

System90[™]
Model 11

Center Channel Powered Signal Processor
Owner's Enjoyment Manual

AudioControl[™]

System90[™]
Model 11

Center Channel Powered Signal Processor
Owner's Enjoyment Manual

AudioControl[®]

making good stereo sound better[®]

Electronic Engineering & Manufacturing, Inc.
22410 70th Avenue West • Mountlake Terrace, WA 98043
206-775-8461 • 206-778-3166

Model 11 Powered Signal Processor

Quick Installation Info

For those of you who are short on time and have experience doing car audio installations refer to pages 5, 6, and 7 (Figures 2 and 3).

The unit is shipped from our factory with the Programmable Frequency Match (PFM) Filter module for the center channel set at 150 Hz.

Of course, you will get the best understanding of the System90 Model 11 applications and features by reading the whole manual. You will also make the author of this manual a lot happier. So enjoy..

Table of Contents

Introduction	1
Imaging and Spatial Restoration	3
System90 Model 11: The Overview	7
Installation	9
Troubleshooting	18
Warranty	20
Specifications.....	22

Owner's Enjoyment Manual

Congratulations on purchasing a truly unique product that will enhance almost any car audio system. The System90 Model 11 will make an incredible improvement in your system's stereo imaging, ambiance and soundstage width. One of the biggest benefits is the fact that you don't have to sacrifice a tremendous amount of room in your vehicle to install your System90 Model 11. In fact, the System90 Model 11, like all System90 components, takes up very little room in your vehicle while still providing you all of the benefits of a multi-component system, leaving you space for the important things in your life.

Out of the gate, we recommend that you have your System90 Model 11 installed by a professional. Not only will they do the best job but they also use lots of hi-tech buzz words like "impedance" and "SPL" that you can say to impress your friends. Besides if an authorized System90 dealer installs your System90 Model 11, we'll double the warranty to two years. Whether you decide to have a professional

install your System90 Model 11 or save a few bucks and do it yourself, you should definitely read this whole manual. Not only will it help you familiarize yourself with all of the special features the System90 Model 11 has, but you might learn something new, so please read on...

Now That You Bought Your System90 Model 11, What Does It Do?

- **Incredible Imaging and Stage Presence:**

Lead vocals come out of the center, where they're supposed to. Instruments are absolutely welded into the stereo sound field, spread in front of you in a precise array, just the way they were when the music was performed.

- **A larger and wider sound field:** The physical limitations of your car are magically removed. Your system will sound much more open and spacious than ever before.

- **Bi-MosFET Amplification:** A specially designed amplifier circuit in the System90 Model 11 allows for clean, accurate reproduction while gener-

Model 11 Powered Signal Processor

ating a minimal amount of heat. This allows for maximum flexibility for the system installer who can mount your System90 Model 11 anywhere they please.

• **Balanced Inputs & Selectable Ground Isolation:** The System90 Model 11 uses a unique differential amplifier that eliminates noise that radiates down from the head unit. The internal ground isolation jumpers allow the installer to select how the power and signal grounds are isolated to provide a noise free system.

• **Total Control:** Not the domineering type but the acoustical type which will let you perfectly match your center channel speaker to your cars acoustics. Three custom bands of equalization for the center channel allow for proper tone shaping. A programmable subsonic filter (PFM) is provided to custom tune the bass response and prevent damage to the center speaker caused by playing music below it's range.

• **Ease of control:** A simple unobtrusive dash control is provided to control all of the functions of the System90 Model 11.

• **Jealous Friends:** Regardless of what kind of system your compatriots have, *your* system will always stand out with the great sound of AudioControl's Performance Match components.

We Interrupt all of this Great Bragging and Tech Talk to Bring You a Very Important Announcement

Stop everything you are doing and fill out your warranty card. Also, save the invoice or sales slip as a proof of your purchase. This will help protect your investment and prove to your insurance company that you really owned a great piece of gear like a System90 Model 11. Just in case somebody "borrows" your System90 Model 11 during one of the rare moments that you are away from your car.

We now return to the rest of the manual, which is already in progress...



General Explanations for Installers and Other Well Rounded Individuals

A Discussion On Stereo Imaging

What Is Stereo Imaging: Very small timing differences between what our two ears hear allow us to determine where sounds come from. This incred-

ible ability is the basis for stereo sound imaging where we as listeners can "see" a complete sound stage of instruments and performers although the sound is coming only from two speakers.

Stereo sound contains identical sounds playing from all speakers as well as different sounds playing from individual speakers. When the listener is sitting

