

AudioControl Industrial[™]

Model 510 & Model 710

Multi-Zone Power Amplifier / Zone Equalizer

Professional Installer's Consciousness Guide

AudioControl Industrial[™]

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Important Information

Dealer Name _____

Date Installed _____

Serial Number _____

AudioControl Industrial _____

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CONGRATULATIONS!

You are now installing a component which can dramatically improve the performance of any multi-zone audio system, especially those utilizing in-wall speakers. The Model 510 / 710 are American-designed, American-built “set and forget” component which will provide a lifetime of trouble-free service.

The Model 510 / 710 are made by the only electronics company in the world that specializes in equalizers, signal processors and audio analyzers. And the company who sells the most popular one-third octave real time analyzer in the world, the SA-3050. AudioControl’s passion for high quality and meticulous attention to detail shows itself in the dozens of awards we have won for our designs, products and service. Now, as when we began, our greatest satisfaction is our reputation for sonic excellence and reliability among people just like you throughout the world.

This manual is designed to help you get everything you can out of this new amplifier/equalizer. So, even though you’re dying to see it in action, please take a few minutes to slog through our not-so-weighty prose and learn how to get the most from this new product. Anything with this many knobs deserves all the explanation it can get.

Product Highlights

600 Watts Strong — With twelve powerful channels of amplification, The Model 510 / 710 will drive 50 watts per channel with all channels driven. This is a true 600 watt amp design, so go ahead and put a small quarry of rock speakers by the bar patio. Then sit back and enjoy the compliments.

Built For The Long Haul — The Model 510 / 710 has been designed with durability in mind. The Lightdrive protection circuitry defends the Model 510 / 710 and your speakers against clipping, distortion, damage, parties and DJs. Even if the party lasts all weekend.

Light Drive Protection — Few things are more irritating than a problem in one zone of an audio system effecting the entire system. This will not happen with the Model 510 / 710. Every stereo output zone features independent protection against short circuits, over-heating, DC offset and clipping. Even if the protection needs to kick in, that doesn’t necessarily mean that the affected zone will shutdown. If a zone overheats, the smart protection reduces the power to that zone, allowing it to cool

Product Highlights

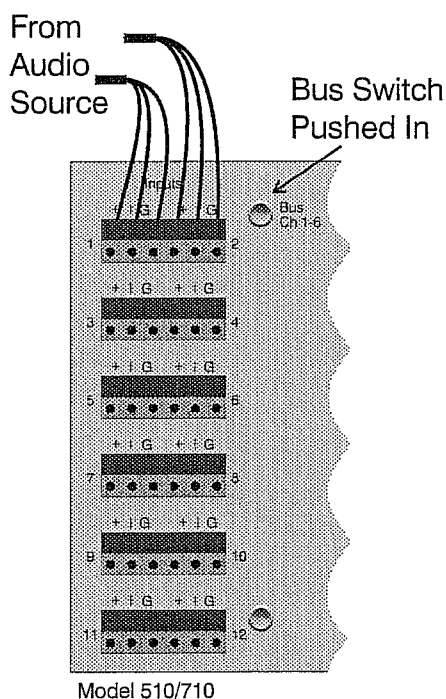
down with only a minimal reduction in speaker volume. Of course the protection circuits are smart enough to reset themselves when the problem is solved.

Specially Designed Frequency Controls — (*Model 710 only*) The Model 710 is intended to provide a dramatic sound improvement for “small” speakers, such as those with 6-inch and 8-inch woofers. The 45Hz, 150Hz, 300Hz, 700Hz, 2500Hz and 12kHz band centers were chosen to optimize in-wall and 2-way mini-monitor speakers at critical frequencies where adjustment is most advantageous. The bandwidths (or ‘Q’ as our engineering types call it) have also been optimized for the difficulties that in-wall speakers present. This allows the Model 710 to improve the sound of these smaller speakers better than any other equalizer.

PFM Programmable Subsonic Filter — The Programmable Frequency Match (PFM) circuitry is an installer adjustable bass-blocking filter which protects small speakers and improves their overall sound. The smaller woofers found in most in-wall or bookshelf speakers cannot reproduce the bass of a larger speaker (the laws of physics intervene). If called upon to reproduce a bass note that would cause the speaker to move PAST its maximum cone travel, damage can result - and even if it doesn’t, severe audible distortion DOES. The solution is AudioControl’s exclusive PFM circuit. It gives small woofers only those frequencies they can use by “chopping off” bass below an installer programmed frequency (40Hz is the factory setting). The woofer is protected and can do a better job of reproducing mid-bass and higher frequencies.

Input Bussing – Sometimes you just want to feed the same music to every zone. You could use a single, stereo amp and series/parallel the speakers. The problem is that if you get a short in the system or the amp dies, **all** of the zones go dead. The Model 510 / 710 solves that dilemma by letting you send a single stereo signal to all 12 channels of the amp with the press of a button. Every room enjoys independent protection and equalization.

Made in the Northwest Rainforest — The Model 510 / 710 began its existence at our factory in Mountlake Terrace, Washington, a few miles north of Seattle. Here, we also build precision test instruments, equalizers and analyzers and a totally awesome line of other audio components. AudioControl Industrial began in 1977 and has won so many audio industry awards for design and engineering excellence that our reception room wall is starting to sag. But enough about us. Let’s start getting the most from your audio system!



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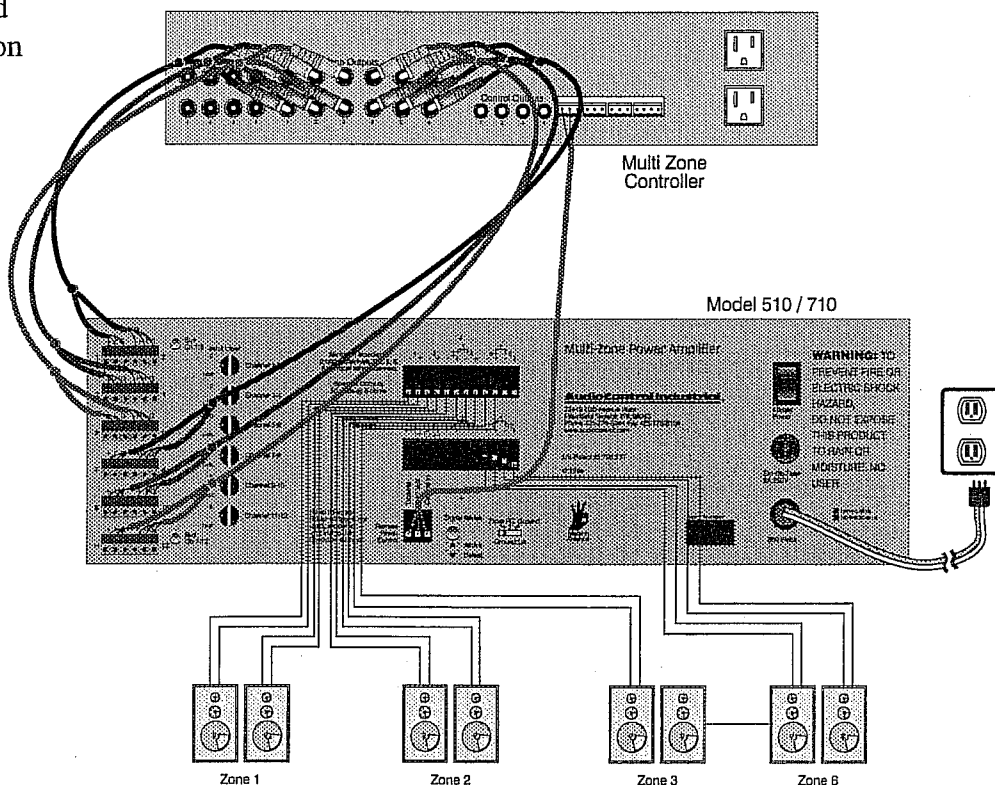
Experienced Installer's Quick Hook-Up Guide

