



Stereo Crossover with Subsonic Filter

Owner's Enjoyment Manual Congratulations!

You have just purchased the state-of-the-art autosound crossover - the 2XS. This crossover is incredibly adjustable, programmable, and most importantly, the 2XS will make your car audio system sound better. Whether you are a car audio soundoff competitor or just someone who appreciates good sound, the 2XS will provide you with many hours of enjoyment. Please take a moment to familiarize yourself with the many features of the 2XS by reading this manual.

Features of the Concert Series 2XS:

- Two channel operation
- Precise 2-way 18dB/octave, programmable electronic crossover with a plug-in module
- Programmable Frequency Match (PFM) subsonic filter
- Balanced inputs
- On-board line driver for signal gain
- Output level controls
- Selectable ground isolation
- Optimum signal output indicator LEDs
- The finest quality - designed and built in America



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This manual was designed and written during a few rare sunny weekends of espressos and micro-brewns in a really nifty place in the Pacific Northwest surrounded by slugs and other creatures crawling out of the rainforest.

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Specifications subject to change without notice.

P/N 9130330

A BRIEF TOUR OF THE 2XS

The Outside

INPUTS: Lurking on the bottom left hand corner of the 2XS, you'll see two RCA-type audio inputs. These are the inputs which get their signals from the outputs of your head unit or equalizer. The inputs are *balanced*, which helps cancel the evil noise that may be radiating into your system from your car's electrical system.

OUTPUT JACKS: To the right of the input jacks you'll find two more pairs of RCA-type jacks. The first pair (on the left) is your high frequency output and the pair on the right is your low frequency output.

OUTPUT LEVEL ADJUSTMENTS: These adjustments control the 2XS signal output to your power amplifiers. The circuitry provides output level control to drive any power amplifier with up to 9.5 volts of input signal, which helps achieve maximum signal to noise ratio. This is a really good thing. Please note: the output of the 2XS is proportional to the input it receives. At approximately 5.6v the 2XS should produce its rated 9.5v of output. Any less input voltage and the output will decrease.

OUTPUT STATUS LEDS

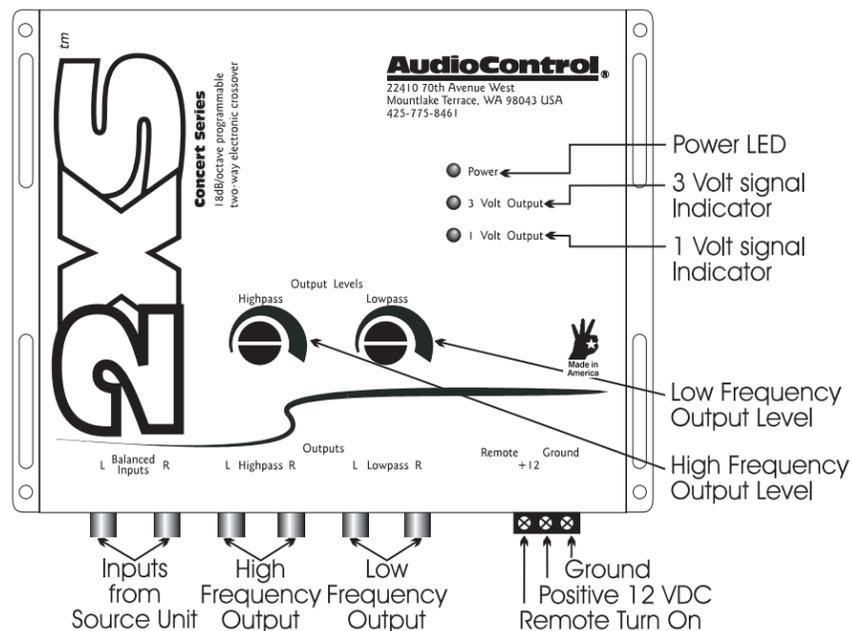
POWER: Indicates when the 2XS is turned on, (clever!)

3 VOLT: Lights up when there is 3 volts RMS present at the 2XSs output jacks. This is more than enough to drive most amplifiers, so check your amplifier's owner's manual to make sure the amp can handle it.

1 VOLT: Displays when there is 1 volt RMS present at the 2XSs output jacks.

POWER CONNECTOR: A wonderful, removable connector that allows you to hook up all of the power and turn-on wires for your 2XS in the convenience of daylight, and then attach them in the dark recesses of your trunk.

