Phoenix Gold

ZX450

TRIPLE DARLINGTON

HIGH DEFINITION AMPLIFIER

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FEATURES

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- Tri-linear™ Capability for Simultaneous Stereo & Bridged Mono Operation
- 2 ohms Bridged/1 ohm Stereo Operation Approved
- Independent Front & Rear, 24dB per octave, Continuously Variable, 30 to 600Hz Highpass/Lowpass Crossovers
- Auxiliary Output RCA Jacks for Lowpass, Bandpass or Highpass Output
- Independent Front & Rear Crossover Circuit Bypass Switches
- Independent Front & Rear, Variable, Input Sensitivity Controls
- Optional LPL Subwoofer Level Control
- Advanced Turn-on & Turn-off Output Muting Circuitry
- Independent Power-on, Thermal & Overload LED indicators
- 24kt Gold-plated High-current Power & Speaker Terminals
- 24kt Gold-plated 2-ounce Copper, Double-sided G10 Glass-epoxy Printed Circuit Boards
- Audiophile Grade Capacitors & 1% Tolerance Metal Film Resistors
- Nylon Isolation Mounting Feet
- Optional RDDP Remote Diagnostic Display Port

SPECIFICATIONS

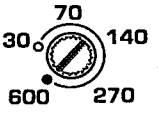
Continuous Output Power (watts):	
Into 4 ohms Stereo @ 12.5 Vdc (IASCA/USAC)	18 x 4
Into 4 ohms Stereo @ 14.4 Vdc	75 x 4
Into 2 ohms Stereo @ 14.4 Vdc	150 x 4
Into 4 ohms Bridged @ 14.4 Vdc	250 x 2
Minimum Speaker Load, Bridged	2 ohms
Into 2 ohms Bridged @ 14.4 Vdc (current limited)	250 x 2
Minimum Speaker Load, Stereo	1 ohm
Into 1 ohm Stereo @ 14.4 Vdc (current limited)	150 x 4
Continuous Current Draw @ Full Power *	55 amps
Peak Current Draw @ Full Power **	80 amps
Frequency Response	± 1dB, 20Hz to 20kHz
Signal to Noise Ratio (A-weighted)	>100dB
Total Harmonic Distortion	<0.02%
Crossover Slope	24dB per Octave
Crossover Frequency Range, Front	30Hz to 6kHz
Crossover Frequency Range, Rear	30Hz to 600Hz
Auxiliary Output Freq. Range, HP or LP	30Hz to 600Hz
Auxiliary Output Freq. Range, Bandpass	30Hz to 6kHz
Input Signal Voltage Range	0.2 volts to 6 volts
Recommended Fuse Size (internal)	50 amp AGU style
Bass Boost	0 to +18dB @ 45Hz
Power Supply Operating Range	10.0 Vdc to 15.5 Vdc
Dimensions, Chassis (inches)	14.00L x 8.60W x 2.00H
Dimensions, Overall (inches)	15.00L x 9.30W x 2.00H

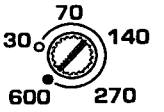
*Average continuous current draw when playing typical music material.

**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.

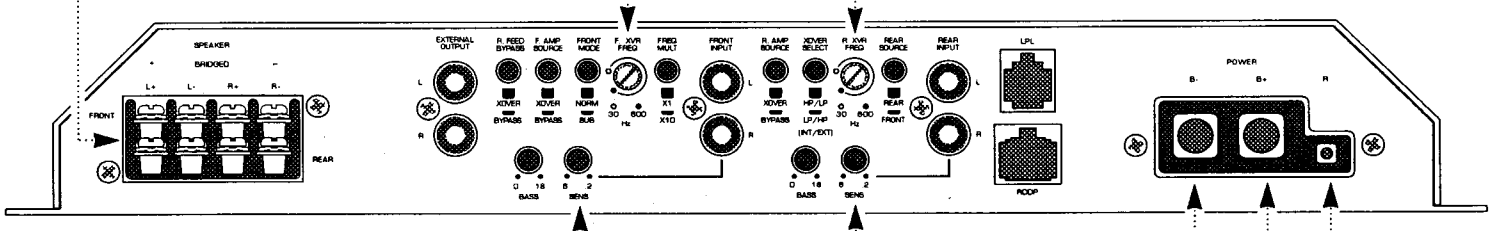
FRONT CROSSOVER FREQUENCY Controls the highpass crossover point for the front speaker outputs. The lowpass output feeds the rear crossover section via the rear feed bypass and rear source switches. Setting the rear crossover to a lower frequency allows the formation of a bandpass signal for the rear or auxiliary outputs. Setting the rear crossover to the same frequency allows cascading the two crossovers together for a 48dB per octave lowpass.





REAR CROSSOVER FREQUENCY Controls the highpass and lowpass crossover point for the rear speaker and auxiliary outputs. The highpass output may be combined with signals from the front crossover section to form a bandpass signal for either rear speaker or auxiliary outputs. When connecting woofers to the front and rear outputs for lowpass operation, this control sets the crossover point for both front and rear outputs.

