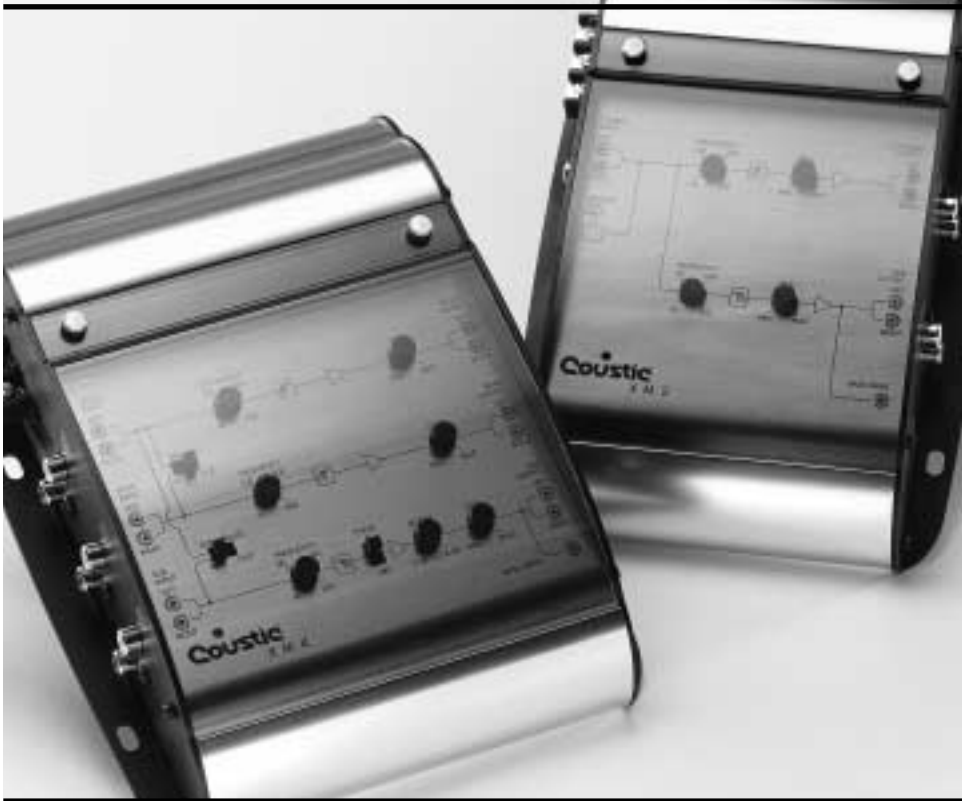


XM2 & XM4 OWNER'S MANUAL



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Cooustic[®]
CAR AUDIO

WELCOME

...to the Cooustic Car Audio world of hard-hitting, high-quality mobile audio products. The new Cooustic XM series 2-way crossovers utilize the industry's most advanced sound engineering and manufacturing processes to offer the highest quality electronic crossovers available on the market today.

Besides their sleek, contoured design, the new XM series 2-way crossovers offer the latest complementary audio features. This booklet offers you a guided tour of all these exciting benefits. For optimal sonic reproduction, please follow the installation suggestions and recommendations as closely as possible. The time you spend will prove to be worthwhile when you sit back and enjoy the high fidelity music!

Whatever your needs for your ultimate car audio system, look to Cooustic Car Audio – we have the fullest range of car audio components to meet the most critical demands.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronically, mechanically, or otherwise, without the prior written permission of Cooustic or Mitek Corporation.

Please take a moment to register your purchase on line at www.cooustic.com.

Please also record the serial number of your crossover in the space provided below and keep this manual for future reference, as well as your sales receipt as proof of ownership. (The serial number of your crossover is marked on the bottom of its metal chassis.)

Serial Number: _____

Date of Purchase: _____

FEATURES

ASYMMETRICAL ELECTRONIC CROSSOVER DESIGN

The advantage of asymmetrical crossovers over "symmetrical" crossovers is the ability of the former to eliminate undesirable peaks and dips in frequency response caused by resonant frequencies present in all enclosed space. Since the crossover points can overlap or underlap the resonant frequencies (i.e. "asymmetrically"), Cooustic XM series allows you to create an acoustically flat and smooth frequency response environment.

LINE LEVEL INPUTS

XM series crossovers feature pre-amp inputs for use with source units that have RCA or line level outputs. An independent set of line level inputs are provided on the XM4 for front, rear and sub connections. These connections allow for front to rear fading and independent sub control (see Parallel Input Switch).

SPEAKER LEVEL INPUTS

The Cooustic XM2 features speaker level inputs, allowing the crossover to work with source units that do not have RCA or line level outputs. The audio signal can be obtained by simply connecting the XM2's speaker level input to the source unit's speaker level outputs.

PARALLEL INPUT SWITCH

This feature allows all XM4 outputs to be driven with either a 2-, 4- or 6-channel input configuration. An adapter is not needed to split the source signal to the front, rear, and sub inputs when the XM4 is used with a source unit that only has a single or dual pair of RCA or line level outputs.

STEREO AND MONO LINE LEVEL OUTPUTS

The XM2 and XM4 feature line level outputs allowing for independent stereo high pass and mono low pass signals to be sent to designated amplifiers. The XM4 includes dual high pass outputs for front and rear fading capability while allowing for a constant mono subwoofer output.

HIGH PASS AND LOW PASS VARIABLE LEVEL CONTROLS

The adjustable high pass and subwoofer output levels allow precise control of the signals going to the respective amplifier.

CONTINUOUSLY VARIABLE CROSSOVERS POINTS

This feature allows for individual high pass and low pass crossover settings that can be selected within a range of frequencies to ensure optimum system performance.

BASS BOOST EQ

This feature found on the XM4 enhances the bass performance of the sound system. The output level is continuously variable with a maximum boost of 18dB @ 45Hz.