Quick Hook-Up Guide

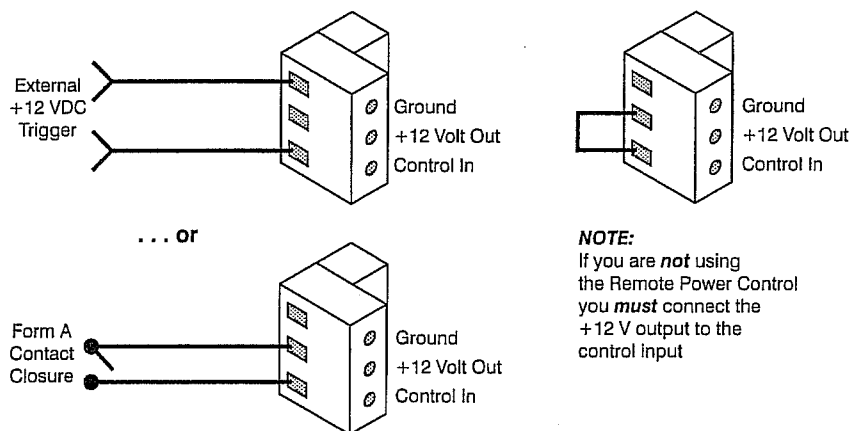
Make sure to fill out and mail the warranty card.

The PFM filter module comes factory set at 40Hz. See page 19 for details on changing the PFM modules. A complete range of frequencies is available from the factory and information is also available on building your own modules in Appendix A.

Final adjustment of The Model 710's boost/cut controls in each zone is best done with a one-third octave real time analyzer and pink noise test signal, but it can be done by ear, especially if you desire to emphasize certain frequencies.



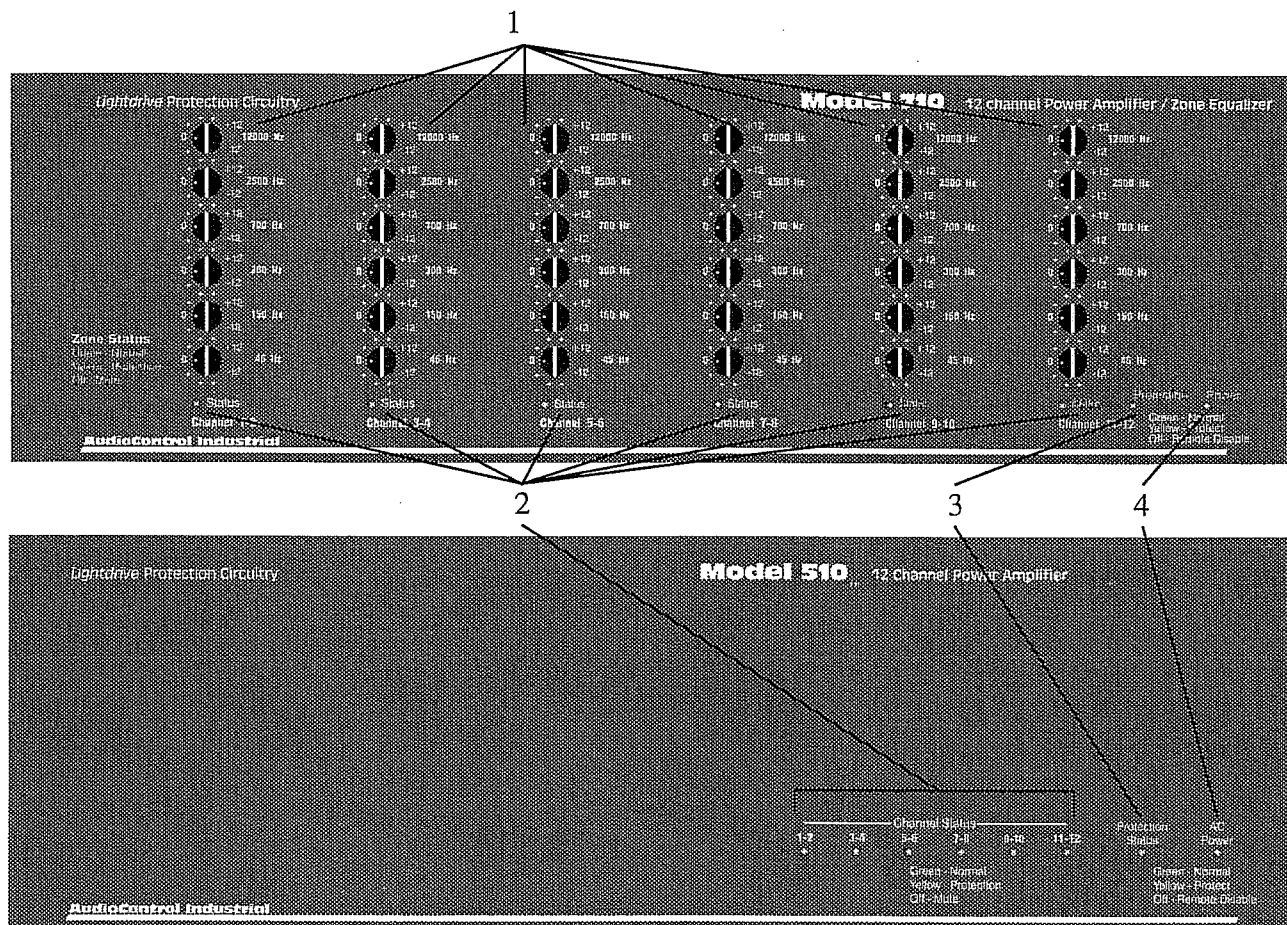
Six Zone System with The Architect and Preamp/Controller



Remote Power Control Hookup

Model 510 & Model 710
Installer's Guide

A Guided Tour Of The Model 510 & Model 710



Front panel:

1. Stereo Speaker Equalizer Controls —
(Model 710 only) This sea of knobs provide up to 12dB boost or cut at 45Hz, 150Hz, 300Hz, 700Hz, 2500Hz and 12KHz. After initial adjustment the only time you would change the control settings are 1) if you connect different speakers into the system, 2) if (assuming the speakers aren't built-in) you move them significantly, such as from a bookshelf to floor stands, or 3) if the room acoustics change through addition or rearrangement of furniture, wall or floor coverings, large hairy dogs, etc.