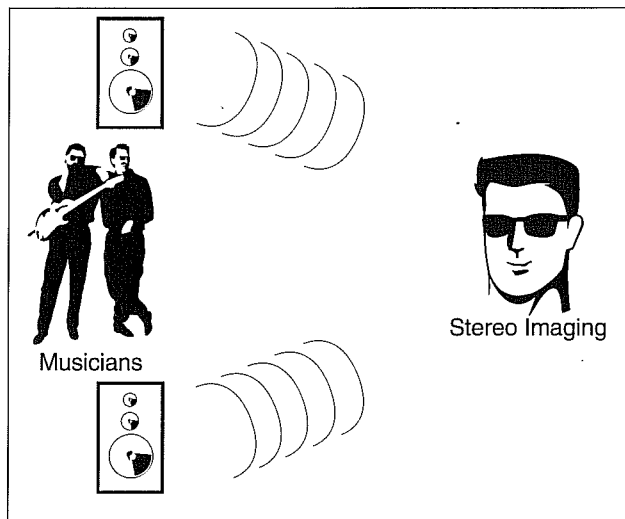


Figure 1-A The Stereo Triangle

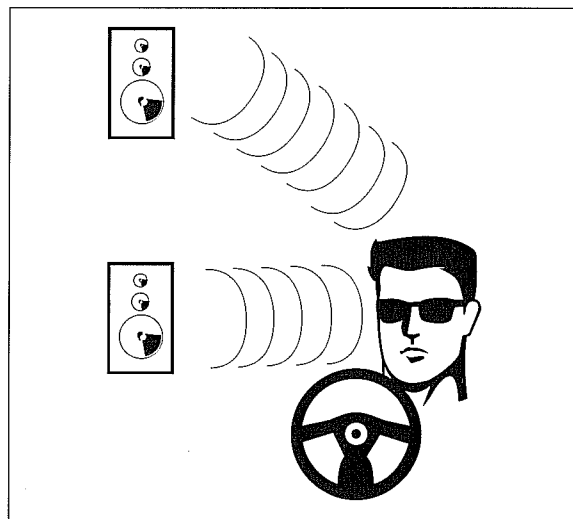


Figure 1-B Incorrect Acoustic Alignment

Model 11 Powered Signal Processor

the same distance from both speakers, they create what is known as the "stereo triangle" (Figure 1-A). While sitting in the "stereo triangle", the blend of identical and different sounds the listener hears, produces images. For instance, the same sound coming out of both speakers can trick the brain into the illusion that the music is coming from between the speakers.

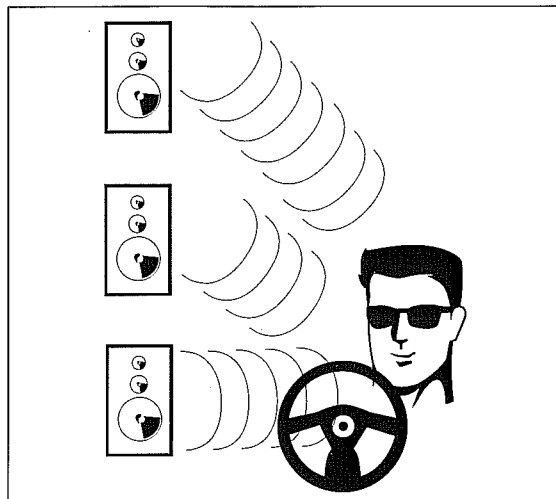


Figure 1-C Ideal Center Imaging in a car

Imaging In a Car: Creating the "stereo triangle" in a vehicle is difficult if not impossible. The seating in a car usually places the listener closer to one speaker and farther from the other causing a timing problem which smears and destroys the center image (Figure 1-B).

Other than smashing out your windshield, mounting your speakers on the fender and relocating the driver's seat to the center of your car, you are not left with too many options.

The System90 Model 11 Center Channel Solution: The patented circuitry in the System90 Model 11 provides your system with a third audio channel. This third channel provides a clear center image wherever you are sitting in the car. In fact the System90 Model 11 not only reproduces what the left and right speakers have in common, but it actually relieves the left and right speakers of their common (monophonic) information. (Figure 1-C)

What is important to understand is that the processing in the System90 Model 11 is the best way to obtain a center channel in an automobile. So good is the technology, that above and beyond being patented (#5,113,447), it has won 6 prestigious industry

awards (our thanks to the academy). If you want more information on Stereo Imaging and Center Channel Processing, send for Tech Note No. 1008.

Everything You Wanted To Know About Spatial Restoration (but were afraid to ask)

The term SPATIAL RESTORATION might cause flashbacks to the 60's for some people but it is really a unique type of processing built into your System90 Model 11 powered signal processor.

The distance between stereo and mono is the difference between the left and right channels. We call that LEFT MINUS RIGHT (L-R).

Sometimes the differences are obvious: If a guitar sound seems to be placed to the left in the sound field, you can bet there is more guitar in the left channel than the right. Not all of it but MORE.

However, the infamous L-R has another purpose, too. It contains the SPATIAL cues which have been captured during the recording process or synthesized at the studio. This includes the echoes and reverberation which give you a sense of space and position in relation to the performers. It creates the spaciousness which sets stereo apart from mono.

The System90 Model 11 creates a copy of the L-R component of the input signal, amplifies it, shapes its tonal contours and then injects it back into the main signal. It's sort of like adding "seasoning" to the "bland", normal sound. The amount of additional L-R signal is controlled by the remote Spatial Restoration knob on the dashboard.

Installers Condensed Hook-up Info

These summarized installation instructions were written for professional installers only. Okay, if you are a want-to-be installer who is trying to save a few bucks, than go ahead and read on. Again though, we recommend you have your System90 Model 11 professionally installed, but it is your car.

1. Before choosing a center speaker, look at the section on "Achieving Oneness With Center Channel Speakers" on the next page.

2. Install the System90 Model 11 between your head unit's pre-amp output and the amplifier channels for the front speakers.

3. Run speaker wires from the center output of the System90 Model 11 to your center channel speaker.

Model 11 Powered Signal Processor

4. If you are using an equalizer or crossover, it should go after the System90 Model 11 and before the amplifiers, Figure 2.

5. Make sure the Programmable Frequency Match (PFM) filter is set at the proper frequency for your center speaker.

6. Adjust center output level such that the center channel output is present but not over-powering.

7. Adjust center channel equalization controls. You want the center channel speaker to sound similar to your left and right speakers. The best way to find out what you like is to experiment (and read the section on equalization in the latter part of this manual). Figure 3.

