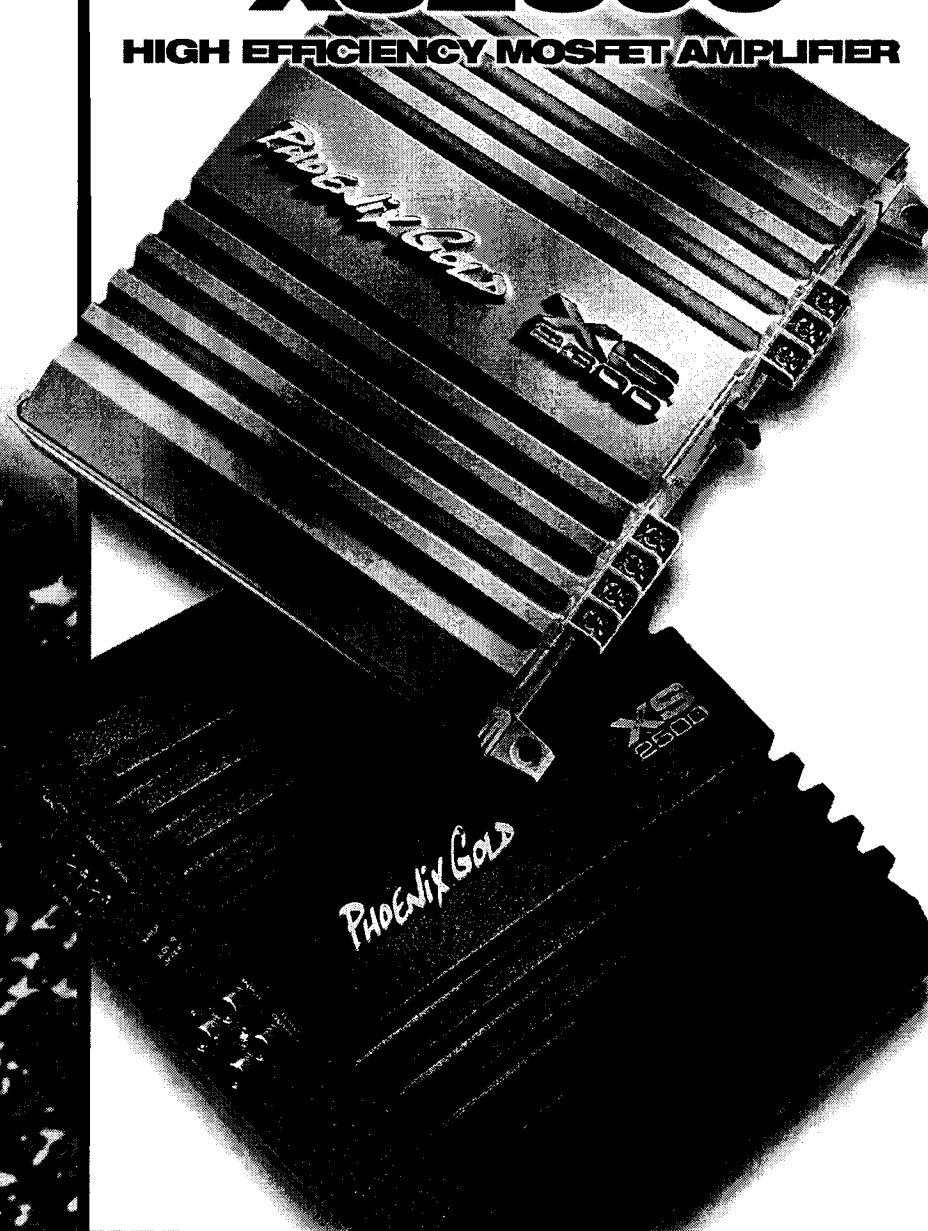


**OWNER'S  
MANUAL**

# **XS2300 XS2500**

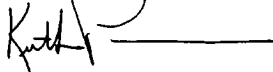
**HIGH EFFICIENCY MOSFET AMPLIFIER**



Dear Phoenix Gold enthusiast,

I thank you for purchasing this Phoenix Gold product. By doing so, you have demonstrated a desire to own the finest audio components available for the car and home. At Phoenix Gold we use state-of-the-art design, engineering and production methods to continually improve the quality, reliability and performance of our products.

The XS series amplifiers provide incredible power and sound quality for the most demanding audiophile or competitor. Properly installed by an Authorized Phoenix Gold Mobile Electronics Retailer, this equipment will provide years of enjoyment. For proper operation, please read this manual carefully and keep it for future reference.



Keith Peterson  
President



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## **FEATURES**

- Defeatable 24dB per Octave Highpass/Lowpass Crossover, Adjustable via a Plug-in Resistor Network (XS2500)
- Defeatable 24dB per Octave Lowpass Crossover, Adjustable via a Plug-in Resistor Network (XS2300)
- Auxiliary Output to Send Lowpass or Highpass Signals to an Additional Amplifier (XS2500)
- LPL Ready, Allows the use of an Optional LPL44 Lowpass Level Control to Adjust Subwoofer Volume
- Fully Differential Hi-Level Input Capability for Easy Integration with most Factory Headunits (XS2500)
- Hi-Level Input Capability for Easy Integration with most Factory Headunits (XS2300)
- Fully Differential Line-Level Inputs Eliminate Common Noise Problems
- Tri-Linear™ Capability Allows Simultaneous Stereo and Bridged Mono Operation
- Adjustable "Twin T"™ Bass Equalization with +18dB of Boost Centered @ 45Hz
- 2 ohms Bridged/1 ohm Stereo Approved
- Advanced Muting Circuitry Eliminates Turn-on and Turn-off Noises
- Advanced Thermal and Overload Protection
- 2 layer, 2 ounce, Copper G10 Glass-Epoxy Printed Circuit Boards
- Power-on LED Indicator
- Audiophile Grade Metal Film Capacitors and 1% Metal Film Resistors
- PWM Mosfet Power Supply
- 24kt Gold Plated Power and Speaker Terminals
- Glass Filled Nylon Isolation Mounting Feet
- 24kt Gold Plated Signal Input and Output Jacks
- XS Linkable Using the Optional XS Link to Connect Multiple Amplifiers Together



**SPECIFICATIONS**

- Frequency Response.....±1dB 20Hz to 20kHz
- Signal to Noise Ratio (A weighted).....>100dB
- Input Sensitivity, Line level Inputs.....100 mVRMS to 3 VRMS
- Input Sensitivity, Hi-level Inputs.....1.75 WRMS to 35 WRMS
- Crossover Frequency, Factory Installed RNet .....85Hz
- Crossover Slope, HP & LP .....24dB per octave
- Bass Boost @ 45Hz .....0 to +18dB
- DC Input Voltage Range.....10 volts to 15.5 volts
- Typical Current Draw at Idle .....< 2 amps
- Minimum Load Impedance, Two Channels Bridged .....2 ohms
- Minimum Load Impedance, Single Channel .....1 ohm

**XS2300**

Continuous Output Power:

Into 4 ohms Stereo @ 12.5 VDC (IASCA) .....	25 watts x 2
Into 4 ohms Stereo @ 14.4 VDC.....	75 watts x 2
Into 2 ohms Stereo @ 14.4 VDC.....	150 watts x 2
Into 4 ohms Bridged @ 14.4 VDC .....	300 watts x 1
Continuous Current Draw @ Full Power * .....	35 amps
Peak Current Draw @ Full Power ** .....	50 amps
Recommended Fuse Size.....	30A ATO style
Dimensions, Chassis .....	7.0"L x 9.25"W x 2.0"H
Dimensions, Overall.....	8.25"L x 9.25"W x 2.1"H

**XS2500**

Continuous Output Power:

Into 4 ohms Stereo @ 12.5 VDC (IASCA) .....	50 watts x 2
Into 4 ohms Stereo @ 14.4 VDC.....	125 watts x 2
Into 2 ohms Stereo @ 14.4 VDC.....	250 watts x 2
Into 4 ohms Bridged @ 14.4 VDC .....	500 watts x 1
Continuous Current Draw @ Full Power * .....	55 amps
Peak Current Draw @ Full Power ** .....	85 amps
Recommended Fuse Size .....	30A x 2 ATO style
Dimensions, Chassis .....	10.5"L x 9.25"W x 2.0"H
Dimensions, Overall.....	11.75"L x 9.25"W x 2.1"H

\* Average continuous current draw when playing typical music material.  
 \*\* Average peak current draw needed for musical peaks (less than 20 milliseconds) when playing typical music material.

