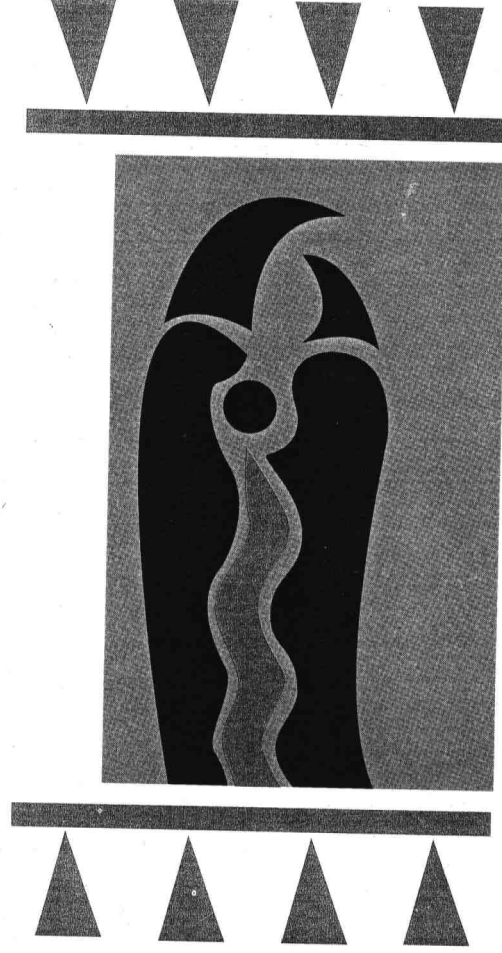


OWNERS MANUAL



HAWK

FALCON

EAGLE

by

HiPonics

MADE IN USA

AMPLIFIER SPECIFICATIONS

AMPLIFIER SECTION SPECIFICATIONS:			
Number of channels	HAWK 2	FALCON 2	EAGLE 4
Continuous output power with all channels driven at 4 ohm. at 14.4 volt battery	2 x 45	2 x 90	4 x 45
Continuous output power with all channels driven at 2 ohm. at 14.4 volt battery	2 x 85	2 x 140	4 x 80
Continuous output power, stereo pairs mono bridged into 4 ohm at 14.4 volt battery	1 x 170	1 x 280	2 x 150
Continuous output power with all channels driven at 4 ohm. at 12 volt battery	2 x 40	2 x 65	4 x 35
Continuous output power with all channels driven at 2 ohm. at 12 volt battery	2 x 60	2 x 85	4 x 55
Continuous output power, stereo pairs mono bridged into 4 ohm at 12 volt battery	1 x 120	1 x 170	2 x 110
Continuous output power, stereo pairs mono bridged into 4 ohm at 12 volt battery	0.1%		
THD	50		
Slew rate (volt/microsecond)	105dB		
Noise below rated output (A weighted)	2 Hz to 150 kHz		
Frequency response at 1 watt output (no crossover filters taken into account)	10 Hz to 30 kHz		
Power bandwidth (no crossover filters taken into account)	100mV to 2.4V		
Input sensitivity for rated output at 12 volt battery	47 K Ohm		
Minimum input impedance at 20 Hz to 20 kHz	120	200	120
Minimum damping factor at 20 Hz to 20 kHz	Thermal	Short Circuit	DC
Protection	0.7ampere	.08ampere	1ampere
Idle current	7ampere	11.5ampere	18.4ampere
Max current at 14.4 volt battery. 4 ohm per channel	2.5ampere	4.5ampere	7.4ampere
Typical current with music, 14.4 volt battery. 4 ohm per channel	10 amp	20 amp	20 amp
Fuse rating (4 ohm per channel loads)	50 mm (1 13/16")		
	176 mm (7")		
Height, mm (inches)	187 (7 1/2")	252 (9 15/16")	
Width, mm (inches)	0.82 (1.8)	1.4 (3)	1.4(3)
Length, mm (inches)			
Weight, Kg (lbs)			
Built in crossover filter features:			
2 way variable frequency crossover in 2 switched ranges (10 Hz to 5.3 KHz)	Yes	Yes	N/A
Amplifier source input selectors		High, Low, Full	
Switched mono/stereo low pass		YES	
CrossShift control		Q: 0.3 -1	N/A
Selectable line outputs		YES	
2 independently variable high pass filters (10 Hz to 1KHz, and 45 Hz to 5.3 KHz)	N/A	N/A	Yes
1 independently variable low pass filter (45 Hz to 5.3 KHz)	N/A	N/A	Yes
Note: all filter slopes are 12 dB per octave			

GENERAL FEATURES FOR 2 & 4 CHANNEL AMERICAN WARRIOR AMPLIFIERS

FEATURES:

- Efficient MOSFET switching power supply.
- Fully complementary topology in the power amplifier block.
- Audiophile quality circuitry.
- Protection circuitry: Over temperature, short circuit on loudspeaker leads, internal DC faults.
- Low noise circuitry design.
- Low profile and small form factor.
- Removable plastic mounting tabs.
- Audio ground floating from 12 volt ground.
- Power and Diagnostic (fault) LED indicators.
- User replaceable power fuse on amplifiers.
- Any stereo pairs are mono bridgeable.
- Input sensitivity variable from 100 milli volt to 2.4 volt to match the amplifier output level of any head unit.
- Line outputs available.
- VersaCross

BENEFITS:

- Less current demand from battery, thus less heat generated
- Total symmetrical signal amplification resulting in audiophile sound quality.
- Transparent sound that rivals Home Audio Components
- Avoids costly damage to both the amplifier and the speakers.
- The toughest obstacle preventing lifelike sound reproduction is noise induced by the amplifier as a result of inexpensive noisy components.
- Easy installation that adapts to many different mounting locations.
- Protects the metalwork from scratches during installation.
- Eliminates engine noise.
- Allows troubleshooting to become easier and more effective.
- Any fuse replacement does not require opening the unit
- Allows for easy upgrades of power or universal sub woofer applications
- Allows for usage with virtually any brand front end CD, Cassette or AM/FM tuner.
- Lets you build onto and expand your system without buying additional crossover.
- Versatile open architecture active crossover system that allows easy configuration for different applications.



2 CHANNEL AMPLIFIER FEATURES

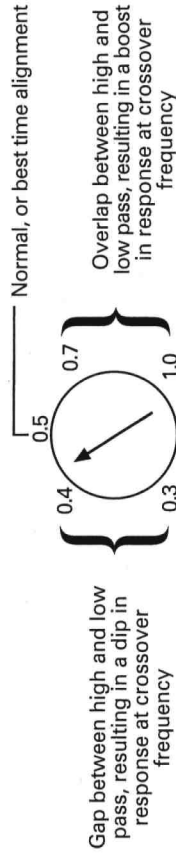
The Hawk and the Falcon 2 channel amplifier feature the most advanced features of any car stereo product in its category available in their category.

Feature	Benefit
• Fully variable 2 way active crossover	Easily adjusted for any crossover frequency between 10 Hz and 5.3 KHz, also suitable for subsonic filter use.
• LO-PASS CONFIG switch.	The crossover low pass output can be switch to mono or stereo.
• AMPS SOURCE SELECT switch.	Routes the internal amplifiers and line out jacks, depending on the application.
• CrossShift control	See below.



CROSS SHIFT:

- 1) The ability to set a gap or overlap at crossover point for equalization.
- 2) Can also be used to do limited time alignment between midrange and tweeters in an active system.
- 3) When the high pass output of the active crossover is used as a subsonic filter, a clockwise, or higher setting of this control will result in a small bass boost at the high pass frequency, resulting in a punchier bass.



4 CHANNEL AMPLIFIER FEATURES

The Eagle 4 channel amplifier feature the most advanced features of any car stereo product in its category available on the market today:

Feature	Benefit
• Two variable active high pass filters are built in.	Allows for independent front and rear high pass usage., or Subsonic filter use on 3 and 4 highpass.
• A separate variable low pass filter is also available.	Allows constant non faded sub bass.
• Independently variable high and low pass filters	Allows gapping or overlapping of crossover points.
• Full featured Versa Cross active crossovers	The ability to configure the filters and amplifier channels, including the line outputs, ensure that this units is unmatched in versatility.
• Lo-Pass Config Button	Determines whether the lo-pass side of the crossover signal is MONO or STEREO.
• Amp Source Select Switch	This feature gives the user total control in assigning whether the Eagle receives high or low pass signals, as well as whether high or low pass signals are sent on to an additional amp added via the line out RCA connections. (see below)

P-4

PLAN YOUR SOUND SYSTEM

Warning: This section contains classified information, please do not read unless authorized to do so!

This information is provided as a guide to achieve good auto stereo installation results.

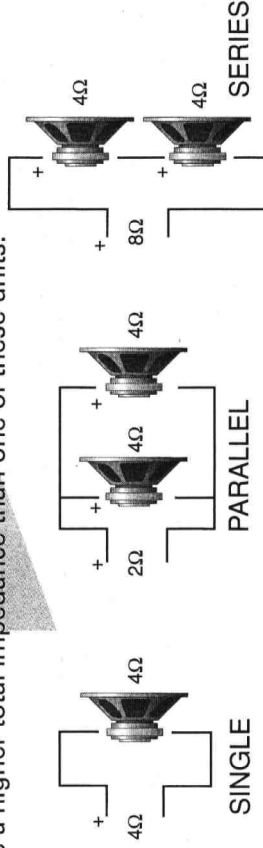
Keep in mind that any system is only as good as its weakest link. The best equipment in the world cannot compensate for a badly executed installation, and if more attention to detail is paid during the installation process, a higher level of listening enjoyment and reliability will result.