Note: If you have the Signal-Sense turned on, then the status LED will not turn on until there is an audio signal present on that zone's inputs.

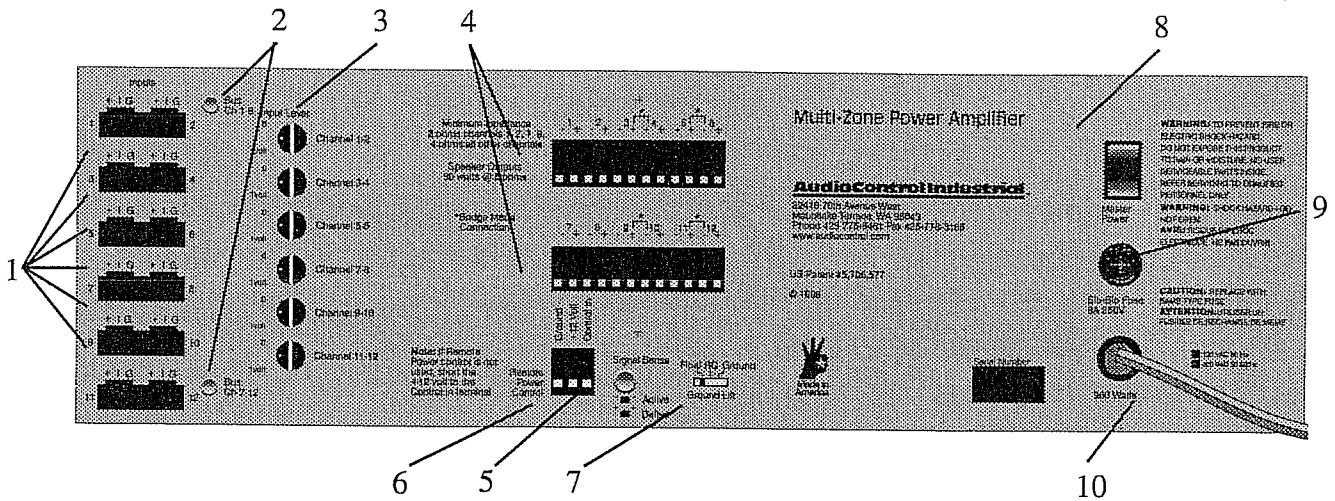
AudioControl Industrial

2. Channel Status LEDs — These dual-color LEDs serve two purposes. First, they illuminate Green when the corresponding zone is active. The second function of the status LED is to turn Amber if something has caused that zone to go into protection.

3. Protection LED — This LED also has two faces. In normal operation it glows Green when the remote power trigger is active and The Model 510 / 710 is in stand-by. If the Protection LED turns Amber, then one of the internal protection circuits have come into use. All the protection circuits automatically reset themselves when the problem causing the fault has been fixed.

4. Power LED — Nothing too tricky here...if you have the Master Power switch (on the back panel) turned on and The Model 510 / 710 is plugged into an active AC outlet, this little red light will shine forth.

A Guided Tour Of The Model 500 & Model 700



Back panel:

1. Inputs — These balanced Euro block inputs connect to your control preamplifier's outputs. The signal sense and equalizer circuitry work in channel pairs (1&2, 3&4, etc.) but you can still use each input as a separate mono channel.

2. Input Bus Switches — Sometimes you need to feed the same audio signal to multiple channels. The Input Bus switch lets you gang three zones together with the press of a button.

3. Input Level Controls — These stereo-ganged controls vary the input sensitivity of the Model 510 / 710.

4. Speaker Outputs — These terminal blocks are designed to make an installer smile. You can unplug the blocks and connect all of the speaker wires to them without balancing The Model 510 / 710 on your lap. This also makes it very simple to pre-wire a system without ever taking the amp out to the installation site. The speaker connector blocks will accept up to 12 awg wire.

5. Signal Sense Defeat — The signal sensing circuitry activates a zone approximately one second after an audio signal is present on the Inputs. To defeat this function and leave The Model 510 / 710 ready to play at all times, press this switch in to the recessed (Defeat) position.

6. Remote Power Control — This three pin connector allows you to remotely turn on The Model 510 / 710. You can either use a contact closure

between the Control In and the +12VDC output or an external 12 volt trigger between the Control In and Ground terminals. The +12 volt output is not designed to power other pieces of equipment. It is a current limited output for switching The Model 510 / 710 only.

7. Ground Lift Switch — This switch selects the level of isolation between the audio signal ground and your AC earth ground. In normal operation this switch should be in the Ground position, but if you run into trouble with an AC ground hum, try the other two settings for the best operation. For your safety, the chassis is always connected to ground regardless of the switch setting.

8. Master Power Switch — This switch shuts off the main AC power. Normally the only time you need to turn off the master power is if the homeowner is going to be gone on vacation for the summer.

9. AC Power Fuse — The Model 510 / 710 is designed with several layers of protection circuitry. This power fuse is here just in case something really awful goes wrong.

10. Power Cord — The Model 510 / 710 draws a hefty 1000 watts. Make certain that it is plugged directly into the wall outlet or a power strip with sufficient power rating. Since The Model 510 / 710 has remote power switching, you can plug the unit into an outlet that is always active.

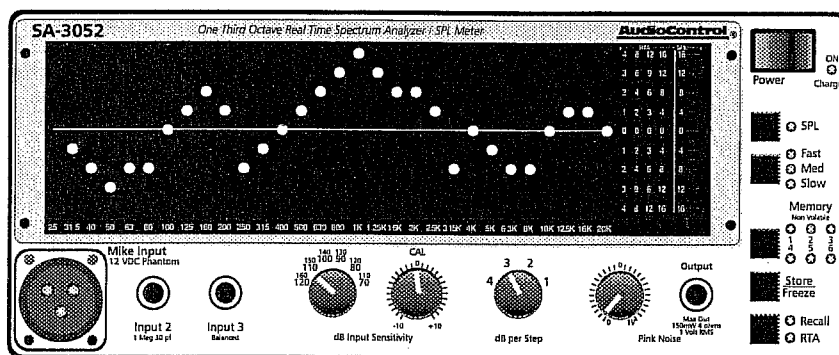
Model 510 & Model 710
Installer's Guide

Hooking Up Your System

Hooking Up Your System

What you'll need:

1. The Model 510 or Model 710 Multi-Zone Power Amp.
2. Audio hook-up cables.
3. (Optional) Rack Mounting Kit to install the Model 510 / 710 into a standard 19" rack.
4. Enough speaker wire to reach all of your speakers.
5. Multi-zone controller, receiver, or preamplifier.
6. Although you can set the speaker optimization controls by ear, a real-time audio analyzer such as the AudioControl SA-3052 is very helpful.



Installation: The Long Version

Installation: The Long Version

What follows is a step-by-step guide to integrating The Model 510 or Model 710 into your multi-zone system. If it seems overly detailed, please forgive us. We would rather tell you too much than too little.

