

PHOENIX GOLD

XS6600

OWNERS MANUAL



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 XS6600 provides incredible power and system design flexibility 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

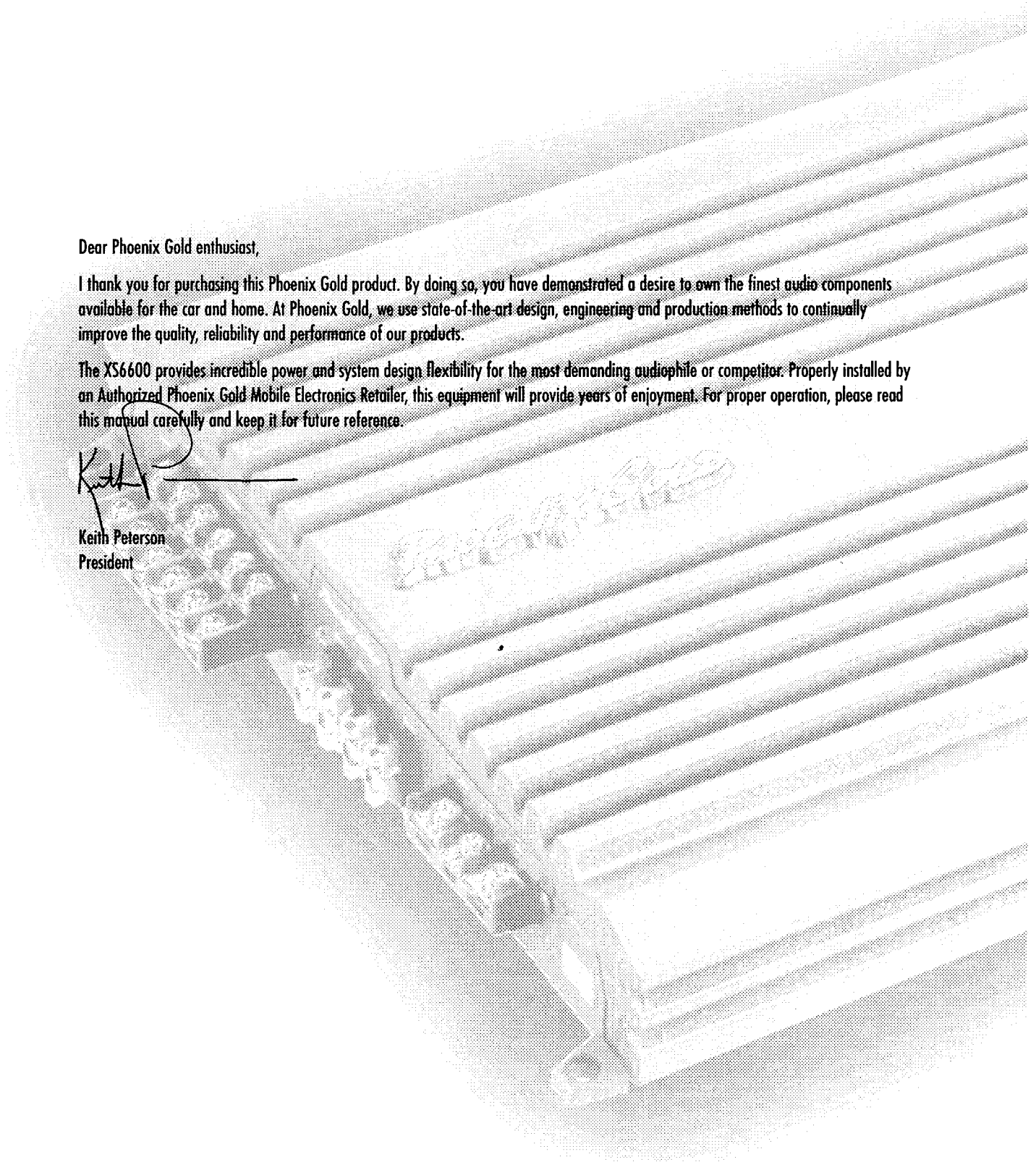


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FEATURES

- Independent Front, Rear and Subwoofer 24dB per octave Highpass, Lowpass and Bandpass Crossovers Adjustable via Hi-Tolerance Resistor-network (RNET) Circuitry
- Optional LPL Subwoofer Level Control
- Fully Differential Hi-level Input Capability
- Config Switch Eliminates the need for "Y" Signal Cables
- Independent Front, Rear and Sub Crossover Circuit Bypass Switches
- Independent Front, Rear and Sub, Variable Input Sensitivity Controls
- Adjustable "Twin T" Bass Equalization with +18dB of Boost Centered at 45Hz
- Tri-linear™ Capability for Simultaneous Stereo & Bridged Mono Operation
- Advanced Turn-on & Turn-off Output Muting Circuitry
- PWM Mosfet Power Supply
- 2 ohms Bridged/1 ohm Stereo Operation Approved
- Audiophile Grade Capacitors & 1% Tolerance Metal Film Resistors
- 24kt Gold-plated High-current Power & Speaker Terminals
- Zytel SF801 Isolation Mounting Feet

SPECIFICATIONS

Continuous Output Power (watts):

Front/Rear Channels

Into 4 ohms Stereo @ 12.5 Vdc (IASCA/USAC).....	18 x 4
Into 4 ohms Stereo @ 14.4 Vdc.....	50 x 4
Into 2 ohms Stereo @ 14.4 Vdc.....	90 x 4
Into 4 ohms Bridged @.....14.4 Vdc	200 x 2
Minimum Speaker Load, Bridged.....	2 ohms
Into 2 ohms Bridged @ 14.4 Vdc (current limited).....	200 x 2
Minimum Speaker Load, Stereo.....	1 ohm
Into 1 ohm Stereo @ 14.4 Vdc (current limited).....	90 x 4

Sub Channels

Into 4 ohms Stereo @ 12.5 Vdc (IASCA/USAC).....	25 x 2
Into 4 ohms Stereo @ 14.4 Vdc.....	75 x 2
Into 2 ohms Stereo @ 14.4 Vdc.....	150 x 2
Into 4 ohms Bridged @ 14.4 Vdc.....	300 x 1
Minimum Speaker Load, Bridged.....	2 ohms
Into 2 ohms Bridged @ 14.4 Vdc (current limited).....	300 x 1
Minimum Speaker Load, Stereo.....	1 ohm
Into 1 ohm Stereo @ 14.4 Vdc (current limited).....	150 x 2