BASS-DRIVE™ (REMOTE SUB GAIN CONTROL PORT)

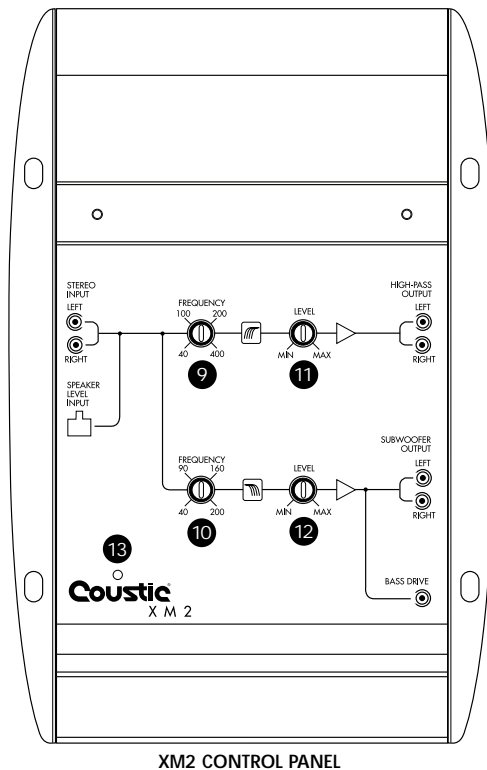
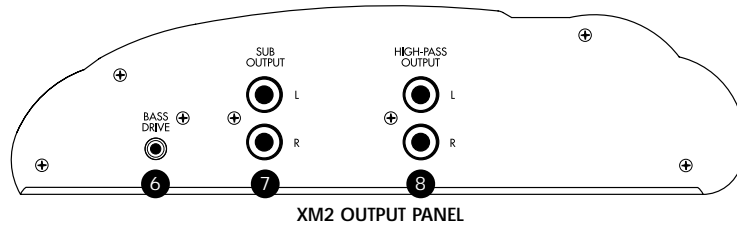
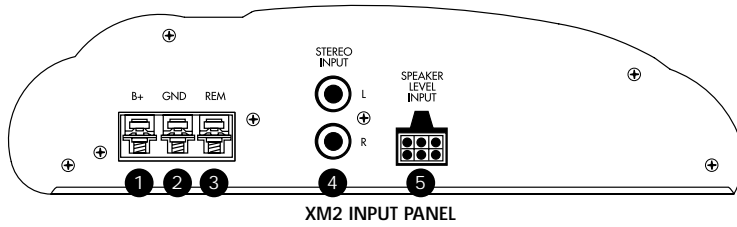
The optimum subwoofer output level changes with road noise that varies according to vehicle speed, wind speed and road surfaces. With our exclusive Bass-Drive™, the subwoofer output level can be adjusted via the model R S remote control to minimize the undesirable effect of fluctuating road noise.

PULSE-WIDTH MODULATED (PWM) SWITCHING POWER SUPPLY

The Cooustic XM4 features a Pulse-width modulated (PWM) switching power supply. The PWM is used to ensure consistent output performance and to eliminate unwanted noise caused by voltage fluctuation.

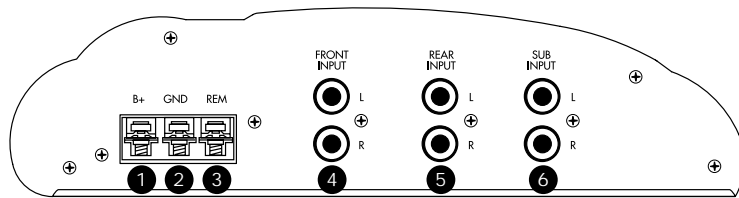
SUB PHASE CONTROL SWITCH

Depending on their placement, an acoustical delay may exist between the time the midrange/tweeter signals are heard and the time subwoofer signals are heard. With the XM4's Phase Inverter, you can compensate for the time delay by shifting the subwoofer output signals 180 degrees out of phase relative to the front and rear output signals.

