PROLOGY

Car Power Amplifier

Power 400	**X1.400.2**
Power 800	**X1.800.4**
Power 1000	**X1.1000.1D**
Power 2000	**X1.2000.1D**

User Manual

SATURN
HIGH-TECH GROUP, Ltd.

PRACTICE SAFE SOUND™

Continuous exposure to sound pressure levels over 100dB may cause permanent hearing loss. High powered auto sound systems may produce sound pressure levels well over 130dB. Use common sense and practice safe sound.

SAFETY INSTRUCTIONS

⚠WARNING This symbol with "**WARNING**" is intended to alert the user to the presence of important instructions. Failure to heed the instructions will result in severe injury or death.

⚠CAUTION This symbol with "**CAUTION**" is intended to alert the user to the presence of important instructions. Failure to heed the instructions can result in injury or unit damage.

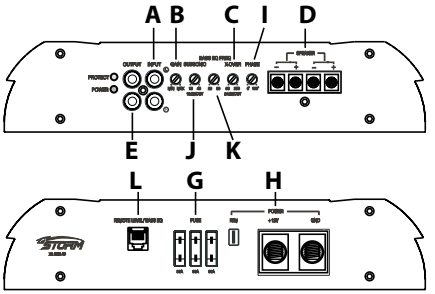
⚠ **CAUTION**: To prevent injury and damage to the unit, please read and follow the instructions in this manual. We want you to have enjoyment from this system, not a headache.

⚠ **CAUTION** If you feel unsure about installing this system yourself, have it installed by a qualified Lightning Audio technician.

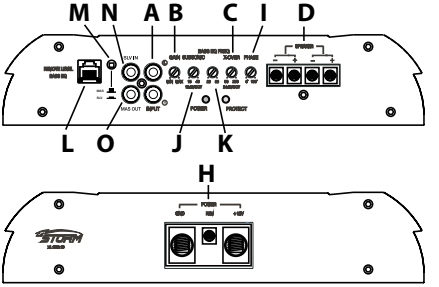
⚠ **CAUTION** Before installation, disconnect the battery negative (-) terminal to prevent damage to the unit, fire and/or possible injury.

DESIGN FEATURES

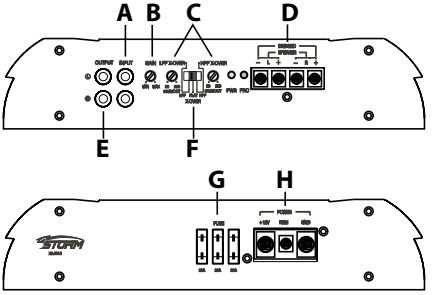
X1.1000.1D



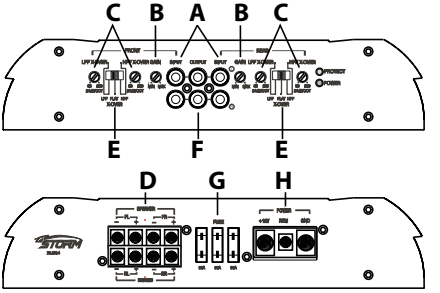
X1.2000.1D



X1.400.2



X1.800.4



DESIGN FEATURES

A. **RCA Input Jacks** – Line Level from Radio Pre-outs: The industry standard RCA jack provides an easy connection for signal level input. They are platinum to resist the signal degradation caused by corrosion.

B. **Gain Control:** The input gain control is preset to match the output of most source units. They can be adjusted to match output levels from a variety of source units.

C. **Adjustable Crossover Frequency Control:** 50-250Hz. Low Pass only on Models X1.1000.1D & X1.2000.1D.

D. **Speaker Connections:** Follow correct polarity, and do not Ground any speaker wires. Do not connect any speaker wires together.

E. **Crossover Filter Switch:** (Models X1.400.2 & X1.800.4 Only)
HPF for High Pass - Mid-Tweeter.
Flat for All Pass - Full Range.
LPF for Low Pass - Subs.

F. **Pass Thru Outputs:** The Pass-Thru provides a convenient source for daisy-chaining an additional amplifier without running an extra set of RCA cables from the front of the vehicle to the rear amplifier location.