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Outside View
2XS Concert Series

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FEATURES

Programmable 18dB/Octave 2-way Crossover

The 2XS utilizes a sharp 18dB/octave state variable filter that accurately separates your high and low frequencies. In addition, by using plug-in resistor modules (for more info see the section on "Making Your Own Crossover Module"), the two way electronic crossover in the 2XS can be configured precisely in any multi-amplified system.

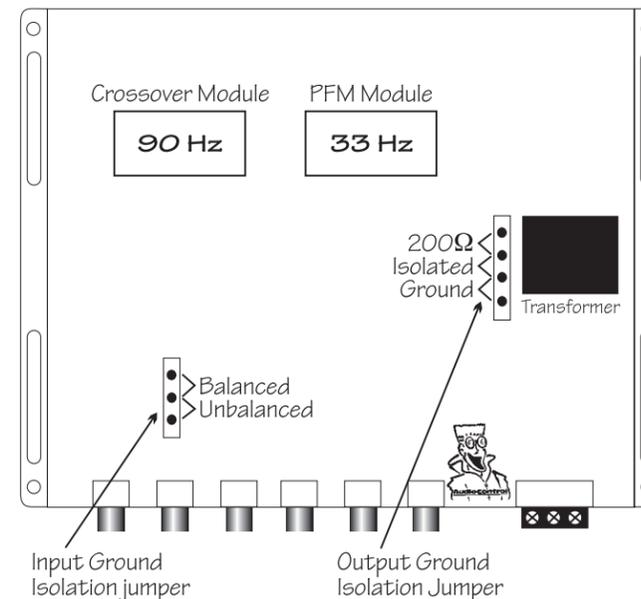
Programmable Frequency Match (PFM) Subsonic Filter

Subsonics are low frequency non-musical noises which are present in most recordings and usually occur below the frequencies which human ears can detect. This robs amplifier power, causes intermodulation distortion, and may even cause speaker damage. Obviously you don't want your system to reproduce these nasty sounds, therefore, the 2XS features an AudioControl exclusive, a sharp 18dB/octave Programmable Frequency Match (PFM) subsonic filter. This PFM filter rolls off these problem-causing frequencies before they get to your amplifiers. Since it is programmable, you can install a PFM resistor module at the ideal low frequency roll-off point (like the subwoofer enclosure tuning frequency or the -3dB down point of your system), and get the best possible sound from your system.

Line Driver

Every electronic component produces a small amount of noise. This noise is the result of electrons bouncing into each other like pinballs. Unfortunately, these noises add to the "noise floor" of your car audio system and can end up as hissssss through your speakers. Fortunately, the circuitry in the 2XS has been designed to provide signal gain. This "gain" allows you to raise the signal above the hissssssing noise floor and drive your amplifier better. This, my friend, is a good thing.

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Inside View
2XS Concert Series

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Selectable Ground Isolation

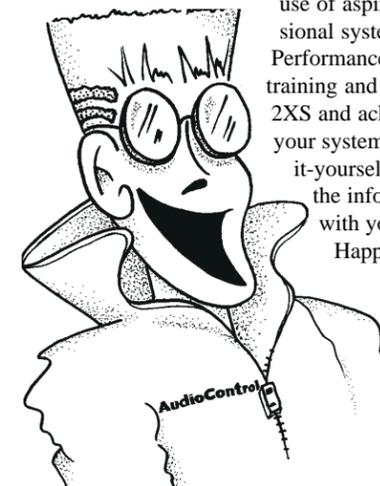
Ground loops and ground noises are constant threats to a quality car stereo installation. Head unit manufacturers ground their products one way while amplifier manufacturers may ground theirs differently. Unfortunately, these differences can cause ground loops. The 2XS helps you avoid these problems by providing selectable signal and power grounds. Ground loops are now things of the past.

The Most Important Instruction of All

FILL OUT AND SEND IN YOUR WARRANTY CARD!

Also, it is crucial that you keep your invoice or sales slip, since it is your only proof of purchase. If somebody takes your 2XS while you're vacationing in Tahiti, insurance companies and law enforcement officials will require some proof of ownership on your part.

For the highest possible product performance and the lowest possible use of aspirin, nothing is better than a professional system installation. Your AudioControl Performance Match audio dealer has the training and equipment necessary to install your 2XS and achieve the best possible sound out of your system. However, if you are a die-hard do-it-yourselfer, this manual will give you all of the information you need to make music with your 2XS. Happy listening.



Spike

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The Inside

PROGRAMMABLE CROSSOVER MODULE: This 14 pin resistor module controls the crossover frequency. We install a 90Hz resistor module at the factory. However, should your system design require something different, they are easy to change. Different modules may be purchased from your dealer or custom built yourself (for more info see the section on "Making Your Own Crossover Module").