Due to continuous product development, features, specifications, and availability are subject to change without notice.



**Amplifier Sensitivity**

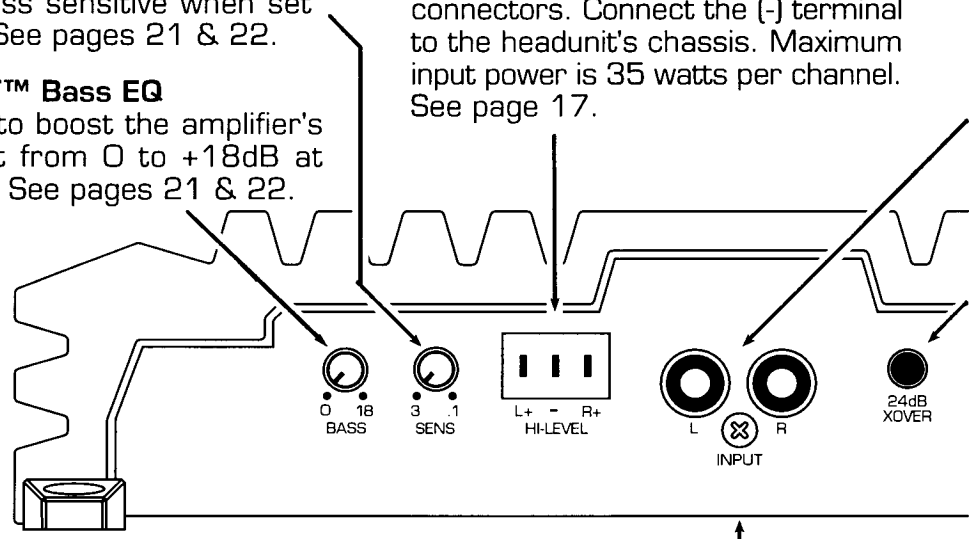
Used to reach maximum amplifier power with a wide variety of headunits. The amplifier is more sensitive to input signals when set to .1 and less sensitive when set to 3. See pages 21 & 22.

**Twin-T™ Bass EQ**

Used to boost the amplifier's output from 0 to +18dB at 45Hz. See pages 21 & 22.

**Hi-Level Inputs**

Used to connect headunits without pre-amp level outputs. Connect (+) speaker wires from the headunit directly to these terminals using the supplied .187" female spade connectors. Connect the (-) terminal to the headunit's chassis. Maximum input power is 35 watts per channel. See page 17.

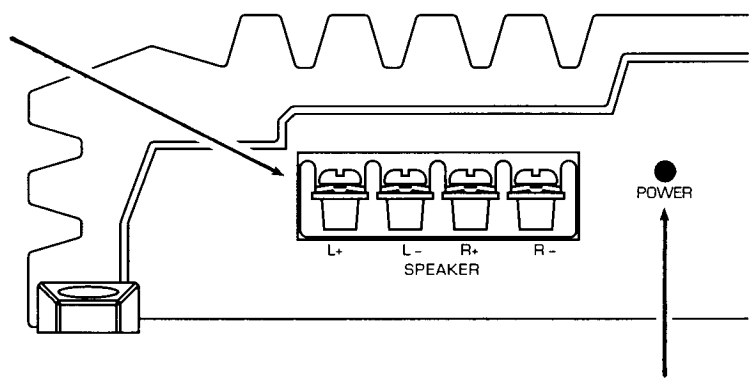


**Speaker Outputs**

Used to connect the amplifier to speakers. Minimum speaker cable size is 16 gauge (PG# SS162 or QS162). Use the left + and right - terminals for bridged mode. Minimum impedance is 2 ohms bridged or 1 ohm stereo. See pages 13 & 18.

**Crossover RNet (bottom)**

Controls the lowpass crossover point for the amplifier. See pages 13, 19 & 20.



**Power-on LED**

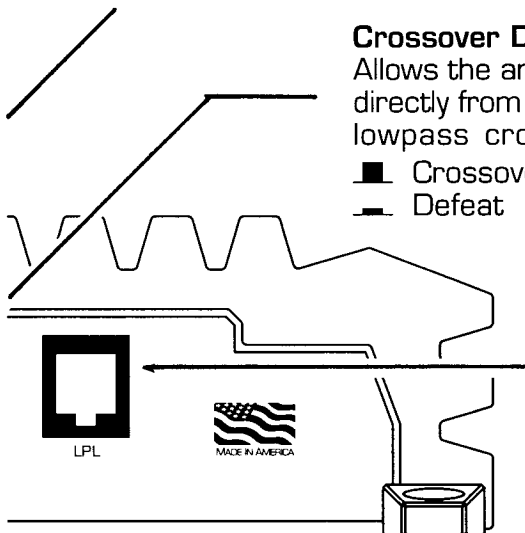
This LED turns on whenever the amplifier is on. The amplifier cannot turn on unless it is grounded through the B- terminal and receiving 12 volts at both the B+ and R terminals. The LED will turn off if the amplifier shuts down due to overheating (thermal) or a shorted speaker (overload). See pages 18 & 23.



# XS2300

## Line-level Inputs

Connect pre-amp signal cables from the headunit directly to these terminals. We recommend using Phoenix Gold QLX or TRX twisted pair interconnects. See page 17.



## Crossover Defeat

Allows the amplifier to receive signals directly from the inputs bypassing the lowpass crossover. See page 13.

- Crossover
- ▤ Defeat

## LPL Control Jack

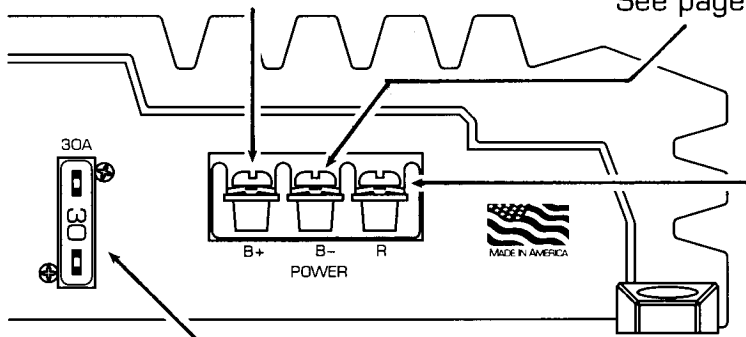
Plug-in the optional LPL44 and remotely control the volume of subwoofers. The LPL circuit controls the output of the internal lowpass crossover. The LPL circuit has no effect unless you use the internal lowpass crossover. See page 13.

## B+ Terminal (battery positive)

Used to connect the amplifier to the vehicle's battery. Minimum power cable size is 8 gauge. This cable must be fused within 18" of the positive battery terminal. See pages 11, 12 & 18.