FRONT & REAR SPEAKER OUTPUTS Used to connect the amplifier to speakers. Minimum speaker cable size is 16 gauge (PG# SS162 or QS162). Use 12 Gauge for bridged operation (SS122 or QS122). Use the left + and right - terminals for bridged mode. Minimum impedance is 2 ohms bridged or 1 ohm stereo.



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

B- TERMINAL (CHASSIS GROUND) Connect to a clean, solid chassis ground. Remove all paint and dirt from the chassis connection point. Minimum cable size is 4 gauge. Keep the cable as short as possible.

B+ TERMINAL (BATTERY POSITIVE) Connect directly to the positive battery terminal. Minimum cable size is 4 gauge. Remember to properly fuse this cable within 18 inches of the positive battery terminal.

REMOTE TURN-ON TERMINAL Connect to a switched 12 Vdc source such as the headunit's "remote" or power antenna wire.

Note: Use a voltmeter to verify that the power antenna wire remains on when operating the CD or tape.

FRONT INPUTS Connect pre-amp signal cables from the headunit to these terminals. Signal from these inputs can supply the front, rear and auxiliary outputs. To maximize noise rejection, we recommend using Phoenix Gold QLX or TRX twisted pair interconnects.

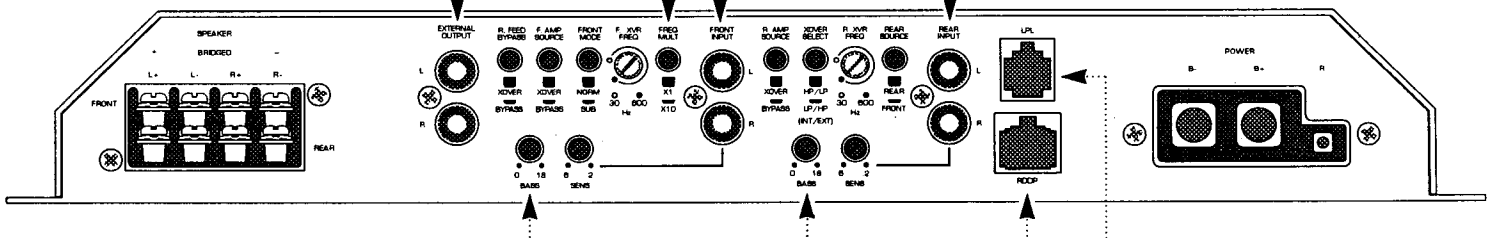
FREQUENCY MULTIPLIER Multiplies the front crossover frequency by a factor of 10 making the adjustment range 300Hz to 6kHz.

AUXILIARY OUTPUTS Provides either a lowpass, highpass or bandpass signal for an additional amplifier or signal processor. For highpass or lowpass mode, the signal is opposite the rear speaker outputs with the crossover frequency set by the rear crossover frequency control. For bandpass mode, the front crossover frequency control sets the upper corner frequency while the rear crossover frequency control sets the lower corner frequency.

REAR INPUTS Connect pre-amp signal cables from the headunit to these terminals. Signal from these inputs can supply the front, rear and auxiliary outputs. To maximize noise rejection, we recommend using Phoenix Gold QLX or TRX twisted pair interconnects.

STATUS LEDS (TOP OF AMPLIFIER)

PWR: Lights when the amplifier is turned on.
THM: Lights if the amplifier shuts down due to overheating.
OVL: Lights if the amplifier shuts down due to a shorted speaker or excessive output current (speaker impedance too low).



FRONT & REAR BASS EQ These independent controls allow up to 18dB of boost at 45Hz for the Speaker outputs. Use these controls sparingly. Every 3dB of boost requires double the power at 45Hz.

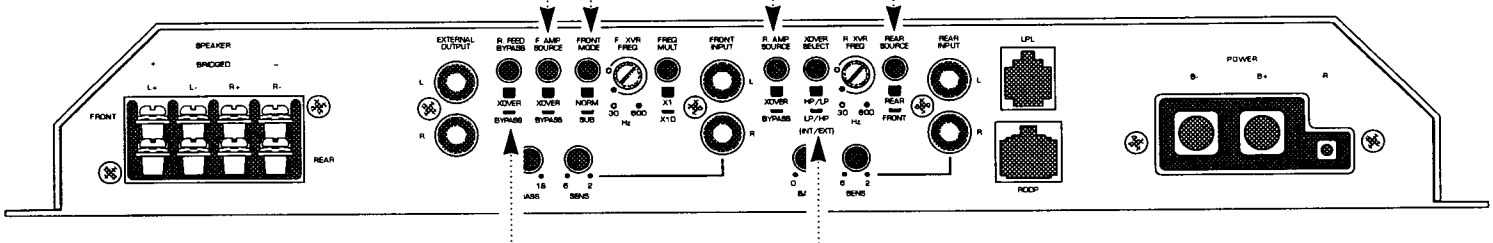
REMOTE DIAGNOSTIC DISPLAY PORT This port is for connecting the optional Remote Diagnostic Display. The display indicates the amplifier's condition with additional status LEDs and a DC voltmeter.