Continuous Current Draw @ Full Power *.....70 amps

Peak Current Draw @ Full Power **.....100 amps

Frequency Response.....+/-1dB, 20Hz to 20kHz

Signal to Noise Ratio (A-weighted).....>100dB

Total Harmonic Distortion.....<0.02%

Crossover Slope.....24dB per Octave

Factory Installed RNET Frequencies (front, rear & sub).....100Hz

Input Signal Voltage Range.....0.1 volts to 3 volts

Recommended Fuse Size.....20 amp x 4 ATO style

Bass Boost.....0 to +18 dB @ 45 Hz

Power Supply Operating Range.....10.0 Vdc to 15.5 Vdc

Dimensions, Chassis (inches).....15.30L x 11.5W x 2.00H

Dimensions, Overall (inches).....16.60L x 11.5W x 2.10H

* Average continuous current draw when playing typical music material.

** Average peak current needed for musical peaks (<20 ms) when playing typical music material.

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

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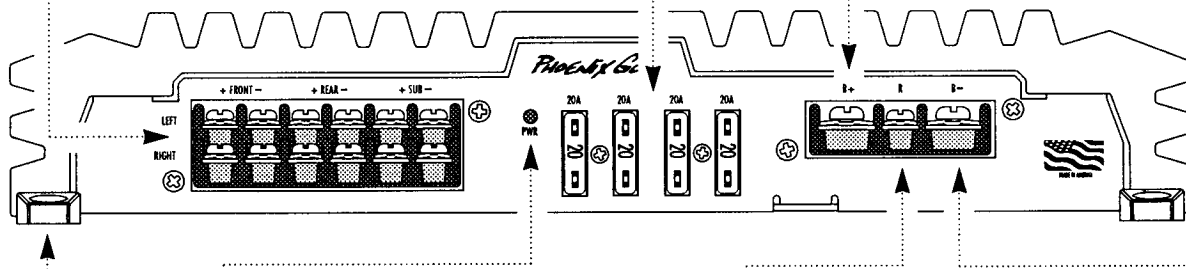
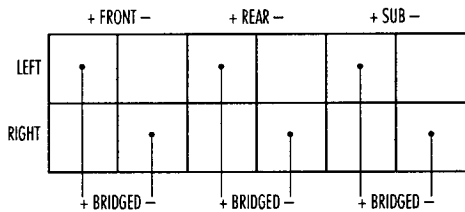
SPEAKER OUTPUTS These terminals accept speaker cables with spade style terminals. Be sure to observe proper speaker polarity when making connections.

Minimum speaker cable size is 16 gauge (PG# SS162 or QS162) for stereo operation. For bridged operation, minimum speaker cable size is 12 gauge (SS122 or QS122).

Note: Minimum impedance is 2 ohms bridged OR 1 ohm stereo.

Use the left + and right - terminals for bridging.

BRIDGED OUTPUT CONNECTIONS



POWER FUSES These four 20 amp ATO style fuses protect the XS6600's power supply from improper connection (reversed B+ and B-). If replacement is necessary, replace only with 20 amp ATO fuses. Never mix fuse sizes.

Never use fuses with a higher amp rating.

B+ TERMINAL (BATTERY POSITIVE) This terminal accepts the main battery cable using a slotted crimp terminal (PG# PRO40). Connect the cable directly to the positive battery terminal with a fuse located within 18 inches of the positive battery terminal. Minimum cable size is 4 gauge (PG# PRO4R or PS4R).

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).

REMOTE TURN-ON TERMINAL This terminal accepts the headunit's switched 12 Vdc "remote" or power antenna wire using a slotted crimp terminal (PG# PRO404).
Note: Use a voltmeter to verify that the power antenna wire remains on when operating the CD or cassette tape.

ISOLATION MOUNTING FEET These specially engineered mounting feet allow the amplifier to mount to almost any surface. Replacement's may be ordered through an authorized Phoenix Gold dealer.

B- TERMINAL (CHASSIS GROUND) This terminal accepts the main chassis ground cable using a slotted crimp terminal (PG# PRO40). Connect the cable to a clean, solid chassis ground such as the floorpan or frame. Do not ground to seat or seat belt mounting bolts. Remove all paint and dirt from the chassis connection point. Keep the cable as short as possible. Minimum cable size is 4 gauge (PG# PRO4R or PS4R).



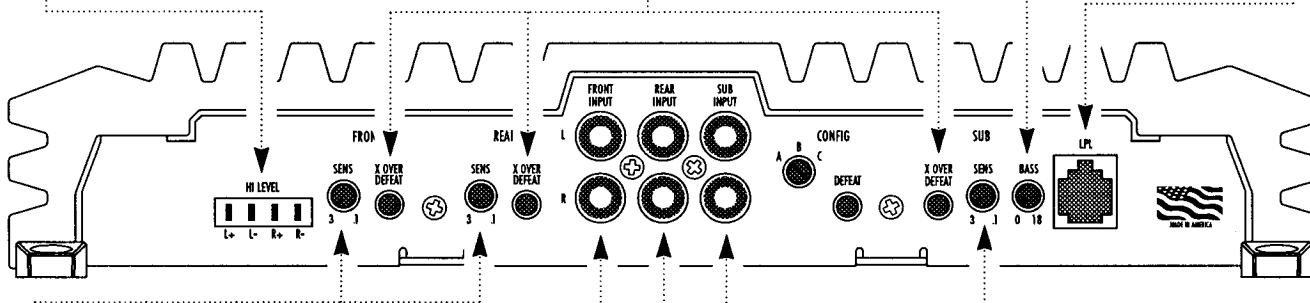
BASS EQ This control allows up to 18dB of boost at 45Hz for the sub speaker outputs. It cannot affect the front or rear speaker outputs. Use this control sparingly. Every 3dB of boost requires double the power at 45Hz.