## B- Terminal (chassis ground)

Used to connect the amplifier to the vehicle's chassis. Minimum ground cable size is 8 gauge. Keep the cable as short as possible. **DO NOT** connect directly to the negative battery terminal. See pages 11, 12 & 18.



## R Terminal

(remote turn-on)  
Used to turn the amplifier on and off with the headunit. Minimum turn-on wire size is 18 gauge. See page 18.

## DC Power Fuse

Used to protect the amplifier's power supply from improper connection (reversed B+ and B-). If replacement is necessary, use the same size and type.

Use a 30 amp ATO style fuse.

*Never use a fuse with a higher amp rating.*



## XS2500

### Twin-T™ Bass EQ

Used to boost the amplifier's output from 0 to +18dB at 45Hz. See pages 21 & 22.

### LPL Control Jack

Plug-in the optional LPL44 and remotely control the volume of subwoofers. The LPL circuit controls the output of the internal crossover. The LPL circuit has no effect unless you use the internal lowpass crossover. See pages 14 & 15.

### Hi-Level Inputs

Connect speaker wires from a headunit without pre-amp level outputs directly to these terminals using the supplied .187" female spade connectors. Maximum input power is 35 watts per channel. See page 17.

### Speaker Outputs

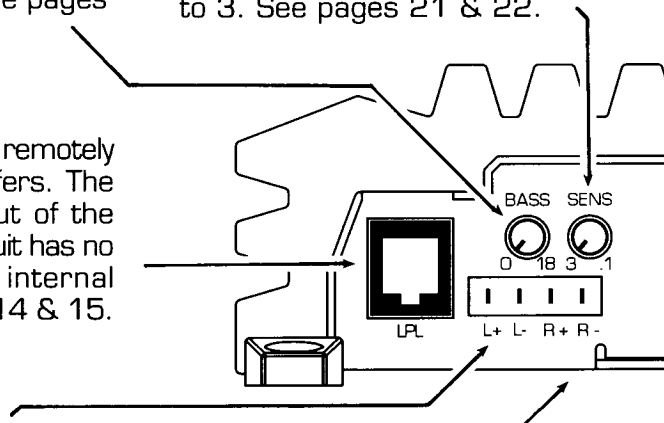
Used to connect the amplifier to speakers. Minimum speaker cable size is 16 gauge (PG# SS162 or QS162). Use the left + and right - terminals for bridged mode. Minimum impedance is **2 ohms bridged** or **1 ohm stereo**. See pages 14, 15 & 18.

### Power-on LED

This LED turns on whenever the amplifier is on. The amplifier cannot turn on unless it is grounded through the B- terminal and receiving 12 volts at both the B+ and R terminals. The LED will turn off if the amplifier shuts down due to overheating (thermal) or a shorted speaker (overload). See pages 18 & 23.

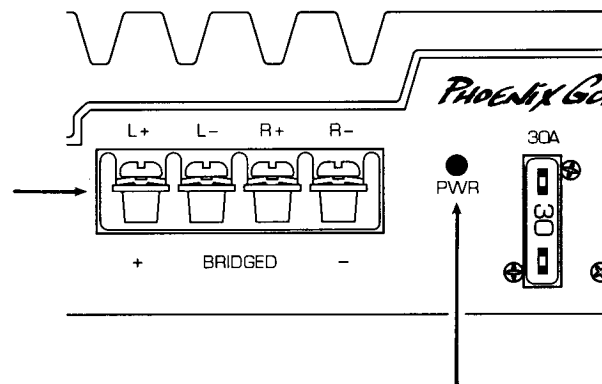
### Amplifier Sensitivity

Used to reach maximum amplifier power with a wide variety of headunits. The amplifier is more sensitive to input signals when set to .1 and less sensitive when set to 3. See pages 21 & 22.



### Crossover RNet (bottom)

Controls the highpass and lowpass crossover point for the amplifier and the auxiliary outputs. See pages 14, 15, 19 & 20.



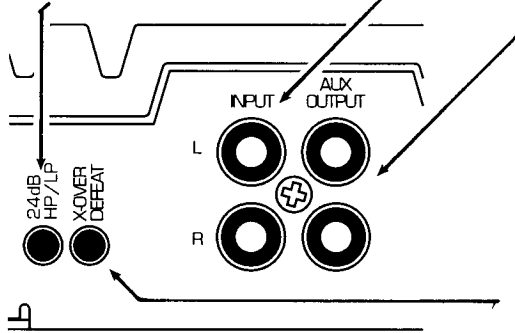
**PHOENIX Gold**  
NO LIMITS!



**Crossover Select**

Provides either a lowpass or highpass signal for the amplifier. The auxiliary outputs receive the opposite signal. See pages 14 & 15.

- Amp. HP/Aux. LP
- ▬ Amp. LP/Aux. HP



**Line-level Inputs**

Connect pre-amp signal cables from the headunit directly to these terminals. We recommend using Phoenix Gold QLX or TRX twisted pair interconnects. See page 17.

**Auxiliary Pre-amp level Outputs**

Provides either a lowpass or highpass signal for an additional amplifier. The signal is always the opposite of the crossover select switch. The crossover frequency is set by the RNet. See pages 14 & 15.

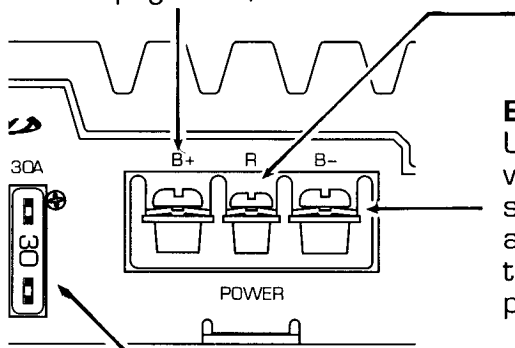
**Crossover Defeat**

Allows the amplifier to receive signals directly from the inputs bypassing the crossover. This switch has no effect on the auxiliary outputs. See pages 14 & 15.

- Crossover
- ▬ Defeat

**B+ Terminal** (battery positive)

Used to connect the amplifier to the vehicle's battery. Minimum power cable size is 8 gauge. This cable must be fused within 18" of the positive battery terminal. See pages 11, 12 & 18.



**R Terminal** (remote turn-on)

Used to turn the amplifier on and off with the headunit. Minimum turn-on wire size is 18 gauge. See page 18.

**B- Terminal** (chassis ground)

Used to connect the amplifier to the vehicle's chassis. Minimum ground cable size is 8 gauge. Keep the cable as short as possible. DO NOT connect directly to the negative battery terminal. See pages 11, 12 & 18.

**DC Power Fuses**

Used to protect the amplifier's power supply from improper connection (reversed B+ and B-). If replacement is necessary, use the same size and type.