LPL CONTROL PORT This port is for connecting the optional LPL44 Remote Lowpass Level Control allowing woofer volume adjustments from the driver's seat. The LPL44 controls woofers connected to the front, rear or auxiliary outputs.

FRONT MODE & FRONT AMPLIFIER SOURCE These switches work together to provide signals to the front amplifier. The front mode switch selects either highpass signals from the front crossover (NORM) or lowpass signals from the rear crossover (SUB) and passes it along to the front amplifier source switch. The primary use of the SUB setting is to connect woofers to both front and rear outputs using the rear crossover and LPL44. With the front amplifier source switch set to XOVER, the front amplifier receives processed signals via the front mode switch. With the front amplifier source switch set to BYPASS, the front amplifier receives signals directly from the front input jacks.

REAR AMPLIFIER SOURCE This switch selects signals for the rear amplifier. When set to XOVER, the rear amplifier receives processed signals via the crossover select switch. When set to BYPASS, the rear amplifier receives signals directly from the rear input jacks.

REAR SOURCE This switch allows the rear crossover to receive signals from the front pre-amp section without the use of "Y" connectors. The FRONT setting selects signals from the front pre-amp section via the rear feed bypass switch. The REAR setting selects signals directly from the rear input jacks.

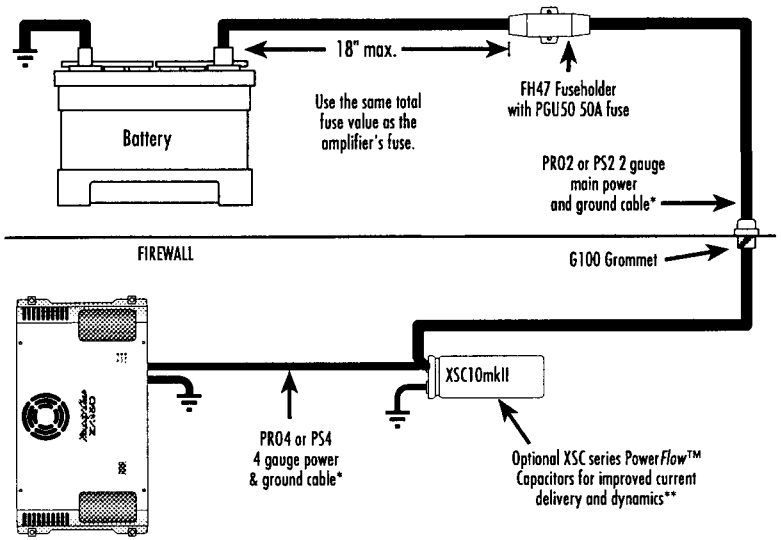


REAR FEED BYPASS This switch has no affect unless the rear source switch is set to the FRONT position. The rear feed bypass switch and rear source switch work together to provide signals to the rear crossover. When set to the XOVER position, signals come from the lowpass output of the front crossover. The primary use of the XOVER setting is to create a bandpass for the auxiliary or rear speaker outputs. Another use for the XOVER setting is cascading the front and rear crossovers to form a 48dB per octave lowpass for the front or rear speaker outputs. In the BYPASS position, signals come directly from the front input jacks.

CROSSOVER SELECT This switch affects signals sent to both the auxiliary and rear outputs. With the HP/LP setting, the rear amplifier source switch receives highpass or bandpass signals while the auxiliary outputs receive lowpass signals. When set to LP/HP, the rear amplifier source switch receives lowpass signals while the auxiliary outputs receive highpass or bandpass signals. Highpass, bandpass and lowpass signals come from the rear crossover. The LPL44 affects the lowpass signal.

