

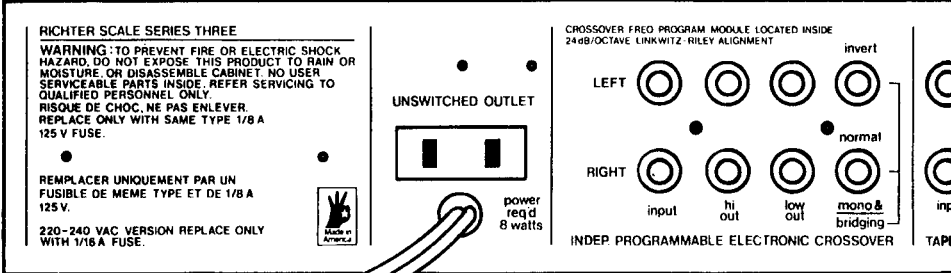
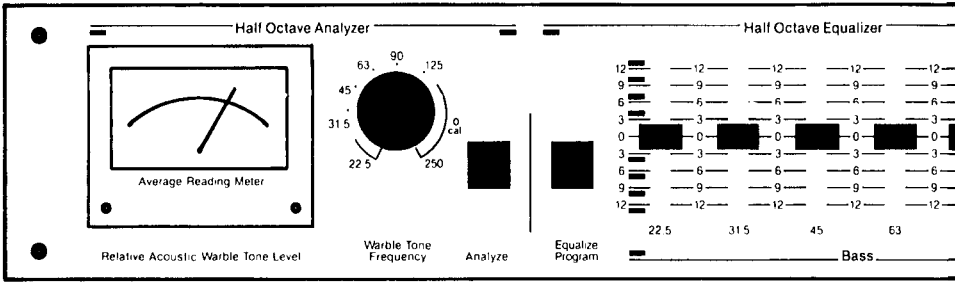
THE RIGHTER SCALE

SERIES THREE

Owner's Manual

AudioControl[®]

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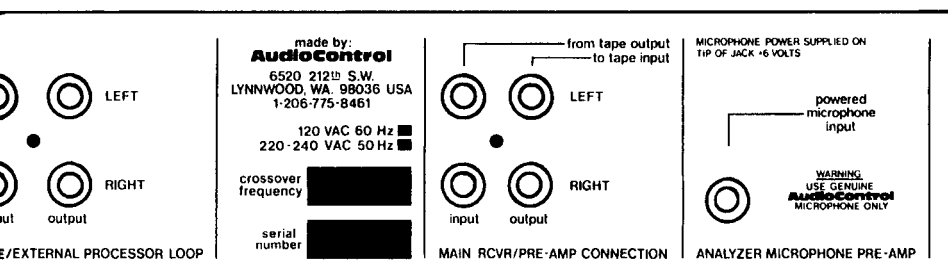
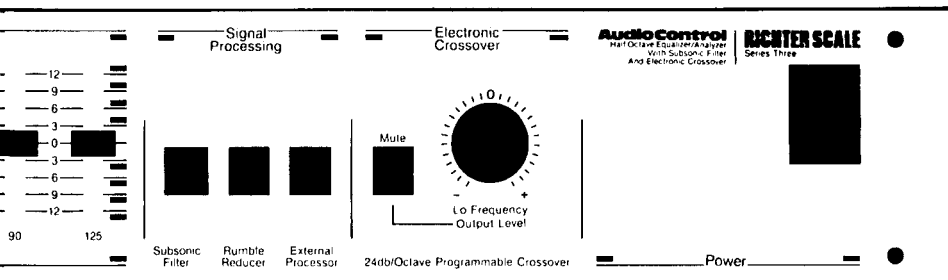
Basic Elements & Features

Congratulations on acquiring the NEW Richter Scale Series Three. It is truly an unique product.

Warble Tone Half Octave Analyzer. Combined with the supplied calibrated microphone, the warble tone test source and meter are an impartial measurement of peaks, dips and speaker/room interactions. The microphone is flat within ± 1 dB in the relevant range. And the ultra accurate test source and meter combine to produce a very useful acoustic analyzer.