G. **Power Fuse:** If this Fuse should blow, determine the cause or see your authorized dealer. Never replace the fuse with one of greater value than the original

H. **Power Connector terminals:** Connects Power, Ground, and Remote

I. **Phase:** (Models X1.1000.1D & X1.2000.1D Only) Used to vary the inversion of the output, 0°-180°, from input source.

J. **SubSonic:** (Models X1.1000.1D & X1.2000.1D Only) A high pass filter designed to prevent frequencies below the audio range from being applied to the subwoofer from the amplifier. Improving subwoofer performance and power handling.

K. **Bass EQ:** (Model X1.1000.1D & X1.2000.1D Only) Variable 20-80Hz frequency control. Boost controlled by remote.

L. **Remote Level/Bass EQ Control:** (Models X1.1000.1D & X1.2000.1D Only) Remote level control attenuates Gain set on the amplifier by up to **-**20dB. Bass EQ control is 0 to +12dB Boost of the frequency (20-80Hz) set on the amplifier.

M. **Master / Slave Switch:** (Model 2000.1D Only) Used to set the amplifier to master or slave when strapping.

N. **SLV IN (slave):** (Model X1.2000.1D Only) When strapping, this is the slaved amplifer input from the master amplifier.

O. **MAS OUT (master):** (Model X1.2000.1D Only) When strapping, this is the master amplifer output to the slave amplifier.

INSTALLATION

INSTALLATION CONSIDERATIONS

The following is a list of tools needed for installation:

Volt/Ohm Meter	Hand held drill w/assorted bits
Wire strippers	1/8" diameter heatshrink tubing
Wire crimpers	Assorted connectors
Wire cutters	Adequate Length—Power Wire
#2 Phillips screwdriver	Adequate Length—Remote Turn-on Wire
Battery post wrench	Adequate Length—Grounding Wire

INSTALLATION

This section focuses on some of the vehicle considerations for installing your new Amplifier. Pre-planning your system layout and best wiring routes will save installation time. When deciding on the layout of your new system, be sure that each component will be easily accessible for making adjustments.

⚠ **CAUTION**: If you feel unsure about installing this system yourself, have it installed by a qualified technician.

⚠ **CAUTION**: Before installation, disconnect the battery negative (-) terminal to prevent damage to the unit, fire and/or possible injury.

Before beginning any installation, follow these simple rules:

1. Be sure to carefully read and understand the instructions before attempting to install the Unit.
2. For safety, disconnect the negative lead from the battery prior to beginning the installation.
3. For easier assembly, we suggest you run all wires prior to mounting your Unit in place.
4. Route all of the RCA cables close together and away from any high current wires.
5. Use high quality connectors for a reliable installation and to minimize signal or power loss.
6. Think before you drill! Be careful not to cut or drill into gas tanks, fuel lines, brake or hydraulic lines, vacuum lines or electrical wiring when working on any vehicle.
7. Never run wires underneath the vehicle. Running the wires inside the vehicle provides the best protection.
8. Avoid running wires over or through sharp edges. Use rubber or plastic grommets to protect any wires routed through metal, especially the firewall.
9. ALWAYS protect the battery and electrical system from damage with proper fusing. Install the appropriate fuse holder and fuse on the +12V power wire within 18” (45.7 cm) of the battery terminal.
10. When grounding to the chassis of the vehicle, scrape all paint from the metal to ensure a good, clean ground connection. Grounding connections should be as short as possible and always be connected to metal that is welded to the main body, or chassis, of the vehicle.

MOUNTING LOCATIONS

The mounting position of your amplifier will have a great effect on the sound and performance produced.

Engine Compartment

Never mount this unit in the engine compartment. Mounting the unit in the engine compartment will void your warranty.

Passenger Compartment Mounting

Mounting the amplifier in the passenger compartment will work as long as you provide a sufficient amount of air for the amplifier to cool itself. If you are going to mount the amplifier under the seat of the vehicle, you must have at least 1" (2.54cm) of air gap around the amplifier's heatsink.

Mounting the amplifier with less than 1" (2.54cm) of air gap around the amplifier's heatsink in the passenger compartment will not provide proper cooling and will severely affect the performance of the amplifier and is strongly not recommended.