POWER*FLOW*™ SYSTEMS

SINGLE AMPLIFIER

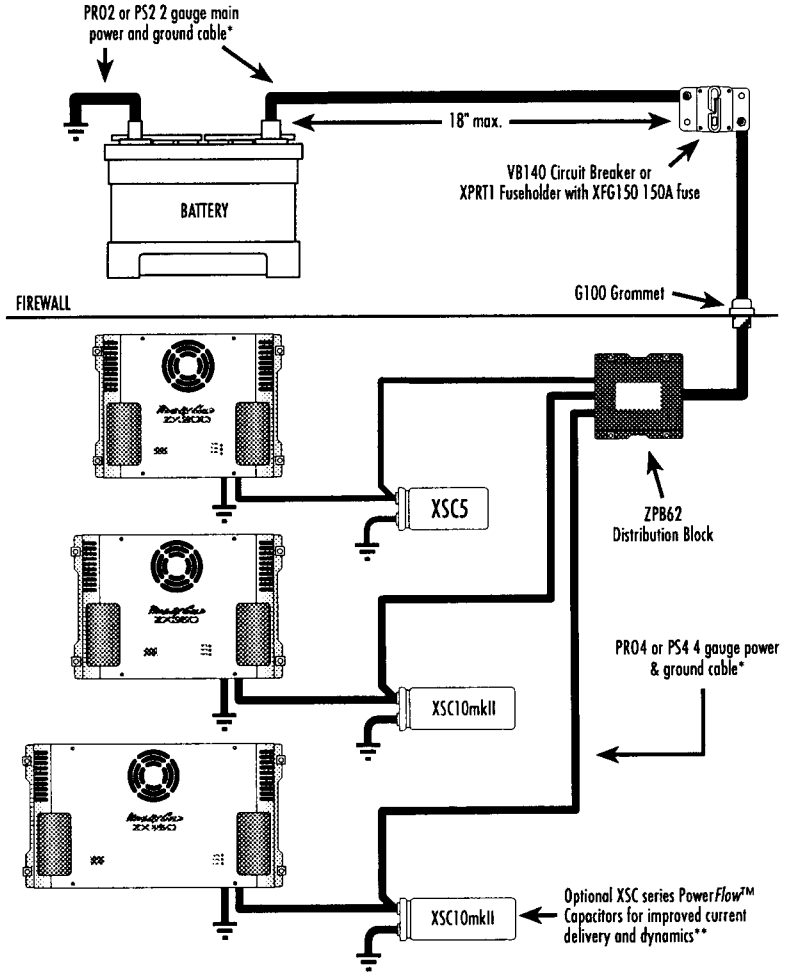


* Use the Power Cable Calculator below for the exact gauge of cable required.

Find the total wattage 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. Round up any wattage or distance that falls between the columns or rows.

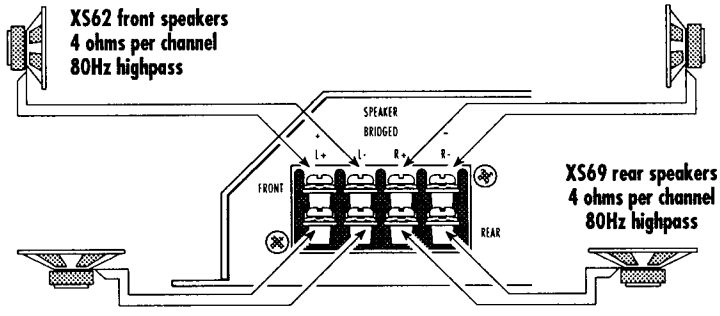
	4 ft	8 ft	12 ft	16 ft	20 ft	24 ft
100 w	10	10	8	8	4	4
200 w	10	8	8	4	4	4
400 w	8	8	4	4	4	2
600 w	8	4	4	4	2	2
800 w	4	4	4	2	2	2
1000 w	4	4	2	2	2	1/0
1400 w	4	2	2	2	1/0	1/0
1800 w	2	2	2	1/0	1/0	1/0
2200 w	2	2	1/0	1/0	1/0	1/0 x 2
2600 w	2	1/0	1/0	1/0	1/0 x 2	1/0 x 2
3000 w	1/0	1/0	1/0	1/0 x 2	1/0 x 2	1/0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

MULTI AMPLIFIER

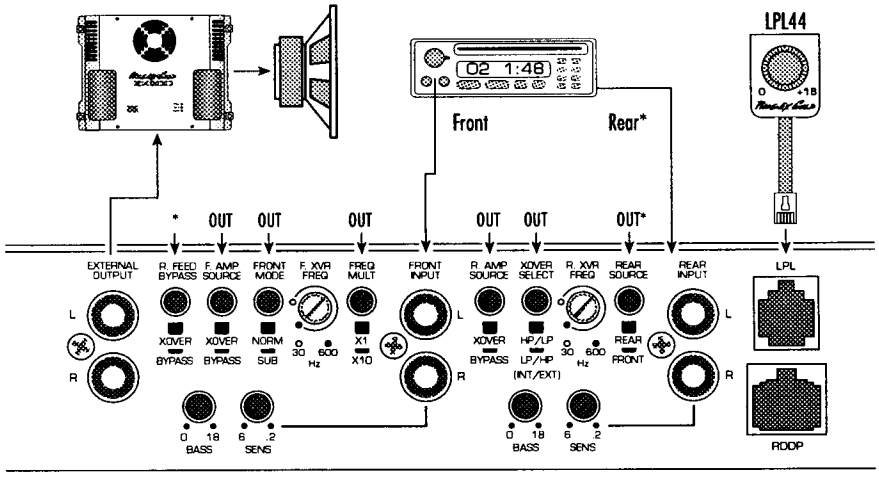


* Use the Power Cable Calculator for the exact gauge of cable required.