First, check the new Model 510 / 710 for any shipping damage. We pack 'em pretty securely, but it's a vicious world out there and anything can happen twixt Mountlake Terrace, Washington, and your installation.

Paperwork

Yes, filling out the warranty registration card is about as exciting as cleaning out your sock drawer, but we'd definitely like the card back after you've hooked up The Model 510 / 710 and played with it a while. We DO read each and every incoming card and react to your suggestions. That's how great products like this are created.

Placement

The Model 510 and Model 710 are very efficient amplifiers, but it does need some breathing room to operate properly. Make certain that the vents on the top and bottom are not blocked and have at least ½" of air space. Also make certain that heat sensitive components such as CD or tape players are not directly on top of the amp.

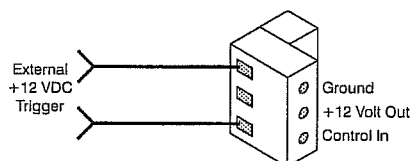
The rack mounting kit for the Model 510 / 710 can be used as either a front or rear mount.

Installation: The Long Version

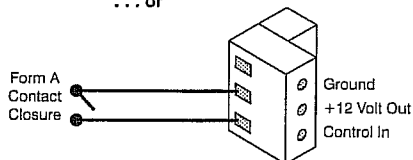


Installation Hint: If your installation doesn't require this remote power turn-on, you must put a short piece of wire between the +12 V output and the Control Input pins.

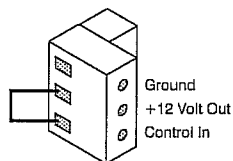
Note: The channels are paired into stereo zones (channels 1&2, 3&4, etc.). The signal-sense control effects both channels in a zone at the same time even if only one input is used.



... or



Note: If you are **not** using the Remote Power Control you **must** connect the +12 V output to the control input.



AC Power

Under normal operating conditions, the Model 510 / 710 can draw up to 1000 watts of AC power. Don't plug it into a switched outlet on your system unless you are certain that it can handle the power rating. Also, please don't cut off the ground pin on the power connector. It is an important safety feature. If you need to plug it into a two prong outlet, use a ground adapter (and connect the ground on it).

Remote Power Control

The Model 510 / 710 has three levels of power control.

1. Main AC Power Switch — This is the master control and must be turned ON for the unit to function. When the main power switch is on, the red Power LED on the front panel lights up. Normally the only time that you would need to turn the AC power switch off is when the system is going to be unused for an extended period.

2. Remote Power Control — This removable 3-pin remote connector on the rear panel allows simple interfacing with external control systems. It accepts either a contact closure or external +12 volts DC (see diagram). The two-color Protection LED on the front panel illuminates Green to show that the remote power control is active and the amplifier is in Stand-by.

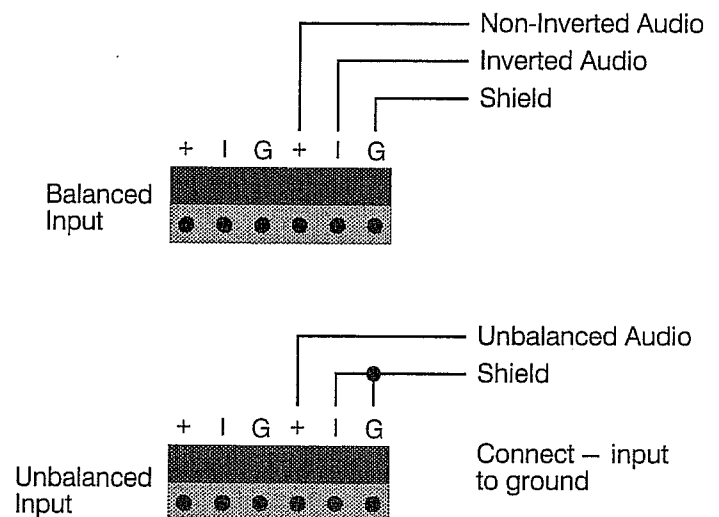
3. Signal-Sense Circuit — This provides individual zone power control. When active, it senses that an audio signal is present on the RCA inputs, enables the power and unmutes that zone. The zone status LEDs on the front panel light up Green when a signal is present.

In some installations it may be desirable to defeat the signal-sense control and leave all zones active regardless of the audio input. To defeat the signal-sense, press in the Signal-Sense Defeat button on the rear panel.

Audio hook-up

If you're an installation veteran, this may seem repetitive, but some things can never be repeated too many times (just ask our Customer Support Department).

1. Turn off ALL components before making any connections.
2. The two main keys to good wiring are labling and consistency. This makes it much easiser to troubleshoot an installation or go back and update an existing system.
3. If the same audio signal needs to feed multiple channels the Input Bus switch on the Model 510 / 710 must be pressed 'in'.
4. Whenever possible, keep power cords away from signal cables to prevent induced hum. This is especially important if you bundle the cables to keep the installation neat looking.



Doing the Deed

Speaker wire hook-up

The same rule applies to the speaker wires as the input audio connections. Take care when running the speaker wires not to cut the insulation pulling around metal ducts or frames. Also, watch out for errant staples punching into the wire.

If you do have a short in a speaker wire the protection circuits in The Model 510 / 710 will show an amber status LED for the shorted zone. The status LED will cycle Amber/Green only when the volume is turned up in the shorted zone.

See Appendix B for information about bridging The Model 510 / 710 into mono operation.

Doing The Deed

Before proceeding on to setting up the Speaker Zone Equalizer controls on The Model 510 / 710, it's a good idea to make sure that you have everything connected and working properly.



Installation Hint: For the absolutely best results, The Architect™ Model 710 should be adjusted with a real time analyzer such as the AudioControl Industrial SA-3052.

1. Double-check all connections. Make certain that all of the audio and speaker connections are firmly seated and tightened down.
2. Turn on your audio system. The Power LED on The Model 510 / 710 should be Red, the Protection LED should be Green and (unless you have defeated the Signal-Sense), all of the Zone Status LEDs should be off.
3. Start one of the audio sources playing and select a zone (how you do this depends on your multi-room control system). The zone status LED should light Green approximately one second after the music begins.
4. Continuing checking each zone to ensure that every one plays properly.
5. Congratulations! You're ready to go on to setting the Speaker Equalizer controls.

You're almost done! Now for the details of operation...

Information For Control Freaks

Here is a brief introduction to each of the Speaker Equalization control frequencies and what their effect on your music is.

45Hz — Low bass. This is about the lowest frequency which in-wall, extension and small bookshelf speakers can achieve. Boosting it too far might cause problems, even though The Model 510 / 710's PFM filter cuts frequencies under 40Hz. But if the speakers can take it, a mild boost will enhance bass instruments such as Fender bass, kick drum, floor toms, timpani and double bass violas.