Plan the system before starting the installation:

- 1) Check that enough current from the vehicle electrical system is available to power your system. Look up the typical current with music for each amplifier in the specification sheet (Panel P2), add these up for the total current requirement, and upgrade the alternator if necessary. Upgrading the battery is only necessary if you intend to listen to the sound system for extended periods of time without the engine running. Note: the alternator is the current source when the engine is running, NOT the battery.
- 2) Match the loudspeaker power handling capabilities to the amplifiers used. Also check that with the intended speaker combination, the total impedance per channel will not be less than 2 ohm, or not less than 4 ohm when any stereo pair is mono bridged.
- 3) Purchase good quality well insulated multistrand power and ground cables. Use at least 12 gauge for the Hawk, and 10 gauge for the Falcon or Eagle.
- 4) If your signal source (head unit or equalizer) only has high, or speaker level outputs, with no line or RCA outputs, purchase a good quality high to low level converter, such as the HiFonics LC-1, to match the speaker level outputs to the input requirements of the amplifier/s. Use only good quality RCA cables.
- 5) And while you're at it, get at least 14 gauge cables for the loudspeaker and remote turn on connections, with some crimp on lug connectors to attach your cables to the barrier strips mounted on the amplifiers. Although the terminals will crimp down bare ends of these cables adequately, the use of lug connectors will make for a neater installation.
- 6) Also plan to mount a system fuse in the main power lead feeding all components in your system, right at the battery. The primary function of this fuse is to protect your vehicle against electrical shorts in the power wiring, and the amplifier mounted fuses are provided to protect the amplifiers. Add up the fuse ratings for all the equipment in the sound system, and multiply this total value by 1.5 for the system fuse current rating.
- 7) Choose a well ventilated mounting position for amplifiers, and if at all possible, mount them with fins running vertically for best natural convection cooling.
- 8) Plan to keep RCA cabling, speaker wires, and power cables as far apart as possible for less noise and interference.

A note about speaker impedance, with series and parallel connections:

Simply put, speakers connected in parallel will have a lower total impedance than a single speaker of the same impedance. Conversely, speakers connected in series will have a higher total impedance than one of these units.



BASIC INSTALLATION NOTES AND APPLICATION TIPS

Let's start the installation:

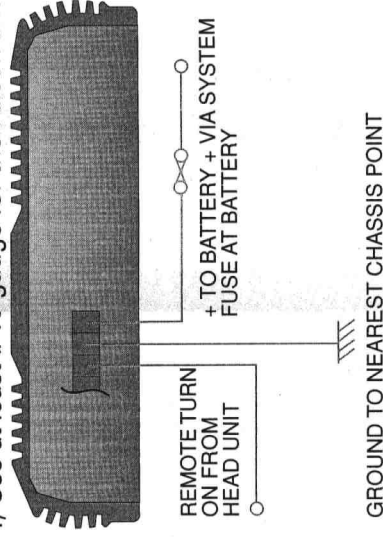
- 1) Read the information on planning a system in section P5.
- 2) Mount the system fuseholder near the vehicle battery. Do NOT install the fuse yet.
- 3) Run all cables required.
- 4) Connect the system fuseholder to the battery positive.
- 5) Connect the main power cable to the other end of the system fuseholder.
- 6) Mount all loudspeakers according to the manufacturers' recommendations, and connect to the speaker cables.
- 7) Slide the plastic mounting tabs provided into the slots in the amplifier bottom plate.
- 8) Mount the amplifier securely with #6 screws through the mounting tabs, making sure you have easy access to all connectors and controls.
- 9) Plug in all RCA leads, and connect the speaker and remote turn on wires.
- 10) Find a good chassis ground point near the amplifier, and cut a length of black power cable, the same gauge as the positive power cable, to reach from the amplifier barrier terminal to this point. Scrape the paint off the vehicle chassis here, crimp or solder a heavy duty ring lug to one end of the power ground cable, then securely fasten the lug to the chassis, with a bolt and spring washer to ensure a good electrical and mechanical connection.
- 11) Connect the other end of the power ground cable to the amplifier.
- 12) Connect the positive power cable to the amplifier.
- 13) Set all controls on the amplifier panel as suggested in the specific application.
- 14) Double check all your work up to this point.
- 15) NOW insert the main system fuse at the battery.
- 16) Turn on the system and, initially advance the volume control slowly, while listening critically that all is well.
- 17) If the system works fine, proceed to set level controls as outlined below.
- 18) On the other hand, if something seems amiss, turn off, and check all wiring and connections again. Should everything check out fine, follow the trouble shooting guidelines in section P16.

How to set amplifier level controls:

- 1) As noted in each application's notes, start off with the amplifier level control fully anti clockwise.
- 2) Play a CD or other music source with high average music levels.
- 3) Turn the head unit volume control to about 80% of its maximum setting.
- 4) Now, turn the amplifier level control slowly clockwise, till you start hearing distortion, then back it off a touch, and you're all set!

12 volt power, ground and remote turn on for all applications:

- 1) For clarity, these connections are not repeated for each individual application wiring diagram, as they are basic to any installation.
- 2) Use #14 gauge for the remote turn on wire from the head unit.
- 3) Use at least #12 gauge for the positive and power grounds of the Hawk.
- 4) Use at least #10 gauge for the Falcon and Eagle's positive and power grounds.



NOTE: It is best not to share power grounds between in a different components in a system. The preferred method is to run individual grounds to the closest chassis point.

HAWK & FALCON FRONT PANEL FEATURES

AMPS SOURCE SELECT

- 1) Selects the frequency range to be amplified and routed to the loudspeakers.
- 2) The **FULL RANGE** setting passes the full frequency range from the INPUT to the internal amplifiers.
- 3) **HIGHPASS** will send the range of frequencies above the point set by the **CROSSOVER FREQ SELECT** controls.
- 4) **LO-PASS** will route those frequencies below the **CROSSOVER FREQ SELECT** controls to the internal amplifiers.
- 5) Note that this switch also affects the **LINE OUT** signal as marked.

CROSSOVER FREQ SELECT

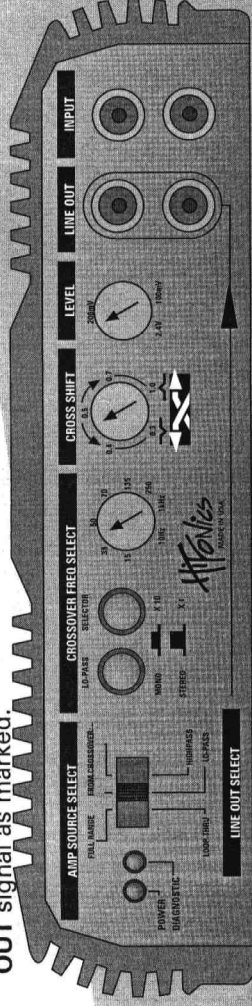
- 1) The variable pot sets the crossover frequency point for both high and low pass.
- 2) The **SELECTOR RANGE** switch is a multiplier for the variable control, for a total adjustment of 10 Hz to 5.3 KHz in 2 ranges.

CROSS SHIFT

- 1) The CrossShift control adjusts the Q, or quality factor of the crossover, from 0.3 to 1 as marked.
- 2) Use it to set a gap between high and low pass, or overlap as marked to equalize a vehicle at crossover point.
- 3) Or use it to provide a bass boost when the crossover is used as a subsonic filter (high pass).
- 4) High and low pass summing will have Linkwitz-Reilly at 0.5, and Butterworth characteristics at 0.7 settings respectively.

LO-PASS CONFIG

- 1) Configures the low pass output of the crossover for **MONO** or **STEREO** as marked.
- 2) This does not affect the routing of the low pass signal, just whether it is mono or stereo.



LED INDICATORS

- 1) **POWER**: Lights up when power and remote turn on is applied.
- 2) **DIAGNOSTIC**: When lit, will indicate a fault condition. See section P16 for trouble shooting procedures. Note: The diagnostic system will shut off the amplifier when a fault is detected.

LEVEL

- 1) Sets the amplifier input sensitivity to match the output level of the music source.
- 2) See section P8 for setup.

LINE OUT

- 1) This output can drive the input of other amplifiers in a system. See Hawk and Falcon application notes.
- 2) Note that the signal level here is NOT affected by the **LEVEL** control.
- 3) Only the frequency range is affected, depending on the position of the **LINE OUT SELECT** switch.

LINE OUT SELECT

- 1) Selects the frequency range available on the **LINE OUT** jacks.
- 2) **LOOP THRU** is a straight connection from the **INPUT** RCA jacks.
- 3) **LO-PASS** is the frequency range below the setting of the **CROSSOVER FREQ SELECT** controls.
- 4) **HIGHPASS** is the range above the setting of the **CROSSOVER FREQ SELECT** controls.
- 5) Please note that the same physical switch selects both the amplifier and line out signals, as marked on the front panel.