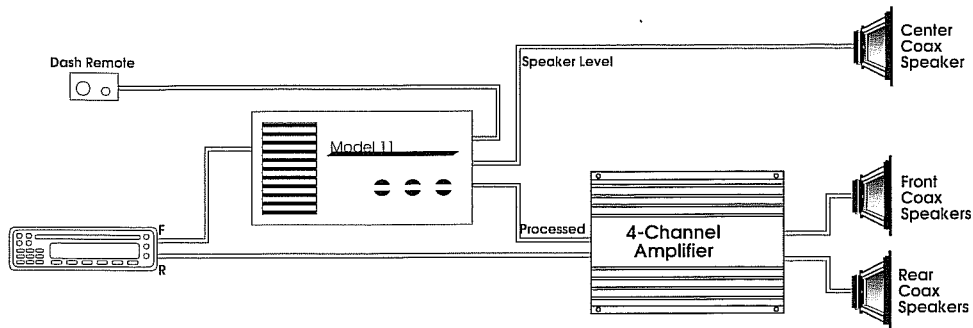


Figure 2. Adding the System 90 Model 11 to a 4-Channel system

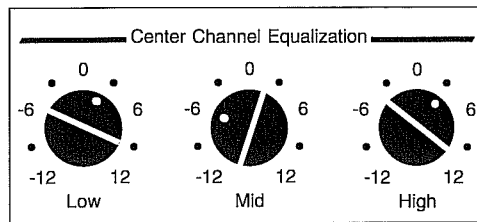


Figure 3

These settings are a good starting point.

Achieving Oneness with Center Channel Speakers

The center speaker is key to the quality of your center channel. Your choice of speaker should be a function of the following considerations. (Does that sound official or what?)

- **In The Center:** This may sound like we're stating the obvious, but the center channel speaker must be placed between the left and right front speakers. It "anchors" the stereo image and if you skew the center channel to either side, the whole gigantic spatially restored, image amplified sound will be out of whack.

- **As Large As Possible:** Center channel information is definitely FULL range. So, within reason, you should choose the largest full-range center speaker you can fit in the dash. The smallest you should consider is a 4 inch. Some claim to play down to 90 Hz, but we don't believe it. A 5-inch or 6x9 coaxial is far better. We've made things easier by including equalization for the center channel output and the PFM filter, which is a low frequency blocker.

- **Installed As High As Possible:** With a large speaker this is easier to say than do. You want the center channel to be as high up in the dash as possible because the full range information that is played through it contains high frequency information (called treble). Treble does not fare too well if it is playing down by your knees.

- **Same Sonic Signature** (say that fast 5 times): The center channel speaker should have the same sonic characteristics as the left and right speakers. In other words, it's frequency response should resemble that of the main speakers. If you are using "Super Blaster Linear Tri-axials" with Poly-kevlar cones, don't use an inexpensive, mushy, paper cone speaker in the center. It won't sound right. If you are using separate midranges and tweeters on the sides, consider the same for the center, if there is room, of course.



Model 11 Powered Signal Processor

System90 Model 11: The Overview

The System90 Model 11 main chassis. The first thing you will notice is that there aren't many controls on the System90 Model 11 chassis; just some set-and-leave-it equalization controls and a center channel level control. That's because the main control knobs will go on the dashboard where you can access them easily. (Figure 4).

Along one side of the Main Chassis, you'll see the Ground and +12 Volt terminals for power, and a terminal for remote activation of the System90 Model 11 when your head unit is turned on.

On the other side of the Main Chassis are:

1. Left & right INPUTS.
2. Left & right "THRU" outputs-we'll explain this one later.

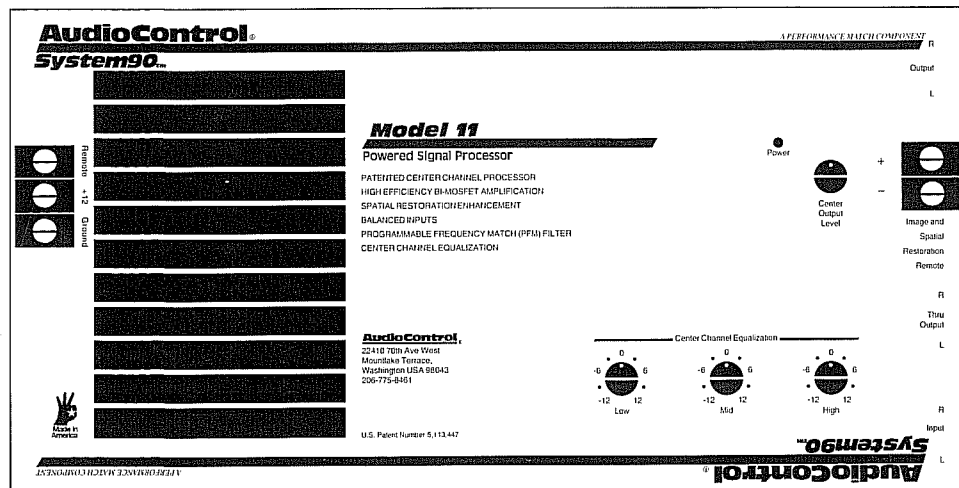


Figure 4 System90 Model 11 Overview

3. A socket for the Dashboard Control's remote connection.

4. SPEAKER OUTPUTS for the center channel speaker(s).

5. Left & right PROCESSED OUTPUTS

On the top of the chassis are:

1. A power LED. This is handy for determining whether your power connections have been made

correctly or as a very dim reading lamp for those special moments in the trunk.

2. HIGH, MID, and LOW equalization controls for the center channel speaker.

3. CENTER OUTPUT LEVEL control to control (what else) the center output level.

The Dashboard Image Control Unit. The dashboard control portion of your System90 Model 11 consists of two rotary knobs; a SPATIAL Enhancement control knob and an Image Amplification control knob. An LED tells you when the System90 Model 11 is operating. You must pull the Image Amplification knob "OUT" to turn on the Model 11's center channel and restoration circuitry.

The **Image Amplification** knob adjusts the amount of information sent to the center channel. By turning the knob clockwise, you send more "monophonic" information to the center channel that is taken from the left and right channels.

The **Spatial Restoration** knob controls the width enhancement. The farther you turn the knob to the right, the greater the SPATIAL effects of the System90 Model 11.