HI-LEVEL INPUTS Connect speaker wires from a headunit without preamp level outputs directly to these terminals using .187" female spade connectors (PG# PRO84). These inputs are in parallel with the Front preamp level inputs. With only hi-level inputs feeding the amplifier, the rear and sub sections of the amplifier will not receive signal unless the Config switch is in the B or C position and the Config Defeat button is out. Maximum input power is 35 watts per channel.

LPL CONTROL PORT Plug-in the optional LPL44 to remotely control the volume of the sub speaker outputs. The LPL44 provides up to 20dB of adjustments. The LPL has no effect unless you use the internal lowpass sub crossover. The LPL44 cannot affect the front or rear speaker outputs.

CROSSOVER DEFEAT SWITCHES These independent switches allow each of the amplifier's speaker outputs to receive signals directly from their input jacks (depending on Config switch and Config Defeat switch settings) bypassing their crossovers.

-  Crossover enabled
-  Crossover defeated

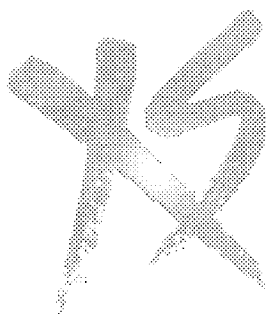


FRONT INPUTS Connect preamp signal cables from the headunit to these terminals. These inputs can supply all amplifier sections with signal eliminating the need for "Y" connectors. To maximize noise rejection, we recommend using Phoenix Gold QLX, TRX, or XS series twisted pair interconnects.

REAR INPUTS Connect preamp signal cables from the headunit with rear preamp outputs to these terminals. Signal from these inputs can supply the rear and sub sections of the amplifier. To maximize noise rejection, we recommend using Phoenix Gold QLX, TRX, or XS series twisted pair interconnects.

SUB INPUTS Connect preamp signal cables from a headunit with subwoofer outputs to these terminals. Signal from these inputs can only feed the sub section of the amplifier. The Config Defeat switch must be pushed in for these jacks to operate. To maximize noise rejection, we recommend using Phoenix Gold QLX, TRX, or XS series twisted pair interconnects.

INPUT SENSITIVITY CONTROLS These controls adjust each section of the amplifier's sensitivity to incoming signals. Clockwise increases sensitivity. Counterclockwise decreases sensitivity. Higher signal levels allow for a lower sensitivity setting and lower overall noise floor. Lower signal levels will require increased sensitivity to reach full power. To maximize performance, we recommend using a PLD1 Professional Line Driver or its equivalent.



CONFIG SWITCH This switch determines where the amplifier's rear and sub sections get audio signals.

Note: This switch will have no effect when the Config defeat switch is pushed in.





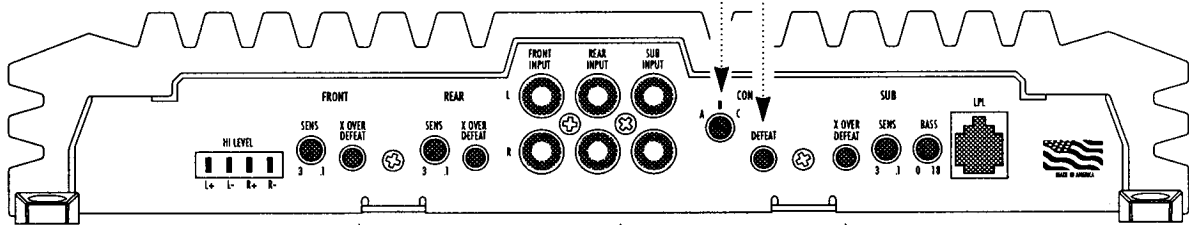
A - DUAL INPUT FRONT/REAR FADING WITH NON FADING SUBWOOFER When set to A, the rear sections receives signals from the rear inputs allowing fading between the front and rear speakers. The sub section receives signal from both front and rear inputs allowing for consistent subwoofer volume regardless of fader position.

B - SINGLE INPUT FOR ALL OUTPUTS When set to B, the front, rear and sub sections receive signal from the front inputs allowing the entire amplifier to run with only one set of preamp signals. This eliminates the need for "Y" connectors.

C - SINGLE INPUT WITH HIGHPASS, BANDPASS & LOWPASS OUTPUTS (3-WAY) When set to C, the rear section receives lowpass signal from the front crossover. The lowpass signal combines with the highpass output of the rear crossover to form a bandpass signal for the rear speakers. The front crossover frequency must be higher than the rear crossover frequency. The sub section receives full range signals from the front inputs eliminating the need for "Y" connectors.

CONFIG DEFEAT This switch defeats the signals from the Config switch allowing the rear and sub sections to receive signals directly from the rear and sub input jacks.

-  Config switch enabled
-  Config switch defeated



FRONT CROSSOVER RNET (BOTTOM) This eight resistor network controls the highpass crossover frequency for the front speaker outputs. The leftover lowpass frequencies may be routed through the rear crossover section to form a bandpass signal for the rear speakers. (Config switch in the "C" position). This RNET frequency must be higher than the rear RNET's frequency for bandpass operation.

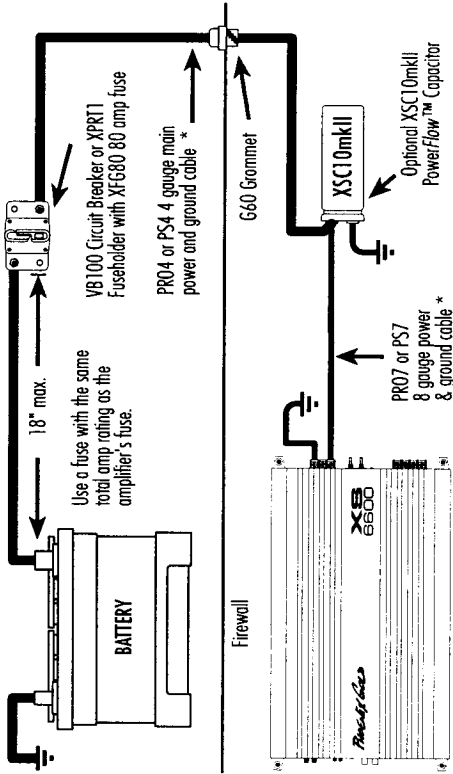
REAR CROSSOVER RNET (BOTTOM) This eight resistor network controls the highpass crossover frequency for the rear speaker outputs. With the Config switch in the "C" position, this RNET determines the lower limit of a bandpass output for the rear speakers. This RNET frequency must be lower than the front RNET's frequency for bandpass operation.