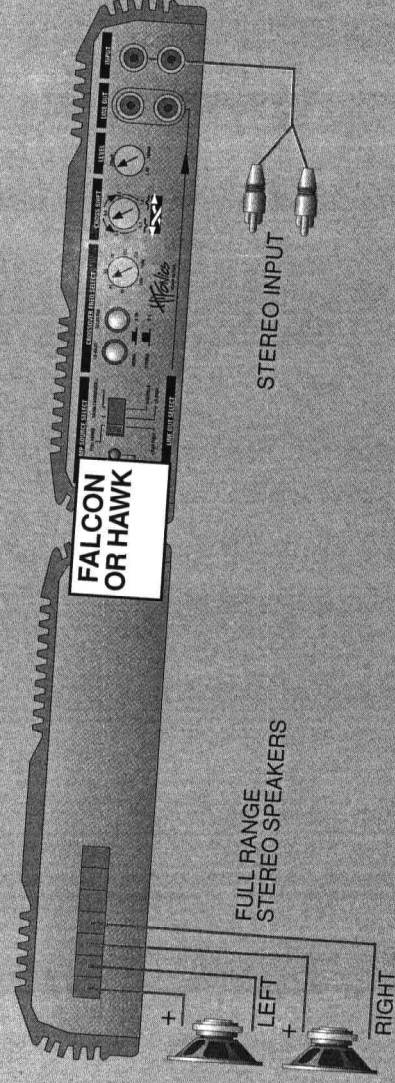
INPUT

- 1) Left and Right inputs to the amplifier, from a line level source, maximum level 2.4 volts.
- 2) Use a line level converter, such as the HiFonics LC-1 if using a head unit with speaker level outputs only.

FULL RANGE STEREO MODE

Note:

- 1) This is the most basic and straightforward application for these amplifiers.
- 2) The active crossover is bypassed, providing full access to the power amplifiers.
- 3) The signal fed into the input RCA's is looped through to the **LINE OUT** RCA's for daisy chaining further amplifier inputs.
- 4) Please note that none of the crossover related controls will have any effect whatsoever on the sound in this mode.



Connection and setup checklist:

- 1) Connect the **LEFT** and **RIGHT** full range loudspeakers as shown, with 2 ohm minimum loads on each channel.
- 2) Connect the inputs to the source, such as a head unit, or equalizer output with good quality RCA cables.
- 3) Set the **AMPS SOURCE SELECT** switch in the **FULL RANGE** position.
- 4) Set the level control to minimum (fully anti clockwise).
- 5) Connect power, ground and remote as per the Basic Installation Notes (section P6).
- 6) Turn the system on, adjust the level control, as described in section P6, to match the source, and enjoy!

FULL RANGE MONO BRIDGED MODE

What is all this mono bridging stuff anyway?

Mono bridged setups are typically used to obtain the maximum rated power from a stereo amplifier into a single speaker.

The Hifonics Warrior Series amplifiers fall into a category that is commonly called "Selfbridging". Simply put, this implies that, if both channels are fed the same (mono) signal, and the speaker is connected as shown, from Left + to Right -, the two channels will combine to drive one speaker.

A quick check of the specification sheet on section P2, will show that for any of the Warrior amplifiers, the 4 ohm **MONO** power is the sum of the **STEREO** 2 ohm power ratings. Just remember this: 2 ohm plus 2 ohm **STEREO** power = 4 ohm **MONO** power.

More notes:

The active crossover is bypassed in this mode, providing full access to the power amplifiers.

The mono signal fed into the input RCA's is looped through to the **LINE OUT** RCA's for daisy chaining further amplifier inputs.

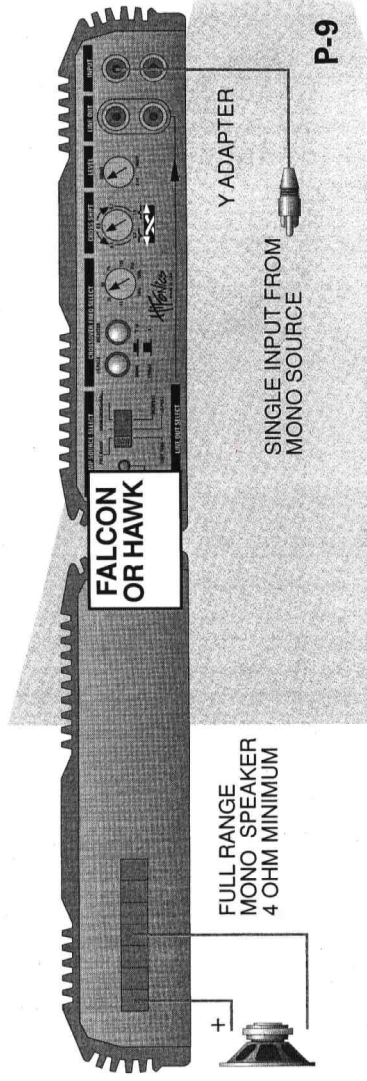
Please note that none of the crossover related controls will have any effect whatsoever on the sound in this mode.

Connection and setup checklist:

- 1) Connect the **MONO** loudspeaker as shown, with 4 ohm minimum impedance.
- 2) Connect the inputs to the same **MONO** source, such as one channel of a head unit, or equalizer output, or more likely, to a true mono output, such as those typically available from a trunk mount active crossover mono sub woofer output. Use a "Y" adapter to take the mono source signal to both Left and Right inputs of the amplifier.
- 3) Set the **AMPS SOURCE SELECT** switch in the **FULL RANGE** position.
- 4) Set the level control to minimum (fully anti clockwise).
- 5) Connect power, ground and remote as per the Basic Installation Notes (section P6).
- 6) Turn the system on, adjust the level control, as described in section P6, to match the source, and enjoy!

**CAUTION: DO NOT BE TEMPTED TO SHORT
THE LEFT AND RIGHT OUTPUTS OF A HEAD
UNIT, EQUALIZER OR ACTIVE CROSSOVER
TOGETHER TO MONO THEM.**

**THIS IS ALMOST GUARANTEED TO DAMAGE
THESE UNITS!**



HIGH PASS STEREO MODE, ALSO WITH SUBSONIC FILTER EXAMPLE

Notes for active high pass, such as tweeter amplification:

- 1) The VersaCross active crossovers in the Warrior amplifiers are ideal for diverse tasks, such as limiting the frequency bandwidth to suit particular loudspeakers.
- 2) Tweeters, or high frequency loudspeakers, are a good case in point. They typically need high pass crossover frequencies from 1 KHz to 5 KHz for best performance and power handling.
- 3) By using the VersaCross features in the correct combinations, the Warrior amplifiers can perform any task asked of them.
- 4) The low pass output of the crossover will be present on the **LINE OUT**.

Connection and setup checklist:

- 1) Connect the **LEFT** and **RIGHT** tweeters, or high frequency loudspeakers as shown, with 2 ohm minimum loads on each channel.
- 2) Connect the inputs to the source, such as a head unit, or equalizer output with good quality RCA cables.
- 3) Set the **AMPS SOURCE SELECT** switch in the **HIGH PASS** position.
- 4) Push the **SELECTOR RANGE** switch in, for the X10 range.
- 5) Set the variable frequency control to the high pass frequency, as recommended by the loudspeaker manufacturer.
- 6) Set the level control to minimum (fully anti clockwise).
- 7) Connect power, ground and remote as per the Basic Installation Notes (section P6).
- 8) Turn the system on, adjust the level control, as described in section P6, to match the source, and adjust the CrossShift control to taste.

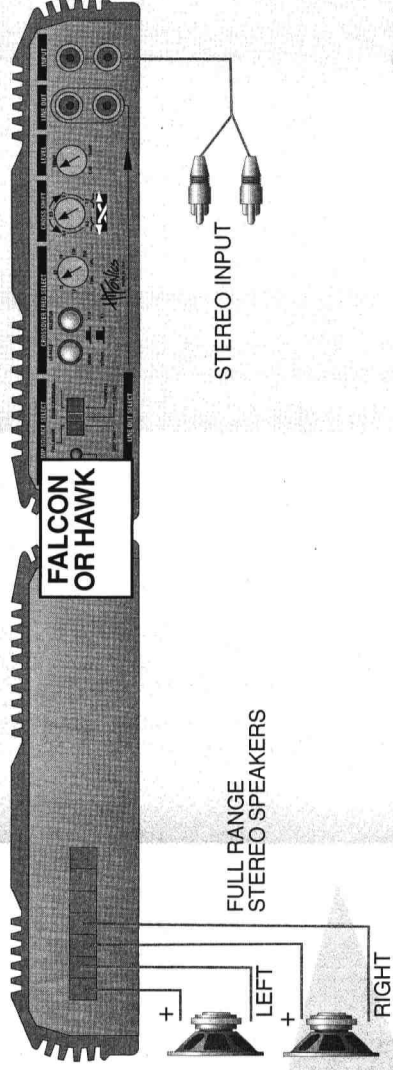
Using the high pass as a subsonic filter:

- 1) The basic setup is the same as above, using full range speakers with woofers, of course, the main difference being that the crossover frequency control need to be set at the correct frequency.
- 2) Set the **SELECTOR RANGE** switch in the X1 position.
- 3) Turn the variable frequency control to a subsonic filter type frequency, 20Hz to 40Hz. Set it at the highest frequency that you can, without sacrificing bass performance.
- 4) Set the CrossShift control clockwise to add some punch to the bass. See illustration in section P4.