PROGRAMMABLE FREQUENCY MATCH (PFM) MODULES: This 14 pin module is the same type of module as the one in the crossover module socket. However, the PFM is the bottom limit for the low frequency output. It is set from the factory at 33 Hz.

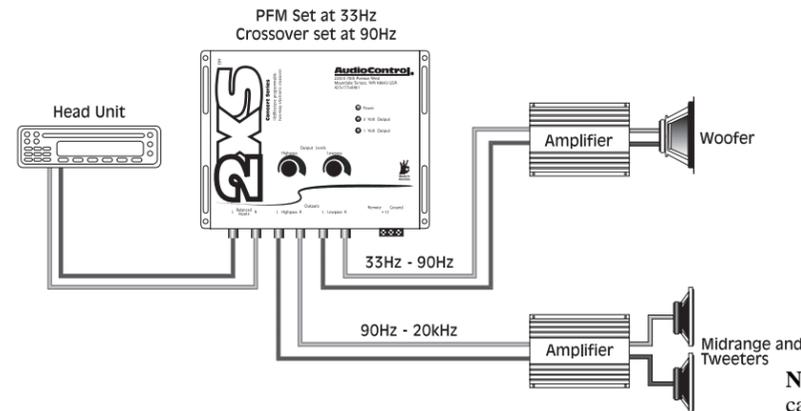
GROUND ISOLATION SELECTOR: This feature allows you to change the power supply ground isolation for different systems. When your 2XS was shipped from the factory, the selector was put in the fully isolated position (which we know is the best). Alas, not every other manufacturer (or installer) devotes so much time and effort into getting their grounds right. Therefore, we have provided other ground isolation options to help if you have a ground loop noise (alternator whine) in your system. Experiment with different settings if you run into this type of problem. To change the settings, turn system off, carefully move the black jumper from the center two pins (fully isolated) to either the top two pins (200Ω) or the bottom two pins (ground). If neither position eliminates the noise, read on.

INPUT GROUND ISOLATION JUMPER: These jumpers provide a hard ground for the balanced input circuitry. Some head units or pre-amplifiers require this for optimum low noise operation. To change the input ground isolation, use the 3 pin jumper located on the lower left portion of the 2XS's circuit board (near the input RCAs.) The unit is shipped in the balanced input position. This should be optimum for most applications. Should you feel the need to experiment however, feel free to turn the system off, change the jumper position and see if it helps.

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INSTALLATION EXAMPLES AND HOOKUP DIAGRAMS -

Simple 2-channel, 2 Way System



QUICK REFERENCE GUIDE TO INSTALLING THE 2XS

If you can install a power amplifier or speakers, you won't have any trouble installing the 2XS. Two cables in, four cables out, connect the power, ground, & remote turn-on and you're in business. If this is a little more than you can swallow in one sitting, read on because we've gone ahead and talked each individual facet of the 2XS to death. You don't have to read it, but it will help you understand some of the more sophisticated features of the 2XS.

MOUNTING: The 2XS can be mounted in many parts of the car, depending on the vehicle's configuration. Behind the dash, under a seat and in the trunk are possibilities, in increasing order of distance from the head end. The farther away, the greater the resistance in the cables, which can cause signal or power loss. Use 100% shielded cables for the best results. Wherever you mount the 2XS, take the following into consideration:

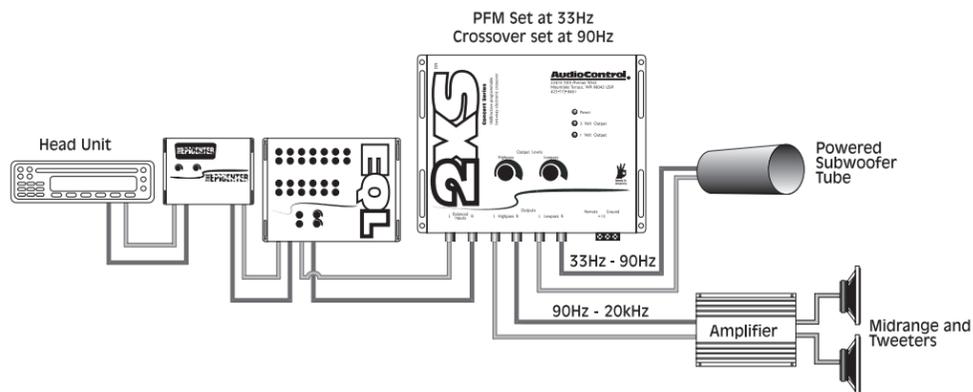
- Don't mount it near heaters, closed spaces or other places where it will get really hot.
- The mounting location must be safe from water or beer seepage.
- The 2XS must be firmly mounted to the car. This protects connections from breakage and stress as well as the possibility of it becoming un-attached when you blast over the occasional speedbump.
- Analyze the potential location carefully to make sure that mounting screws won't pierce a gas tank, gas/brake/or electrical lines.
- The 2XS has been designed with very high quality parts and in a manner which reduces mass-related circuit board stress (a typical failing of lots of car gear). Still, all electronics have a limit to environmental stress, so no fair mounting it to the front bumper or under the oil pan.