SUB CROSSOVER RNET (BOTTOM) This eight resistor network controls the lowpass crossover frequency for the sub speaker outputs. This separate RNET allows for an independent subwoofer crossover frequency that can be overlapped, staggered or equal to the front or rear RNET frequencies.



POWERFLOW™ SYSTEMS

SINGLE AMPLIFIER



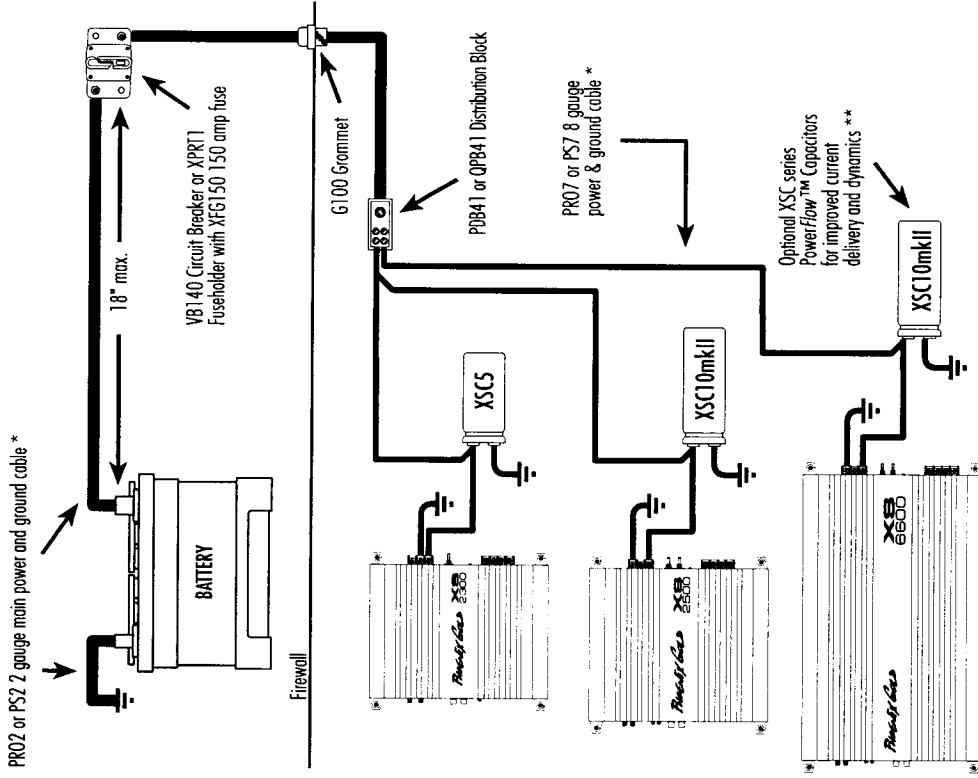
If not using PowerFlow™ capacitors, you can connect 4 gauge cable directly to the amplifier using PG# PR040 spade terminals.

* 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.

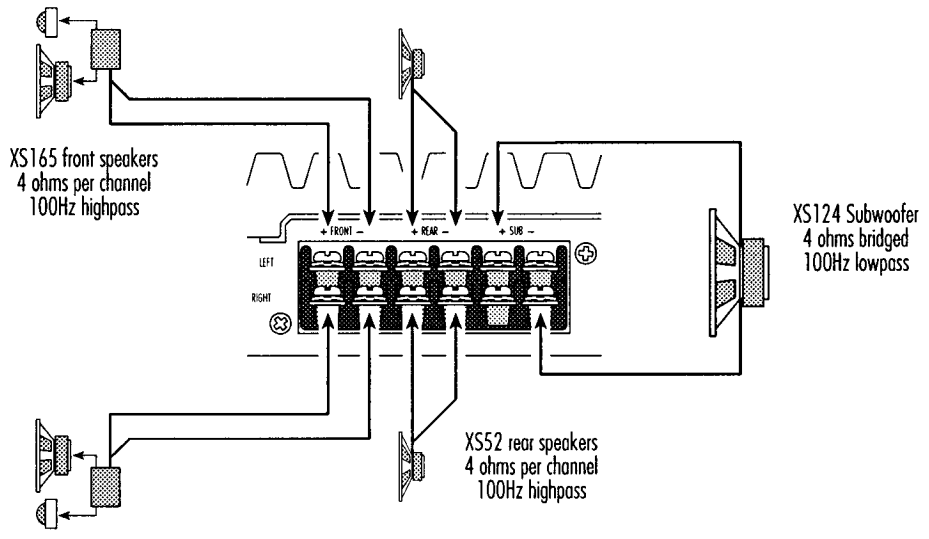
	4 ft	8 ft	12 ft	16 ft	20 ft	24 ft
100 W	10	10	8	8	4	4
200 W	10	8	8	4	4	4
400 W	8	8	4	4	4	2
600 W	8	4	4	2	2	2
800 W	4	4	4	2	2	2
1000 W	4	4	2	2	2	1/0
1400 W	4	2	2	2	1/0	1/0
1800 W	2	2	2	1/0	1/0	1/0
2200 W	2	2	1/0	1/0	1/0	1/0 x 2
2600 W	2	1/0	1/0	1/0	1/0 x 2	1/0 x 2
3000 W	1/0	1/0	1/0	1/0 x 2	1/0 x 2	1/0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

MULTI AMPLIFIER



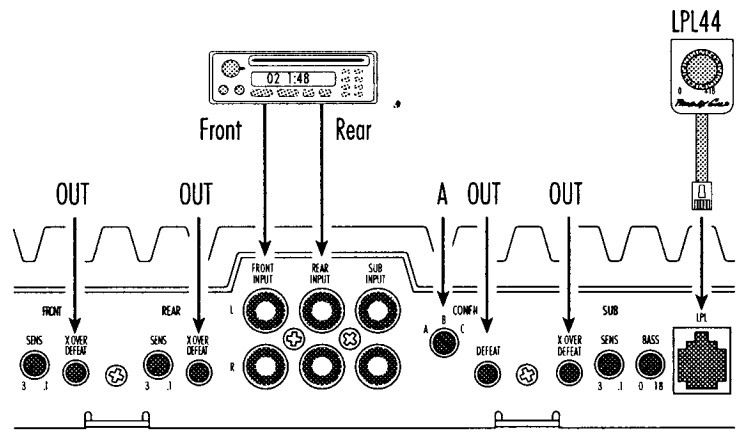
* Use the Power Cable Calculator on the previous page for the exact gauge of cable required.
 ** Use at least 1 farad of capacitance for every 1,000 watts of amplifier output.