Important: See the notes in section P11 on subsonic filters.

A hint on improving the sound of door mounted full range speakers:

- 1) Door mounted full range speakers, including co-axials, are notorious for high distortion at bass frequencies.
- 2) Use the Warrior in the high pass mode as described in this section, and experiment with the frequency setting. Try adjusting it from 30 Hz to 60 Hz.
- 3) Again, by turning the CrossShift control clockwise, bass punch can be added.



HIGH PASS MONO MODE, MAINLY FOR MONO BRIDGING INFORMATION

Important: Refer to section P9 for basic mono bridging information.

Notes:

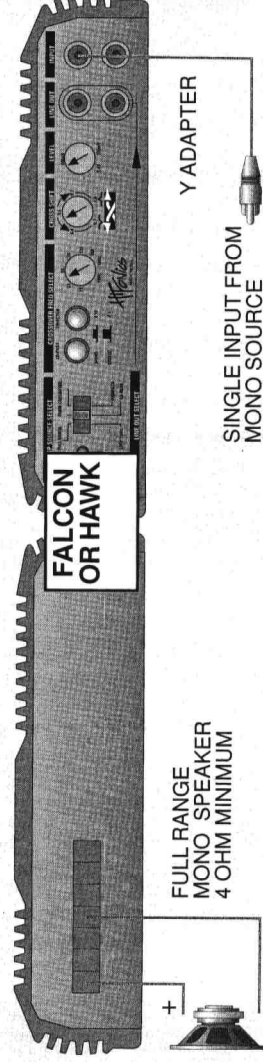
- 1) The same input connection from a mono source via a "Y" adapter applies, as per section P9.
- 2) The mono speaker wiring is also the same as per section P9. Remember that 4 ohm is the minimum load for mono bridging applications with the Warrior amplifiers.
- 3) This time we will use the high pass output of the crossover as a subsonic filter, instead of just using a full range signal from the input.
- 4) Although the mono signal fed into the input RCA's is passed to the **LINE OUT RCA's** from the crossover low pass output, it is at too low a frequency range to be of any practical use.

Connection and setup checklist:

- 1) Connect the **MONO** loudspeaker as shown, with 4 ohm minimum impedance.
- 2) Connect the inputs to the same **MONO** source, such as one channel of a head unit, or equalizer output, or more likely, to a true mono output, such as those typically available from a trunk mount active crossover mono sub woofer output. Use a "Y" adapter to take the mono source signal to both Left and Right inputs of the amplifier.
- 3) Set the **AMPS SOURCE SELECT** switch in the **HIGH PASS** position.
- 4) Set the **SELECTOR RANGE** switch to X1.
- 5) Set the variable frequency control around 20 Hz to 40 Hz
- 6) Set the level control to minimum (fully anti clockwise).
- 7) Connect power, ground and remote as per the Basic Installation Notes (section P6).
- 8) Turn the CrossShift control clockwise for some bass punch.
- 9) Turn the system on, adjust the level control, as described in section P6, to match the source, and enjoy!

What is the advantage of a subsonic filter?

- 1) Vented, bandpass and free air application loudspeakers can have excursion induced distortion when fed with too much low bass energy. This may cause audible distortion, reduced power handling, and decreased life expectancy for the woofers.
- 2) Technically, the term "subsonic" implies those low frequencies outside the human hearing capability, below 20 Hz, but most loudspeakers cannot reproduce much sound pressure below 35 Hz anyway, so "subsonic" has come to include any unwanted low frequencies, that can cause distortion in sound systems.
- 3) Now, by filtering out the lower frequencies with a high pass filter, such as the ones built into the Warrior amplifiers, we can not only decrease the bass distortion, increase woofer power handling, but also make woofers more reliable.



2 WAY ACTIVE CROSSOVER SYSTEM WITH HAWK FOR HIGHS, AND FALCON FOR STEREO LOWS WITH SUBSONIC FILTER

Enough already with the basic stuff:

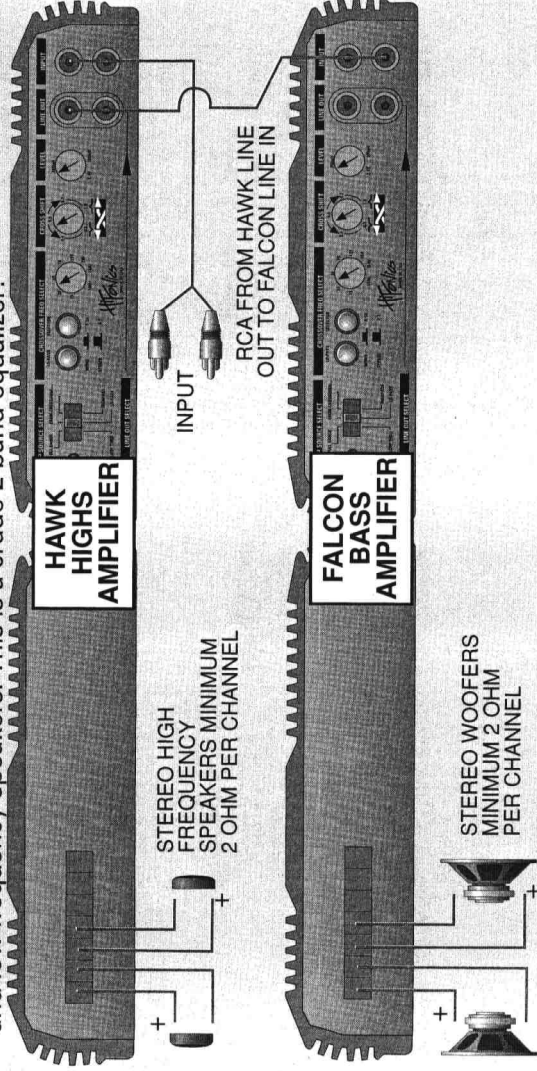
- 1) This is where we show how to use 2 of the Warriors in a 2 way active system, including sub sonic filter. Look Ma, no outboard crossovers!
- 2) Matters like power, ground, remote, minimum speaker impedances, left and right channels will not be mentioned again, as we need the space for other serious business. All that stuff is silk screened on the amplifiers anyway.

The basic philosophy behind this application, or Active Sound Systems 101:

- 1) Two amplifiers are available, each with its own active 2 way crossover, so we can get the full benefit by using the Hawk for highs, and feed its low pass output to the input of the Falcon.
- 2) The high pass crossover output in the Falcon can be utilized as a subsonic filter for the woofers, creating an active bandpass arrangement for said woofers.

Connection and setup checklist:

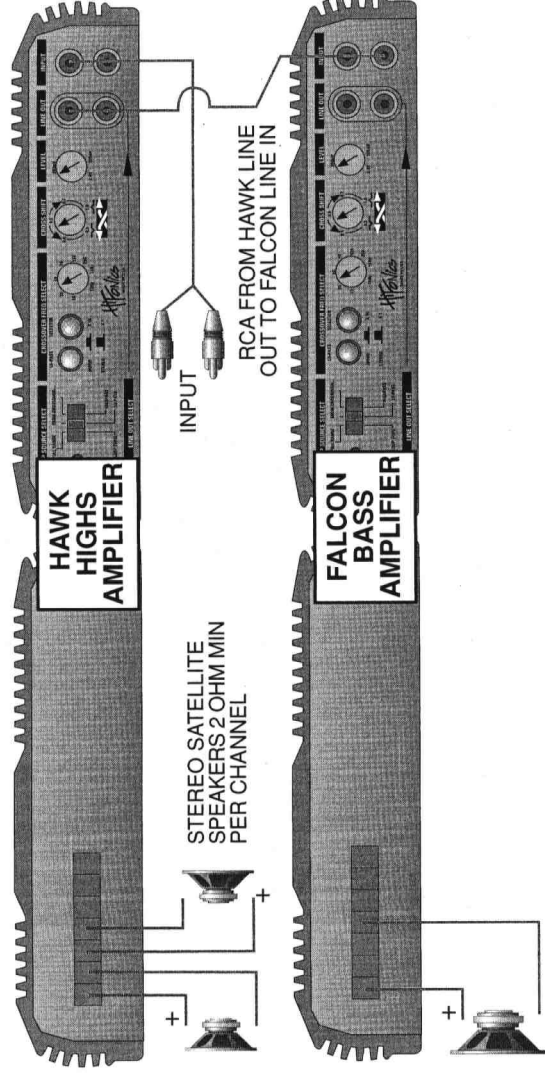
- 1) Connect the loudspeakers as shown.
- 2) Connect the Hawk inputs to the source, such as a head unit, or equalizer output with good quality RCA cables. Now connect the **LINE OUT** of Hawk to the **INPUT** of Falcon with RCA cables.
- 3) Set the Hawk **AMPS SOURCE SELECT** switch in the **HIGHPASS** position.
- 4) Set the Falcon **AMPS SOURCE SELECT** switch also in the **HIGHPASS** position.
- 5) Set the **SELECTOR RANGE** switch and variable frequency control combination on the Hawk to the desired frequency, say 80 Hz to cross over between subwoofers and satellite speakers, or maybe 4 KHz to cross over between woofers and tweeters. Please consult the speaker manufacturer for this information.
- 6) For subsonic filtering, the **SELECTOR RANGE** switch on the Falcon **MUST** be in X1, and its variable frequency control at about 20 Hz to 40 Hz, depending on the woofers, types of enclosures - feel free to experiment for the best sound.
- 7) The Hawk's CrossShift setting is also best found by experimentation, which is another reason it is fully variable.
- 8) The CrossShift on the Falcon will give a small bass boost when turned clockwise.
- 9) Set the level controls on both amplifiers fully anti clockwise initially, and set up each amp individually. Then fine tune the levels to match the tonal balance between high and low frequency speakers. This is a crude 2 band equalizer!