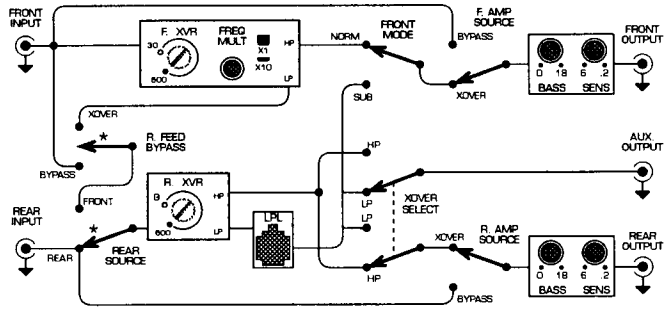
** Use at least 1 farad of capacitance for every 1,000 watts of amplifier output.



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



One Channel Shown for Clarity

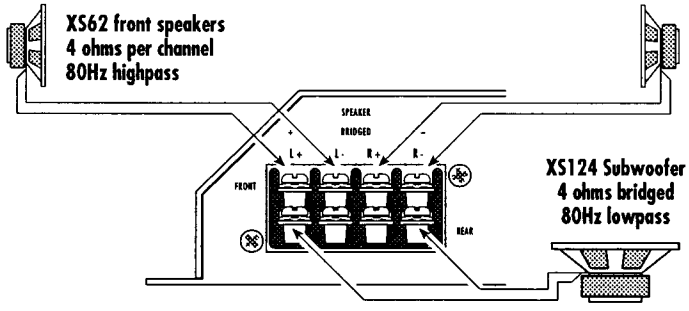


The front crossover frequency control determines the XS62's high-pass frequency independently of the XS69's and auxiliary outputs.

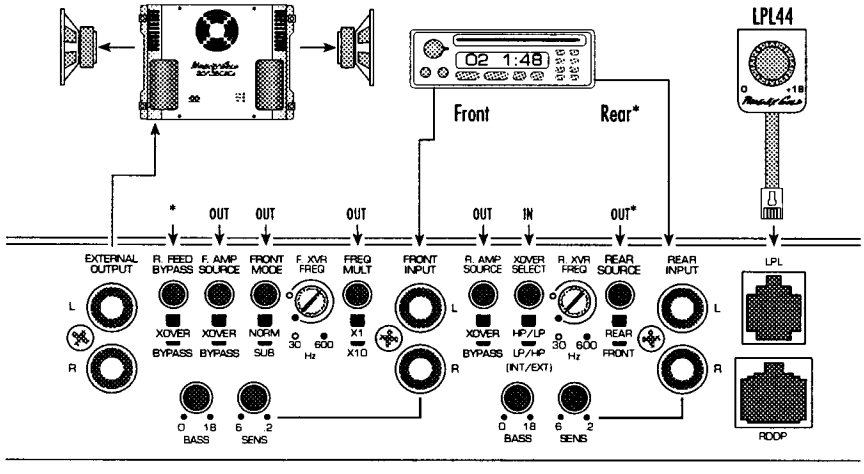
The rear crossover frequency control determines the XS69's highpass frequency and auxiliary output's lowpass frequency.

The auxiliary output sends lowpass signals to another amplifier. Use the LPL44 to control the auxiliary output's volume from the driver's seat.

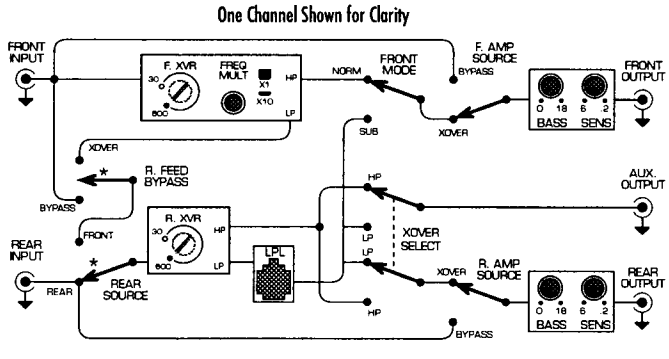
* For single pre-amp headunits, set the ***rear feed bypass*** switch to **BYPASS** and the ***rear source*** switch to **FRONT**. This allows signals from the front inputs to reach the rear crossover without the use of "Y" connectors.



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



One Channel Shown for Clarity



The front crossover frequency control determines the XS62's highpass frequency independently of the XS124 and rear speakers.

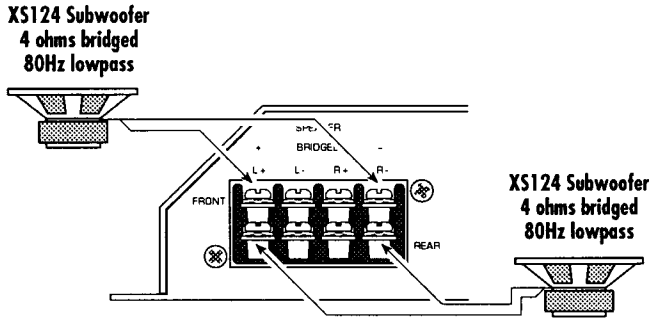
The rear crossover frequency control determines the XS124's lowpass frequency and auxiliary output's highpass frequency.