There are no right or wrong settings for the control knobs so experiment with your system to get the sound that you like.

How to Install the AudioControl System90 Model 11

If you have read everything in the manual up to this point, then you probably know that we really do feel that having a professional install your System90 Model 11 and the center channel speaker in your vehicle would be in your best interest. They have the experience, the know-how and most importantly, all the right tools.

Professional assistance is also recommended when it comes to selecting the center speaker and adjusting the center channel equalization and OUTPUT level control. These are best done by someone with experience-not to mention a professional real time spectrum analyzer such as the AudioControl Industrial SA-3050A. Enough said, let's move on...



Model 11 Powered Signal Processor

A. Placement and Mounting of the System90 Model 11 Main Unit

PLACEMENT: Because of the Bi-MosFET amplifier design, you can place the unit practically anywhere it can receive power. In the trunk, under a seat, or behind the dash. Bolted to the roof rack is considered a no-no. The System90 Model 11 has been designed using very rugged parts and engineered in a manner which reduces stress (both physical and mental) on the circuit board. However, avoid mounting the System90 Model 11 near a heater, in front of the firewall or anywhere else it can get really hot. The mounting location must be safe from water seepage. Many trunks have problems with bad seals (rubber gaskets, not the sleek, furry mammals who balance beachballs and eat mackerel). Check for old water stains.

MOUNTING: The System90 Model 11 installs like a power amplifier, by securing it with four screws and lock washers through the four slots in the units base. Make sure the System90 Model 11 chassis can be firmly mounted without vibration. This protects connections from breakage and undue stress as well

as preventing them from coming apart when you rocket over a speed bump. Avoid any location where mounting screws will pierce the gas tank, fuel or brake line, or short out an electrical line.

1. Place the System90 Model 11 in it's mounting position and mark the four screw holes. Try to keep them to the corner of the slots if possible.

2. Now remove the System90 Model 11 and drill four mounting holes.

3. Replace the System90 Model 11 and secure tightly with four metal mounting screws with lock washers.

B. Placement and Mounting of the System90 Model 11 Dash Control

The dash control can be mounted in various locations in or under the dash and with or without the bracket. Make certain that it is within easy reach of the driver (but you already knew that).

UNDER-DASH-INSTALLATIONS. The image control mounts with four screws which attach to the underside of the dashboard. Since you will probably need to slide under the dash upside down to get a clear view of the dash, it is recommended that you

recruit a faithful assistant to hand you things.

1. Slide into the car and place the image control in its potential mounting position. Now ask for "scalpel" and then tell your assistant you are kidding and ask for a pencil instead.

2. Mark the four mounting holes and remove the controller.

3. Drill four holes into the dashboard underside.

4. Replace the controller and secure it with four screws.

IN-DASH INSTALLATION. For that very slick

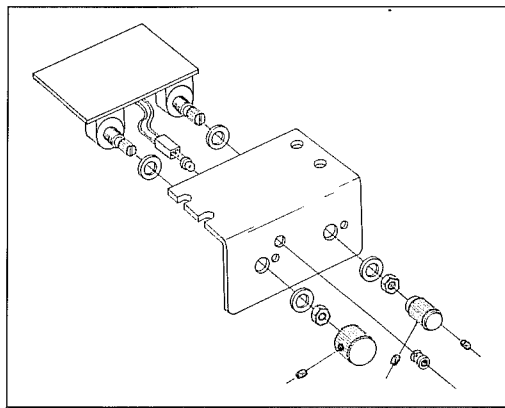


Figure 5 Exploded View of Remote

custom look (or if under-dash ain't making it), the image control can be mounted directly into the dashboard. To make this less complicated, we have provided an extra label and an LED holder. A small hex driver, medium screwdriver, pliers, and power drill with 9/32" (7 mm), 13/64" (5mm) and 1/8" (3mm) bits are required...along with some patience and delicacy. (Figure 5.)

1. First of all, you will need to disassemble the System90 Model 11 dash control. Gently pull the LED assembly from its black plastic holder on the mounting bracket. Do not remove the actual LED wires from the connector.

2. Take off the knobs by loosening their set screws, then unscrew the lock nuts and washers. Remove the circuit board and rotary controls from the bracket.

3. Now take a deep breath and using the label as a template, drill two 9/32" holes in the dashboard (drinking double espresso's before performing this task is not recommended).

NOTE For that completely stealth appearance, you may separate the circuit board that the rotary controls are attached to as long as you remember to

Model 11 Powered Signal Processor

extend the 3" jumper wires from one circuit board to another.

4. Drill 1/8" holes for the control pot lock tabs or remove them if you deem them unnecessary.

5. Drill a 13/64" hole for the LED.

6. Apply the pressure-sensitive label, (with pressure of course).

7. Remove the black plastic LED holder from the Image Control bracket and insert it into the 13/64" hole.

8. Insert the rotary control/circuit board into the 9/32" holes, and the LED assembly into its black plastic holder. Make sure the red wire on the connector goes to the long lead of the LED.

9. Make sure that any parts of the LED wires or circuit board are not touching metal and then replace the lock nuts, washers, and tighten securely.

10. Finally, put the knobs back on and tighten the set screws.

11. Enjoy the applause and go buy your faithful assistant a beer, Pepsi, Yoohoo or diet Ginseng soda.

C. System90 Model 11 Audio Wiring

PLANNING YOUR HOOK-UP STRATEGY.

Okay, time to trot out the flow charts and diagrams. Naturally, there are lotsa ways to hook up the System90 Model 11, depending on what the rest of your system is like. The following are just a few of the possibilities.