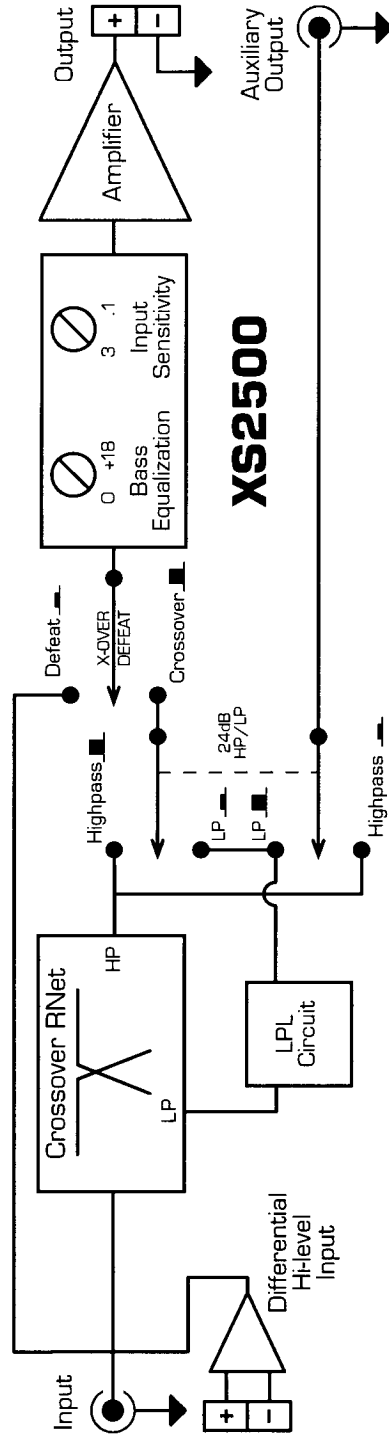
Use two 30 amp ATO style fuses (60 amp total).  
*Never use fuses with a higher amp rating.*



# OPERATIONAL DETAILS

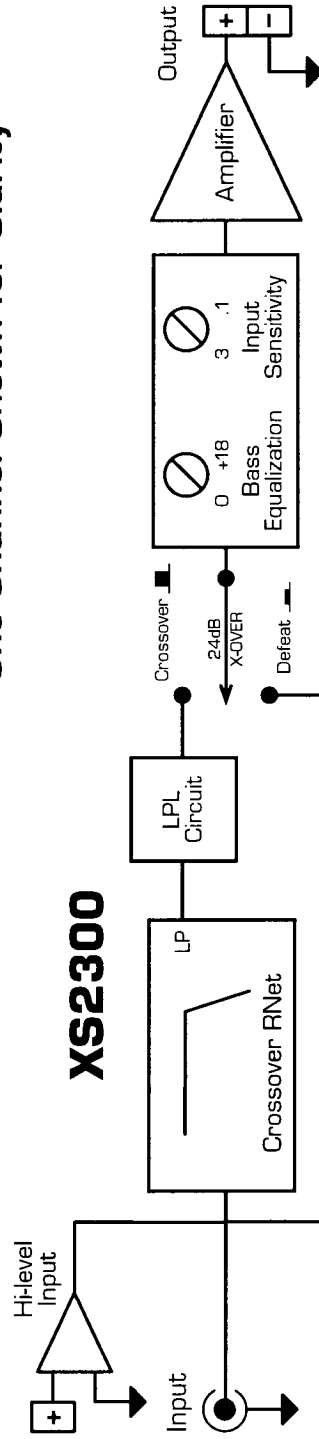


## SIGNAL FLOW DIAGRAMS



**XS2500**

## One Channel Shown for Clarity



**XS2300**

## **PLANNING**

A successful installation must begin with planning. There are several things to consider before beginning the installation.

### **1. Inspect the vehicle's electrical system:**

The vehicle's battery and charging system must be in excellent condition before installing the amplifier. If the condition of the electrical system is in doubt, have it inspected and repaired by a qualified technician.

### **2. Plan the mounting locations for all components:**

The only way to determine if your system requires custom work is to decide on a location for each component. Consult with a qualified custom installer before beginning any custom work. Attempting to modify your vehicle without the proper tools and experience can lead to damaging the equipment or vehicle.

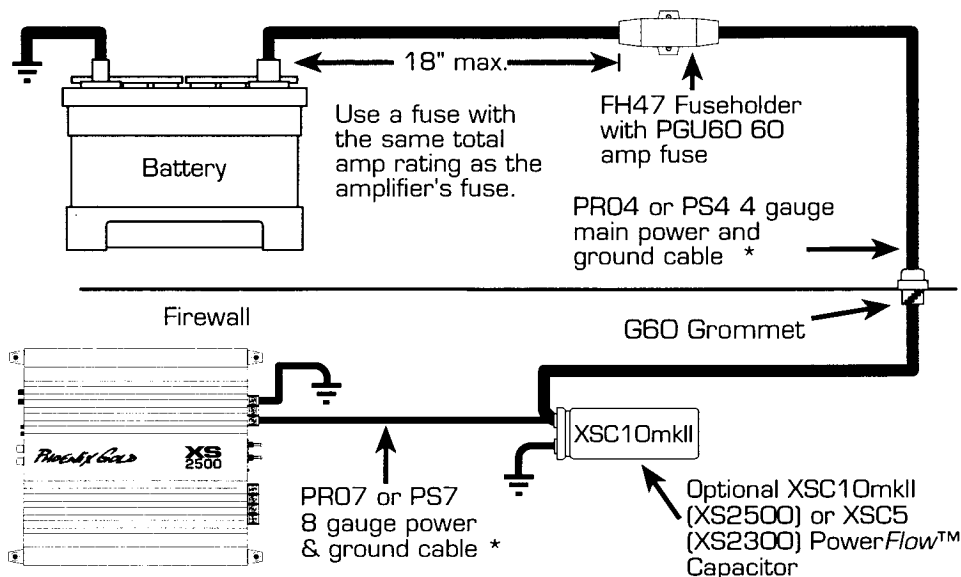
### **3. Plan all system cable routes:**

When choosing cable routes, make sure there is no chance of interference with the mechanical operation of the vehicle controls such as the steering wheel, gas, brake, clutch, trunk hinges, etc.

- a. Power cables: All main power cables must be fused within 18" of the positive battery terminal. Do not route power cables near hot engine components such as exhaust manifolds. Power cables must be protected with grommets when they pass through any metal panels such as the firewall.
- b. Signal cables should *never* run alongside amplifier power cables, other vehicle wiring, or electrical components such as engine control computers.
- c. Speaker cables can run next to electrical or signal cables without interference. However, passive crossover components may receive interference from electrical cables.



## SINGLE AMPLIFIER POWERFLOW™ SYSTEM



If not using PowerFlow™ capacitors, you can connect 4 gauge cable directly to the amplifier using PG# PR040 spade terminals.