The auxiliary outputs send highpass signals to another amplifier.

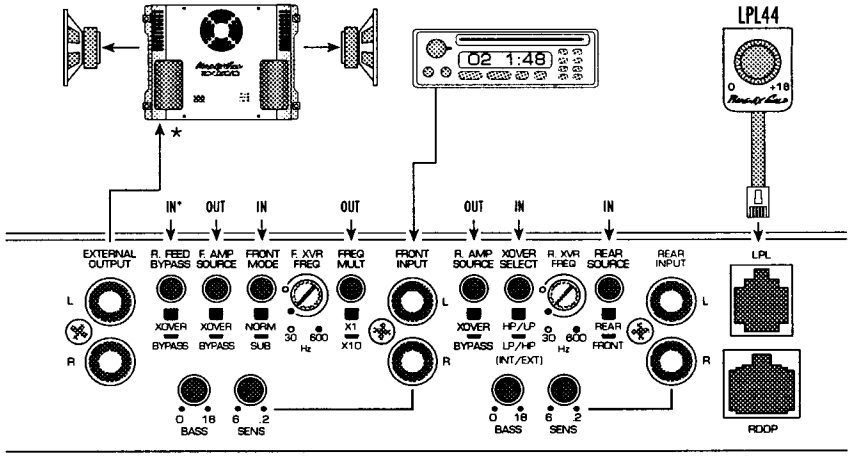
Use the LPL44 to control the XS124's volume from the driver's seat.

* For single preamp headunits, set the ***rear feed bypass*** switch to **BYPASS** and the ***rear source*** switch to **FRONT**. This allows signals from the front inputs to reach the rear crossover without the use of "Y" connectors.

OUTPUTS		
FRONT	**REAR**	**AUXILIARY**
LOWPASS	LOWPASS	HIGHPASS



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



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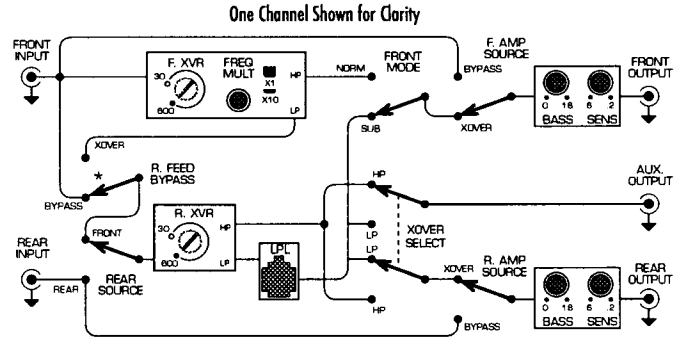


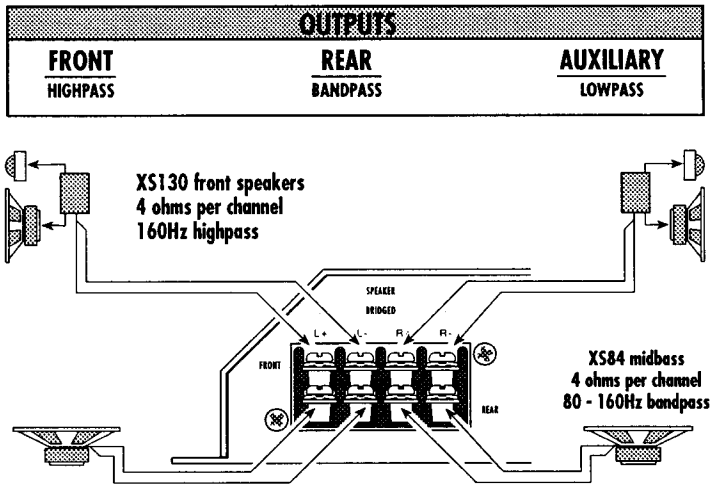
The rear crossover frequency control determines the crossover frequencies of all outputs.

Use the LPL44 to control the volume of both front and rear outputs.