AUDIO WIRING: The main idea is to minimize potential signal interference and noise. That means using good quality 100% shielded audio-type RCA cables. Since the 2XS has a very low output impedance, cable noise pick-up OUT of the 2XS is not a problem.

The head unit that feeds the 2XS however, could have a medium output impedance (2k to 10k ohms) and long cable lengths could be a problem. That's why we suggest mounting the 2XS as close as possible to the head unit. The cables going from the deck to the 2XS must be the best you can get. Not cheapo stranded shield with 50% shielding. Try to hold out for the trusty 100% shielding to cut noise in this critical run. Of course, if you are utilizing the balanced input circuitry in the 2XS, this will also minimize your chance of noise.

POWER WIRING: The 2XS' +12 volt and ground (-) connections should be made with 18 gauge wire or better. Just insert the wire into the nifty connector and tighten the screw.

2-channel, 2 Way with the Epicenter and Equalization



NOTE: As always, you should disconnect the negative terminal of the car's battery before working on electrical connections.....Unless you want an extra tingle in your day.

GROUNDING THE SOURCE UNIT BEHIND THE DASH AND EVERYTHING ELSE TO THE FRAME IN THE REAR ALMOST CERTAINLY GUARANTEES THAT YOU WILL HAVE A GROUND LOOP. USE A SINGLE GROUND POINT THAT YOU KNOW IS COMMON WITH OTHER GROUNDED PARTS OF THE STEREO SYSTEM. TO MINIMIZE NOISE, MAKE THE CONNECTION WITH NO LESS THAN 18 GAUGE MULTI-STRANDED WIRE.

OUTPUT LEVEL CONTROLS: These controls provide two useful functions. First they allow you to control the overall balance between the high frequency output and the low frequency output. Second they can provide extra signal gain or cut if needed. Many head units have very weak output levels - in this case both controls can be operated on the "max" side. If the output is extremely high you can operate the controls on the "min" side to match hi/low balance as well as to match overall levels to the power amps.

CROSSOVER FREQUENCY SELECTION

We recommend that the crossover frequency be based on the design criteria of the low and high frequency speakers. For example, a 2-way system with 12" woofers for low frequencies and 5 1/4" 2-way separates for midrange and high frequencies should utilize a crossover point based on how low the 5 1/4" and how high the 12" will play.

Design for the system, not the woofers alone. We designed the 2XS with a fixed but PROGRAMMABLE crossover. This is the most reliable and accurate design. It will not change frequencies over time the way knob adjustable crossovers will, and that is a *really* good thing.

MAKING YOUR OWN CROSSOVER MODULE

We have provided the 2XS with a 90Hz resistor module, ALREADY PLUGGED IN. This is a common mid/treble dedicated woofer crossover point.

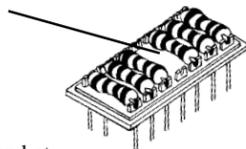
Additional crossover and PFM filter modules are available from your authorized AudioControl dealer. If you are good with a soldering iron you can build your own modules by using the following formula:

$$\frac{7200}{\text{Selected Frequency(Hz)}} = \text{Resistance Value (in Kilohms)}$$

Example: For a 2500Hz module, the formula yields a resistor value of $7200 \div 2500 = 2.88\text{Kohms}$.