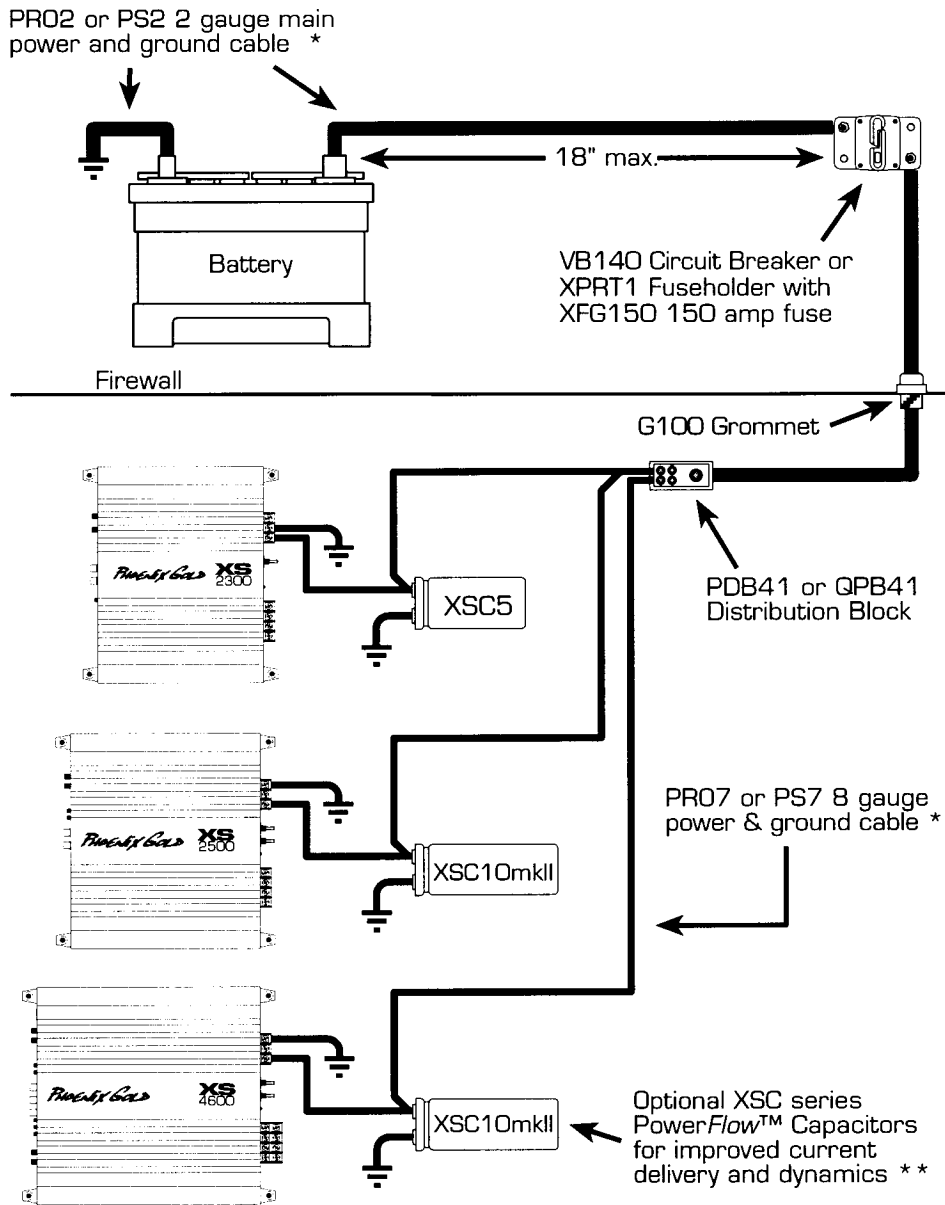
\* Use the Power Cable Calculator below for the exact gauge of cable required.

Find the total power the cable must support on the left and the distance of the cable run along the top. Where the two meet indicates the proper gauge cable. When in doubt use a larger gauge.

	4 ft	8 ft	12 ft	16 ft	20 ft	24 ft
100 w	10	10	8	8	4	4
200 w	10	8	8	4	4	4
400 w	8	8	4	4	4	2
600 w	8	4	4	4	2	2
800 w	4	4	4	2	2	2
1000 w	4	4	2	2	2	1/0
1400 w	4	2	2	2	1/0	1/0
1800 w	2	2	2	1/0	1/0	1/0
2200 w	2	2	1/0	1/0	1/0	1/0 x 2
2600 w	2	1/0	1/0	1/0	1/0 x 2	1/0 x 2
3000 w	1/0	1/0	1/0	1/0 x 2	1/0 x 2	1/0 x 3



**MULTI AMPLIFIER POWERFLOW™ SYSTEM**



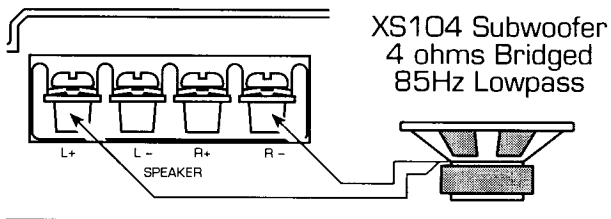
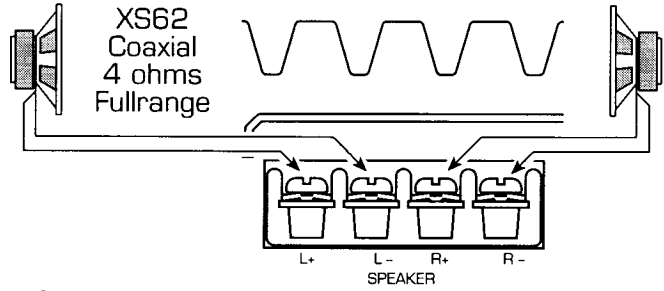
\* Use the Power Cable Calculator on the previous page for the exact gauge of cable required.

\*\* Use at least 1 farad of capacitance for every 1,000 watts of amplifier output.

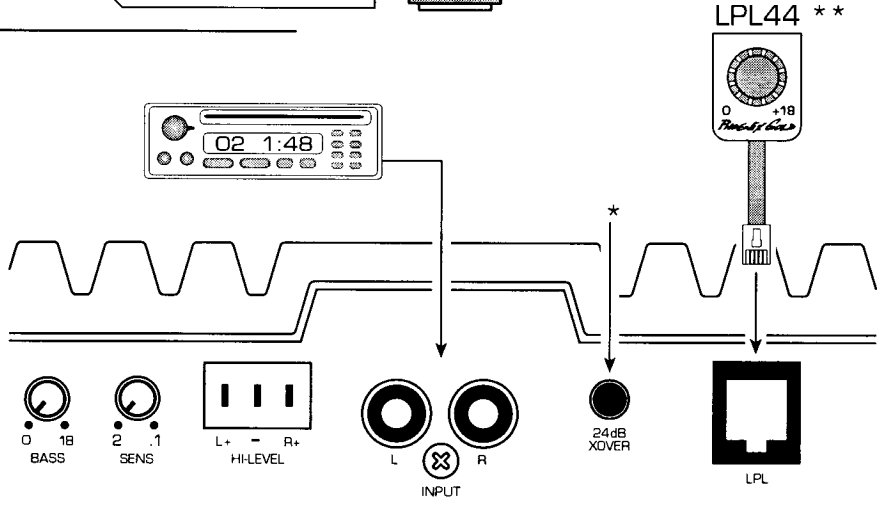


**XS2300 CONFIGURATIONS**  
Full Range & Bridged Lowpass

Minimum stereo impedance: 1 ohm



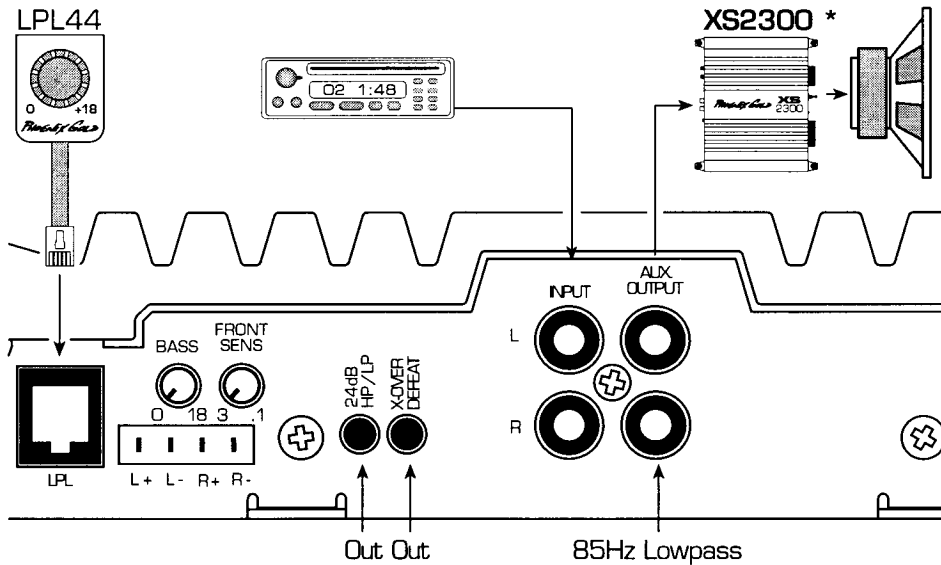
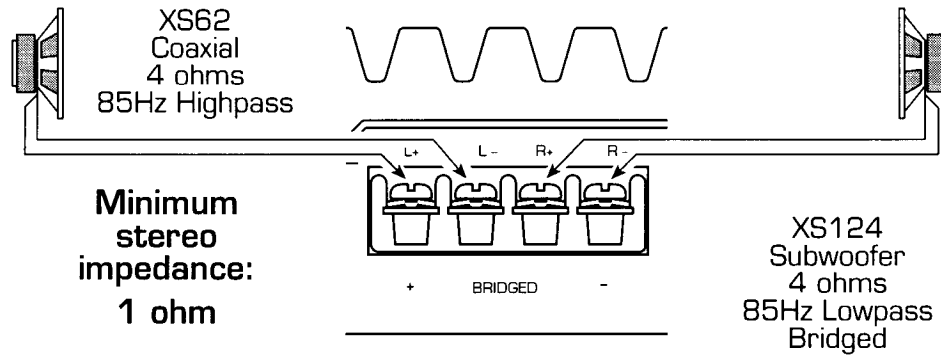
Minimum bridged impedance: 2 ohms