2-CHANNEL SYSTEM. The simplest type of system is one where you're adding the System90 Model 11 to a system with a head unit and a single, stereo power amplifier. The line level output connection is made between the SPATIAL RESTORATION OUTPUTS on the System90 Model 11 and the stereo amplifier. A speaker level connection is then made between the System90 Model 11 and the center channel speaker. If you are using The Epicenter, it goes between the line level input and the head unit. Otherwise your System90 Model 11 comes first. (Figure 6.)



4-CHANNEL SYSTEM.

The System90 Model 11 can be added to any existing 4-channel system and still maintain fading. The front audio channels of the head unit should go into the System90 Model 11 inputs and out the SPATIAL RESTORATION outputs to the front amplifier. The rear audio channels from the head unit should run directly into the rear inputs of the amplifier. (Figure 7)

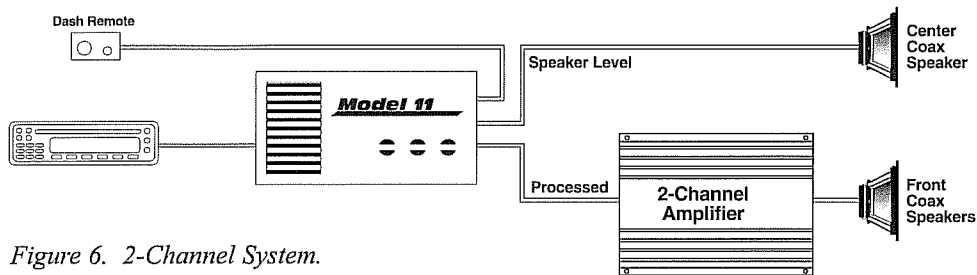


Figure 6. 2-Channel System.

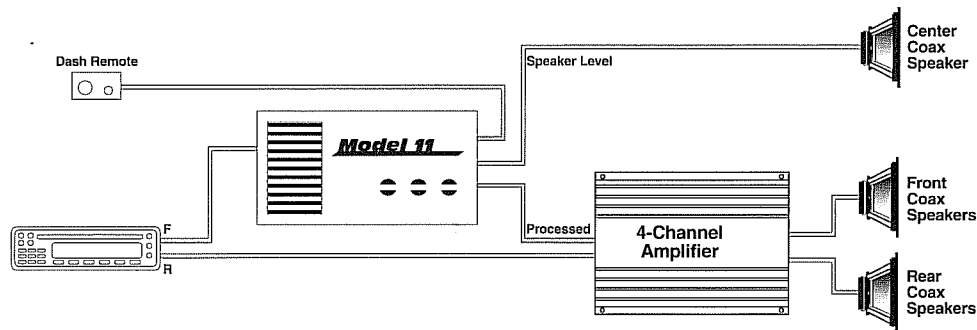


Figure 7. 4-Channel System using a 4-channel radio

Model 11 Powered Signal Processor

USING THE THRU CONNECTIONS. Along with the main INPUTs and OUTPUTs, there are left and right THRU sockets. Basically these are two more OUTPUTs that are unaffected by the circuitry in the System90 Model 11. Above and beyond the multitude of uses for the thru-puts, you can utilize the System90 Model 11 to allow a 2-channel head unit to run a 4-channel system. (Figure 8)

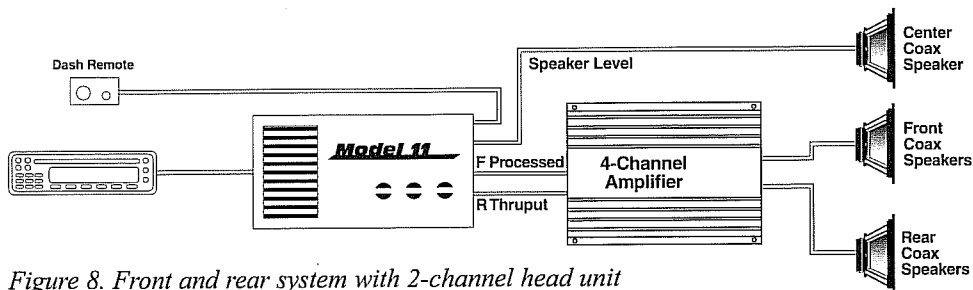


Figure 8. Front and rear system with 2-channel head unit

D. System90 Model 11 Power Wiring

IMPORTANT NOTE Disconnect the negative terminal of your car's battery before working on any electrical connections. Failure to do so could alter the space-time continuum plus give you a wonderful tingly feeling.

POSITIVE(+12V) CONNECTION. You will want to use 10 gauge or lower wiring as power wire between the System90 Model 11 and the battery. A 10

amp rated fuse & holder should be installed on the power line near the battery. DO NOT install the fuse until the installation is complete.

GROUND CONNECTION. Connect the same gauge wire for ground as you did for power to the negative terminal, ground bus, or a verified ground location.

REMOTE TURN-ON CONNECTION. Connect a 22 to 18 gauge wire from the head-unit's remote turn on lead to the appropriate terminal on the System90 Model 11.

CENTER CHANNEL SPEAKER CONNECTION. The center channel speaker output on the System90 Model 11 should be wired directly to the center channel speaker(s) using 18 gauge or larger

speaker wire. If you do run multiple speakers on the center channel output, keep in mind you lower the impedance the System90 Model 11 plays into. If you don't know what effects lower impedance can have, then please ask or refer to the section on professional installation.

PROGRAMMABLE FREQUENCY MATCH (PFM) FILTER. Your System90 Model 11 has a special user programmable circuit to prevent the center channel speaker from trying to reproduce frequencies lower than it can handle. If you are using, say a 5" center channel speaker, it can't very well be expected to crank out 40 Hz bass. It would probably cough out it's voice coil first.

That's where the PFM circuit comes in. You could think of it as a crossover or low cut filter (or a speaker saver if you are not technically minded). When shipped from the factory, the Model 11's PFM is set to cut off frequencies below 150 Hz (on the center channel only). That should protect even the lamest 5-inch speaker.