OUTPUTS		
FRONT	REAR	SUB
Highpass, fading	Highpass, fading	Lowpass, non-fading



- Front RNet - 100Hz**
- Rear RNet - 100Hz**
- Sub RNet - 100Hz**

Minimum bridged load is 2 ohms.
Minimum load per channel is 1 ohm.



The headunit's fader will control the front to rear balance without affecting the subwoofer's volume.

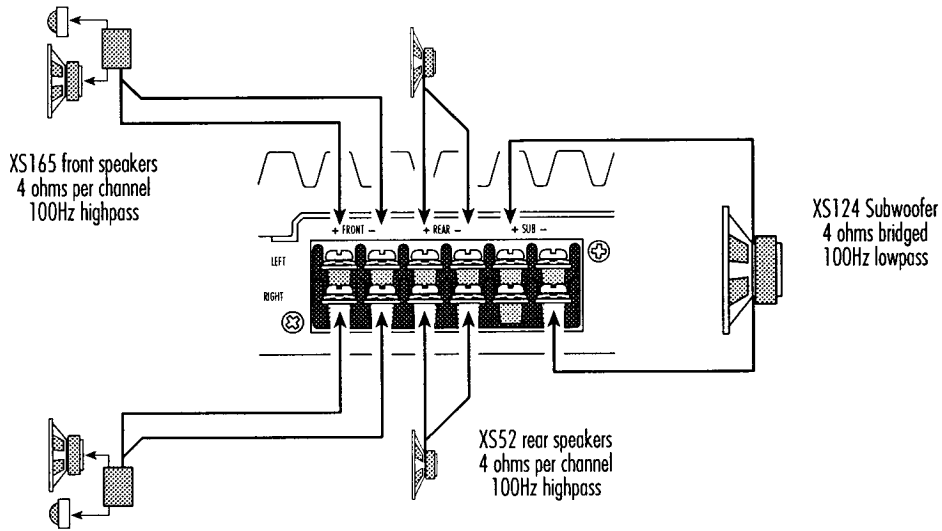
The front RNet determines the XS165's highpass crossover point.

The rear RNet determines the XS52's highpass crossover point. The sub RNet determines the XS124's lowpass crossover point.

Use the LPL44 to control subwoofer volume from the driver's seat.

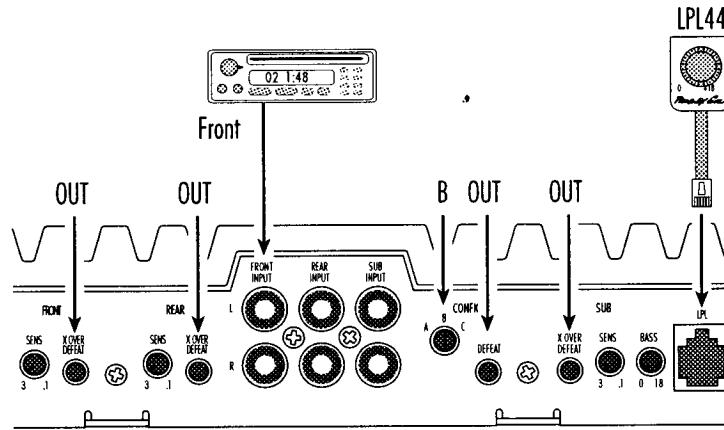


OUTPUTS		
FRONT	REAR	SUB
Highpass, non-fading	Highpass, non-fading	Lowpass, non-fading



Front RNet - 100Hz
Rear RNet - 100Hz
Sub RNet - 100Hz

Minimum bridged load is 2 ohms.
Minimum load per channel is 1 ohm.



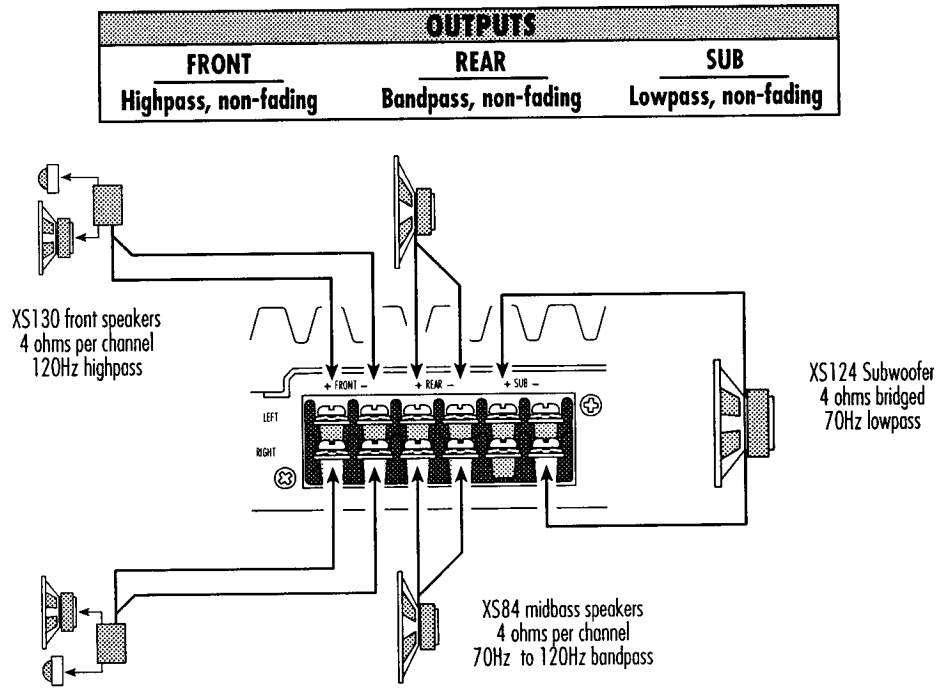
This configuration allows a single input to provide signal for all outputs.