- \* Set the 24dB crossover button *in* for fullrange or *out* for lowpass. The RNet determines the lowpass crossover frequency.
- \*\* The optional LPL44 only effects the output level when using the lowpass crossover.



<b>XS2500 CONFIGURATIONS</b>	
<u>Speaker Output</u>	<u>Auxiliary Output</u>
Stereo Highpass	Lowpass



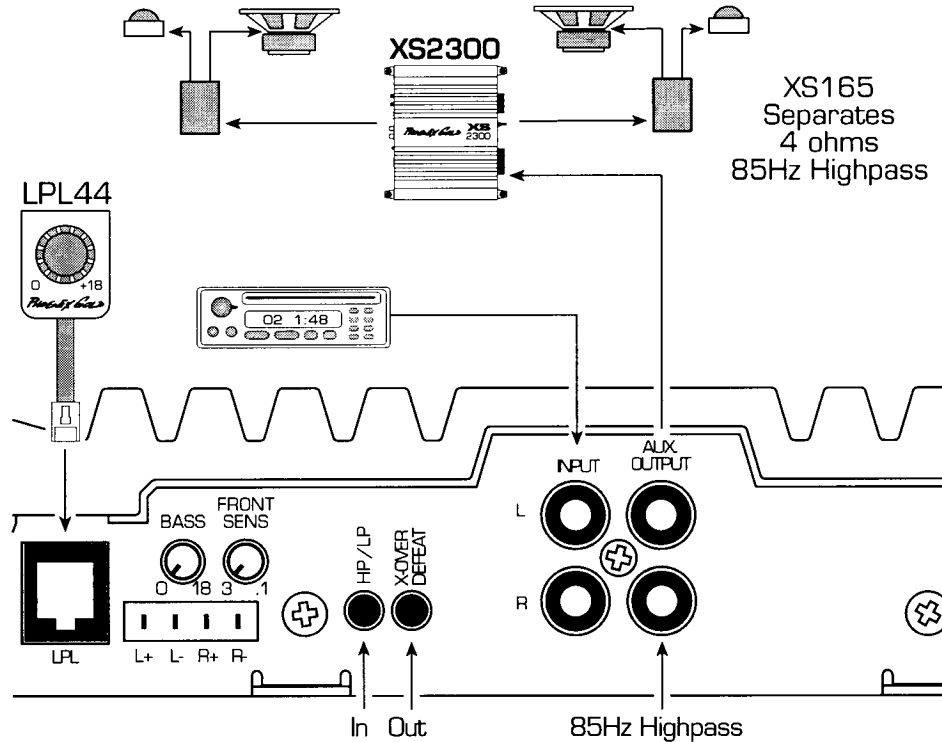
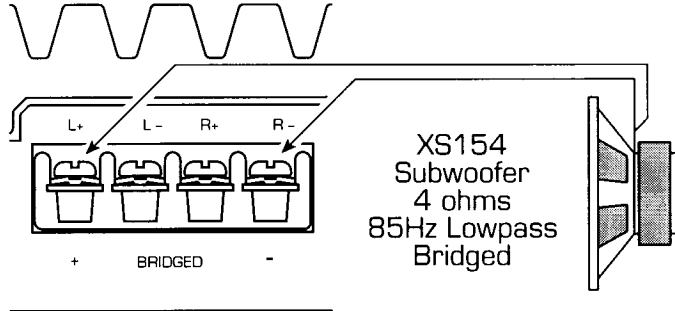
The RNet divides frequencies between the speaker outputs and the subwoofer amplifier. Use the optional LPL44 to control subwoofer volume.

- \* Bypass the XS2300's crossover for 24dB per octave subwoofer operation. You can combine the XS2300's lowpass crossover with the XS2500's auxiliary output for 48dB per octave operation. This requires identical RNet's in both amplifiers. A lower frequency RNet in the XS2300 will stagger the crossover frequencies between highpass and lowpass.



XS2500 CONFIGURATIONS	
Speaker Output Bridged Lowpass	Auxiliary Output Highpass

Minimum bridged impedance: 2 ohms



The RNet divides frequencies between the speaker outputs and the highpass amplifier. Use the optional LPL44 to control subwoofer volume.

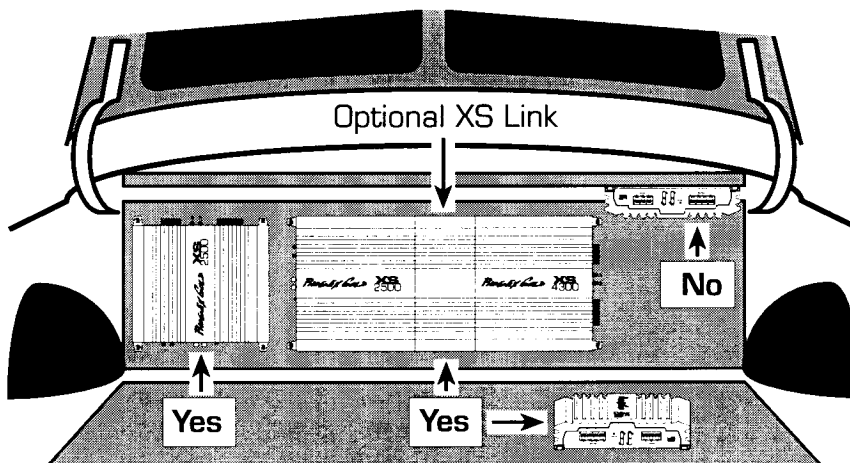




## MOUNTING

You can mount the XS amplifier in a variety of positions. There are only a few precautions that must be observed:

Never mount the amplifier upside down. This traps heat within the heatsink causing the amplifier to overheat and shut down.



Never mount the amplifier where it can get wet. Water damage is not covered by the limited warranty.

The glass-filled nylon mounting feet allow the amplifier to be mounted on almost any surface. If damaged, they can be replaced by ordering PG# 5740.0002 (white) or 5740.0003 (black).

Use fresh air cooling fans when mounting the amplifier in an enclosed space like a small storage compartment or enclosed amp rack. Design your cooling system to circulate at least 25cfm (cubic feet per minute) for each amplifier.

Example - An XS2500 in an enclosed amp rack requires two 25cfm fans. One fan for intake and one for exhaust.

