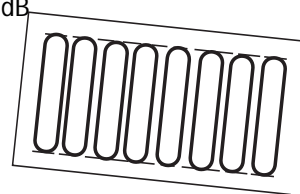
For example, if you need a crossover point of 150Hz:

$$7200 \div 150\text{Hz} = 48 \text{ Kohms}$$

For a 24dB/octave crossover module, you need eight resistors and a 16 pin DIP component header. For the 18dB/octave PFM module, you need six resistors and a 14 pin header. The resistors used to build the module should be ¼ watt, 5% tolerance, carbon film.



18dB

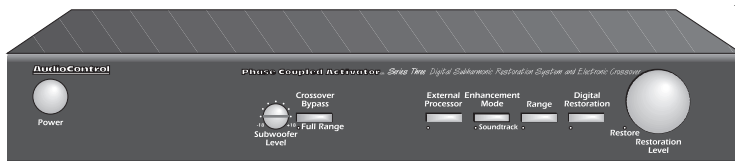


24dB

**NOTE:** If you would like more information about building crossover modules, write us and ask for Technical Note# 1005 - Crossover modules.

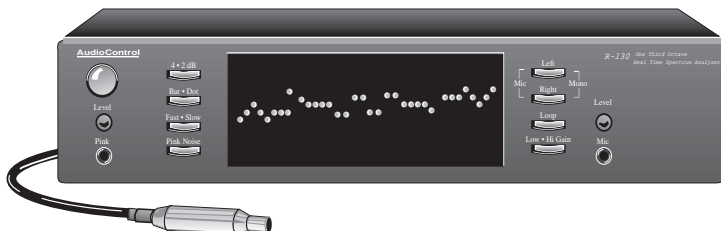
## Now Showing At A Dealer Near You

We're not exaggerating when we say the Phase Coupled Activator Series Three will completely blow you away with more low-end bass than you've ever thought possible from a home theater system. One magazine reviewer listened to it and said, "*The Phase Coupled Activator makes music and video soundtracks more natural sounding and more fun.*"



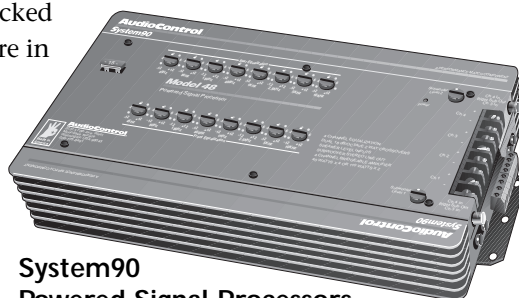
**Phase Coupled Activator  
Series Three**

The R-130 is one of the flagships of the AudioControl home product line. It is the best that we could design and will complement any audiophile system or quality home theater. The R-130 is a one-third octave, real-time audio analyzer that allows you to see the acoustics of your listening environment and correct them.



**R-130 Real-time  
Audio Analyzer**

Great Sound, Less Space. The AudioControl System90 Powered Signal Processors bring the passion of great sound to any automobile. Life is full of little things (baby strollers, golf bags, groceries, etc.). A high-quality autosound system shouldn't take up all the trunk space you need to carry those necessities. Imagine: a high-efficiency power amplifier, a high-quality acoustics-matching equalizer and an audiophile-grade crossover all in one compact chassis that can be tucked away almost anywhere in your car. Now you're living.



**System90  
Powered Signal Processors**

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and now a word from the 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 Rialto equalizer 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 Rialto equalizer for five (5) years or 2,628,000 minutes 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 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.
2. The Rialto equalizer 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.
3. You cannot let anybody who isn't: (A) the AudioControl factory; (B) an authorized service center; or (C) somebody authorized in writing by AudioControl to service the Rialto equalizer. If anyone other than (A), (B) or (C) messes with the Rialto equalizer, that voids your warranty.
4. You have to fill out the warranty card and send it to us within 15 days after purchasing the Rialto equalizer.
5. The warranty is also void if the serial number is altered or removed, or if the Rialto equalizer has been used improperly. Now that sounds like a big loophole, but here is all we mean by it:

Unwarranted abuse is: (A) physical damage (don't use the Rialto equalizer 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 Rialto equalizer 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 Rialto equalizer.

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



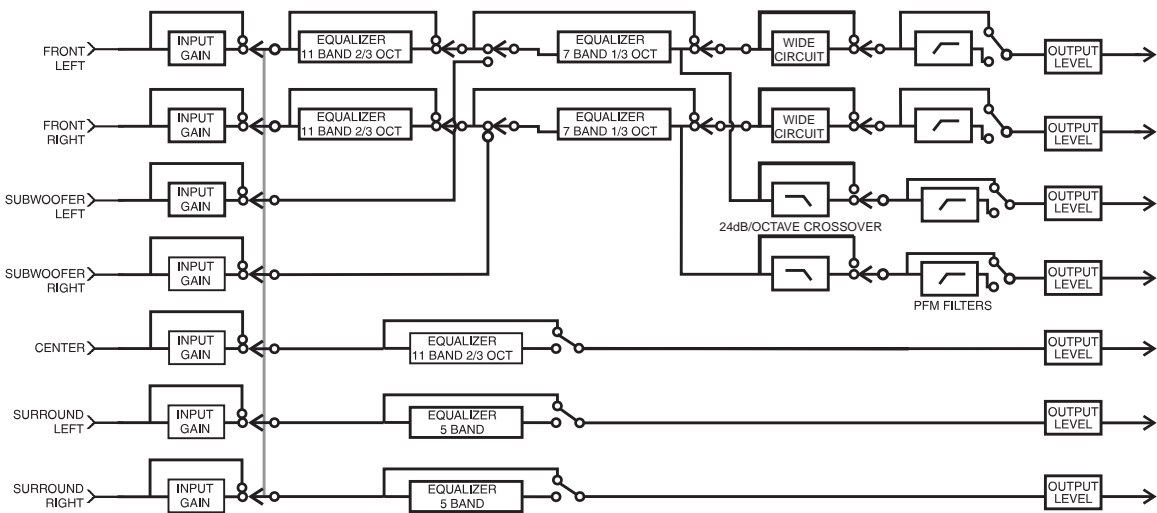
## What to do if you need service

First, contact AudioControl, either by phone 425/775-8461 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 Rialto. (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



## CREDITS (specifications)

Number of channels .....	7 (L,R,C,Sub <sub>L</sub> ,Sub <sub>R</sub> ,Surround <sub>L</sub> ,Surround <sub>R</sub> )
Frequency response .....	20-20kHz ±1dB
Total harmonic distortion .....	0.008%
Signal to Noise ratio (at full output).....	113 dB
Maximum output level .....	7 Vrms
Output level controls .....	- ¥ - 0dB
Input gain switch .....	+ 12dB
Electronic crossover .....	24 dB/Octave Linkwitz-Riley
Factory crossover setting.....	90Hz (user programmable)
	(Additional frequency modules available from dealer)
PFM filter slope.....	18 dB/Octave
Programmable Frequency Match (PFM) frequency	25Hz (user programmable)
Power draw .....	18 Watts
Size .....	2.5"h x 11"d x 17"w (19"w with optional rackmounts)
Weight .....	10 lbs
Country of origin .....	USA

The End

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## EPILOGUE

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AudioControl and Making Good Stereo Sound Better are registered trademarks of Electronic Engineering and Manufacturing, Inc.

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**®  
*making good stereo sound better*®

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