The headunit's fader has no control over front to rear balance.

The front RNet determines the XS165's highpass crossover point.
 The rear RNet determines the XS52's highpass crossover point.
 The sub RNet determines the XS124's lowpass crossover point.

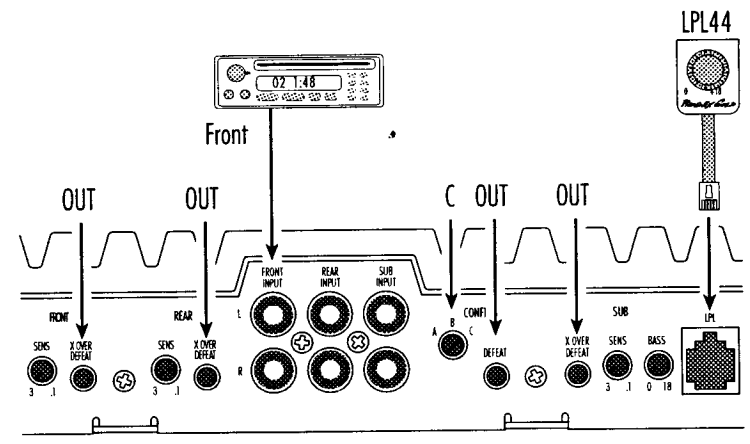
Use the LPL44 to control subwoofer volume from the driver's seat.





- Front RNet - 120Hz**
- Rear RNet - 70Hz**
- Sub RNet - 70Hz**

Minimum bridged load is 2 ohms.
Minimum load per channel is 1 ohm.



This configuration allows a single input to provide signal for all outputs.

The headunit's fader has no control over front to rear balance.

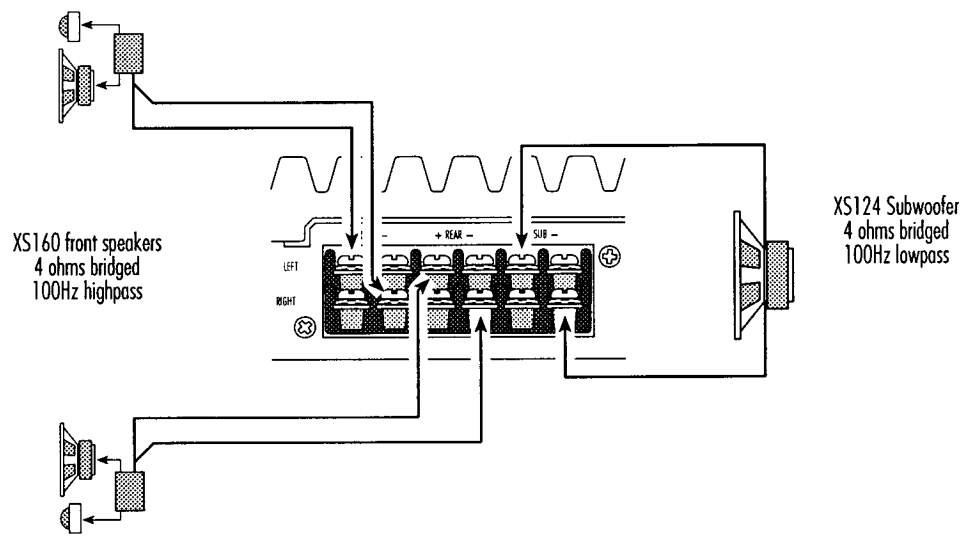
The front RNet determines the XS130's highpass and the XS84's lowpass crossover points. The rear RNet determines the XS84's highpass crossover point and forms a bandpass from 70Hz to 120 Hz. The sub RNet determines the XS124's lowpass crossover point.

The front RNet frequency must be higher than the rear RNet frequency.

Use the LPL44 to control subwoofer volume from the driver's seat.

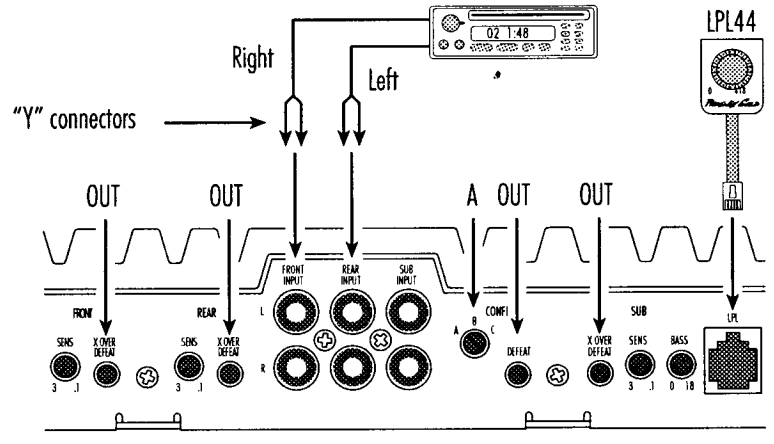


OUTPUTS		
FRONT	REAR	SUB
Highpass, bridged	Highpass, bridged	Lowpass, non-fading



- Front RNet - 100Hz**
- Rear RNet - 100Hz**
- Sub RNet - 100Hz**

Minimum bridged load is 2 ohms.
Minimum load per channel is 1 ohm.



This configuration allows the XS6600 to operate as a three channel amplifier and increase power to the mid/high speakers.

The front RNet determines the right XS160's highpass crossover point. The rear RNet determines the left XS160's highpass crossover point. The front and rear RNet's must be the same frequency. The sub RNet determines the XS124's lowpass crossover point.

Use the LPL44 to control subwoofer volume from the driver's seat.



CROSSOVER ADJUSTMENTS You can adjust the crossover frequencies by changing the resistor network (RNet) located inside the amplifier. The XS6600 is factory equipped with three 100 Hz RNet.