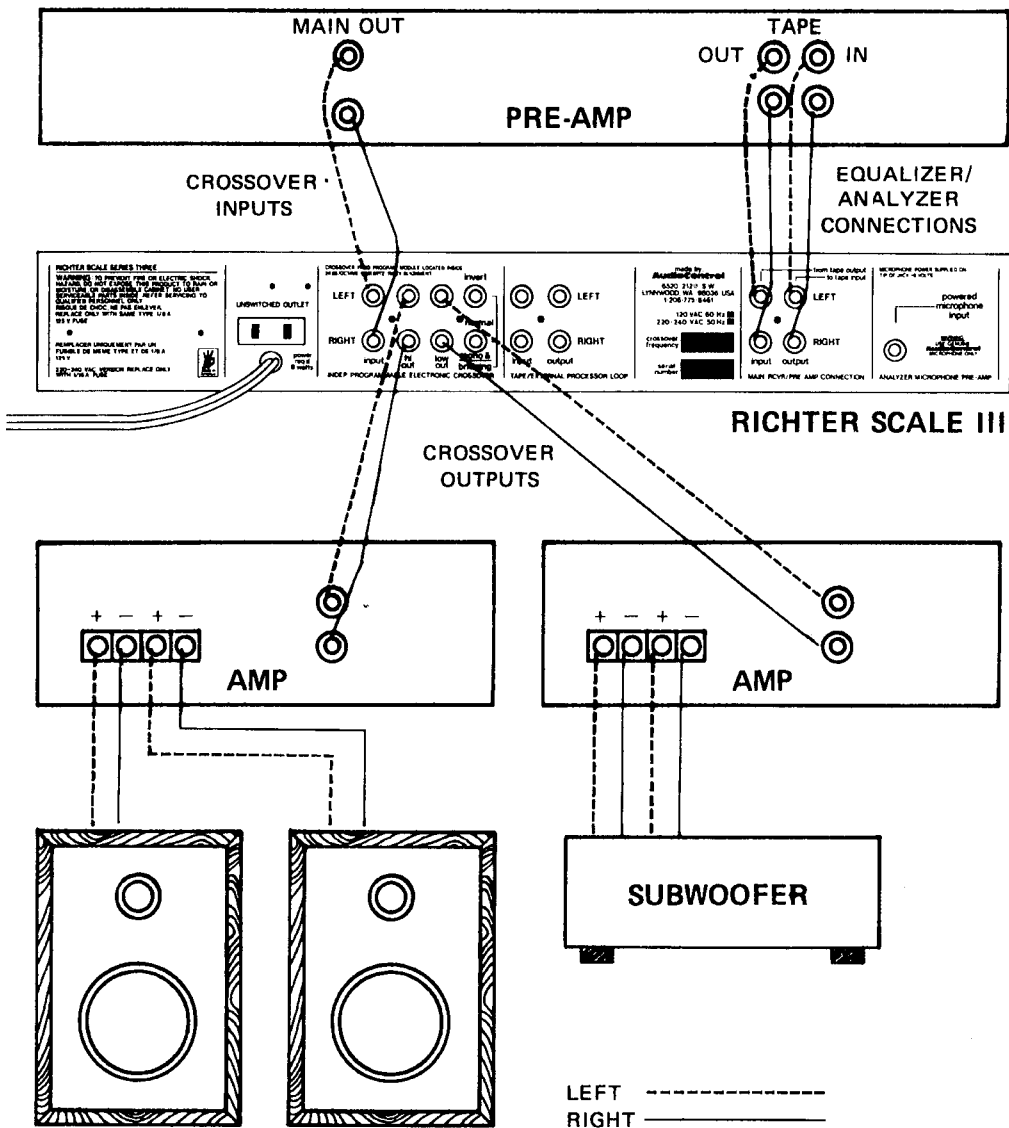
Six Band Half Octave Equalizer. These six bands control the critical bass region from centerpoints of 22.5 to 125 Hz in half octave steps. While the warble tone analyzer gives you information about acoustic problems, this section gives you precise control - all the way down to 22.5 Hz.

Programmable Electronic Crossover. The Richter Scale crossover is 24dB/octave and programmable by a plug-in module to nearly any frequency you desire. The



module provides easy, accurate, and stable over time crossover point adjustment. The crossover design is the Linkwitz-Riley alignment which provides a very sharp, zero phase error alignment. A low frequency output level is provided so the second amplifier need not have a volume control. The crossover section is completely independent from the equalizer and analyzer sections of the Audio Control Richter Scale.

Many Other Features. The Richter Scale Series Three includes a host of other features. An 18dB/octave Subsonic Filter protects speakers and saves amplifier power. To cut turntable rumble and reduce acoustic feedback a Rumble Reduction circuit is built in. For optimum bass reproduction a mono bass output is supplied as well as an inverted mono bass output for a bridging adapter. RCA jacks and center connectors are gold plated.