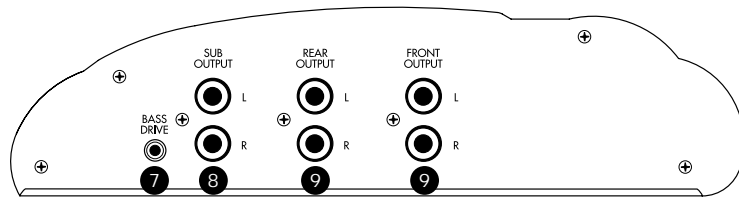


XM2: CONTROLS, INDICATORS & TERMINALS

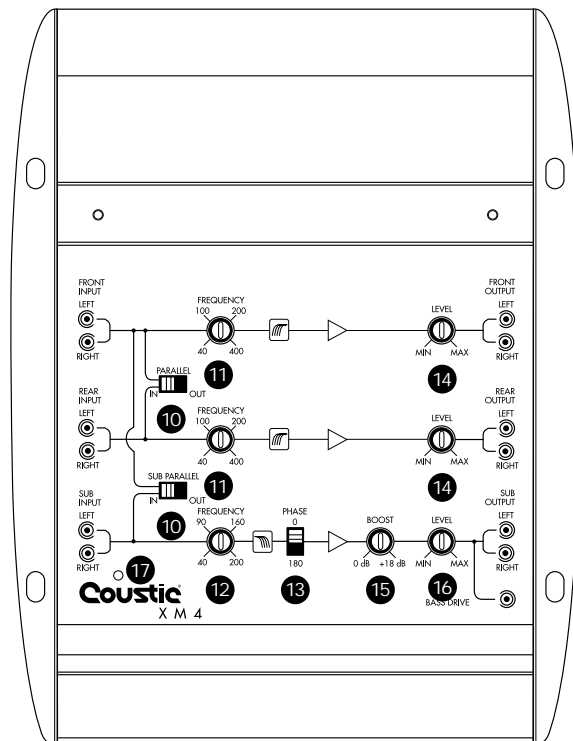
- 1 Power Input Terminal (B+) – To be connected to the positive terminal of your vehicle battery or other constant +12V source
- 2 Ground Input Terminal (GND) – To be wired to the vehicle's chassis ground
- 3 Remote Turn-on Input Terminal (REMOTE) – To be connected to the remote control wire or antenna lead of the source unit for remote ON/OFF
- 4 Line Level Inputs – To be connected to the front channel RCA output of the source unit
- 5 Speaker Level Inputs – To be connected to the front channel speaker output of the source unit
- 6 Bass Drive™ Remote Sub Gain Control Port – Connection for optional R S remote to control subwoofer output levels
- 7 Subwoofer Line Outputs – To be connected to the dedicated subwoofer amplifier left/right inputs
- 8 High Pass Line Outputs – To be connected to the dedicated high frequency amplifier left/right inputs
- 9 High-Pass Frequency Selector – For selection of high-pass crossover frequency between 40Hz and 400Hz, 18dB/Octave
- 10 Subwoofer Frequency Selector – For selection of the low-pass crossover frequency between 40Hz and 200Hz, 36dB/Octave
- 11 High Pass Output Level Control – For adjusting the high pass output signal level
- 12 Subwoofer Output Level Control – For adjusting the low pass output signal level
- 13 Power Indicator – This indicator lights up when the internal switching power supply is activated and the unit is operational



XM4 INPUT PANEL



XM4 OUTPUT PANEL



XM4 CONTROL PANEL

XM4: CONTROLS, INDICATORS & TERMINALS

- 1 Power Input Terminal (B+) – Connects to the positive terminal of your vehicle battery or other constant +12V source
- 2 Ground Input Terminal (GND) – Wires to the vehicle's chassis ground
- 3 Remote Turn-on Input Terminal (REM) – Connects to the remote control wire or antenna lead of the source unit for remote ON/OFF
- 4 Front Line Level Inputs – Connects to the front channel RCA output of the source unit
- 5 Rear Line Level Inputs – Connects to the rear channel RCA outputs of the source unit
- 6 Subwoofer Line Level Inputs – Connects to the subwoofer channel RCA outputs of the source unit
- 7 Bass Drive™ Remote Sub Gain Control Port – Connection for optional R S remote to control subwoofer output levels
- 8 Subwoofer Line Outputs – Connects to the dedicated subwoofer amplifier left/right inputs
- 9 High Pass Line Outputs – Connects the crossover's front and rear high pass outputs to the dedicated high frequency amplifier inputs
- 10 Parallel Input Switches – "IN": Set each switch to the "IN" position when the source unit does not supply rear or subwoofer channel outputs. "OUT": If the source unit has independent front, rear and/or sub channel outputs, set each switch to the "OUT" position
- 11 High-Pass Frequency Selectors – For selection of high-pass crossover frequency between 40Hz and 400Hz, 18dB/Octave
- 12 Subwoofer Frequency Selector – For selection of the low-pass crossover frequency between 40Hz and 200Hz, 36dB/Octave
- 13 Sub Phase Control Switch – Positioning the switch to the "180" position shifts the subwoofer output signals 180 degrees out of phase relative to the front and rear output signals
- 14 High Pass Output Level Controls – Adjusts the high pass output signal
- 15 Sub Bass Boost EQ – Centered at 45Hz with 18dB of adjustment, this feature will enhance the low frequency output of your audio system
- 16 Subwoofer Output Level Control – For adjusting the low pass output signal level
- 17 Power Indicator – This indicator lights up when the internal switching power supply is activated and the unit is operational

INSTALLATION

FOR SAFETY, DISCONNECT THE BATTERY GROUND BEFORE INSTALLATION.

Caution: Please follow all the installation recommendations and instructions in this manual. Installing and/or using the XM series electronic crossovers in methods other than those outlined herein may reduce the performance capability of the crossovers. Any such installation or usage may render the product warranty void.

PREPARATION

Before wiring and connecting the XM2 or XM4, please read the entire manual.

Mark down the accessories, tools required and important points as you go through this manual. Have all the necessary accessories, hardware and tools on hand. The following basic tools are required:

- Electric hand drill with assorted bits
- Screwdrivers (Phillips and flat head)
- Pliers
- Wire cutters
- Wire strippers
- Sharp knife
- Crimping tool
- Electrical tape or heat shrink tube for professional finish
- Soldering Iron (propane torch type) with solder
- Nylon tie wraps
- Volt/Ohm meter

Note: Please check with your vehicle's manual to see if special tools are necessary for working on your particular vehicle.

Check and make sure the vehicle's main battery and/or auxiliary battery, if any, is/are in good working condition and has sufficient capacity to run the electrical components of the vehicle plus the complete audio system.

The XM series crossovers are designed for use in 12 Volt **NEGATIVE GROUND** electrical system **ONLY**. Installing the units in a vehicle with positive ground electrical system could result in serious damage to the electronic crossover, other audio components and/or the vehicle's electrical components. If your vehicle happens to run on a positive ground electrical system, please consult your Cooustic dealer for specific instructions on installation.