BATTERY AND CHARGING

Amplifiers will put an increased load on the vehicle's battery and charging system. We recommend checking your alternator and battery condition to ensure that the electrical system has enough capacity to handle the increased load of your stereo system. Stock electrical systems which are in good condition should be able to handle the extra load of any Lightning Audio amplifier without problems, although battery and alternator life can be reduced slightly. To maximize the performance of your amplifier, we suggest the use of a heavy duty battery and an energy storage capacitor.

INSTALLATION

WIRING THE SYSTEM

⚠ **CAUTION**: If you do not feel comfortable with wiring your new unit, please see your local Authorized Lightning Audio Dealer for installation.

⚠ **CAUTION**: Before installation, disconnect the battery negative (-) terminal to prevent damage to the unit, fire and/or possible injury.

⚠ **CAUTION**: Avoid running power wires near the low level input cables, antenna, power leads, sensitive equipment or harnesses. The power wires carry substantial current and could induce noise into the audio system.

1. Plan the wire routing. Keep RCA cables close together but isolated from the amplifier's power cables and any high power auto accessories, especially electric motors. This is done to prevent coupling the noise from radiated electrical fields into the audio signal. When feeding the wires through the firewall or any metal barrier, protect them with plastic or rubber grommets to prevent short circuits. Leave the wires long at this point to adjust for a precise fit at a later time.
2. Prepare the power cable for attachment to the amplifier by stripping 1/2" of insulation from the end of the wire. Insert the bared wire into the B+ terminal and tighten the set screw to secure the cable in place.

NOTE: The B+ cable MUST be fused 18" or less from the vehicle's battery. Install the fuseholder under the hood and prepare the cable ends as stated above. Connections should be water tight.

3. Trim the power cable within 18" of the battery and strip1/2"of insulation from the end of the wire.
4. Strip 1/2" from the battery end of the power cable and crimp a large ring terminal to the cable. Use the ring terminal to connect to the battery positive terminal. **DO NOT install the fuse at this time.**
5. Prepare the grounding cable for attachment to the amplifier by stripping 1/2" of insulation from the end of the wire. Insert the bared wire into the GND terminal and tighten the set screw to secure the cable in place. Prepare the chassis ground by scraping any paint from the metal surface and thoroughly clean the area of all dirt and grease. Strip the other end of the wire and attach a ring connector. Fasten the cable to the chassis using a non-anodized screw and a star washer.
6. Prepare the REM turn-on wire for connection to the amplifier by stripping 1/2" of insulation from the wire end. Insert the bared wire into the REM terminal and tighten the set screw to secure the cable into place. Connect the other end of the REM wire to a switched 12 volt positive source. The switched voltage is usually taken from the source unit's accessory lead. If the source unit does not have this output available, the recommended solution is to wire a mechanical switch in line with a 12 volt source to activate the amplifier.
7. Securely mount the amplifier to the vehicle or amp rack. Be careful not to mount the amplifier on cardboard or plastic panels. Doing so may enable the screws to pull out from the panel due to road vibration or sudden vehicle stops.
8. Connect the source signal to the amplifier by plugging the RCA cables/high level inputs into the input jacks at the amplifier.
9. Connect the speakers. Strip the speaker wires 1/2" and insert into the speaker terminal and tighten the set screw to secure into place. Be sure to maintain proper speaker polarity. DO NOT chassis ground any of the speaker leads as unstable operation may result.
10. Perform a final check of the completed system wiring to ensure that all connections are accurate. Check all power and ground connections for frayed wires and loose connections which could cause problems.

NOTE: Follow the diagrams for proper signal polarity.

⚠ **CAUTION**: The X1.400.2 and X1.800.4 amplifiers are not recommended for impedance loads below 2Ω stereo and/or 4Ω bridged (mono).