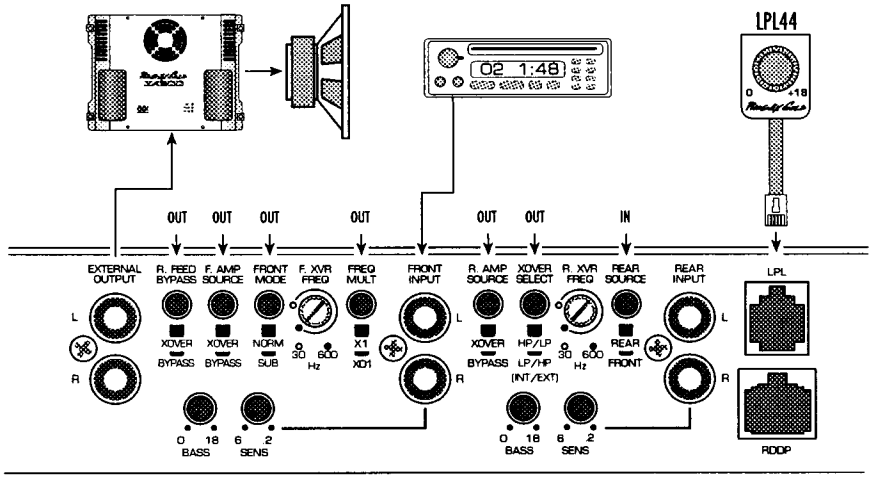
The auxiliary output sends highpass signals to another amplifier.

* 48dB per octave operation is possible by passing the signal through both front and rear crossovers. However, this eliminates the highpass auxiliary outputs. Set the ***rear feed bypass*** switch to **XOVER**. Set the front crossover frequency control to match the rear crossover.

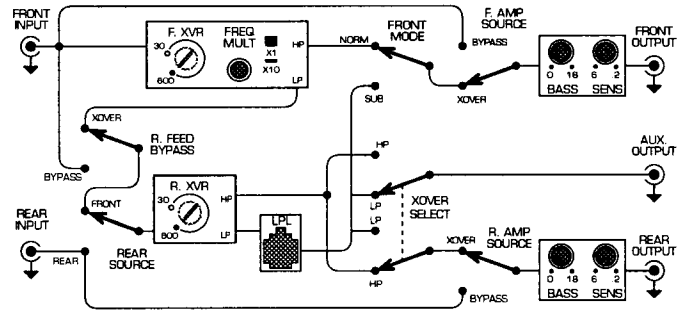
Note: An RTA is very helpful when setting up 48dB operation. Set the front crossover frequency to 600Hz. Disable all amplifiers except the ZX450. Using pink noise, set the rear frequency to the desired crossover frequency. Lower the front frequency until the roll-off slope gets steeper. Stop when the slope is at its steepest point.



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



One Channel Shown for Clarity



The front crossover frequency control determines the XS130's highpass and the XS84's lowpass frequency.

The rear crossover frequency control determines the XS84's highpass frequency and auxiliary output's lowpass frequency.

The auxiliary output sends lowpass signals to another amplifier.

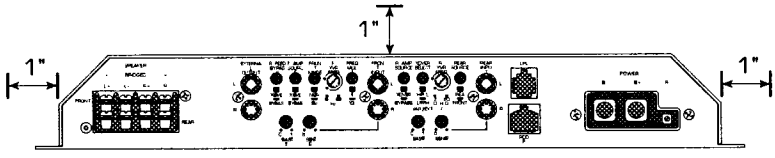
Use the LPL44 to control the auxiliary output's volume from the driver's seat.

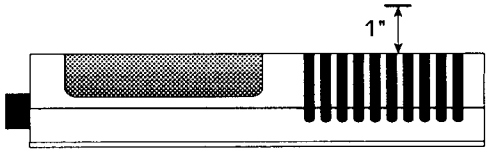
Note: If connecting tweeters to the front outputs, set the ***frequency multiplier*** switch to **X10**. This multiplies the front crossover's frequency range by a factor of ten. The range becomes 300Hz to 6kHz.

MOUNTING You can mount the ZX450v.2 in a variety of positions. There are only a few precautions that must be observed:

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

Do not mount the amplifier where debris such as stray wire strands could fall into the fan intake or exhaust openings. This could cause serious damage to the electronic circuitry. Damage from debris is not covered by the limited warranty.





Make sure the amplifier has adequate ventilation. Leave at least one inch of clearance on the sides and top of the amplifier as shown above.

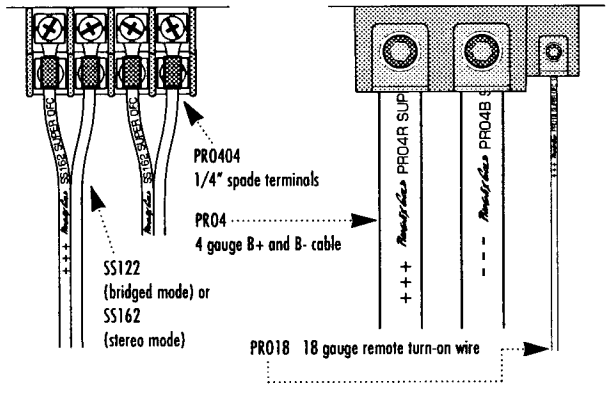
Mounting the amplifier inside an enclosure is not recommended unless the enclosure itself has ventilation fans to circulate fresh air through the enclosure. Design your cooling system to circulate at least 30cfm (cubic feet per minute) for each amplifier.