2 WAY ACTIVE CROSSOVER SYSTEM WITH HAWK FOR SATELLITE SPEAKERS, AND FALCON FOR MONO SUB BASS, WITH SUBSONIC FILTER

About mono subwoofer and satellite speaker systems:

- 1) Human ears cannot readily locate the direction of a sound source at low frequencies, especially in the confined air space of a typical automobile. This phenomenon allows us to cheat and produce good quality low bass in car stereo systems with a single subwoofer, more often than not, mounted out of sight in the trunk of the vehicle.
- 2) Directional cues will still emanate from the high frequency speakers, preferably mounted in the front of the vehicle, to create the illusion of a sound image and stage. This perfect illusion is the Holy Grail of car stereo enthusiasts.
- 3) These high frequency speakers are commonly called "satellites", and great care has to be paid to their mounting and location if a proper sound stage is to be achieved.
- 4) Typical crossover frequencies between subwoofers and satellites are in the 60 Hz to 120 Hz range.



Connection and setup checklist:

The setup is essentially the same as for the system shown in section P12, with the following exceptions:

- 1) A single subwoofer is connected in the mono bridged mode to the Falcon.
- 2) The crossover frequency on Hawk must be set in the 60 Hz to 120 Hz range.
- 3) The Hawk's **LO-PASS CONFIG** switch should be set to **MONO**.

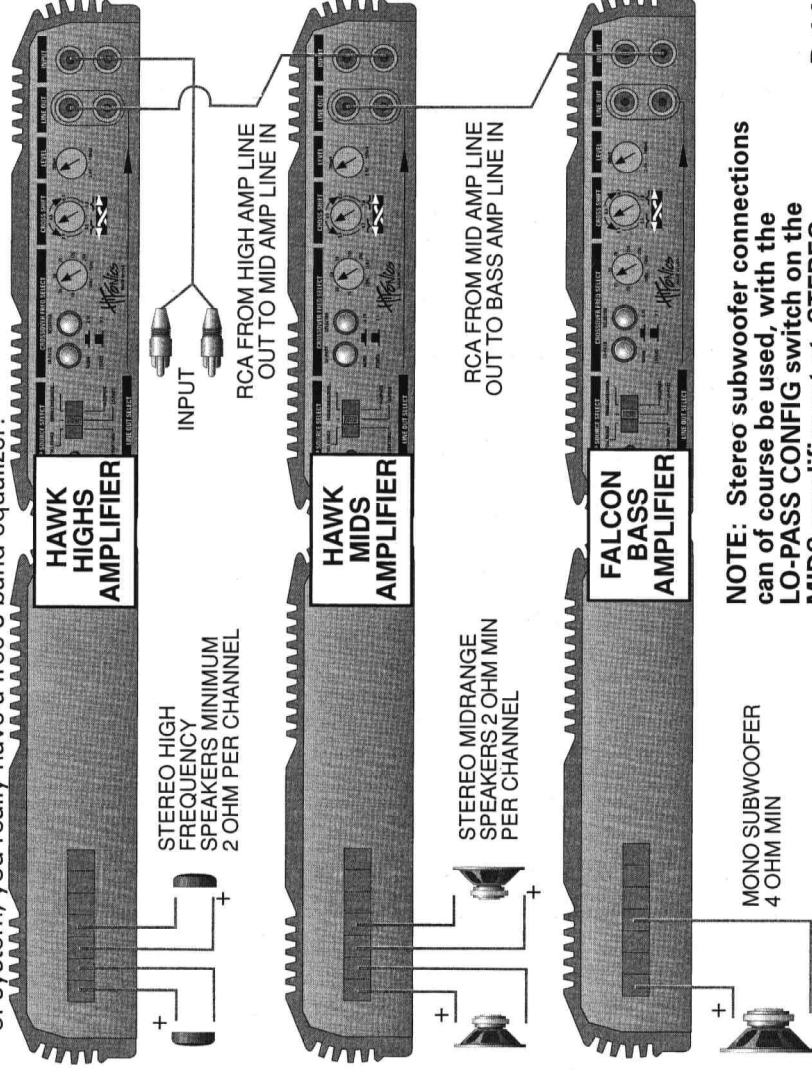
3 WAY ACTIVE CROSSOVER SYSTEM WITH HAWK FOR TWEETERS, A HAWK OR FALCON FOR MIDS OR MIDBASS, AND A FALCON FOR MONO SUB BASS, WITH SUBSONIC FILTER

A brief description of this 3 way active system:

- 1) Three amplifiers are used, so we have three active 2 way crossovers available.
- 2) By combining these crossovers as shown, we can create a high pass for tweeters, a bandpass for mids or midbass, and another bandpass for the subwoofers. The lower frequency of the subwoofer "bandpass" section forms a subsonic filter, of course.

Connection and setup checklist:

- 1) Connect all loudspeakers as shown in the wiring diagram.
- 2) The source signal is fed into the tweeter amplifier input, its line out connects to the mids amplifier input, whose line output is connected to the sub bass amplifier input, as shown with RCA cables.
- 3) Tweeter amplifier: Set the **LO-PASS CONFIG** to stereo, and the crossover frequency according to the tweeter specifications, typically 2 KHz to 5 KHz.
- 4) Mids or Midbass amplifier: Set the **LO-PASS CONFIG** to mono, and the crossover frequency according to the desired crossover point between mids and subwoofer speakers, in the 60 Hz to 120 Hz range. Do not cross the mids over too low, else distortion or damage to them may result.
- 5) Sub bass amplifier: Set the crossover frequency in the subsonic range, 20 Hz to 40 Hz.
- 6) Start system setup with all level controls fully anti clockwise, set each amplifier's level control individually as described in section P6. Then, using the sub bass amplifier as reference, adjust the mids and tweeter amplifier level controls for the desired tonal balance. With three level controls, each setting a different frequency band in this type of system, you really have a free 3 band equalizer!



NOTE: Stereo subwoofer connections can of course be used, with the **LO-PASS CONFIG** switch on the **MIDS** amplifier set at **STEREO**.

HOW TO USE STEREO WARRIOR AMPLIFIERS TO UPGRADE AND IMPROVE EXISTING CAR STEREO SYSTEMS SIMPLY AND COST EFFECTIVELY

Existing system upgrade:

You already have a basic car stereo system installed in your car, and want to improve it, yet the budget does not allow for replacing everything. Let's assume that the existing system consists of a head unit, a full range 2 channel amplifier and two door speakers.

- 1) The existing amplifier and speakers are probably adequate for high frequency or satellite reproduction, so leave them and the head unit in place.
- 2) The most dramatic improvement to such a system can be accomplished by the addition of a subwoofer and amplifier.

- 3) By using a Hawk, or Falcon for this purpose, we can make the following changes to the system:

- * Use the Warrior amplifier in the mono low pass mode to power the subwoofer.
 - * Feed the head unit signal into the Warrior amplifier input, and feed it's crossover high pass output to the existing amplifier, creating a 2 way active crossover system.
- 4) The existing amplifier and speakers will sound a lot cleaner, since they do not have to amplify and reproduce low bass information, that task is taken over by the Warrior amplifier and subwoofer.

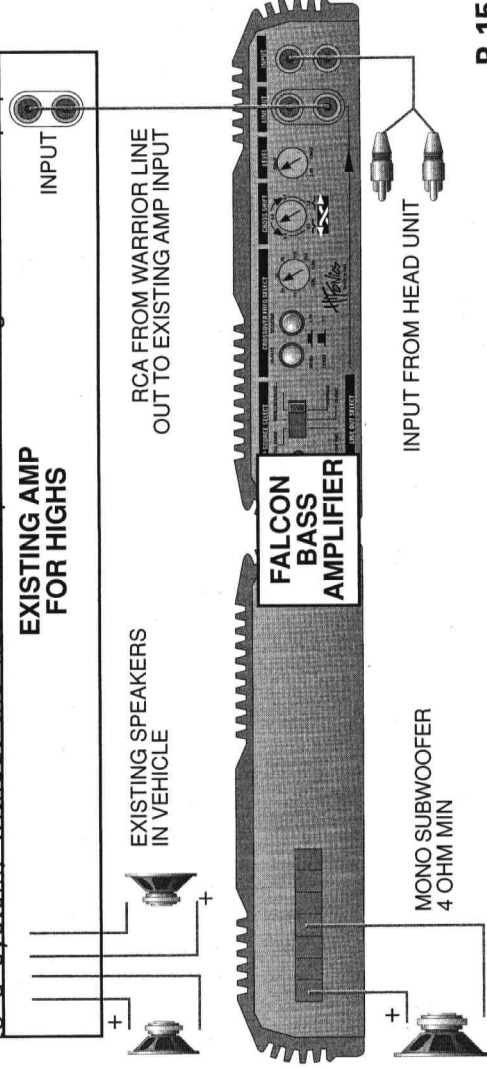
Connection and setup checklist:

First, follow the basic installation procedures for the Warrior amplifier as outlined in section P6.