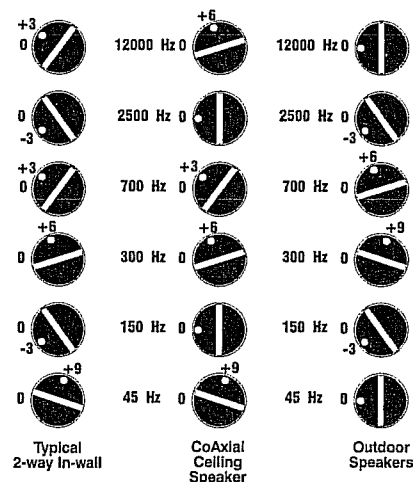
150Hz — High bass. There's a lot of bass information at this frequency. In fact, most modern music is mixed to enhance this area of the frequency spectrum. 150Hz also determines the depth of male vocals and contains reverberant information which contributes to the spaciousness of sound. Boosting 150Hz can add "POW!" and impact to bass or it can make the sound "bonky" and "boomy". This is a critical adjustment with small or in-wall speakers. Experiment with it.

300Hz and 700Hz — High and low midrange. These controls directly effect the sound of instruments and vocals. These bands also determine the speaker's presence (whether the music sounds far away or close in). Small speakers often produce too much midrange, so these controls are candidates for being turned down slightly during your initial experimentation. Definitely consider reducing 700Hz if you are only using your extension speakers for background music.

2500Hz — Treble. Female vocals and the "edge" of instruments such as guitars, snare drums, saxes, violins, etc. are found in this range. If accentuated too much (by boosting this control) sounds in the 2500Hz range can seem harsh and fatiguing to the ear due to excessive output by the speaker or because of live, reflective room acoustics.

12kHz — High treble. The fine detail, texture and sheen of music is found here. The breathiness of vocals, the "sheen" of cymbals, the high overtones of piano and strings. Actually, there's audible music information up to 20,000Hz on some CD's and most adult's hearing is still pretty good at 15,000Hz. But we've chosen 12,000Hz because it provides more useful control to compensate for room acoustics and common small-speaker deficiencies.

Information for Control Freaks



Example Settings

The Truth About Bass & The Programmable Frequency Match Filter

The Truth About Bass And The Programmable Frequency Match Filter

Now that digital audio is the favorite musical source, there's more low bass running around in a typical system. Low bass injects large amounts of power into ANY kind of speaker — up to 60% of your amplifier's output is being used to reproduce frequencies under 100Hz. That can really tax a system which is driving multiple speakers from a single amplifier channel. The second problem is that bass produces heat in the speaker. If more heat is built up than the speaker can dissipate, the driver coil can literally go into meltdown (or worse).

In addition, ultra-low bass and small speakers don't always get along, ESPECIALLY when you DO have ample power. The low bass music content can cause over-excursion: The speaker cone attempts to travel farther than its physical limits, potentially causing damage (in some cases you can actually hear a clacking sound!). Even before destruction sets in, there are other problems with feeding super-low bass to small speakers. Most bookshelf and in-wall loudspeakers are 2-way systems. That means that the woofer also handles a large part of the critical midrange area. When the woofer is bashing around trying to reproduce unrealistically low bass, it's ability to produce midrange is compromised due to intermodulation distortion. So not only don't you get low bass, you get lousy vocal and instrumental reproduction.

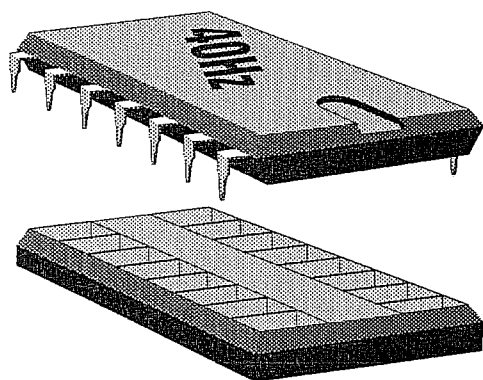
Pragmatically, it boils down to this: If you want ultra-low, foundation-shaking bass from an in-wall speaker, you should add in a separate subwoofer, a somewhat expensive approach. A more economic approach is to equalize the speaker for maximum low bass output WITHIN IT'S PRACTICAL RANGE and eliminate

lower frequencies which either can't be reproduced or which incite excessive cone travel.

The equalization part is handled by The Model 710's 45Hz control. The prevention part is handled by The Model 510 / 710 Programmable Frequency Match filter circuit. While it may seem surprising, actually cutting off some of the lowest bass will make the bass sound cleaner, punchier and even louder.

AudioControl's Programmable Frequency Match circuit is an adjustable subsonic filter which cuts off low frequencies. The PFM filter's cut-off point is adjustable via a small resistor module inside The Model 510 / 710. When you receive your unit, it is programmed with a 40Hz bass cut-off. Depending on the application, you may want to change the filter frequency. Don't let ego get in the way and set the PFM too low because somebody thinks that a 6" woofer should be able to play down to 20Hz.

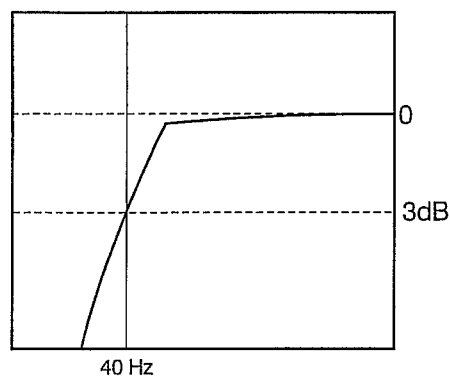
The following standard module frequencies are available from AudioControl: 20, 25, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 130, 150, 200, and several higher frequencies going up to 6000Hz which probably aren't applicable except in very special circumstances. Each module's frequency is determined by 6 resistors inside a 14-pin DIP network. See Appendix A for details on building your own modules.



Close-up view of PFM Modules

Note: The modules are not directional so it does not matter which way they are inserted.

The Truth About Bass & The Programmable Frequency Match Filter



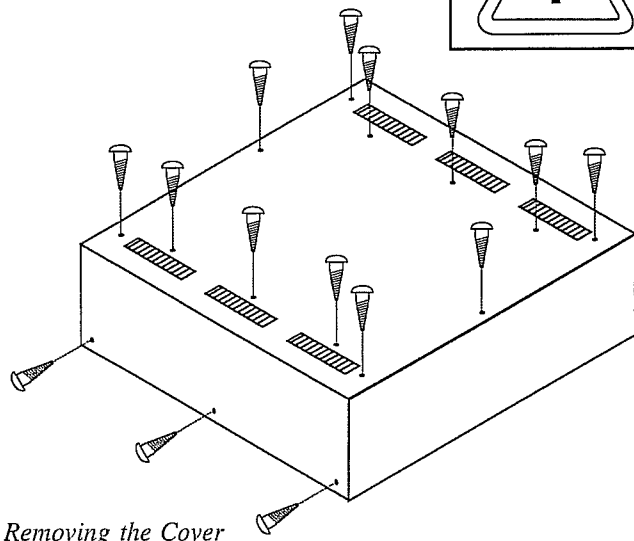
PFM rolloff curve

Changing The PFM Modules

Changing The PFM Modules



WARNING: Unplug the Model 510 / 710 from AC power before beginning. There are dangerous voltages present inside.