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

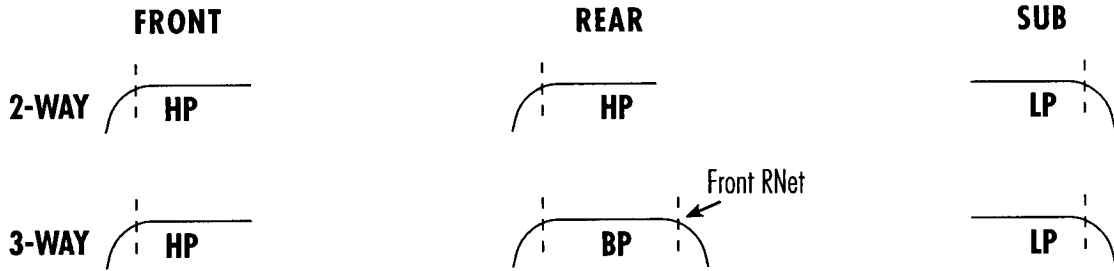
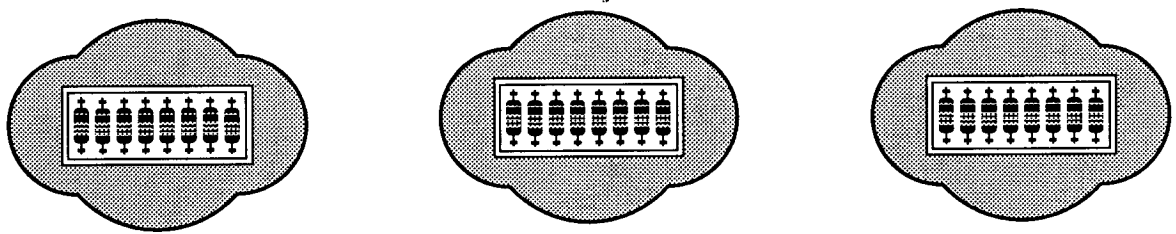
5500 Hz	PG# XSRN5500	250 Hz	PG #XSRN250
4650 Hz	PG# XSRN4650	120 Hz	PG# XSRN120
3850 Hz	PG# XSRN3850	85 Hz	PG# XSRN85
3250 Hz	PG# XSRN3250	70 Hz	PG# XSRN70
2650 Hz	PG# XSRN2650	55 Hz	PG# XSRN55
1000 Hz	PG# XSRN1000	45 Hz	PG# XSRN45
825 Hz	PG# XSRN825	30 Hz	PG# XSRN30
650 Hz	PG# XSRN650	20 Hz	PG# XSRN20
550 Hz	PG #XSRN550		



CONFIG SWITCH

Position A	2-WAY	HP / HP / LP, Fading	Use Front & Rear Inputs
Position B	2-WAY	HP / HP / LP, Non-fading	Use Front Inputs Only
Position C	3-WAY	HP / BP / LP, Non-fading	Use Front Inputs Only

CONFIG DEFEAT SWITCH Set the CONFIG DEFEAT switch to the IN position to bypass the CONFIG switch setting. This requires connecting signal cables to all inputs.



Access the RNet by removing the protective plastic covers 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 covers to keep out dirt and debris.

If replacement Phoenix Gold RNet are not available, you can still customize your crossover frequencies by removing the factory installed RNet and inserting eight resistors directly into the RNet socket.

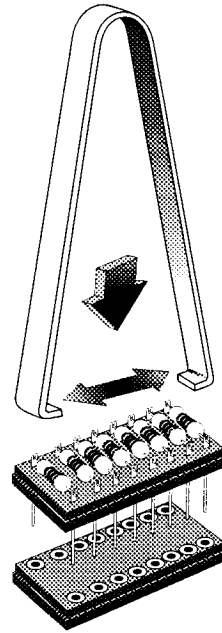
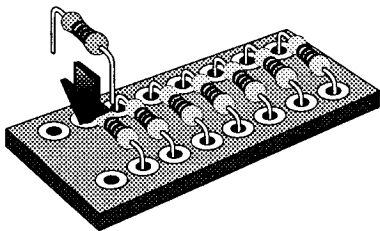
Calculate the resistor value using this formula:

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

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

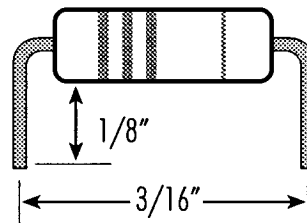
$$\frac{18150}{325} = 55.8$$

Plug the resistors directly into the socket holes as shown.



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

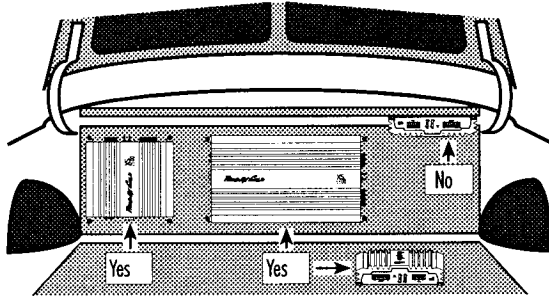
Bend each resistor's leads so there is exactly 3/16" space between them. Then cut the leads off 1/8" below the body of the resistor.



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

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

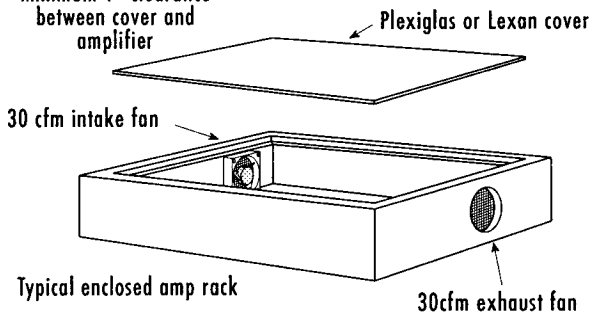
Never mount the amplifier upside down. This traps heat within the heatsink causing the amplifier to overheat and shut down.



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

The Zytel ST801 mounting feet allow the amplifier to be mounted on almost any surface. If damaged, they can be ordered through an Authorized Phoenix Gold Mobile Electronics Retailer.