- 1) Remove the **RCA** inputs to the existing amplifier, and plug them into the **INPUT** jacks of the Warrior amplifier.
- 2) Use another **RCA** cable to **RCA** connect the **LINE OUT** jacks of the Warrior amplifier to the input jacks of the existing amplifier.
- 3) Connect the 4 ohm subwoofer to the Warrior amplifier as shown.
- 4) Set the **AMPS SOURCE SELECT** switch on the Warrior to **LO-PASS**.
- 5) Set the crossover frequency on the Warrior to 80 Hz or so.
- 6) Set the **LO-PASS CONFIG** switch on the Warrior to **MONO**.
- 7) As usual, start off the setup with both the existing and Warrior amplifier level controls turned to minimum. Then adjust the level control on the existing amplifier for tonal balance.

Please note:

- 1) This system, like any other, can be further upgraded in the future, by the addition of more Warrior amplifiers, and better high frequency speakers as needed.
- 2) The unmatched versatility of the Warrior products ensures that you can always add to a system, without the need to replace existing HiFonics equipment.



P-15

HOW TO TROUBLE SHOOT FAULTY CAR STEREO SYSTEMS!

Universal trouble shooting notes:

Good installation practices as outlined in P5 and P6 will prevent problematic systems.

- 1) The first step in fault finding is to simply go over the system and make sure that all connections are tight, plugs and fuses are good, and are seated in their sockets, in other words, the obvious possibilities.
- 2) Use a voltmeter to check that all equipment is receiving proper positive voltage, ground, and remote turn on signals.
- 3) Check that any switches and variable controls on the components in a system are set properly.

The DIAGNOSTIC LED on the amplifiers is a powerful tool:

The amplifier diagnostic system will detect two basic fault conditions:

- 1) Short circuits on the speaker leads.
- 2) Internal faults that can cause the amplifier to output dangerous **DC** levels to the loudspeakers.

When either of these two faults is detected, the amplifier will be shut down automatically, and the **DIAGNOSTIC LED** will light up. The amplifier will stay off, till reset by turning the head unit off, and back on after a few seconds. If the fault condition is still present, the diagnostic system will shut the amplifier off again. Keeping this in mind, we can easily determine whether the fault is in the installation, or in the amplifier:

- 1) Disconnect all loudspeaker and **RCA** leads from the amplifier, leaving power, ground and remote leads connected.
- 2) Now turn the amplifier back on, and if the **POWER LED** lights up, and not the **DIAGNOSTIC LED**, the amplifier is good.
- 3) If, however, the amplifier shuts off, and the **DIAGNOSTIC LED** lights up, the amplifier has an internal fault.

Assuming the amplifier is good according to the diagnostic procedure as described, we now have to find the problem in the system:

- 1) Plug the input **RCA's** back into the amplifier, and turn it on. If it powers up, the input signal and cables are good.
- 2) If the amplifier goes into diagnostic, check the **RCA** cables and source driving the amplifier, replace if necessary.
- 3) If the amplifier powers up, connect loudspeaker leads one at a time, and the faulty cabling should shut the amplifier down again.

*The secret to successful trouble shooting is to simply check one part of the system at a time:

- 1) Isolate components from each other to localize faults.
- 2) In multi amplifier systems, check one amplifier or component of the system and its associated cabling and loudspeakers, before moving on to the next.

Finding the causes of noise or distortion:

If a system has noise or distortion, work your way back from the amplifier to the head unit:

- 1) Unplug the inputs to the amplifier, and if the noise is still present, check the amplifier power and ground connections.
- 2) If the noise disappears, it is picked up by the RCA cables, or originates from the head unit.

* Possible causes of engine noise or whine:

- 1) A bad cell in the vehicle battery.
- 2) Faulty alternator.
- 3) Bad connections in the battery or alternator wiring.
- 4) Noisy ground to head unit in the dash - try regrounding it straight to the chassis, instead of using factory wiring present in the dash. Do the same for a dash mounted equalizer.

EAGLE FRONT P/

3&4 HIGHPASS

- 1) This high pass filter, variable from 10 Hz to 1 KHz, is permanently connected to the input of the 3&4 amplifier pair.
- 2) Since it can vary down to 10 Hz, at that point it can be regarded as full range.
- 3) Having this permanently connected to the 3&4 pair, allows us to use it at any time, either as:
 - a) A subsonic filter, when set from 20 Hz to 40 Hz or so.
 - b) Or as the lower, or high pass cut off frequency control for active bandpass applications, in conjunction with the **LO-PASS** filter when the **3&4 SOURCE SELECT** switch is in a low pass setting.

LEVEL B

- 1) Sets amplifier pair 3&4 input sensitivity to match to the output level of the source.
- 2) Permanently connected to the 3&4 pair.

REAR OR B INPUT

- 1) Line input jacks routed by the AMPS **3&4 SOURCE SELECT** switch.
- 2) Actual usage depends on the particular application.

LO-PASS

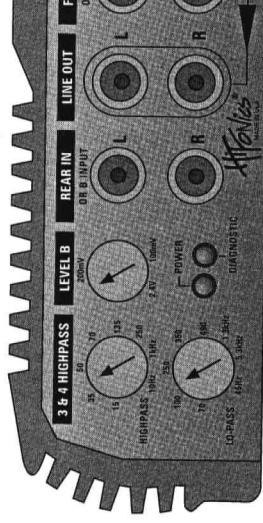
- 1) Continuously variable low pass filter, 45 Hz to 5.3 KHz.
- 2) Signal routing and mode set by AMPS **3&4 SOURCE SELECT** and the **LO-PASS CONFIG** switches.

FRONT OR A INPUT

- 1) Line input jacks routed by the two amplifier select switches.
- 2) Actual usage depends on the particular application.

LED INDICATORS

- 1) **POWER**: Lights up when power and remote turn on is applied.
- 2) **DIAGNOSTIC**: When lit, will indicate a fault condition. See section P16 for trouble shooting procedures. Note: The diagnostic system will shut off the amplifier when a fault is detected.



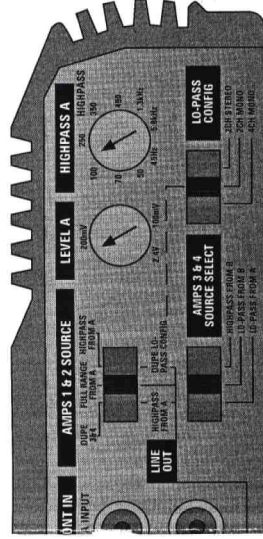
LINE OUT

- 1) Line out **RCA** jacks, the actual signal content is selected by the **LINE OUT** part of the **AMPS 1&2 SOURCE** select switch.
- 2) Can be high pass or low pass (2 channel mono or stereo, or 4 channel mono), depending on the positions of the two amplifier source selectors, and the **LO-PASS CONFIG** switch as marked.

PANEL FEATURES

AMPS 1&2 SOURCE SELECT

- 1) Selects the input of the 1&2 amplifier pair, and also routes the output signal to the **LINE OUT** jacks as marked below this switch.
- 2) **DUPE 3&4** routes the signal as selected by the **AMPS 3&4 SOURCE SELECT** to the 1&2 amplifier pair. Note that this pair's level will be set by the **LEVEL B** control only, for an exact duplication of the 3&4 amplifier pair signal.
- 3) **FULL RANGE FROM A** takes the signal from the **A INPUT** jacks and routes it thru the **A LEVEL** control to the 1&2 amplifier pair.
- 4) **HIGHPASS FROM A** routes the signal from the **A INPUT** jacks thru the **HIGHPASS A** filter, to the **A LEVEL** control to the 1&2 amplifier pair.



LEVEL A

- 1) Sets amplifier pair 1&2 input sensitivity to match the output level of the music source.
- 2) Note that with the **AMPS 1&2 SOURCE** select switch in the **DUPE 3&4** position, this will have no effect on the 1&2 amplifier pair, but will control the high pass level on the **LINE OUT**.

HIGHPASS A

- 1) Continuously variable high pass filter, 45 Hz to 5.3 KHz.
- 2) Can be selected to control the frequency response of amplifier pair 1&2 by the **AMPS 1&2 SOURCE SELECT** switch as indicated.
- 3) The **A**, or **FRONT IN** jacks are routed to this filter.

LO-PASS CONFIG

- 1) Configures the low pass filter for **MONO** or **STEREO**.
- 2) Also routes the input of the low pass filter from 2 channel to 4 channel.
- 3) 4 channel low pass is **MONO** only.

AMPS 3&4 SOURCE SELECT

- 1) Selects the input routing of the 3&4 amplifier pair.
- 2) **LO-PASS FROM A** takes the input from the **A RCA** jacks, connects them to the input of the built in low pass filter, and routes the signal to the 3&4 amplifier pair input.
- 3) **LO-PASS FROM B** from the **B RCA** jacks, connects them to the input of the built in low pass filter, and routes this signal to the 3&4 amplifier pair input.
- 4) Bear in mind that the **LO-PASS CONFIG** switch also affects the low pass signal as marked.