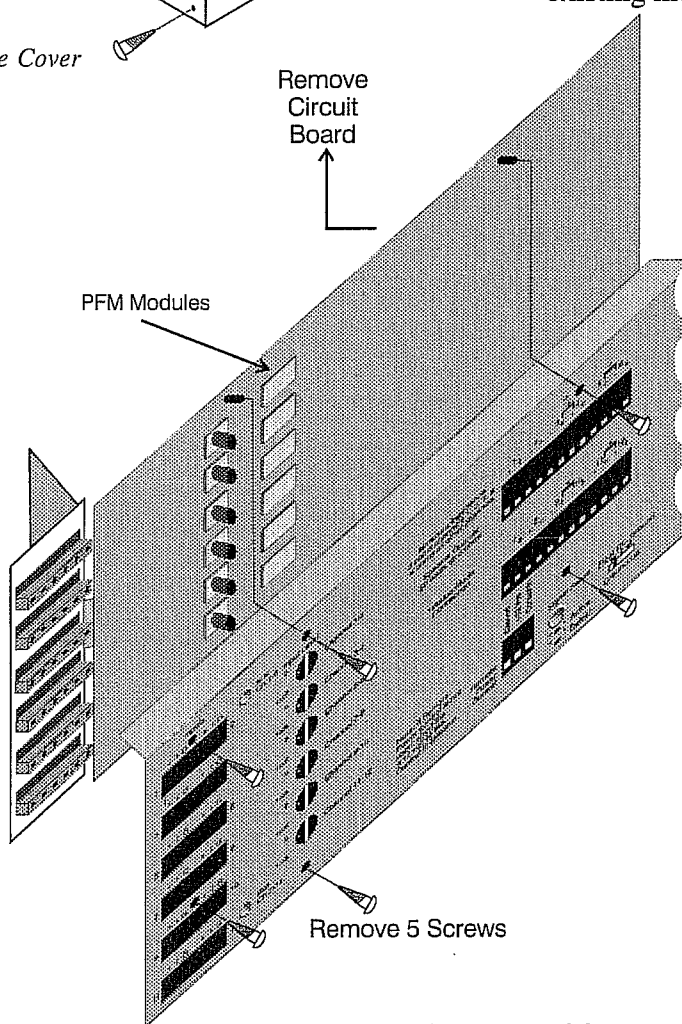


Removing the Cover

The first task in changing the PFM modules is to remove the top chassis of the Model 510 / 710. To do this, first remove the 18 screws marked in the figure above. Now let your wrist relax for a few moments and survey the innards of this beast. The PFM modules are located on the circuit board that runs along the rear of the Model 510 / 710 (see figure).

Use a small screwdriver to gently pry the existing modules from their sockets taking care not to bend the contact pins. Now you can install the replacement modules. There is **NO POLARITY** to these modules so they can install in either direction.

Now you can put the top back onto the Model 510 / 710 and go back to enjoying your music.



Changing the PFM Modules

Troubleshooting The Model 510 / 710

Troubleshooting The Architect

Almost all problems can be eliminated by re-checking the wiring and settings of the Model 510 / 710. If a problem cannot be solved using the guide below, please call the AudioControl factory for further assistance.

1. No Sound:

- Verify Power LED is on.
- Verify Protection LED is Green.
- Verify Channel Status LED for zone is Green.
- Verify Source unit is operating.
- Check the Speaker Connector plug on the rear panel.
- Check the AC Power Fuse on the rear panel.

2. Protection LED is Green, but no Channel Status LEDs are on:

- Verify Source unit is operating.
- Try turning up the volume higher.
- Defeat the Signal-Sense using switch on rear panel. All Channel Status LEDs should turn on. If not, call the factory.

3. Channel Status LED is Amber:

- Check speaker leads for short.
- If the Model 510 / 710 is excessively hot, turn down the volume and allow it to cool off. The Status LED should turn back to Green after a short while.
- The speaker impedance may be too low.

4. Protection LED is Amber:

- Something seriously wrong has happened inside the Model 510 / 710. Please contact the factory.

5. Speaker Buzzing or Cracking at high volume:

- Reduce the equalizer boost at 45Hz or 150Hz.
- Try a higher PFM filter frequency. The factory setting is 40Hz.

6. There is no signal, but the Channel Status LED is still Green:

- Check the Signal-Sense defeat switch on the rear panel. If it is pressed in, the Channel Status LEDs will stay on as long as the Remote Power Control is enabled.
- The Channel Status LEDs stays on for several minutes after the audio signal has stopped to prevent prematurely turning off during quiet passages or disk changes.

A Brazen Plug For Other AudioControl Products

A Brazen Plug For Other AudioControl Products

A Brazen Plug for other AudioControl Industrial Products

AudioControl Industrial began building products in 1977 and currently manufactures a full line of components for distributed audio and audio analysis. All AudioControl Industrial products from the Balanced Line series of Pro to Consumer Adapters to our state-of-the-art IASYS system setup tool are designed and built with our same dedication to innovation and highest quality. Our SA-3050 third-octave RTA is still the world's most popular audio analyzer.

Do you ever ask the questions: Where do I pick the best crossover point? What is the right delay setting? Where do I set the limiter? If so, then IASYS is for you. This sophisticated fuzzy-logic system setup analyzer provides "Answers, Not just Data". No longer do you need to set up computers and pour over complicated graphs. Iasys automatically runs through all the tests necessary to answer your audio system setup questions.

The Balanced Line series adapters provide a high-quality active audio interface between unbalanced consumer audio equipment and balanced professional units. The active design ensures full range operation and allows boosting -10dB consumer up to +4dB pro audio levels.



BLD-10 4-channel Balanced Line Driver



BLR-10 4-channel Balanced Line Receiver

Pro to Consumer Adapters

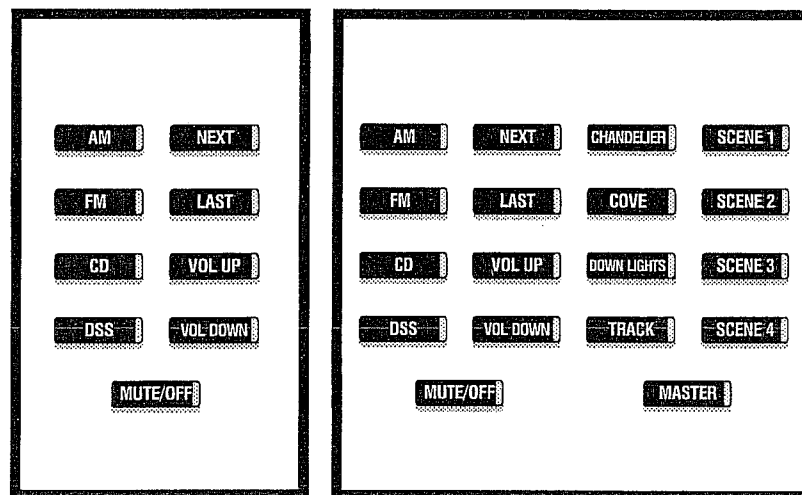
The Director Model 46 multi-zone audio controller provides matrix routing and level controls for up to 4 stereo audio source inputs and 12 stereo zone outputs. The Director can be controlled by fully programmable wall stations or linked to other automation systems through the RS-232 serial port. Oh, it handles paging also.