Hooking Up the Richter Scale

First, you can provide power to the Audio Control **Richter Scale** by plugging it into the switched outlet on your pre-amp. What, you already have the turntable there? No problem since on the back of the **Richter Scale** is a

replacement outlet which becomes switched when the **Richter Scale** is plugged into the switched outlet. We try to make things convenient.

For the equalizer/analyzer signal, the recommended way to hook in your unit is to put it in the tape monitor or external processor loop of your pre-amp. That way you can activate the **Richter Scale** by pushing in the TAPE MON button.

Look on the back of your pre-amp for two or more sets or RCA sockets marked TAPE. Two will be marked OUT or REC; two will say IN or MON.

There may be two of these outlet socket groups. If so they will be marked "1" and "2".

To connect the **Richter Scale** into this circuit, plug one end of a set of connecting cords into the "REC"/"OUT" of the pre-amp. Connect the other end to the main input sockets on the back of the **Richter Scale** (red is generally used to denote right; white, black or grey represents left).

Now connect another set of connecting cords to the plugs on your pre-amp marked "PLAY", "IN", "PLAYBACK", etc. Hook the other end of these cords to the **Richter Scale** main input sockets marked "to tape input".

Now check the drawing above.

To prove the connections are correct 1) put on a CD, record or FM. 2) Slide the **Richter Scale** slider marked 125 all the way up. 3) Press the TAPE MON button on your pre-amp. 4) Press the EQUALIZE PROGRAM button on the **Richter Scale**. You should hear a marked change in the sound. If you don't, check your connections.

Okay, that's fine for those of us who just have a regular system. But how about the gadget-o-phile. How do you hook up a **Richter Scale** with lots of goodies.

We recommend placing other equalizers, dynamic expanders, click and pop filters, and special synthesizers into the external processor loop of the **Richter Scale**.

A Guided Tour through the Gizmos

(Looking at the front of the unit, moving left to right.)

Half Octave Analyzer. Adjusting speaker response in the last three octaves is nearly impossible to do with just the naked ear. You're "hearing" them with more than just your ears. That's why we built in a half-octave warble tone generator and meter.

The meter is designed to be damped, in order to average out variations in the warble tone and decrease extraneous transient sounds during testing.

The warble tone frequency center is set with the warble tone frequency knob (makes sense). It will also produce warbles with band widths other than those indicated band centers shown. Try twiddling it quickly to amaze your friends and send dogs scurrying for cover.

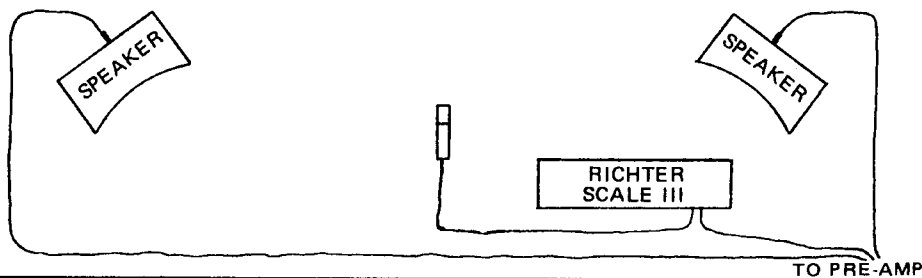
The analyze button at the right activates the dB meter circuitry and the warble tone.

But what is this strange warble sound? Basically, it is a rapidly oscillating tone of fixed amplitude within specific frequency limits. Is it accurate? Very accurate.

Half Octave Equalizer. This six band half octave equalizer gives you incredible control over the critical bass region. The sliders are ganged. So as you adjust them, you are controlling both channels at the same time. Now let's see how all this comes together.

Doing the Deed

1. Set the equalizer sliders at 0dB.
2. Plug the microphone cable into the rear of the unit and place the mike in your listening area pointed between the speakers.



3. Push in the EQUALIZE PROGRAM and ANALYZE buttons. Set the frequency control knob at 250Hz.

4. Adjust your system volume until the meter needle is at 0dB. Now set the warble tone to 125Hz.

5. Adjust the corresponding slider to achieve half the needed boost or cut. That is, if the reading is -10, adjust the slider until it is -5.