LINE OUT SELECTOR

- 1) Selects the signal content and source routed to the **LINE OUT** jacks.
- 2) It is the same physical switch as the **AMPS 1&2 SOURCE SELECT** switch:
 - a) When 1&2 selects **DUPE 3&4**, the line out will be highpass signal, whose frequency is set by the **HIGHPASS A** control, derived from the **A** inputs, and its level will be affected by the **LEVEL A** control.
 - b) When the 1&2 amplifier pair selects either **FULL RANGE FROM A** or **HIGHPASS** from **A**, the line out is a low pass signal, frequency set by the **LO-PASS** control, and will follow the **LO-PASS CONFIG** and **AMPS 3&4 SOURCE SELECT** switches for the source of this low pass signal.

4 CHANNEL FULL RANGE DISCRETE APPLICATION

Note:

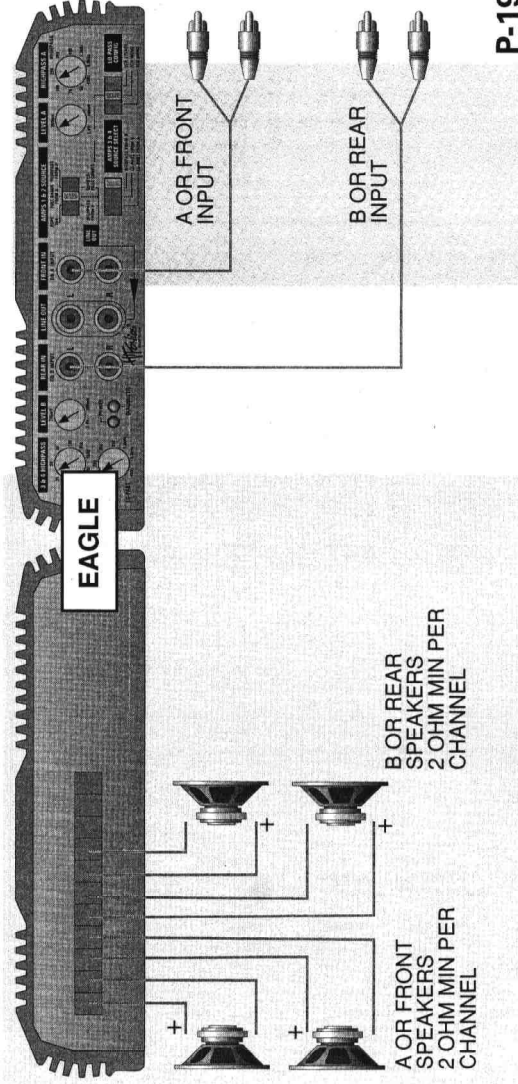
- 1) In this basic mode, we will bypass the filters, and use the power amplifiers directly.
- 2) The **LINE OUT** jacks are not used, although a low pass signal is available. Further applications (P25 to P31) will show its uses.

Connection and setup checklist:

- 1) Set the **AMPS 1&2 SOURCE SELECT** switch to **FULL RANGE FROM A**.
- 2) Set the **AMPS 3&4 SOURCE SELECT** switch to **HIGHPASS FROM B**.
- 3) Set the **3&4 HIGHPASS** to 10 Hz.
- 4) Connect the A and B inputs to the source as shown.
- 5) Connect the loudspeakers as per the wiring diagram.
- 6) Connect power, ground and remote turn on wiring as per section P8. Note: These connections are of course the same for all Warrior amplifiers, and will not be mentioned again for any of the Eagle applications
- 7) Set A and B level controls as per section P6.
- 8) Keep in mind that in this application, amplifier pair 1&2 derive its input from the **A, or FRONT INPUT RCA jacks**, and amplifier pair 3&4 derives its input from the **B, or REAR INPUT jacks**.

Some notes in passing about Eagle conventions:

- 1) Input RCA jack references, like **A and FRONT INPUT** are interchangeable, and the actual use is determined by the specific application. The same holds true for the **B and REAR INPUT**.
- 2) We refer to amplifier pair 3&4 as "full range" in this and other applications, simply because its permanent filter, the **3&4 HIGHPASS** can be set down to 10 Hz. By intelligent adjustment of the **3&4 HIGHPASS** control, this filter can act as a subsonic filter for pair 3&4, when set in the 20 Hz to 40 Hz range.



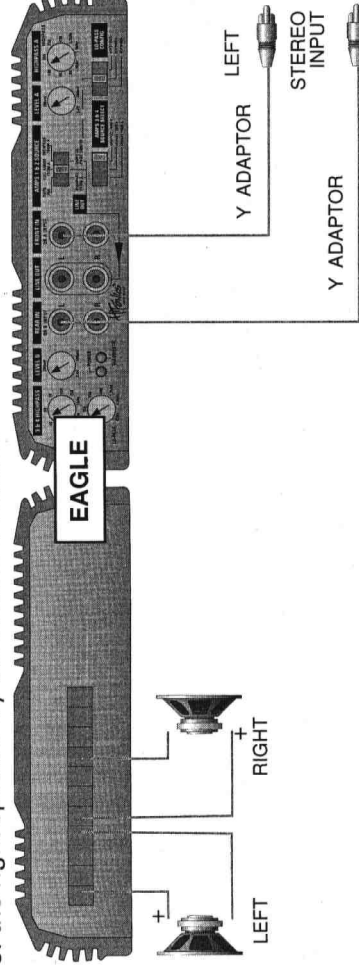
2 OR 3 CHANNEL FULL RANGE DISCRETE APPLICATIONS

Why use a 4 channel amplifier for only 3 or 2 channels?

- 1) The Eagle's self bridging capability lends itself to be used for unusual applications:
- 2) Mono bridge both amplifier pairs, and the Eagle is a 2 channel amplifier, for two 4 ohm speakers. This may be necessary if you need the power available in this mode, and an Eagle is already available in the system, or a stereo amplifier of appropriate power is not available.
- 3) Mono bridge one pair, and leave the other pair in stereo, for an excellent combination of three channels output power and power ratings for a satellite/mono subwoofer system, if an outboard 2 way crossover with mono sub bass output is available, and you do not wish to use the internal filters. (See sections P22, P23 and P24 on using the built in crossovers for this use)
- 4) See section P9 for background on mono bridging.

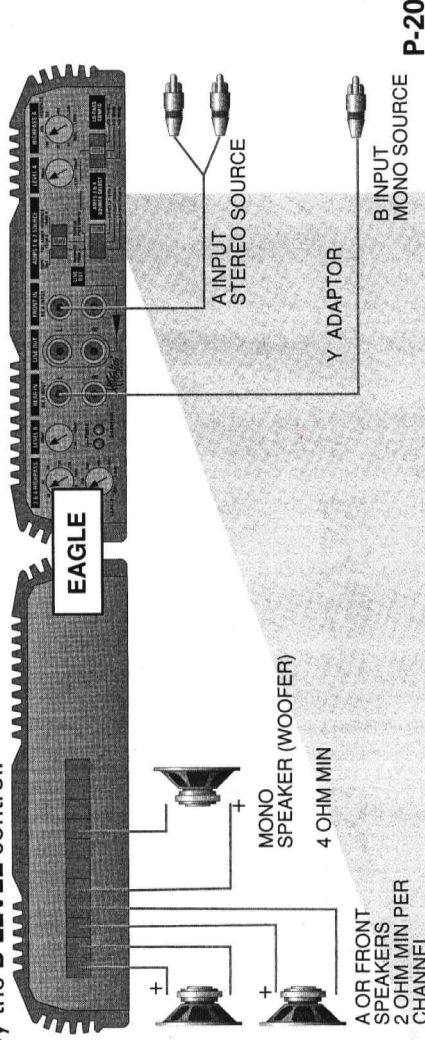
Connection and setup checklist for the 2 channel full range mode:

- 1) Set the **AMPS 1&2 SOURCE SELECT** switch to **FULL RANGE FROM A.**
- 2) Set the **AMPS 3&4 SOURCE SELECT** switch to **HIGHPASS FROM B.**
- 3) Connect the **A INPUT** and **B INPUTS** with Y-adapters from a stereo source as shown.
- 4) Set the **3&4 HIGHPASS** to 10 Hz.
- 5) Connect 2 loudspeakers (each minimum 4 ohms) in the mono bridged mode as shown.
- 6) Important: The level of the left speaker will be set by the **LEVEL A** control, and that of the right speaker by the **LEVEL B** control.



Connection and setup checklist for 3 channel mode:

- 1) Set the amplifier **SOURCE SELECTS** and the **3&4 HIGHPASS** as per the 2 channel full range mode.
- 2) Feed the **A INPUT** with a full range stereo signal, and the **B INPUT** with a mono source as shown.
- 3) Connect the speakers as indicated.
- 4) The stereo speakers' level will be set by the **A LEVEL**, and that of the mono speaker by the **B LEVEL** control.



FRONT AND REAR SYSTEM WITH INDIVIDUAL HIGH PASS, AND A 2 CHANNEL AMPLIFIER FOR CONSTANT, NON FADED SUB BASS, WITH SUBSONIC FILTER

Note:

- 1) This application is probably on of the most common uses for an Eagle plus a 2 channel Warrior.
- 2) We will use the four channels in the Eagle in high pass mode for front and rear satellites. See section P13.
- 3) The **LINE OUT** of the Eagle will be set to output a mono low pass signal to the 2 channel amplifier, to power the subwoofer. This mono signal consists of the front and rear input signals mixed together, so the sub bass will be present at all times, or non faded.
- 4) As an added bonus, the crossover high-pass output on the 2 channel amplifier can be used as a subsonic filter.