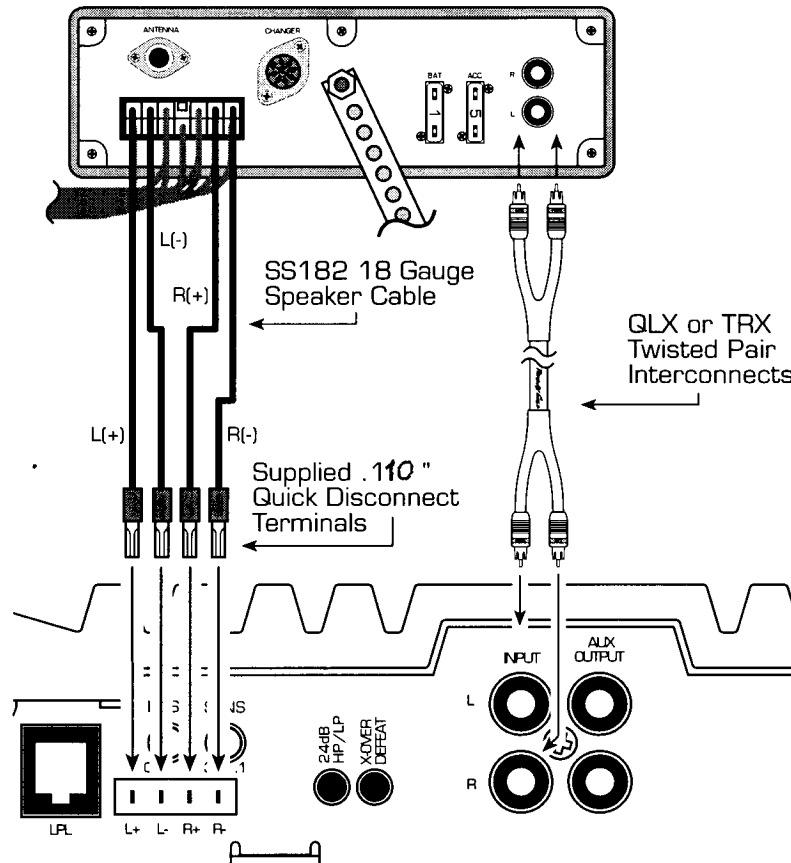


## INPUT CONNECTIONS

**Line-Level:** Connect high quality RCA style signal cables to the inputs jacks. Use both left and right input jacks for stereo, bridged or Tri-Mode operation. For maximum noise rejection, we recommend Phoenix Gold QLX or TRX twisted pair signal cables.

**Hi-Level XS2500:** Connect the positive hi-level inputs to the headunit's positive speaker outputs. Connect the negative hi-level inputs to the headunit's negative speaker outputs.

**Hi-Level XS2300:** Connect the positive hi-level inputs to the headunit's positive speaker outputs. Connect the negative hi-level input directly to the headunit's chassis. Do not use the headunit's negative speaker wires.

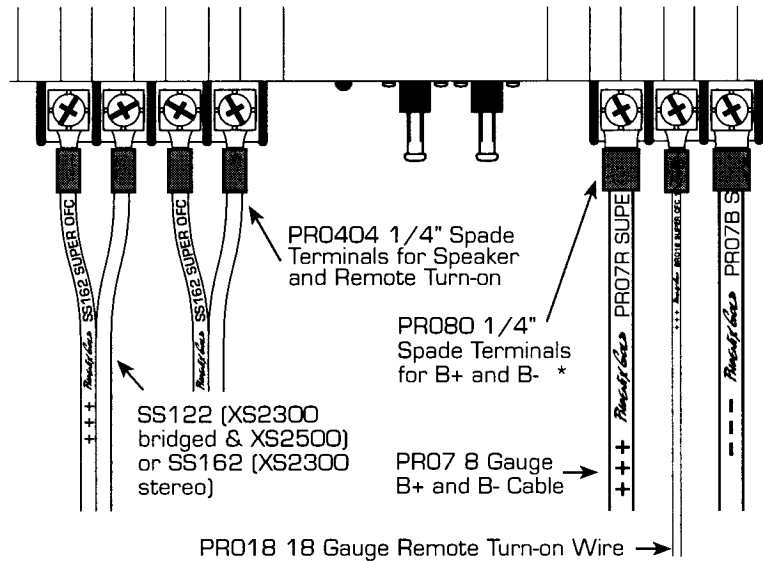


*Note:* Never use hi-level and line-level inputs at the same time.

Maximum hi-level input power: **35 watts per channel**

## **POWER & SPEAKER CONNECTIONS**

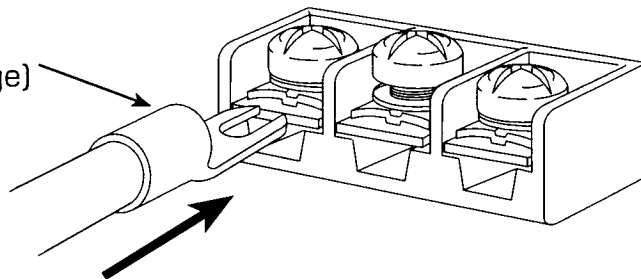
Use crimp-on terminals for connecting battery and speaker cables to the amplifier.



Use a tool designed to crimp noninsulated terminals. For extra reliability, crimp and solder each terminal.

\* You can connect 4 gauge cable directly to the amplifier using PG# PRO40 spade terminals.

\* PRO80 (8 gauge)  
or PRO40 (4 gauge)



Use a #2 phillips screwdriver to tighten each terminal.

*Note:* Do not use powered screwdrivers to tighten the terminals. This can damage the gold plating and strip the screw's head.

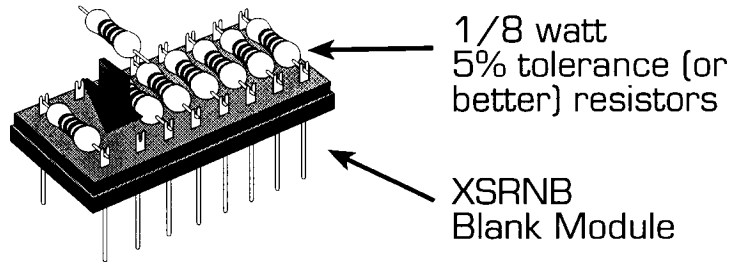


## **CROSSOVER ADJUSTMENT**

You can adjust the crossover frequencies by changing the resistor network (RNet) located inside the amplifier.

Your local Phoenix Gold electronics dealer stocks the following optional RNet's:

Freq.	PG#	Freq.	PG#
550Hz	XSRN550	70Hz	XSRN70
385Hz	XSRN385	55Hz	XSRN55
270Hz	XSRN270	35Hz	XSRN35
180Hz	XSRN180	20Hz	XSRN20
120Hz	XSRN120	Blank Module	XSRNB
100Hz	XSRN100		



You can build your own RNet by using a blank module and installing eight resistors. Calculate the resistor value using this formula:

$$\frac{18150}{f (Hz)} = R (k\Omega)$$

For example, if you want a crossover frequency of 325Hz, simply plug 325 into the formula:

$$\frac{18150}{325} = 55.8$$

The closest commercially available resistor value is 56kohm. Use eight 56k, 1/8 watt, 5% tolerance (or better) resistors.