INSTALLATION

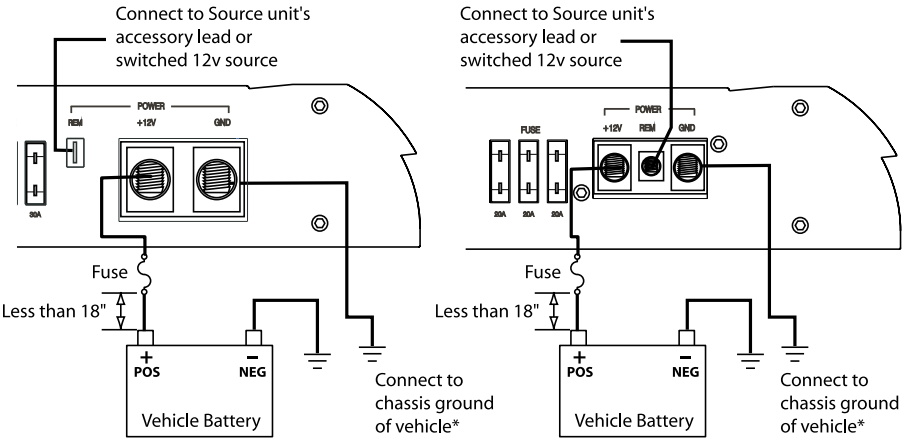
MONO AMPLIFIERS X1.1000.1D & X1.2000.1D

These amplifiers have two (2) speaker outputs for convenience and are paralleled internally.

⚠ **CAUTION**: The X1.1000.1D and X1.2000.1D amplifiers are not recommended for impedance loads below 1Ω.