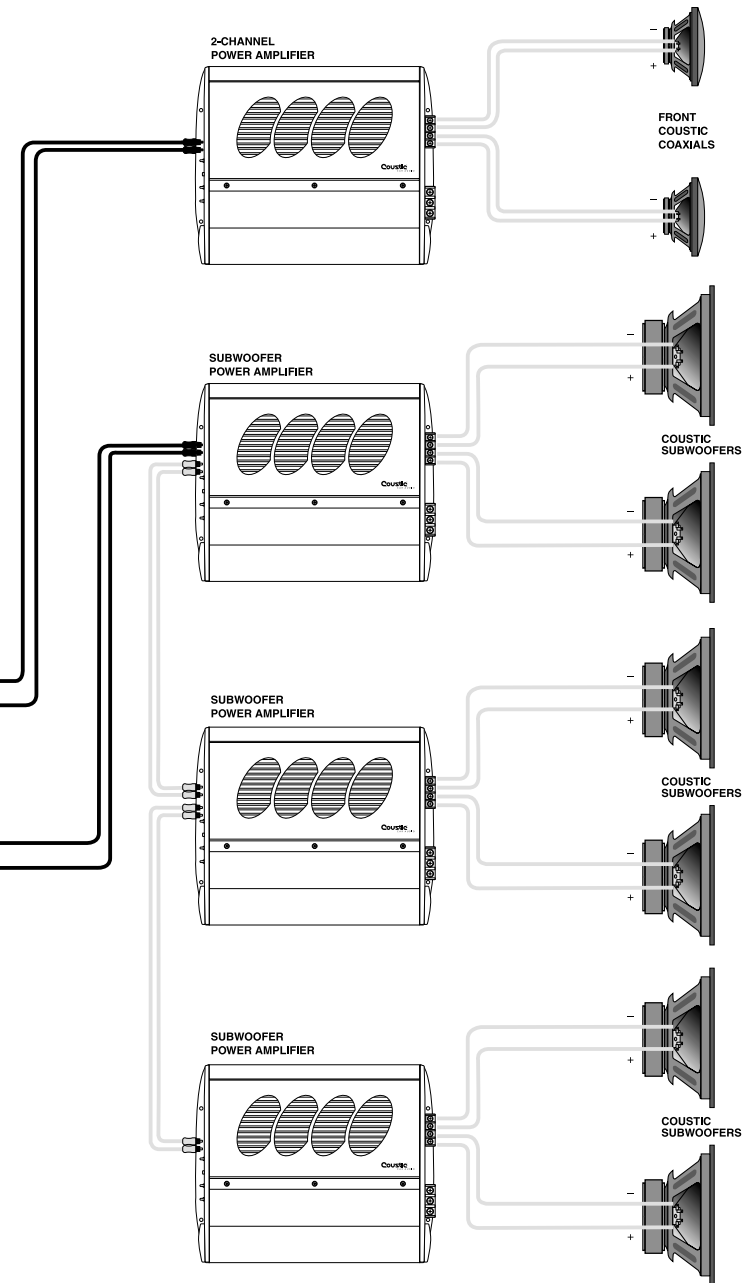
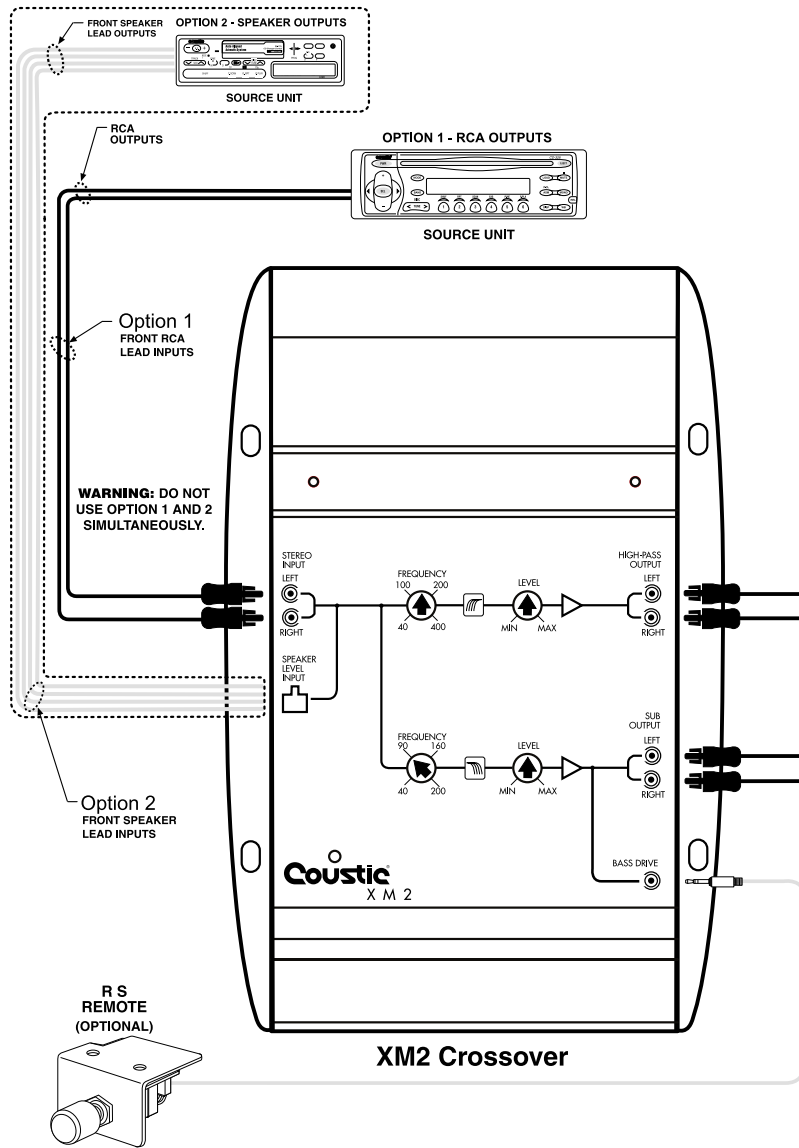
LOCATION

- Select a mounting location that is easily and conveniently accessible, e.g. inside the trunk.
- To avoid damage to the unit, keep the crossovers away from any heat source (such as the engine or any heat-generating ducts).
- Leave at least 6" clearance above the unit to allow easy adjustment.