Example - A ZX450v.2 in an enclosed amp rack requires two 30cfm fans. One fan for intake and one for exhaust.

Mount the amplifier to flat surfaces only. Make sure the amplifier's base does not flex or distort.

The isolation mounting feet may be replaced if damaged. Order PG# 5620.0006 for black and PG# 5620.0005 for white. Contact an Authorized Phoenix Gold Dealer for details.

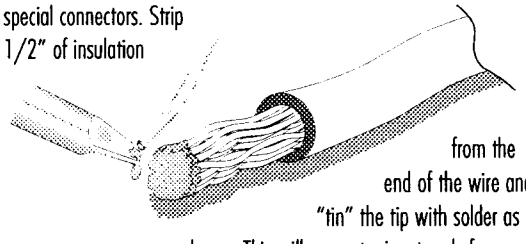
POWER & SPEAKER CONNECTIONS Use crimp-on terminals for connecting speaker cables to the amplifier. Use a tool designed to crip noninsulated terminals. For extra reliability, crimp and solder each terminal.



Use a #2 philips screwdriver to tighten each speaker termianl.

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

B+ battery, B- ground and remote turn-on cables connect directly to the terminal block without the need for special connectors. Strip 1/2" of insulation from the end of the wire and "tin" the tip with solder as shown. This will prevent wire strands from fraying and still provide for maximum contact area between the terminal block, set screw and bare copper cable.

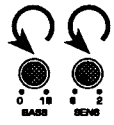


Tighten the remote turn-on set screw with the supplied 2mm hex wrench. The 4mm hex wrech tightens the B+ battery and B- ground terminals.

INPUT SENSITIVITY & BASS ADJUSTMENT

1. Install all system fuses.

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



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

4. Make preliminary adjustments to the front and rear crossover frequencies. Check the manufacturer's specifications for the proper frequency range of each speaker. It may be necessary to fine tune the crossover frequencies later for the best overall sound quality.

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

6. Turn the headunit on with the volume set to minimum.

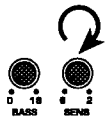
7. Visually check the amplifier's condition. The green power LED should be on.

8. Check the condition of all other components to make sure they are powered up.

9. Set the headunit's tone controls, balance, and fader to the center (flat) position. Turn off any loudness or other signal processing features.

10. 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.

11. Use the front and rear input sensitivity controls to reach maximum undistorted output for each speaker set.
Note: The idea is to find maximum undistorted output for each speaker set independently.



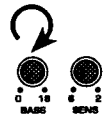
12. Repeat input sensitivity adjustments for all other amplifiers.
Note: The ZX450's sensitivity and bass controls have no affect on the auxiliary outputs. An amplifier connected to the auxiliary outputs receives the same signal level available to the ZX450's inputs (unity gain).

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

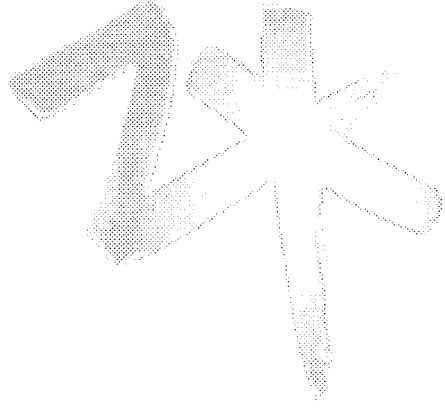
14. Listen to various musical selections to check overall system balance. Compare front to rear, midbass to midrange, etc. If one speaker set is too loud compared to another, then its level must be lowered to blend correctly with the other speakers. The idea is to reference all speakers to the weakest set.
Note: For subwoofers controlled by an LPL44, keep the sensitivity setting from step 11 or 12. 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.

15. Fine tune crossover frequencies to achieve the smoothest possible blending of each speaker set.

16. Adjust the Bass Equalization Controls if necessary.
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.



17. With all levels set correctly, the system will reach overall maximum undistorted output at the volume level set in step 10.



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 & 11).
	Blown power fuse	Check for a short to chassis ground in the B+ cable. Install a new AGU 50A fuse.
No output and power-on LED is on	No signal from the headunit	Check the headunit for proper output.
	Faulty input signal cables	Try substituting different signal cables.
	Faulty speaker or speaker cables	Try substituting another speaker or cables.
Distorted sound	Clipped input signal	Make sure the headunit is not producing a clipped signal (page 12).
	Input sensitivity too high	Lower input sensitivity (page 12).
Amplifier cuts off when driven hard	Thermal protection circuit activated (yellow LED on)	Check for poor mounting location (page 11) and low impedance load (pages 7 - 10).
	Overload protection circuit activated (excessive current through the outputs, red LED on)	Check for low impedance loads (pages 7 - 10), damaged speaker cables, rubbing speaker voice coils or shorted speaker tinsel leads.