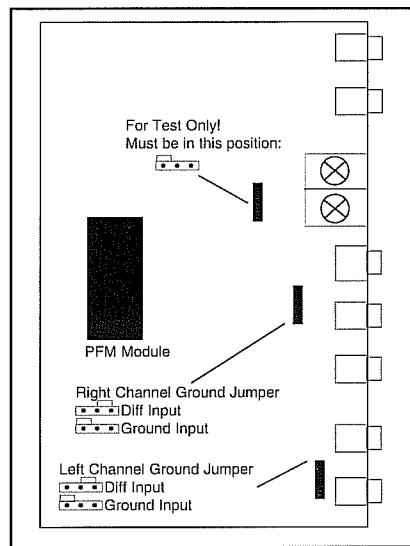


Figure 9
System90 Model 11
interior view.

If you wish to change the PFM resistor module you need to do the following:

1. Turn off the system power. Failure to do so can result in something so nasty happening that we can't print it. Trust us.

2. Remove the top panel and locate

the Programmable Frequency Match module as shown in Figure 9.

3. Exchange the existing PFM module with one of your choosing.

4. Replace the chassis top and tighten the screws.

5. Turn the system power back on.

Model 11 Powered Signal Processor

E. A Short Test Run

1. First, re-connect the negative terminal of the car's battery and install the 10 amp fuse into the fuse holder on the positive power line.

2. Next, make sure that any other dashboard equalizer, loudness or tone controls are either switched out of the signal chain, or turned to their center (neutral) position.

3. Confirm that the three equalization knobs on the top of the System90 Model 11 (HIGH, MID, LOW) are set in their center detent position.

4. Make sure that the CENTER OUTPUT LEVEL gain control is at its center detent position.

5. Turn the Model 11's Spatial Restoration and Image Amplification Controls all the way to the LEFT (7 o'clock position) and pull the Image Amplification knob out. The LED on the remote should be on now.

6. Pop in tape or CD and turn the system up to a pleasant listening level.

7. Do you hear the sound of silence? If so, check the wires from the head unit to the System90 Model 11 and the System90 Model 11 to the other amplifier(s). Make sure the power LED on the main unit is on.

8. Now rotate the System90 Model 11 Spatial Restoration Control to the right (toward MAX). You should hear a wonderfully open stereo with the sound actually wider than the confines of the vehicle. If you hear sound but nothing changes when you turn the Spatial Restoration Control clockwise, check all the connections, particularly the ones between the dash controls and the System90 Model 11. Also make sure you pulled the knob out or that you are not using the THRU OUTPUT by mistake.

9. Time to check the center channel. Start turning the Image Amplification knob to the right. Sound should start coming out of the center speaker. If you are not getting any sound, check the signal and speaker hook-ups. Once you start to hear sound coming from the center channel speaker adjust the gain control on the System90 Model 11 chassis if it is too loud or soft. Stay tuned for more on level matching.

10. Turn both controls to the left (off) position and rotate the head unit's balance control to the far left. The sound in the car should move to the left. If it moves to the right, time to back track. Somewhere along the way your left and right inputs or

outputs got crossed and need to be changed. General practice is to use RED plugs for RIGHT and BLACK (or White) plugs for LEFT. It is important to make sure that LEFT is really LEFT all the way down the signal chain.

F. Adjusting the Center Channel Equalization Controls

In a perfect world, you would want to use the same speaker in the center channel as you are using on the left and right channels to maintain the "Same Sonic Signature".

However, due to the various mounting locations in an automobile, you will still hear a noticeable difference between the center channel speaker and the side channels.

On the top of the System90 Model 11 chassis are three equalization controls. These controls only effect the center channel output not the "overall" sound. LOW, HIGH, & MID controls were designed with two different purposes in mind. First, they can be used to compensate for all of the various center channel speaker installations. If your treble sounds

like air escaping from a balloon, you can boost the Model 11's HIGH control. If the vocals sound distant and harsh you can adjust your MID control proportionately. If BASS is your thing and your center channel is starting to buzz uncontrollably, back off on the LOW control. Second, the equalization controls can be used to purely change the sound of the System90 Model 11. Go ahead and ad lib. We feel so confident in the way we built your System90 Model 11 that there is nothing you can do with the equalization controls that can damage it. Sound is subjective, so enjoy it. We have found that the settings below (Figure 10) are a good starting point.

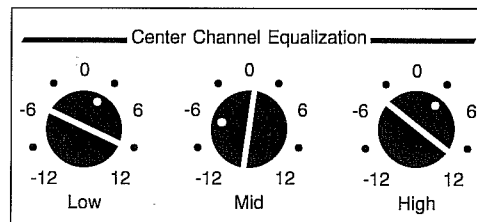


Figure 10

Model 11 Powered Signal Processor**G. Adjusting the Center Output Level**

The first inclination is to turn up the center channel as loud as possible. More is better, right? NOT!! Ideally you want to blend the left, right and center speakers to produce a seamless sound in front of you, across your windshield. Too much center channel makes the music sound blaring and obnoxious, while too little can seem empty and lifeless. You want it to be smooth and full sounding like...HEY, we know what you're thinking, so watch it.

1. Set the Image Amplification control all the way to the right and compare it with the knob pushed in and pulled out.

2. Adjust the center level gain so as you click in and out, the overall sound doesn't increase or decrease but the image moves solidly center.

3. Again, your taste is what is right. The Autosound Police won't come to your house. Anyway, not yet, Mr. Orwell.

H. For Installers Only

Yes, we know that everyone will immediately read this, but that's okay because there is nothing secret here.