6. Now repeat the procedure for 90Hz, 63Hz, and 45Hz.

7. Before turning the warble tone knob to 31.5, listen to the 45 Hz warble a moment. If there is a rubbing sound or audible distortion which would suggest woofer over-excursion, do not rotate the warble tone frequency knob to 31.5. Doing so can damage small woofers which are not capable of the awesome excursions necessary to create this frequency.

If everything sounds okay, ease the knob down slowly.

Note the meter reading. It may very well be -20dB or even less. That's because most woofers just can't put out this frequency.

SLOWLY advance the 31.5 slider, listening for any signs of woofer overdrive (flames, ripped cones, howling dogs in the next block). If necessary, advance it all the way to +12.

8. Do the same for 22.5 Hz.

9. For owners of woofers which make funny sounds when warbled at 31.5. Don't feel bad, because if you can flatten woofers to 45 Hz, that's better than most systems anyway. Add as much 31.5 and 22.5 as you can and then back off slightly.

10. Now rotate the warble tone frequency knob back to 125 and repeat steps 5-8. This is necessary because of filter interactions between each of the half-octave bands: adjusting one affects the bands adjacent.

11. If necessary, repeat the sweep again.

The object is to be able to sweep the warble tone frequency knob and not have the meter deviate from more than ± 1 dB until it gets to 31.5 and 22.5 where, as we have explained, not all, (try "very few") woofers can put out flat response.

Now you have calibrated the system and are ready to listen to the improvement.

Subsonic Filter. Subsonics are sounds below the range of human hearing. You don't need them. They rob amplifier power, can cause speaker damage and may cause intermodulation distortion.

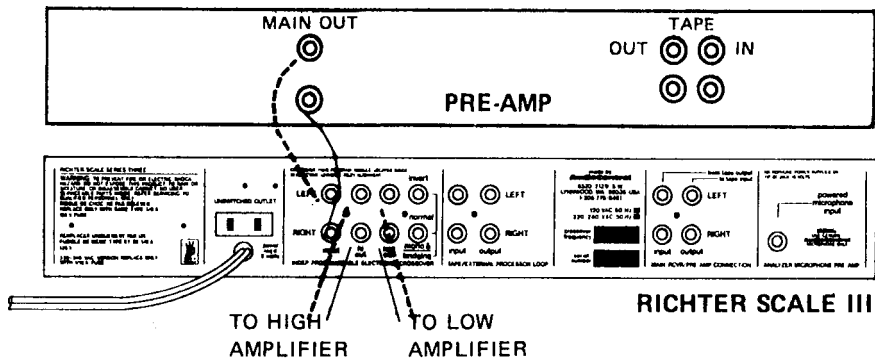
Audio Control's **Richter Scale** uses a sophisticated 3-pole, 18dB per octave subsonic filter to do away with subsonic interference for good, and without any audible side effects. The bass response of you system will sound more solid and in most cases you can safely use a more powerful amplifier. We highly recommend you use it all the time.

Rumble Reduction. Quite simply, this switch cuts turntable rumble, reduces acoustic feedback and even reduces the "thumps" that occur if you lower the cartridge too quickly onto a record.

About the best way to explain its function is to put on a record, boost bass, and then turn it up. Now click the rumble reduction button in and out. The difference can be dramatic.

The Linkwitz-Riley Crossover. The ultra-accurate 24dB/octave Linkwitz-Riley crossover alignment is generally regarded as the "best" crossover design but until recently was only available in extremely expensive professional electronic crossovers for both practical and economic reasons. First publicized by Siegfried Linkwitz and Russ Riley, two Hewlett Packard engineers, in a 1976 Journal of Audio Engineering Society article, this crossover alignment offers flat amplitude response with a steep 24dB/octave rolloff rate and zero phase differences (lobing error). The result, simply, is a clearer, more accurate sound system.

Hooking Up the Crossover. The crossover is completely independent of the equalizer/analyzer section and must be hooked up separately. Refer once again to the hook up drawing. First, run patch cords from the pre-amp main outputs to **Richter Scale** crossover inputs. They connect the high and low outputs to their respective amplifiers. Note, the MUTE and OUTPUT LEVEL control on the unit front panel only control the low frequency outputs.



What We Mean By Programmable. The crossover frequency point is programmable by changing a 16 pin resistor network module located underneath the top cover of the unit. Changing the module changes the crossover frequency point. The resistor network is the most reliable and accurate design. It will not drift frequency over time.