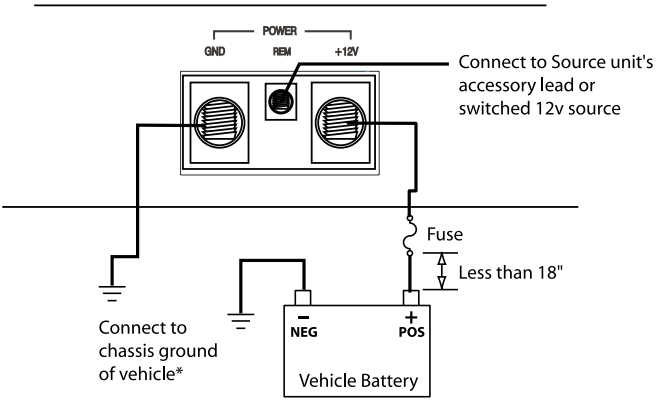
X1.1000.1D

X1.400.2
X1.800.4

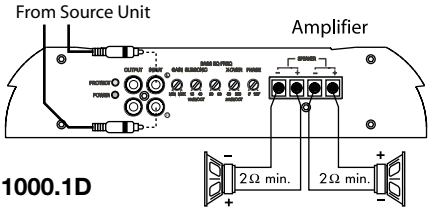


*Keep Grounds as short as possible

X1.2000.1D

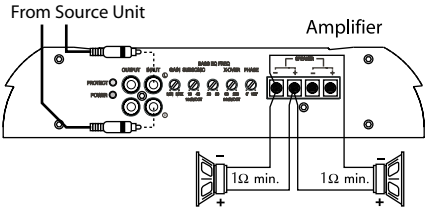


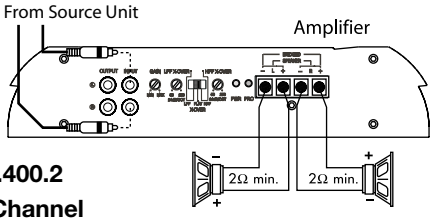
*Keep Grounds as short as possible



X1.1000.1D

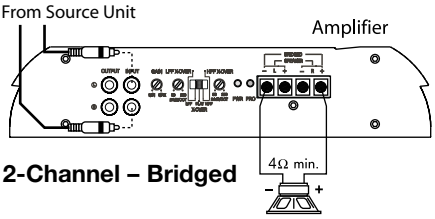
X1.2000.1D



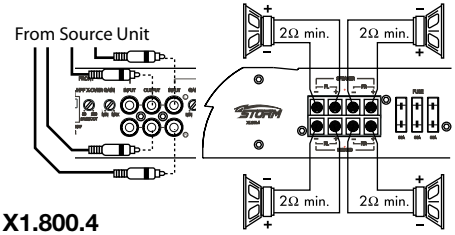


X1.400.2

2-Channel

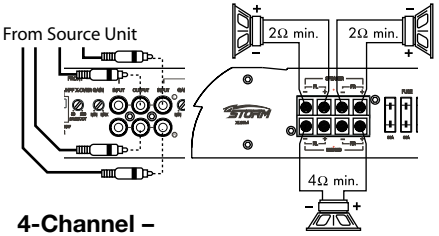


2-Channel – Bridged



X1.800.4

4-Channel



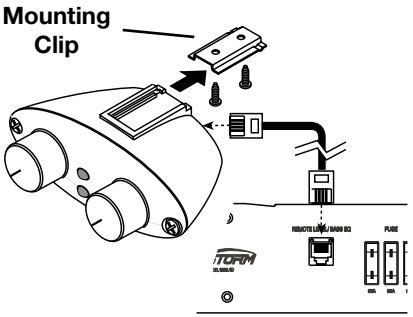
4-Channel –

Set as 3-Channel Bridged

REMOTE LEVEL/BASS EQ CONTROL (Models X1.1000.1D & X1.2000.1D Only)

Mounting and installation

1. Find a location, either under the dash or near the center console, that gives easy access to the remote.
2. Using the screws supplied, install the mounting clip with the tabs towards the back.
3. Route the cable for the remote and connect to both the remote and amplifer.
4. Slip the remote onto the mounting clip until it snaps into place.

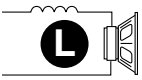


USING PASSIVE CROSSOVERS

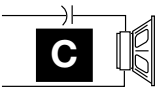
A passive crossover is a circuit that uses capacitors and/or coils and is placed on speaker leads between the amplifier and speaker. The crossover delegates a specific range of frequencies to the speaker for optimum driver performance. A crossover network can perform one of three functions: High-Pass (capacitors), Low-Pass (inductors or coils) and Bandpass (combination of capacitor and coil).

The most commonly used passive crossover networks are 6dB/octave systems. These are easy to construct and require one component per filter. Placing this filter in series with the circuit will reduce power to the speaker by 6dB/octave above or below the crossover point depending on whether it is a high-pass or low-pass filter. More complex systems such as 12dB/octave or 18dB/octave can cause impedance problems if not professionally designed.

Passive crossovers are directly dependent upon the speaker's impedance and component value for accuracy. When passive crossover components are used in multiple speaker systems, the crossover's effect on the overall impedance should be taken into consideration along with the speaker's impedance when determining amplifier loads.



6dB/Octave Low-Pass



6dB/Octave High-Pass

Freq. Hertz	Speaker Impedance					
	2 OHMS		4 OHMS		8 OHMS	
	L	C	L	C	L	C
80	4.1mH	1000mF	8.2mH	500mF	16mH	250mF
100	3.1mH	800mF	6.2mH	400mF	12mH	200mF
130	2.4mH	600mF	4.7mH	300mF	10mH	150mF
200	1.6mH	400mF	3.3mH	200mF	6.8mH	100mF
260	1.2mH	300mF	2.4mH	150mF	4.7mH	75mF
400	.8mH	200mF	1.6mH	100mF	3.3mH	50mF
600	.5mH	136mF	1.0mH	68mF	2.0mH	33mF
800	.41mH	100mF	.82mH	50mF	1.6mH	26mF
1000	.31mH	78mF	.62mH	39mF	1.2mH	20mF
1200	.25mH	66mF	.51mH	33mF	1.0mH	16mF
1800	.16mH	44mF	.33mH	22mF	.68mH	10mF
4000	.08mH	20mF	.16mH	10mF	.33mH	5mF
6000	51mH	14mF	.10mH	6.8mF	.20mH	3.3mF
9000	34mH	9.5mF	68mH	4.7mF	.15mH	2.2mF
12000	25mH	6.6mF	51mH	3.3mF	100mH	1.6mF

L = Low-Pass (Inductor)
C = High-Pass (Capacitor)
For more information, see your Authorized Lightning Audio Dealer.

⚠ **CAUTION**: The Lightning Audio amplifiers are not recommended for impedance loads below 2Ω stereo and 4Ω bridged (mono) loads.