GROUND LOOPS: Ground loops are insidious. They are caused by the non-zero resistance of the wire used to interconnect the equipment. Typically, ground loops are created by a piece of equipment

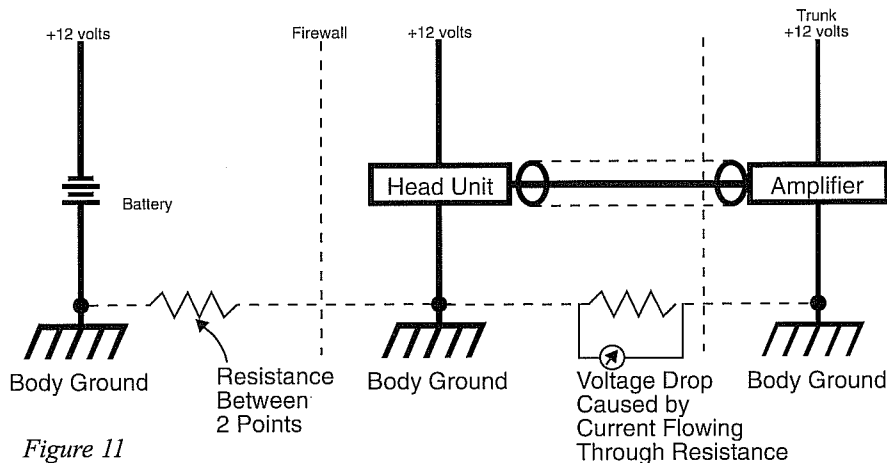


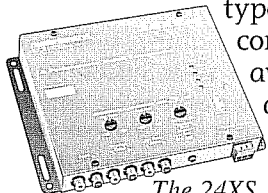
Figure 11

having multiple connections into the grounding system.

Figure 11 shows what happens. Generally, the audio wiring has higher resistance than the power wiring. Since the electrical system of the car uses body/frame structure as it's negative return, the non-zero (yes, it's small, but not small enough!) resistance of the car body allows small voltage drops to be created between various points in the car body. (Figure 11)

The Unsolicited Blatant Plug for Other AudioControl Products

In addition to the System90 Model 11, we manufacture a unique line of high-quality Performance Match Components, all designed to work together to give you the best-sounding system, regardless of the type of vehicle you own. These components have won so many awards that the walls in our lobby are sagging.



The 24XS

Crossovers

The **24XS_{tm}** is a state-of-the-art 24dB/octave Linkwitz-Riley alignment 2-way crossover with SWAT(Speaker Wave Alignment Technology)

The **2XS_{tm}** is a 2-way baby brother, designed specifically for bi-amplified systems.

The **4XS_{tm}** is an electronic crossover that provides 4-channel/2-way or 2-channel/3-way configurations. Ideal for competition systems.

The **3XS_{tm}** 4-channel/2-way 24dB/octave electronic crossover is ideal for fading systems that use a subwoofer.

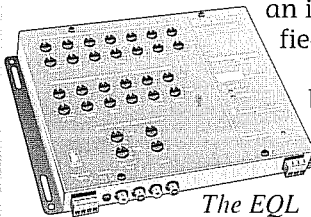
Equalizers

The **EQL_{tm}** is a 2-channel/13 band equalizer that is an ideal enhancement for any amplified system.

The **EQX_{tm}** provides all the benefits of the EQL plus a 24dB/octave Linkwitz-Riley 2-way crossover.

The **EQT_{tm}** provides and uncomparable 30 bands of precise constant Q equalization. There is no substitute!

The **EEQ_{tm}** is a 4 channel equalizer that is ideal for those systems where the front and rear speakers are different sizes.



The EQL

Model 11 Powered Signal Processor

Specialty Products

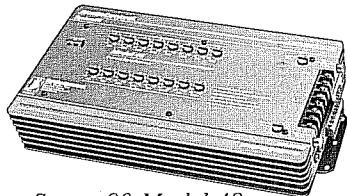
The Epicenter[™] is our patented bass restoration solution that will dramatically add impact or depth to your sound system, so you can really *feel* the bass.

System90 Powered Signal Processors

The **Model 20[™]** provides 140 watts of clean power plus patented bass restoration and a 2-way electronic crossover in one compact, easy-to-install package.

The **Model 40[™]** comes with 4 channels of amplification, dual 2-way electronic crossovers, and The Epicenter which makes it ideal to power a complete system while taking up very little space.

The **Model 48[™]** has 8 bands of front and rear equalization plus a powerful 160 watt 4-channel amplifier.



System90 Model 48

Warranty

Usually when you get to this part of the manual you start to ask yourself, what's the catch. Loopholes, fine print and finding a lawyer come to mind. Well not with our warranty. Ours is a warranty that looks out for you, the customer, and helps you to resist the temptation to have your friend "who's good with electronics" try to repair your AudioControl System90 Model 11. So go ahead and read this warranty, then enjoy your new component for a few days before sending in the warranty card and comments. By the way, the President of the company reads every warranty card.

"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 honor these conditions, we will warrant all materials and workmanship on your System90 Model 11 for one year from the date you bought it, and will fix or replace it, at our option, during that time. If an authorized AudioControl System90 dealer installs your System90 Model 11 and affixes the official sticker on the bottom of the unit, your warranty is extended to two years.

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 purchase your System90 Model 11.

2. You must keep your sales slip or receipt so you have proof of when and from whom you bought your System90 Model 11. We're not the only company to require this, so it's a good habit to get into with any stereo purchase.

3. Your System90 Model 11 has to have been originally purchased from an authorized AudioControl dealer. You do not have to be the original owner to take advantage of the one-year warranty, but the date of purchase is still important, so be sure to get a copy of the sales slip from the original owner.

4. You cannot let anybody who isn't: (a) the AudioControl Factory; (b) an authorized service center; or (c) someone authorized in writing by AudioControl, service your System90 Model 11. If anyone other than (a), (b), or (c) messes with your System90 Model 11, that voids the warranty.