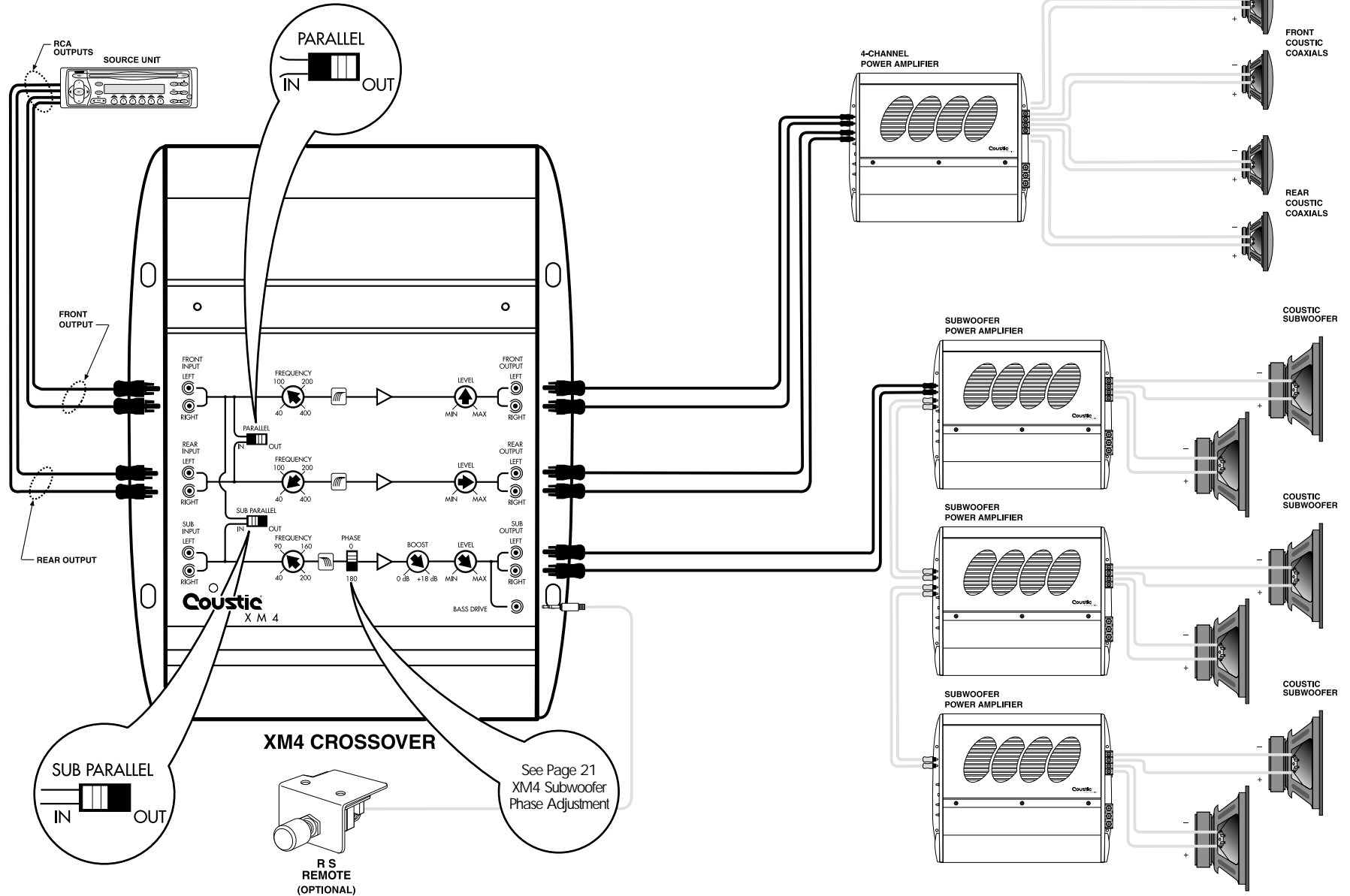
MOUNTING

- Place the XM series crossover at the desired location and use it as a template to determine the exact position of the mounting holes.
- Mark the mounting holes with a felt pen, and put the crossover aside.
- If the mounting surface is carpeted, cut out small circles of the carpet and padding around the four mounting holes to expose the metal underneath.
- Use a center punch to ensure drilling the exact position for the screws. Drill four (4) $\frac{1}{8}$ " pilot holes. **DO NOT BEGIN DRILLING UNTIL YOU HAVE PUT THE CROSSOVER ASIDE. USING THE CROSSOVER AS A DRILLING GUIDE MAY CAUSE IRREPARABLE DAMAGE TO THE UNIT.**
- Mount the XM series crossover with the Phillips head sheet metal screws and steel washers provided. (It is best not to tighten the screws to the maximum at this stage, since you might want to change the position at a later stage.)