OPERATION

ADJUSTING GAIN

To adjust the gain setting, turn the amplifier gains all the way down. Turn the source unit volume up until distortion is audible and then turn it down a bit until the distortion is inaudible. This will be about two thirds all the way up on most source units. Next, turn the amplifier gain setting until once again distortion is audible and then back it down until the distortion is inaudible.

NOTE: For a more in depth setting procedure, contact Lightning Audio Technical Support.

ADJUSTING CROSSOVER (X-OVER)

Models X1.400.2 & X1.800.4

Placing the switch in the HPF position sets the amplifier to the High Pass mode, enabling frequencies above the cut-off point to pass, adjustable between 50-250Hz.

Placing the switch in the FLAT position sets the amplifier to the All Pass mode, preventing any crossover adjustment, allowing all frequencies to pass..

Placing the switch in the LPF position sets the amplifier to the Low Pass mode, enabling frequencies below the cut-off point to pass, adjustable between 50-250Hz.

Turn the crossover adjustment knob all the way down. With the system playing, turn the crossover adjustment knob up slowly until the desired crossover point is achieved.

Models X1.1000.1D & X1.2000.1D

Turn the crossover adjustment knob all the way down. With the system playing at normal listening level, turn the crossover adjustment knob up slowly until the desired crossover point is achieved.

SUBSONIC (Models X1.1000.1D & X1.2000.1D Only)

A high pass filter designed to prevent frequencies below the audio range from being applied to the subwoofer from the amplifier.

Set this to your personal preference while listening to the system.

PHASE (Models X1.1000.1D & X1.2000.1D Only)

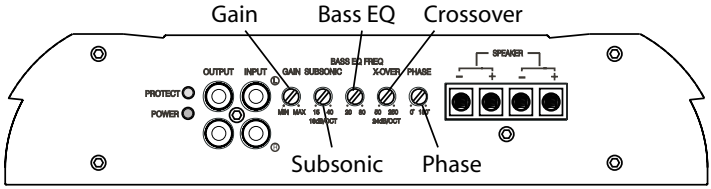
This varies the inversion of the output signal from 0° to 180° from the input signal. Set this to your personal preference while listening to the system.

BASS EQ (Models X1.1000.1D & X1.2000.1D Only)

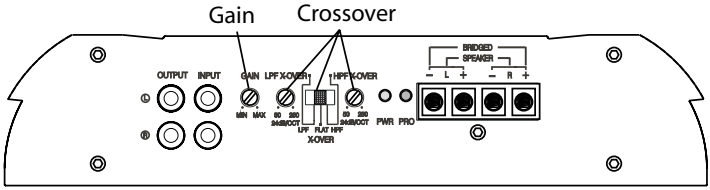
Used with the Remote Level/Bass EQ Control, the control will boost the frequency of what is set here.

Example: If the Bass EQ Freq on the amplifier is set to 50Hz, the Remote will boost that frequency.

X1.1000.1D
X1.2000.1D
is Simular



X1.400.2
X1.800.4
is Simular



OPERATION

STRAPPING AMPLIFIERS (X1.2000.1D Only)

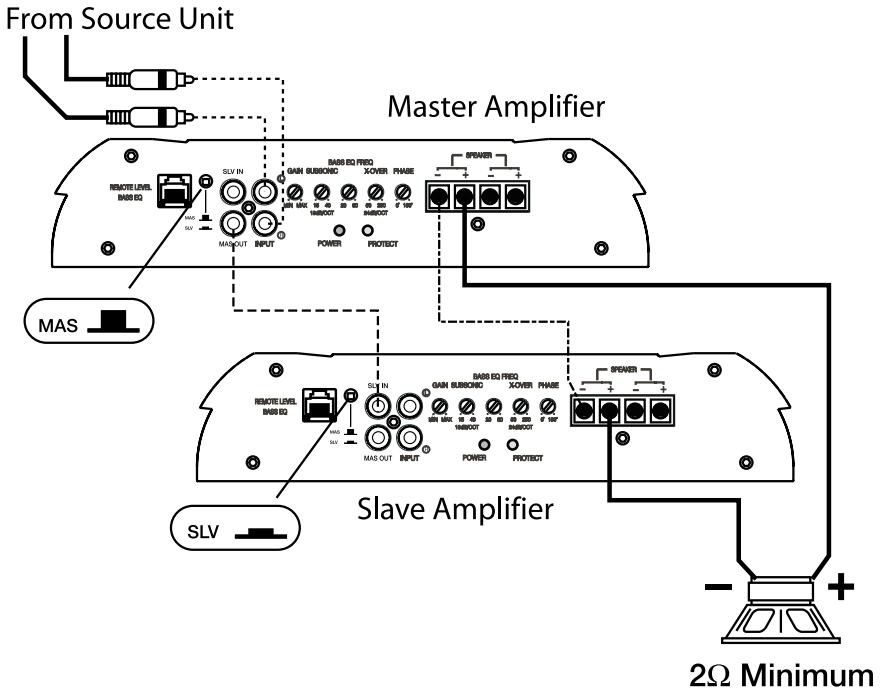
The X1.2000.1D amplifiers have the ability to connect two together and have their outputs combined, or strapped, to power a single speaker load.