5. The warranty is also void if the serial number has been altered or removed, or if the AudioControl System90 Model 11 is used improperly. Now that sounds like a big loophole but here is all we mean by it.

Unwarranted abuse is: (a) physical damage. Our products are not meant to be used as jack stands for

your car; (b) improper connections. We have done the best we can to protect the inputs. However, 120 volts into the jacks can fry the innards of the poor beast; (c) sadistic things. This is the best mobile product we know how to manufacture, but if you use it for the front bumper of your Baja bug and get it full of water and dirt, things will go wrong.

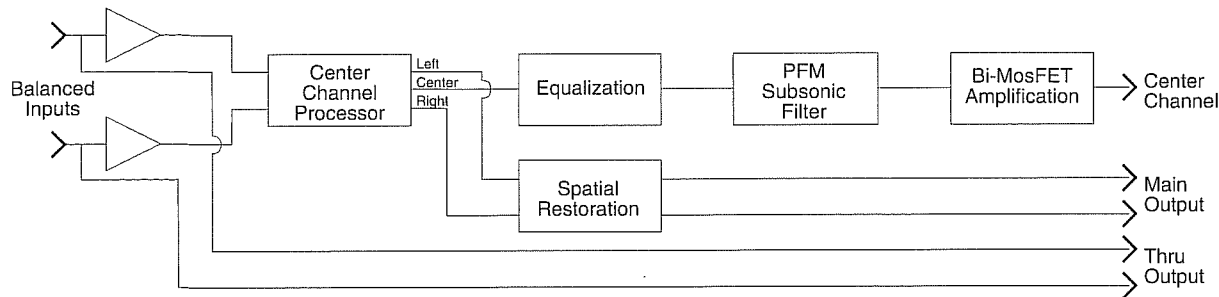
Assuming you conform to numbers 1 through 5, which isn't all that hard to do, we get the option of deciding whether to fix your old unit or replace it with a new one.

LEGALESE SECTION

This is the only warranty given by AudioControl. This warranty gives you specific legal rights which vary from state to state.

Promises of how well your System90 Model 11 will work are not implied by this warranty. Other than what we've 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 System90 Model 11.

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

Model 11 Powered Signal Processor**System90 Model 11 SPECIFICATIONS**

All specifications are at nominal car voltage 14.4 VDC

Frequency response	15-20kHz ± 0.5 dB
Signal to Noise	>105dB
Total Harmonic Distortion	0.05%
PFM Filter Slope	18dB/octave
PFM Filter Frequency	Programmable 15Hz-4500Hz
Dash Remote	Voltage Controlled, 20' cable supplied
Inputs	Balanced Differential
Power Supply	High Efficiency Balanced MosFET Switcher
Amplifier	Class AB Bi-MosFET output
Amplifier power output	24 watts @ 4ohms/49 watts @ 2 ohms
Damping Factor	>100
Recommended Fusing	10 Amps
Dimensions	1.25"H x 11.25"W x 6.5"D
Weight	5 Lbs
Country of Origin	USA

© 1994 Electronic Engineering and Manufacturing, Inc. All rights reserved. AudioControl is a division of Electronic Engineering and Manufacturing, Inc.

AudioControl, Performance Match, Making Good Stereo Sound Better, System90, 2XS, 3XS, 4XS, 24XS, EQL, EQX, EQQ, EQT, The Epicenter, Model 20, Model 40, and Model 48 are all trademarks of Electronic Engineering and Manufacturing, Inc.

This manual was thought of, designed, written and completed on one of the truly rare bright and sunny days in the Pacific Northwest rainforest where moss grows freely.

AudioControl®

making good stereo sound better®

Electronic Engineering & Manufacturing, Inc

22410 70th Avenue West • Mountlake Terrace, WA 98043

206-775-8461 • Fax 206-778-3166



THE AUDIO CONTROL STORY

We could be making electric toothbrushes, but we're not.

Audio Control's president made that observation while explaining why we design and handcraft stereo equalizers and other sound products. Of all the things a group of employees could legally produce in a Lynnwood, Washington factory, we think a device that lets you hear music better is just about the best thing we could be making.

We incubate and hatch our products in a modern plant complete with solder baths, non-stop FM over half dozen big speakers, a ping pong table in the breakroom, a Lab with a matched set of frisbees, more test equipment than a Japanese sci-fi flick, and employees so friendly that the UPS man regularly stops in to have lunch with us.

Maybe it's that we're located out here in the misty rain forest of the Northwest where moss grows on the windshields, the sun rarely makes it through the overcast, and Boston ferns grow so well they've formed a union. This fertile soil has grown Carver, Phase Linear, Speakerlab, and Tapco.

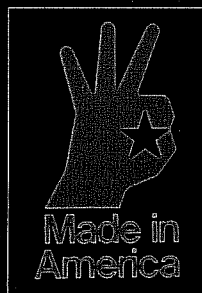
Whatever it is here in the Northwest, we're perfectly content to stay here and keep producing high quality, well-engineered, affordable hi-fi equipment without so much as a glimmer of the sort of greed and me-too-manship that so often pervades the stereo market. We like producing a high quality product that is useful and gives people pleasure without wasting energy or resources. Something nobody else thought of, though should have.

Thus, we're not only interested in what goes out of Audio Control, we're interested in the comments which come back. Our fearless leader and production staff still read every warranty card, suggestions from which have lead to customer-based product changes instead of marketing department speculation.

We're really glad you bought something from us. Our appreciation will come back to you in the thousands of hours of pleasure you'll receive from your high quality Audio Control product.

The people of Audio Control





AudioControl

22410 - 70th Ave. W., Mountlake Terrace, WA 98043

Phone (206) 775-8461