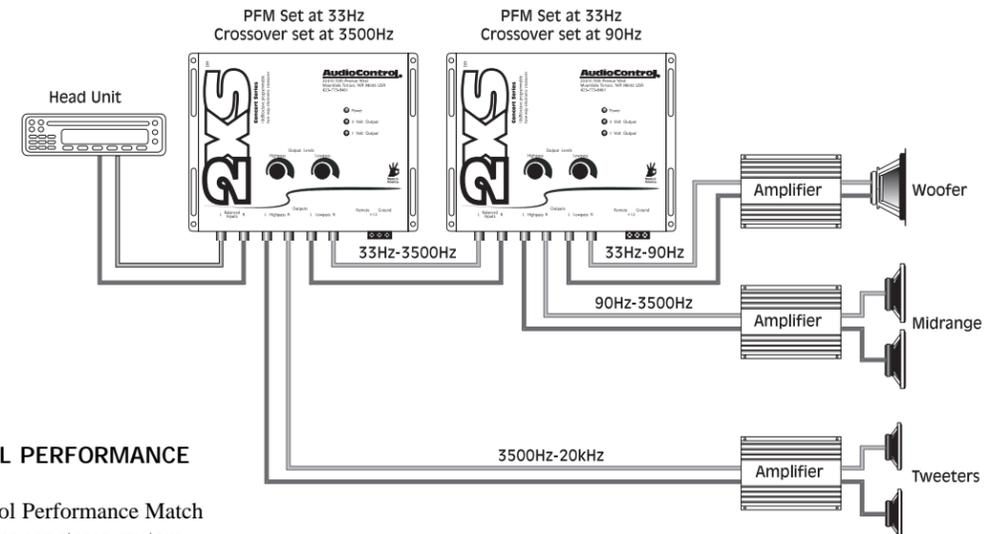
The 18dB crossover module requires six resistors of this value.

Note: Center remains open



NOTE: The resistors used must be 1/4 watt and at least 5% tolerance carbon film, or 1% tolerance metal film.

2-Channel, 3 Way System



A BLATANT PLUG FOR OTHER AUDIOCONTROL PERFORMANCE MATCH PRODUCTS

The 2XS is only one component in the AudioControl Performance Match line designed to extract "killer" performance from your car stereo system. Basically, there are real world barriers to good auto sound such as the fact that doors and trunks rarely make good speaker boxes. AudioControl Performance Match products, like the Concert Series 2XS, EQX™, EQL™, EQT™, and the new MVC™ (Master Volume Control) allow you to adjust or "voice" components to the specific acoustics and equipment in your stereo system whether it is a sleek Honda or a stylish Buick. The result is, as one warranty card stated; "A dream come true."

THE AUDIOCONTROL CONCERT SERIES 2XS LIMITED WARRANTY

People are scared of warranties. Lots of fine print, lots of non-cooperation, months of waiting around. . .

We'll 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 is "good with electronics" try to repair your AudioControl 2XS. So go ahead and read through this warranty, then enjoy your new component for a few days before sending in the warranty card and comments.

"Limited" doesn't mean anything ominous. The Federal Trade Commission tells all manufacturers to use the term to indicate certain conditions have to be met before they'll honor the warranty. IF you honor these conditions, we will warrant all material and workmanship on your Concert Series 2XS for FIVE YEARS from the date of purchase if installed by an authorized AudioControl dealer, and will fix or replace it, at our option, during that time. For you "do-it-yourselfers", we offer you the same warranty for one year.

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 purchased your 2XS.
2. You must keep your sales slip or receipt so you have proof of when and where you bought your 2XS. We're not the only company to require this, so it's a good habit to be in with any stereo purchase.
3. Your 2XS 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 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 2XS. If anyone other than (a), (b), or (c) messes with your 2XS, that voids the warranty.

5. The warranty is also void if the serial number has been altered or removed, or if the AudioControl 2XS 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 mobile 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 input 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 1-5, and it 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 2XS will work are not implied by this warranty. Other than what we've covered in this warranty, we have no obligation, expressed or implied. Also, we will not be obligated for direct or indirect consequential damage to your system caused by hooking up the AudioControl 2XS.

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

2XS SPECIFICATIONS

All specifications are measured at 14.4 VDC (standard automotive voltage)

Frequency Response	15Hz-20kHz;±1dB
Total Harmonic Distortion (25Hz-20kHz)	0.005%
Signal to Noise Ratio (rated full output)	115dB
Maximum Output Level	9.5 Vrms
Crossover Slope	18dB/Octave
Crossover type	State Variable
Crossover frequencies	set at 90Hz (user programmable)
PFM filter slope	18dB/Octave
PFM filter frequency	set at 33Hz (user programmable)
Power supply	transformer isolated PWM DC/DC converter
Power draw	150mA
Recommended fuse rating	1 Amp
Size	1.15" h x 5.5" w x 4.65" d
Weight	2 lbs
Balanced In	yes
Input Ground Isolation jumpers	yes
Output Ground Isolation jumpers	yes
Country of Origin	U.S.A

2XS BLOCK DIAGRAM