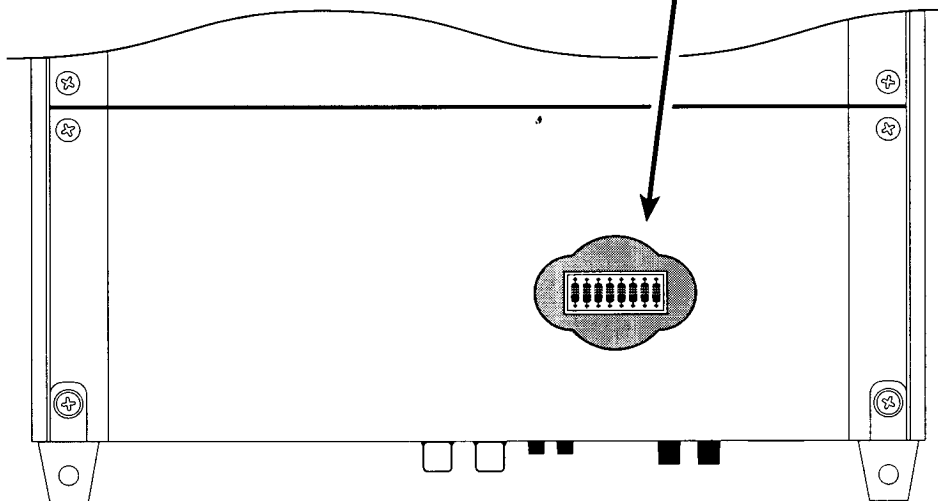
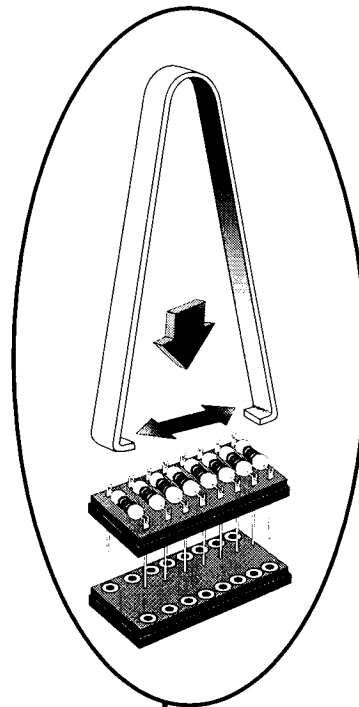
Access the RNet by removing the protective plastic cover located on the bottom of the amplifier.

Use an IC removal tool to carefully remove the RNet from its socket. Be careful not to bend the pins.

Be very careful when inserting a new RNet. Make sure all 16 pins line up with their corresponding socket holes then gently press the RNet into the socket.

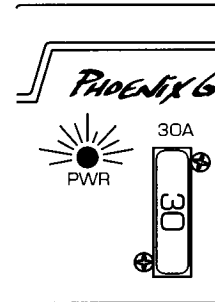
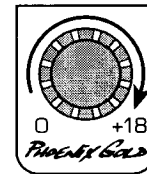
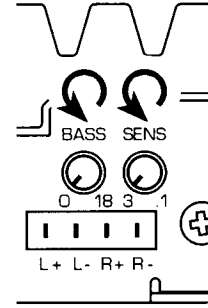
Note: Before powering up the amplifier, verify that all pins are properly seated in the socket.

Replace the protective plastic cover to keep out dirt and debris.



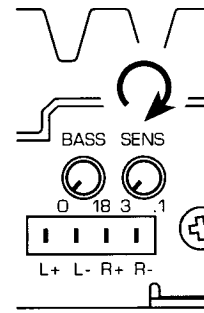
## INPUT SENSITIVITY & BASS ADJUSTMENT

1. Install all system fuses.
2. Set the amplifier's input sensitivity control and bass equalization control to minimum (full counterclockwise).
3. Set all amplifier signal routing switches according to your system's design. See pages 13-15.
4. If using an LPL44, set it to maximum (full clockwise).
5. Turn the headunit on with the volume set to minimum.
6. Visually check the amplifier's condition. The green power LED should be on.
7. Check the condition of all other components to make sure they are powered up and working.
8. Set the headunit's tone controls, balance, and fader to the center (flat) position. Turn off any loudness or other signal processing features.
9. Set the volume control of the headunit for maximum undistorted output (on most headunits this will be approximately 7/8 of maximum volume). Use a very clear and dynamic recording.



**PHOENIX GOLD**  
**NO LIMITS!**

- Use the amplifier's sensitivity control to reach maximum undistorted speaker output. Repeat this for all other amplifiers. The idea is to find maximum undistorted output for each amplifier independently.



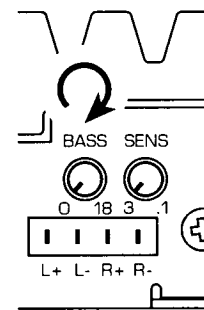
- Reduce the headunit's volume to a comfortable level.

- Listen to various musical selections to check overall system balance. Compare front to rear, midbass to midrange, etc. If an amplifier is too loud compared to the others, then its level must be lowered to blend correctly with the weakest amp. The idea is to reference all amplifiers to the capability of the weakest amp.

*Note:* For subwoofers controlled by an LPL44, keep the sensitivity setting from step 10. Use the LPL44 to blend subwoofers with the rest of the system. The correct subwoofer volume will change depending on road noise and differences in recordings.

- Adjust the Bass Equalization Controls according to taste.

*Note:* Use these controls sparingly. Every 3dB of boost requires double the power at 45Hz. If your subwoofer system requires 18dB of boost to sound good, there may be a problem. Look for out-of-phase woofers, a leaking subwoofer box, or incorrect box size.



- With all levels set correctly, the system will reach overall maximum undistorted output at the volume level set in step 9.



# TROUBLE-SHOOTING



Symptom	Probable Cause	Solution
No output and Power-on LED is off	No battery, ground, or remote connection Blown power fuses	Connect B +, B -, and a remote turn-on to the amplifier (pages 5 - 8, 11, 12 & 18). Check for a short to chassis ground in the B+ cable. Install new fuses (pages 5 - 8).
No output and power-on LED is on	No signal from the headunit Faulty input signal cables Faulty speaker or speaker cables	Check the headunit for proper output. Try substituting different signal cables. Try substituting another speaker or cables.
Distorted sound	Clipped input-signal Input sensitivity set too high	Make sure the headunit is not producing a clipped signal (pages 21 & 22). Lower input sensitivity (pages 21 & 22).
Amplifier shuts off when driven to high output levels	Thermal protection circuit activated (overheat) Overload protection circuit activated (excessive current through the outputs)	Check for poor mounting location (page 16) and low impedance load (pages 13 - 15). Check for low impedance loads (pages 13-15), damaged speaker cables, rubbing speaker voice coils or shorted speaker tinsel leads.





**LIMITED WARRANTY**

Phoenix Gold provides a limited warranty on all electronics (free of manufacturing defects in materials and/or workmanship) to the original consumer/purchaser for a period of eighteen (18) months when installed by an Authorized Phoenix Gold Mobile Electronics Retailer. Returning a copy of the original sales receipt with the warranty registration card extends the period to thirty-six (36) months. The limited warranty period is thirty (30) days if installed by anyone other than an Authorized Phoenix Gold Mobile Electronics Retailer. We will cover parts and labor provided the product was purchased from an Authorized Phoenix Gold Retailer. This Warranty does not apply to any product where the tags and/or serial numbers have been cut, removed, tampered or altered in any manner. This limited warranty is applicable to only the original consumer/purchaser and is not transferable. Electronics that are deemed defective during the warranty period will be repaired or replaced at the discretion of Phoenix Gold. Repaired or replaced product will be covered until the original warranty period expires. Phoenix Gold will not be responsible for any incidental or consequential damages that may result from a defect in the product. Select states may not allow the exclusion or limitation of incidental or consequential damages, so the prior limitations may not apply.

Dealer's name \_\_\_\_\_

Telephone number \_\_\_\_\_

Salesperson's name \_\_\_\_\_

Installer's name \_\_\_\_\_

Model number \_\_\_\_\_

Serial number \_\_\_\_\_