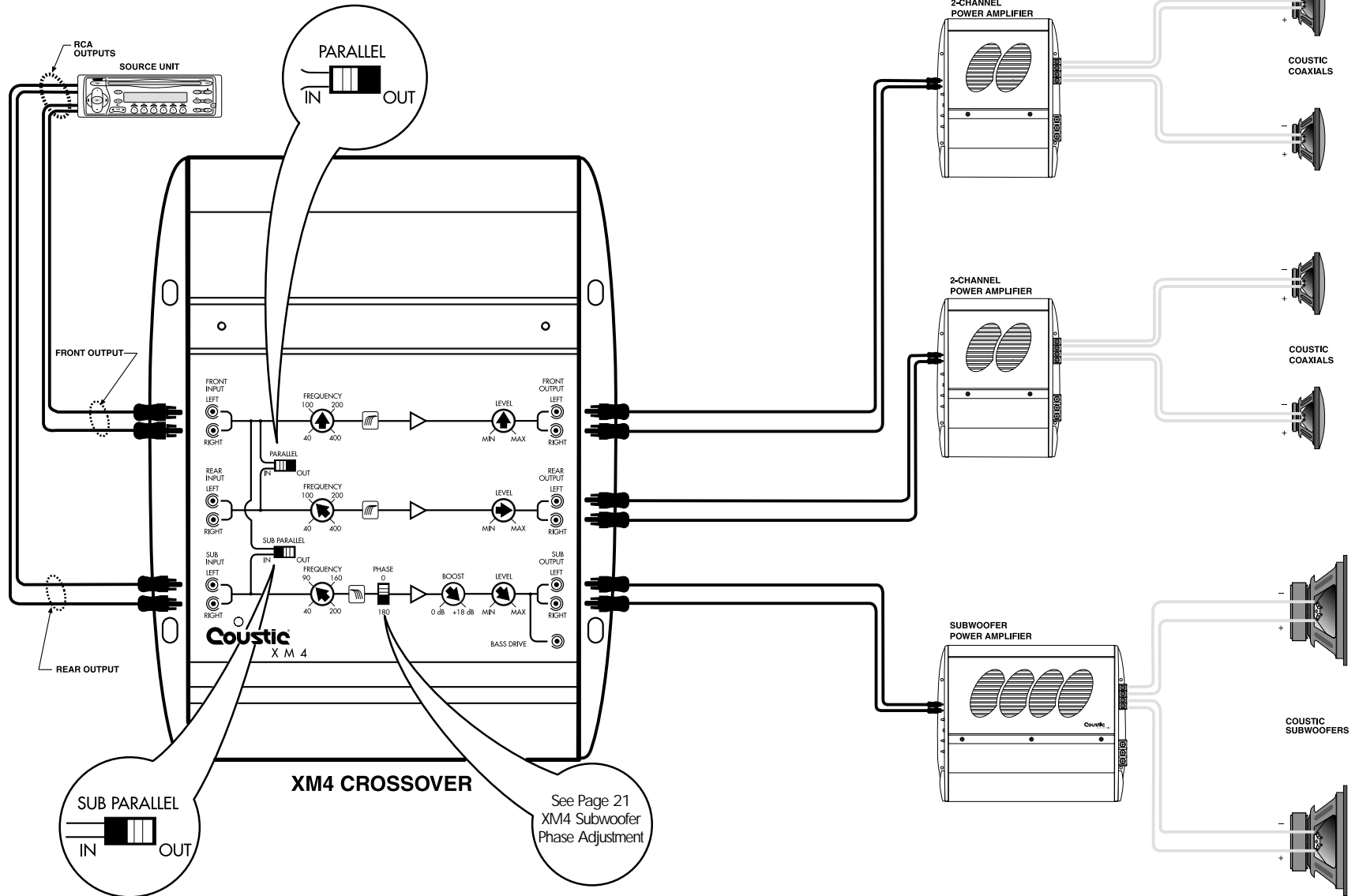
XM2 MULTI-SUB AMP CONFIGURATION



XM4 MULTI-SUB WITH FRONT/REAR FADE CONFIGURATION



**XM4 FRONT WITH REAR FILL CONFIGURATION
USING SOURCE UNIT'S REAR OUTPUT
AS REMOTE SUB GAIN CONTROL**



WIRING

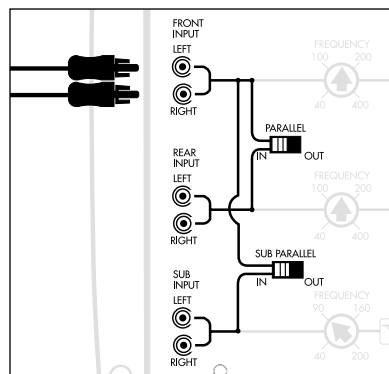
Caution: Routing audio cables and power cables together would invariably cause radiated engine noise in your audio system. If possible, run audio cables on one side of your car and power cables on the other. Never route these wires underneath the vehicle body.

- It is best to route all wires of the audio system along with the existing electrical wires of the vehicle through this would call for the dismantling of kick panels, door sills, etc. Where possible, the cleanest and safest route is under the carpet or behind the side panels.
- If you need to dismantle any part of the vehicle during installation, make notes of the dismantling process to ensure that you would be able to reassemble those parts afterwards. All the hardware, for example, screws, dismantled from the vehicle should be kept in a container to make reassembly easier.
- Run the various wires accordingly while avoiding sharp edges and door jams.
- Grommets should be used to protect the wires when they are routed through bare metal holes. For best protection, we recommend using automotive flexible plastic tubing, and for ease of handling, use plastic tie-wraps.
- All wires and cables should be "stress relieved" at various points on both the input and output side of the crossovers. Cable clamps should be used to reduce stress on the terminals.

Note: The battery ground should remain **DISCONNECTED** at all stages of installation.

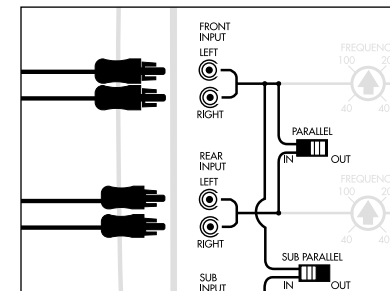
AUDIO INPUT CONNECTIONS

- Connect the front outputs of the source unit to the front inputs of the crossover. If using the XM2's speaker level input connection, use the appropriate speaker wires from the source unit.
- If using the XM4 with source unit that does not have additional rear and sub line level outputs, slide each parallel input switch to the "IN" position and skip the next two steps.



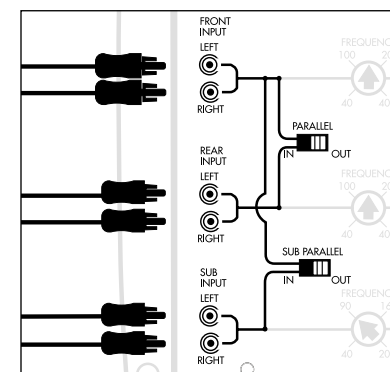
if using the rear outputs from the source unit

- Connect the rear outputs of the source unit to the rear inputs of the crossover. Slide the parallel input switch to the "OUT" position.



if using the subwoofer outputs from the source unit

- Connect the subwoofer outputs of the source unit to the sub inputs of the crossover. Slide the parallel input switch to the "OUT" position.