Okay, enough commercials.

Once again, we thank you for choosing AudioControl Industrial components for your system designs.



The Director Model 46 Audio Multi-Room Controller



Appendix A

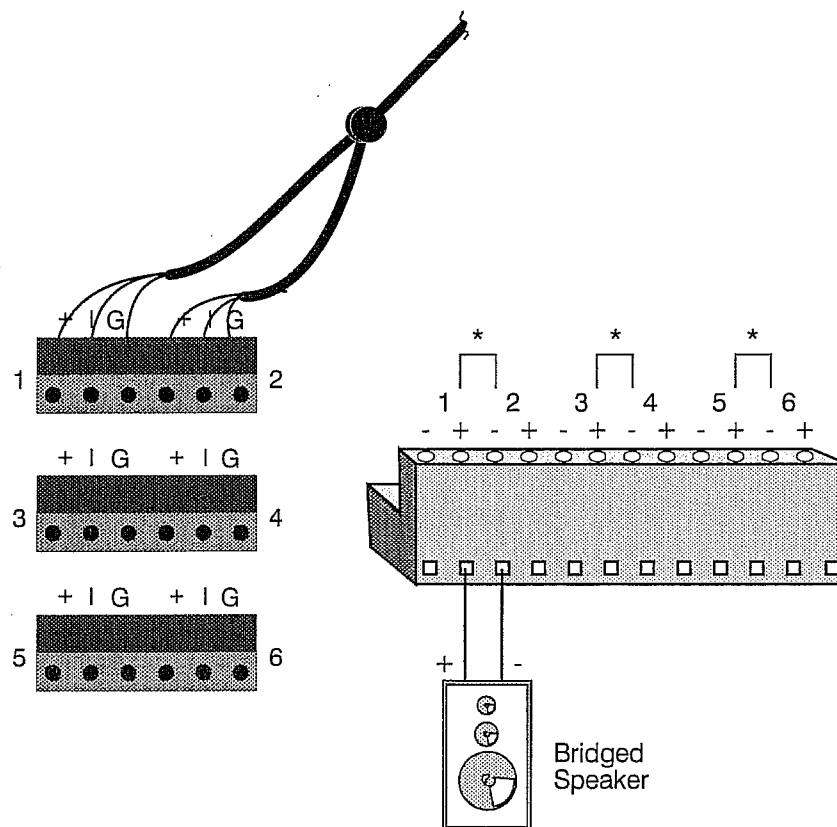
Appendix A - Bridging The Model 510 / 710



Caution - When bridging a zone, the minimum speaker load impedance on that bridged output is 4 ohms. In a bridged system, each channel of the bridged pair “sees” one half of the speaker load. This means that a bridged amp driving a 4 ohm speaker is operating into a 2 ohm load.

To increase the output power of The Model 510 / 710, you can join (bridge) the two channels of one zone into a single channel of 100 watts. Accomplishing this is a simple matter. Just connect the audio input to both channels of that zone and then connect the speaker terminals as shown in the diagram below.

Bridge connection showing input and Speaker Hookup



Appendix B - Building Your Own PFM Modules

AudioControl PFM filters use resistor modules for frequency programming. All modules are constructed in the same way, with the exception of the actual value of the resistors used. In each module, ALL resistor values are equal. The resistor value for any given frequency is chosen according to the following equation:

$$\text{Resistor (kilohms)} = 7200 \div \text{frequency (Hz)}$$

Example: To find the resistors needed for 1000 Hz.

$$R \text{ (kilohms)} = 7200 \div 1000$$

$$R \text{ (kilohms)} = 7.2$$

$$R = 7.2 \text{ K} = 7200 \text{ ohms}$$

Standard Module Frequencies

| 18dB/octave (14 pin) | |
|----------------------|-----------|
| Frequency | Frequency |
| 20 Hz | 100 Hz |
| 25 Hz | 120 Hz |
| 35 Hz | 130 Hz |
| 40 Hz | 150 Hz |
| 45 Hz | 170 Hz |
| 50 Hz | 200 Hz |
| 60 Hz | 270 Hz |
| 65 Hz | 350 Hz |
| 70 Hz | 500 Hz |
| 80 Hz | 725 Hz |
| 90 Hz | 950 Hz |

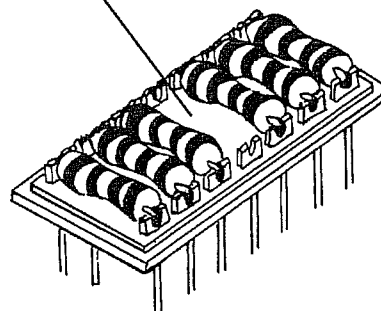
Building Modules

PFM modules require 6 resistors mounted on a 14-pin DIP header. In the 14-pin modules, the middle resistor position is unused and may be left unconnected. We recommend 5% ¼ watt carbon film resistors, or if you really want to be spot-on, 1% metal-film resistors (difficult to get).

The DIP headers are available from Radio Shack or other electronic parts distributors. Radio Shack seems to carry more 16-pin headers than 14-pin, so you may have to manufacture a 14-pin unit by cutting off the last 2 pins. It will make things easier if you buy a 16-pin IC socket as well. You can chuck the socket in your vise and have a handy fixture to hold the header while you solder.

Do not be confused by the modules from the factory that do not show individual resistors. They really are there, just encased in plastic.

Note: Center Resistor is absent



Appendix B

Frequencies by Resistor Value

Five-percent resistors are available in 24 standard values per decade (this means that from 10 to 100 ohms, there are 24 values). The following table lists the crossover frequencies that result from using these standard 5% values.

| Frequency Value | | Frequency Value | |
|-----------------|---------------|-----------------|----------------|
| 965 Hz | 7500 Ω | 129 Hz | 56 K Ω |
| 822 Hz | 8200 Ω | 117 Hz | 62 K Ω |
| 795 Hz | 9100 Ω | 106 Hz | 68 K Ω |
| 723 Hz | 10 K Ω | 96 Hz | 75 K Ω |
| 658 Hz | 11 K Ω | 88 Hz | 82 K Ω |
| 603 Hz | 12 K Ω | 79 Hz | 91 K Ω |
| 556 Hz | 13 K Ω | 72 Hz | 100 K Ω |
| 482 Hz | 15 K Ω | 66 Hz | 110 K Ω |
| 452 Hz | 16 K Ω | 60 Hz | 120 K Ω |
| 402 Hz | 18 K Ω | 56 Hz | 130 K Ω |
| 362 Hz | 20 K Ω | 48 Hz | 150 K Ω |
| 329 Hz | 22 K Ω | 45 Hz | 160 K Ω |
| 301 Hz | 24 K Ω | 40 Hz | 180 K Ω |
| 268 Hz | 27 K Ω | 36 Hz | 200 K Ω |
| 241 Hz | 30 K Ω | 33 Hz | 220 K Ω |
| 219 Hz | 33 K Ω | 30 Hz | 240 K Ω |
| 201 Hz | 36 K Ω | 27 Hz | 270 K Ω |
| 185 Hz | 39 K Ω | 24 Hz | 300 K Ω |
| 168 Hz | 43 K Ω | 22 Hz | 330 K Ω |
| 154 Hz | 47 K Ω | 20 Hz | 360 K Ω |
| 142 Hz | 51 K Ω | 15 Hz | 470 K Ω |

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.