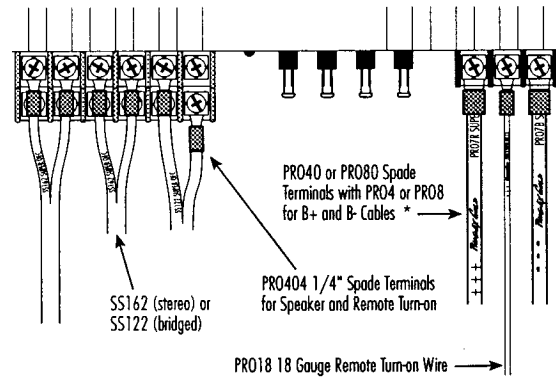
Minimum 1" clearance between cover and amplifier



Use 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 30cfm (cubic feet per minute) for each amplifier. Example - An XS6600 in an enclosed amp rack requires two 30cfm fans. One fan for intake and one for exhaust.

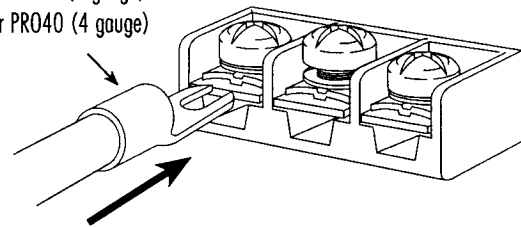


POWER & SPEAKER CONNECTIONS Use crimp-on terminals for connecting battery and speaker cables to the amplifier.



- * 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.

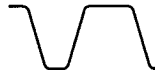
* PRO80 (8 gauge) or PRO40 (4 gauge)



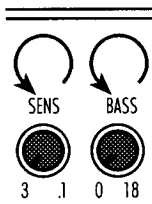
Use a #2 phillips screwdriver to tighten each terminal.
Note: Do not use powered screwdrivers to tighten the terminals. This can damage the gold plating and strip the screw's head.

INPUT SENSITIVITY AND BASS ADJUSTMENT

1. Install all system fuses.



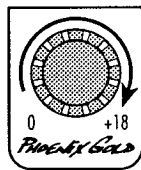
2. Set all the amplifier's input sensitivity controls and the bass equalization control to their minimum positions (full counterclockwise).



3. Set all amplifier signal routing switches according to your system's design.

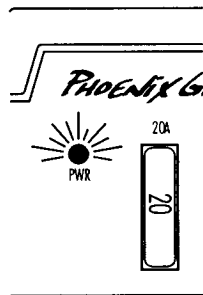


4. If using an LPL44, set it to maximum (full clockwise).



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.

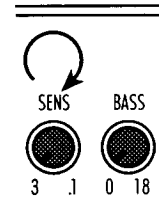


7. Check the condition of all other components to make sure they are powered up and working.

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.

10. Use the amplifier's front, rear & sub input sensitivity controls to reach maximum undistorted output for each speaker set. Repeat this for all other amplifiers. The idea is to find maximum undistorted output for each speaker set independently.



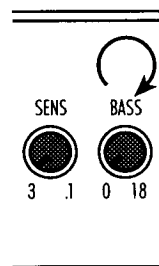
11. Reduce the headunit's volume to a comfortable level.

12. Listen to various musical selections to check overall system balance. Compare front to rear, midbass to midrange, etc. If one speaker set is too loud compared to another, then its' level must be lowered to blend correctly with the other speakers. The idea is to reference all speakers to the weakest set.

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.

13. Adjust the Bass Equalization Controls according to taste.

Note: Use this control 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.



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

SYMPTOM	PROBABLE CAUSE	SOLUTION
No output and Power-on LED is off	No battery, ground, or remote connection	Connect B+, B-, and a remote turn-on to the amplifier (pages 6 & 13). The amplifier must have a clean solid chassis ground connected to the B- terminal and receive at least 10.5 volts through the B+ and R terminals.
	Blown power fuse	Use an ohmmeter to check for a short to chassis ground in the B+ cable with the B+ cable disconnected from the amplifier, battery and all other devices. Correct any short and install a new fuse. Replace only with the same rating and type of fuse: Use four 20 amp ATO fuses.
No output and power-on LED is on	No signal from the headunit	Use an AC volt meter to check for voltage at the headunit's preamp outputs. The level should fluctuate with the peaks in music.
	Faulty input signal cables	Use an AC volt meter to check for voltage at the signal cables' outputs. Try substituting different signal cables.
	Faulty speaker or speaker cables	Try substituting another speaker or cables.
Distorted sound	Clipped input signal feeding the amplifier	Make sure the headunit is not producing a clipped signal (page 14). Most headunits clip their own output above 7/8 volume. Distorted signals coming into the amp will sound distorted at any input sensitivity setting.
	Input sensitivity too high	Lower input sensitivity (page 12). Setting the sensitivity too high causes distortion. Distortion causes speakers to rapidly overheat and can result in speaker failure.
Amplifier cuts off when driven to high output levels	Thermal protection circuit activated	Check for poor mounting location allowing hot air to be trapped within the heatsink (page 13). If the heatsink reaches 90 degrees Celsius, the amplifier shuts down and the green Power-on LED turns off. The amplifier will turn back on when the heatsink temperature falls below 90 degrees.
Amplifier cuts off when driven to high output levels	Overload circuit activated by excessive output current. Various causes are:	
	- Total speaker load impedance is too low	Minimum bridged impedance is 2 ohms. Minimum stereo impedance is 1 ohm.
	- A damaged speaker cable touching the vehicle chassis, speaker cables or tinsel leads touching each other, or damaged speaker voice coil	With the wires disconnected from the amp, Use an ohm meter to check for a short from any speaker cable to chassis ground. Check the DC resistance of the speaker's voice coil. It should be close to the speaker's nominal impedance specification and should fluctuate when the cone is touched. Visually check each speaker for damaged tinsel leads, or other broken parts. Smell the speaker's magnet area for a burned scent.
	- Damaged passive crossover components	Visually examine inductors, capacitors and resistors for signs of heat stress. Use a soldering iron to touch up connections to the circuit board. Try substituting a different crossover network.



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