AUDIO OUTPUT AND POWER CONNECTIONS

- Connect the high pass and subwoofer outputs of the XM series crossovers to the inputs of their respective amplifiers.
- Connect the crossovers' B+ terminals to the positive terminal of the vehicle's battery. Cut the supplied fuse loop (so there are now two separate wires that attach to each end of the fuse holder). Install the fuse holder 18" from the battery on the power wire that runs through firewall or sheet metal to protect the battery, the vehicle and more importantly, you.
- Connect the GND terminal of the XM series crossover to the vehicle chassis. For better conductivity, if necessary, scrape paint off of the chassis to reveal bare metal at the contact point.
- Connect the REM terminal of the crossover to the remote output terminal of the source unit to establish crossover remote power on/off via the source unit. If the source unit does not provide a remote output, connect to its power antenna terminal.
- Double check all the previous installation steps. If everything is in order, complete the installation by reconnecting the battery ground to the vehicle chassis.

ADJUSTMENTS

CROSSOVER FREQUENCY ADJUSTMENT

To avoid over-crowding the control panel, only four frequencies are shown on each frequency selector. In reality you can choose any of the frequencies between the lowest and the highest setting marked on the selectors.

- When setting the crossover frequencies, it is best to use source materials with a lot of bass.
- Center the tone, balance and fader controls of the source unit (leaving the other controls at their previous positions).
- Set the volume of the source unit to approximately $\frac{2}{3}$ of its maximum output.

FRONT CHANNEL CROSSOVER FREQUENCY SETTING:

Adjust the fader of the source unit to increase the volume level of the front speakers. Starting from the preset frequency, adjust the front channel frequency downward or upward until you get your desired sound quality. Again, there is no universal optimum setting. It depends on the size and location of the front speakers.

XM4 REAR CHANNEL CROSSOVER FREQUENCY SETTING:

Adjust the fader of the source unit to increase the volume level of the rear speaker. Just like setting the front channels, starting from their respective preset frequencies, gradually adjust the rear channel frequencies downward or upward until you get your desired sound quality.

SUBWOOFER CROSSOVER FREQUENCY SETTING

Starting from the preset 200Hz, gradually adjust the subwoofer frequency downward to 120Hz. If the bass is still "boomy" or soft sounding, adjust it downward even further until the bass sounds tight and deep. The optimum setting varies from vehicle to vehicle and from individual to individual.

OUTPUT LEVEL ADJUSTMENT

As in the case of crossover frequency adjustment, when making the output level adjustment it is best to use compact discs or cassette tapes with greater dynamic range.

- Center the tone, balance and fader controls of the source unit (leaving the other controls at their previous positions).

- Set the volume of the source unit to approximately $\frac{2}{3}$ of its maximum output.
- Starting from their respective preset levels, adjust one output level at a time. With each of the level controls, turn the level up or down until distortion develops, then retrace the path until distortion disappears.
- Optimum output levels vary with the program source (radio, tape or CD). If the optimum output levels for radio differ considerable from those for tape/CD, locate the median levels that are best for both program sources. (Before making output level adjustment for radio, first locate a FM station with strong radio signals.)
- The optimum subwoofer output level changes from time to time, depending on the volume of road noise, which in turn depends on the vehicle speed, wind speed and road surface. With the XM series Bass-Drive™ remote sub gain control port and the R S remote control, the subwoofer output level can be adjusted as and when necessary from the driver's seat.

XM4 SUBWOOFER PHASE ADJUSTMENT

- In a mobile audio system where the distance of the subwoofer to the listener is different from the distance of the midrange/tweeter to the listener, an acoustical time delay might exist due to the different timing these signals are received by the listener. The overall effect would be either almost no bass or the bass seems to lag behind the highs (commonly known as "out of phase"). If this is the case, experiment with the phase inverter switch for a position that gives you more bass output from the subwoofer.

NOISE CHECK

Before mounting the XM series crossovers and the other audio components permanently, please conduct the following noise check:

- Start the engine and turn on the power of the source unit.
- Rev the engine and vary the audio volume to check for radiated engine noise. If there is an alternator whining noise or tic-tic noise, refer to the TROUBLESHOOTING GUIDE for assistance. If the problem persists, consult your local Cooustic dealer or Cooustic directly.
- If no unwanted noise is detected, double check all the wiring and cables for safe placement. Then securely tighten the mounting screws of all the audio components.

SPECIFICATIONS***XM2 — 2-CHANNEL 2-WAY CROSSOVER***

High Pass Crossover:	18dB/Oct 40Hz-400Hz
Low Pass Crossover:	36dB/Oct Mono 40Hz-200Hz
Bass Drive:	0dB to 18dB
Max Input/Output:	8Volts RMS
Input current:	1 amp max.
Frequency response: limit	20Hz – 20kHz \pm ¼dB before crossover
Separation:	60dB
THD+N:	<0.1%
Signal to Noise:	>90dB
Input Impedance:	>10k Ohms
Output Impedance:	50 Ohms
Dimensions:	2 $\frac{3}{16}$ " H x 8 $\frac{1}{2}$ " W x 5 $\frac{7}{8}$ " L (55mm x 216mm x 149mm)

XM4 — 2-/4-/6-CHANNEL 2-WAY CROSSOVER

Dual High Pass Crossover:	18dB/Oct 40Hz-400Hz
Low Pass Crossover:	36dB/Oct Mono 40Hz-200Hz
Bass Drive:	0dB to 18dB
Bass Boost Eq:	0-18dB @ 45Hz
Phase Switch:	0°/180°
Max Input/Output:	8Volts RMS
Input current:	1 amp max.
Frequency response: limit	20Hz – 20kHz \pm ¼dB before crossover
Separation:	60dB
THD+N:	<0.1%
Signal to Noise:	>90dB
Input Impedance:	>10k Ohms
Output Impedance:	50 Ohms
Dimensions:	2 $\frac{3}{16}$ " H x 8 $\frac{1}{2}$ " W x 6 $\frac{7}{8}$ " L (55mm x 216mm x 174mm)

Due to continual product development, all specifications are subject to change without notice.