"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 Model 510 / 710 for five (5) years from the date you installed 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 installing the The Model 510 / 710.
 2. You must keep your invoice for proof of purchase showing when and from whom the unit was purchased. We're not the only ones who require this, so it's a good habit to get into with any component.
 3. The Model 510 / 710 must have originally been installed by an authorized AudioControl Industrial dealer. You do not have to be the original owner, but you do need a copy of the original invoice.
 4. You cannot let anybody who isn't: (A) the AudioControl factory; or (B) somebody authorized in writing by AudioControl to service the The Model 510 / 710. If anyone other than (A), or (B) messes with The Model 510 / 710, that voids your warranty.
 5. The warranty is also void if the serial number is altered or removed, or if The Model 510 / 710 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 Model 510 / 710 to level your projection TV); (B) improper connections (120 volts into the audio connections 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 install van, 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.

The Warranty

Legalese Section

This is the only warranty given by AudioControl Industrial. This warranty gives you specific legal rights, and you may also have rights that vary from state to state. Promises of how well The Model 510 / 710 will work are not implied by this warranty. Other than what we've said we'll do in this warranty, we have no obligation, express or implied. We make no warranty of merchantability or fitness for any particular purpose. Also neither we nor anyone else who has been involved in the development or manufacture of the unit will have any liability of any incidental, consequential, special or punitive damages, including but not limited to any lost profits or damage to other parts of your system by hooking up to the unit (whether the claim is one for breach of warranty, negligence of other tort, or any other kind of claim). Some states do not allow limitations of consequential damages.

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

The warranty included with the unit shall supersede this plain-text version if there is any inconsistency between the two.



Model 510 & Model 710
Installer's Guide

What to do if you need service

What to do if you need service

First, contact AudioControl Industrial, 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:

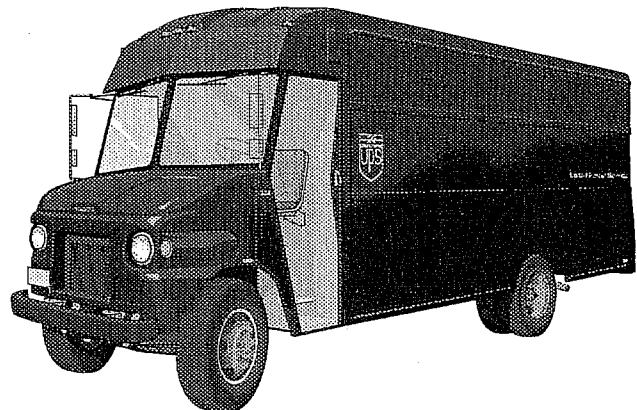
- 1) A copy of your proof of purchase (that sales receipt we've been harping about). No originals please. We cannot guarantee returning them to you.
- 2) A brief explanation of the trouble you are having with The Model 510 / 710. (You'd be surprised how many people forget this.)
- 3) A return street address. (No PO Boxes, please)
- 4) A daytime phone number in case our technician 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 use to send it to us, so if you return the unit overnight freight, we send it back overnight. We recommend United Parcel Service (UPS) for most shipments.

Repair service is available at:

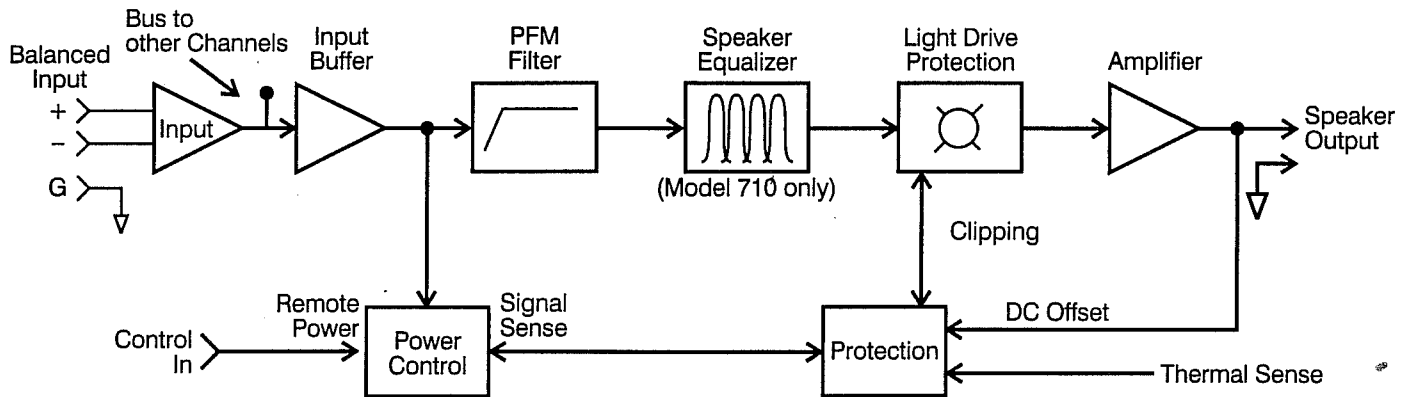
AudioControl Industrial™

Attn: Service Department
22410 70th Avenue West
Mountlake Terrace, WA 98043 USA
Phone 425/775-8461 • FAX 425/778-3166
e-mail: service@audiocontrol.com



AudioControl Industrial.

BLOCK DIAGRAM



SPECIFICATIONS Model 510 & Model 710

| | |
|--|---|
| Amplifier Power Rating | 50 Watts @ 8 ohms |
| Bridged Power | 100 watts @ 8 ohms |
| Minimum Recommended Speaker Load | 4 ohms (2 ohms in limited zones) |
| Damping Factor | Greater than 200 |
| EQ Center Frequencies | 45Hz, 150, 300, 700, 2500 and 12kHz |
| S/N ratio | >100 dB, A-wtd, ref. Full Output |
| Total Harmonic Distortion | 0.05% (50 watts/8 ohms 20-20K) |
| Input Sensitivity | 0-1V variable |
| Crosstalk | >75 dB (1 kHz, Any channel to channel) |
| Input Impedance | 100 Kilohms |
| Protection | Clipping, Thermal, Short Circuit, DC Offset |
| Power Consumption (all channels driven full power) | 960 watts |
| Weight | 35 pounds |
| Dimensions | 17"W x 16"D x 5.25"H |
| US Patent # | 5,708,577 |
| Country of Origin | U.S.A. |

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This manual was written, designed, printed and stuffed into the box in the U.S.A. Probably on a really soggy day considering where we live.



Made in
America

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