⚠ **CAUTION**: Two X1.2000.1D amplifiers that are strapped together are not recommended for impedance loads below 2Ω.

1. Select which amplifier of the two will be the master. and set the Master/Slave switch in the "out" position.

NOTE: Only adjustments made to the master amplifier will effect the output to the connected speaker.

2. Connect RCA cables from the source signal to the input connection on the master amplifier.
3. Set the Master / Slave switch on the slave amplifier to the "in" position.
4. Connect a RCA cable from the MAS OUT connector on the master amplifier to the SLV IN connector on the slave amplifier.
5. Connect one of the negative (-) speaker outputs from the master amplifier to one of the negative (-) speaker outputs on the slave amplifier using a 10 gauge wire (minimum).
6. Connect one of the positive (+) speaker outputs from the master amplifier to the positive (+) terminal of the speaker being use.
7. Connect one of the positive (+) speaker outputs from the slave amplifier to the negative (-) terminal of the speaker being use.



TROUBLESHOOTING

Symptom	Diagnosis	Remedy
Amplifier does not turn on.	B+ or REM not between 10.5 and 15.5 volts or no voltage present	Check the alternator, battery, fuse, and wiring and repair as necessary
Amplifier Noise	Amplifier is not properly grounded.	Check wiring and repair as necessary
(Turn-On Pop)	Voltage spike from source unit is entering amplifier's input	Connect a relay turn-on module to REM terminal if pops are eliminated with no input signal to amplifier
Engine Noise	Noise is radiating into signal cables	Re-route signal cables away from sources of high current

SPECIFICATIONS

MODEL- Storm	**X1.1000.1D**	**X1.2000.1D**	**X1.400.2**	**X1.800.4**
Continuous Power Rating (RMS) - Measured at 14.4 Battery Volts				
4Ω Load Per Channel	400 Watts x 1	700 Watts x 1	100 Watts x 2	100 Watts x 4
2Ω Load Per Channel	700 Watts x 1	1200 Watts x 1	200 Watts x 2	200 Watts x 4
4Ω Load Bridged (Mono)			400 Watts x 1	400 Watts x 2
X1.1000.1D & X1.2000.1D Only 1Ω Load Bridged	1000 Watts x 1	2000 Watts x 1		
Dimensions: - add 1.5" (xcm) to length for mounting feet				
Height	2.2" (5.6cm)	2.2" (5.6cm)	2.2" (5.6cm)	2.2" (5.6cm)
Width	10.4" (26.42cm)	10.4" (26.42cm)	10.4" (26.42cm)	10.4" (26.42cm)
Length	14" (35.56cm)	22.0" (56.00cm)	15.2" (30.61cm)	18.6" (47.24cm)

Signal-to-Noise Ratio	>90dB A-weighted
Input Sensitivity	150mV - 4V
Crossover (X1.1000.1D & X1.2000.1D only)	24dB/octave Low Pass only
Crossover (X1.400.2 & X1.800.4 only)	24dB/octave HPF/Flat/LPF Switch
Crossover Frequency	variable from 50Hz to 250Hz
Channel Separation	50dB
Bass Equalization (X1.1000.1D & X1.2000.1D only)	Variable from 0dB to +12dB @ 20-80Hz

Specifications subject to change without notice