We have provided the **Richter Scale** with a 90 Hz module already plugged in.

Making Your Own Crossover Frequency. We have also provided a chart of resistor values needed for whatever crossover point your particular system will need. The module is located under the top cover of the unit on the circuit board in line between the crossover outputs on the unit's rear and the subsonic filter button on the front. **NOTE:** The resistors used must be **AT LEAST FIVE PERCENT TOLERANCE CARBON OR METAL FILM**. We recommend one percent metal film resistors.

If you need a crossover frequency not listed here, use the following formula to calculate the resistor.

		CROSSOVER FREQUENCY	RESISTOR VALUE
		72Hz	100k ohms
RESISTOR =	$\frac{7234315.59}{\text{Frequency}}$	80Hz	91k ohms
		(ohms)	88Hz
		96Hz	75k ohms
		117Hz	62k ohms
		129Hz	56k ohms
		142Hz	51k ohms
		153Hz	47k ohms
		168Hz	43k ohms
		185Hz	39k ohms
		212Hz	34k ohms

INTRODUCTION TO THE AUDIO CONTROL CONDITIONAL WARRANTY

People are scared of warranties. Lots of fine print. Lots of non-cooperation. Months of waiting around.

Well, don't be scared of this warranty. It's 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 Audio Control product.

Also, warranties help us keep track of our customers so we can let you know of any modifications, dangers, or improvements. Now, that doesn't mean you are going to get put on a mailing list, and get wierd Aztec porno or free deodorant samples. Your name and address on the warranty are strictly confidential to Audio Control.

So, go ahead and read through your warranty, then enjoy your new equalizer for a few days before sending in the warranty and any comments.

FIVE YEAR CONDITIONAL WARRANTY

"Conditional" doesn't mean anything ominous.

The Federal Trade Commission makes all manufacturers use the term to indicate certain conditions you have to meet before they'll honor the warranty.

If you honor these conditions, we will warrant all materials and workmanship on your Audio Control **Richter Scale** for **five years** from the date you bought it, and will fix it or repair it during that time.

Here are the conditions that make this warranty conditional:

1. You have to fill out the warranty card and send it to us within 15 days after you bought you Audio Control product.

2. You must keep your sales slip or receipt so you have proof of when, and from whom, you bought your **Richter Scale**. We're not the only company to require this, so it's a good habit to get into with any hi-fi purchase.

3. Your Audio Control **Richter Scale** has to have been originally purchased from an authorized Audio Control dealer. You don't have to be the original owner to take advantage of the five-year warranty, but the date of purchase is still important so be sure you get the sales slip from the original owner.

4. You can't let anybody but someone, at our factory, nurse your ailing unit back to life. If anyone other than us messes with it, that voids the warranty.

5. The warranty's also not in effect if the serial number has been altered or removed, or if the Audio control unit is used improperly. Now that sounds like a big loophole, but here's all we mean. Unwarranted abuse is:
a) physical damage, (our consumer products are not meant to prop up bookcases or get hauled around in a toolcase, etc.)
b) improper connections, patch the phono jacks into a line socket or hook it to the speaker terminals on your power amp and we aren't responsible... high input signals could fry the innards, c) sadistic things you shouldn't do to any electronics, such as get them too hot, wet, dirty, etc.

Assuming you conform to numbers 1-5 and it's not all that hard, we get the option of deciding whether to fix your old unit or give you a new one. This is the only warranty given by Audio Control. This warranty gives you specific legal rights which vary from state to state. Promises of how well your Audio Control product will work are not implied by this warranty. Also, we will not be obligated for direct or indirect consequential damage caused by defect or warranty claim, express or implied, or damage to your system caused by hooking up the Audio Control **Richter Scale**.

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

THE RICHTER SCALE

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Richter Scale Series III Specifications

Total Harmonic Distortion	0.005%
Frequency Response	18 to 100k Hz
Input Impedance	100k ohms
Output Impedance	150 ohms
Signal to Noise Ratio (rated full output)	-120dB
Meter Range	-20dB to +6dB
Maximum Output Level	7 Vrms
Crossover Slope	24dB/Octave
Crossover Frequency	Programmable*
Subsonic Filter	18dB/Octave
Size	17"x2.5"x8.25"
Warranty	5 Years
Country of Origin	U.S.A.

*While the crossover comes pre-set at 90 Hz, it can be programmed for almost any frequency from 20 to 20k Hz.



AudioControl®

making good stereo sound better®

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