TROUBLESHOOTING GUIDE

SYMPTOM – No Power

PROBABLE CAUSE – Check all the ground, B+ and remote terminals for tight connection.

- Check all fuses.
- Use a Volt/Ohm meter to check all power wire connections to see if the system is receiving +12VDC.

SYMPTOM – “Motorboating”: The power indicator going off repeatedly when the audio system is on.

PROBABLE CAUSE – Check if the crossover power wire is connected directly to the battery.

- Check the battery voltage; if low, recharge or replace it.
- Check if the crossover has good ground connection (i.e. whether the ground wire is making good contact with a bare metal spot of the vehicle chassis).

SYMPTOM – When the engine is running, the audio system has a whining noise that remains unchanged or disappears with the increase of audio volume.

PROBABLE CAUSE – Check all the power wires to see if they are all connected directly to the battery.

- Check all the ground connections to the entire system for good contact with bare metal of the vehicle chassis. Check if the source unit and the crossover are grounded at the same reference point.

SYMPTOM – Obvious distortion at low volume.

PROBABLE CAUSE – Output level of various channels not compatible, refer to section titled OUTPUT LEVEL ADJUSTMENT.

WARRANTY

LIMITED WARRANTY

Important Notice to Consumer: Cooustic offers the following warranty to the ORIGINAL PURCHASER of COUSTIC products within the period stated herein:

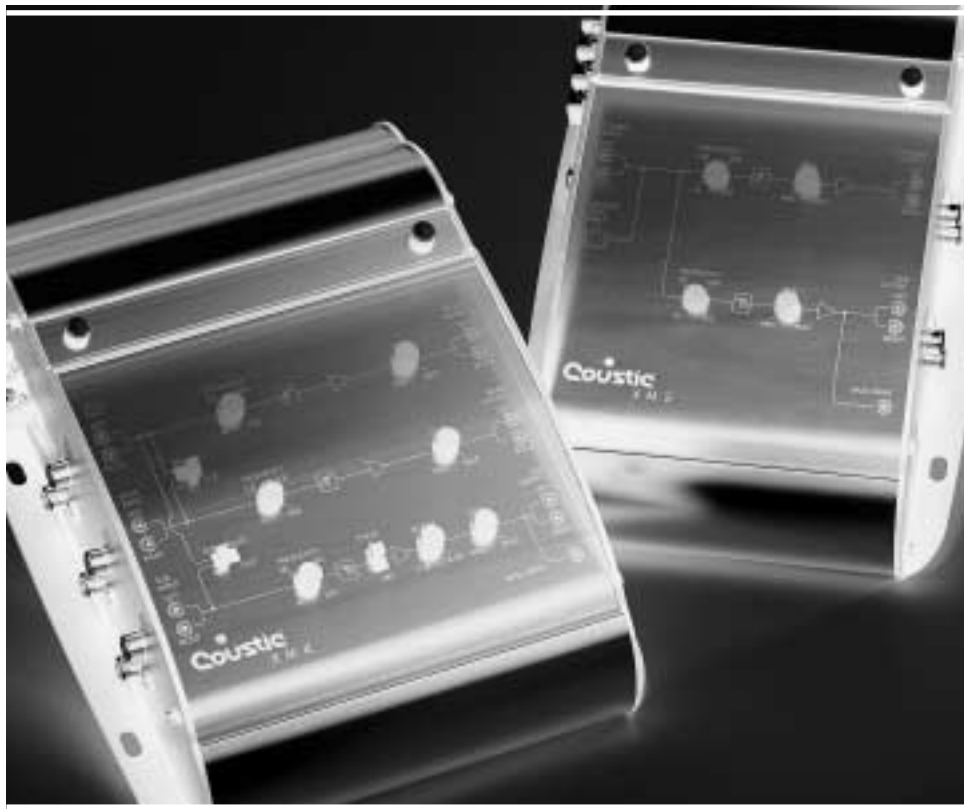
Cooustic warrants the XM2, XM4 and XM6 against defects in material and workmanship for a period of ONE (1) YEAR from date of original purchase. The limited warranty is offered as an Over The Counter (OTC) exchange providing that the product was purchased from an authorized Cooustic dealer and is accompanied by valid sales receipt at the time of exchange. Replacement units will be warranted for the remaining portion of the original warranty period.

IMPORTANT: THIS WARRANTY DOES NOT COVER INSTALLATION OR DAMAGE RESULTING FROM ACCIDENT, MISUSE, ABUSE, IMPROPER WIRING, INCORRECT VOLTAGE, OPERATING UNIT AGAINST INSTRUCTIONS IN OWNER'S MANUAL OR ANY PRODUCT WHICH HAS BEEN OPENED, TAMPERED WITH OR SERIAL NUMBERS REMOVED.

This warranty does not cover labor costs for removal and/or installation of the unit for repair. Under no circumstances shall Cooustic be liable for any special, incidental or consequential damages or for any other expenses incurred by reason of use or implied including any implied warranty of merchantability or fitness for particular use or otherwise.

This warranty gives the CONSUMER specific legal rights and he may also have other rights which vary from state to state. Some states do not follow the exclusion or limitation of incidental or consequential damages, hence the above exclusions and limitations may not apply.

For additional information, call us at 602-438-2020, or visit our website at www.cooustic.com.



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COU000699 RevA 10/01

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