Connection and setup checklist:

- 1) Set the **AMPS 1&2 SOURCE SELECT** switch on the Eagle to **HIGHPASS FROM A**.
- 2) Set the **AMPS 3&4 SOURCE SELECT** switch on the Eagle to **HIGHPASS FROM B**.
- 3) Set the Eagle's **HIGHPASS A** (for the front satellites) to about 80 Hz to 150 Hz.
- 4) Set the Eagle's **3&4 HIGHPASS** (for the rear satellites) to the same.

* These high pass frequencies for the front and rear will depend on the actual speakers and their mounting locations:

- a) As a rule of thumb, for 4" speakers use 120 Hz, for 6" speakers use 80 Hz, and for 6"x9" speakers mounted on a rear deck, use 50 Hz to 70 Hz.
- b) If you are uncertain, set these controls at the lowest frequencies you can, without hearing distortion.

- 5) Set the Eagle's **LO-PASS CONFIG** switch to **4 CH MONO**, and its **LO -PASS** filter to about 80 Hz.

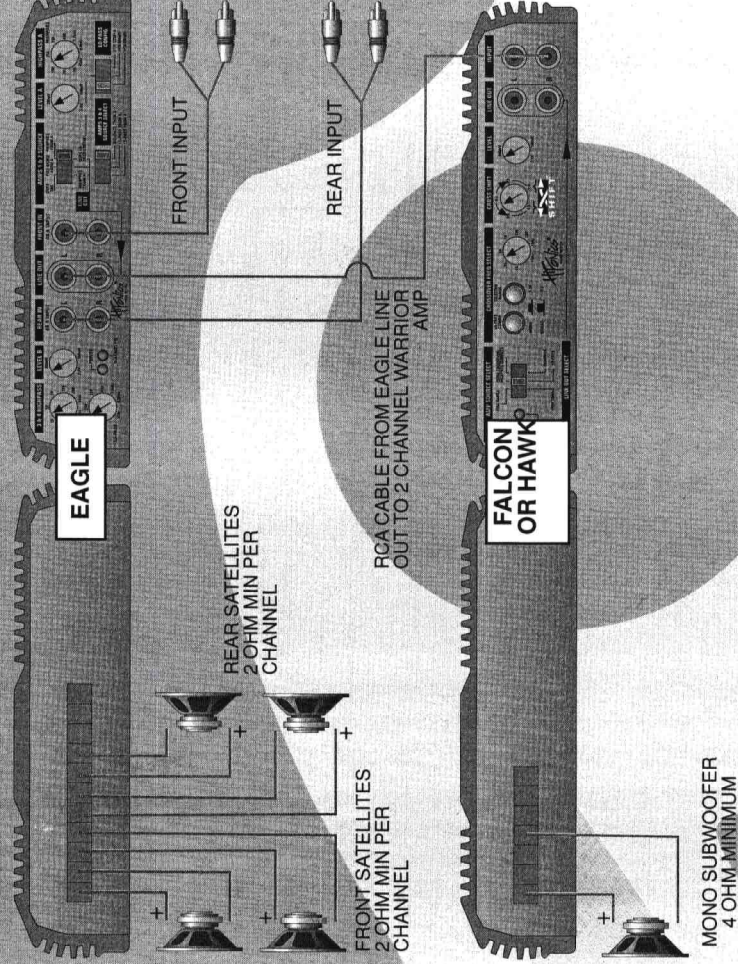
- 6) Connect the outputs of the head unit or dash mounted equalizer to the **FRONT and REAR** inputs as shown.

- 7) Connect the front and rear speakers as shown to the Eagle.

- 8) Connect the **LINE OUT** of the Eagle to the input of the 2 channel amplifier with a RCA to RCA cable.

- 9) Set the **AMPS SOURCE SELECT** switch of the 2 channel amplifier to **HIGHPASS**, and set its frequency control in the 20 Hz to 40 Hz range.

- 10) Connect the subwoofer to the 2 channel amplifier as shown, in the mono bridged mode.
- 11) During the setup, keep in mind that the **A and B LEVEL** controls on the Eagle will set the front and rear levels, respectively. The level control on the 2 channel amplifier will set the subwoofer level.



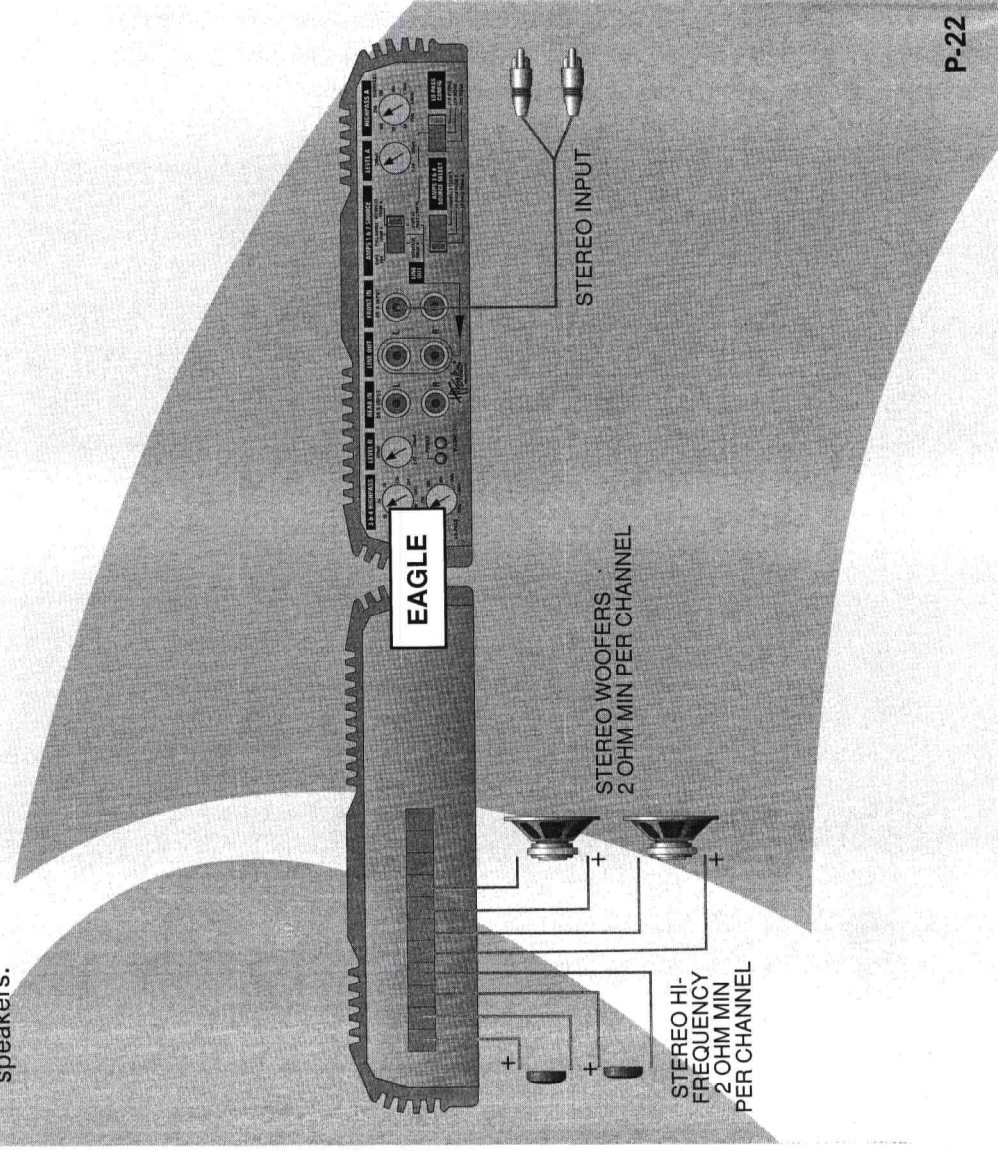
2 WAY ACTIVE SYSTEM, WITH STEREO WOOFERS, AND SUBSONIC FILTER

Or, how to build a 2 way active system with only one amplifier:

- 1) 2 Channels will be used for high pass, and the rest for low pass.
- 2) High and low pass frequencies are individually set, so that a gap OR overlap at crossover frequency can be set. Hint: This can aid in equalizing for bad car acoustics at crossover point.
- 3) The low frequency channels also have a high pass filter, which can be tucked away at 10 Hz, or used as a subsonic filter when set appropriately (see section P10).

Connection and setup checklist:

- 1) Set the AMPS 1&2 SOURCE SELECT to **HIGHPASS FROM A**.
- 2) Set the AMPS 3&4 SOURCE SELECT to **LO-PASS FROM A**.
- 3) Set the **LO-PASS CONFIG** switch to **2 CH STEREO**.
- 4) Set **HIGHPASS A** and the **LO-PASS** frequency controls to the desired crossover point. Refer to the manufacturers' specifications of the speakers used.
- 5) Set the 3&4 **HIGHPASS** at 20 Hz to 40 Hz.
- 6) Connect the speakers as shown.
- 7) **LEVEL A** will set the high frequency level, and **LEVEL B** the level of the low frequency speakers.

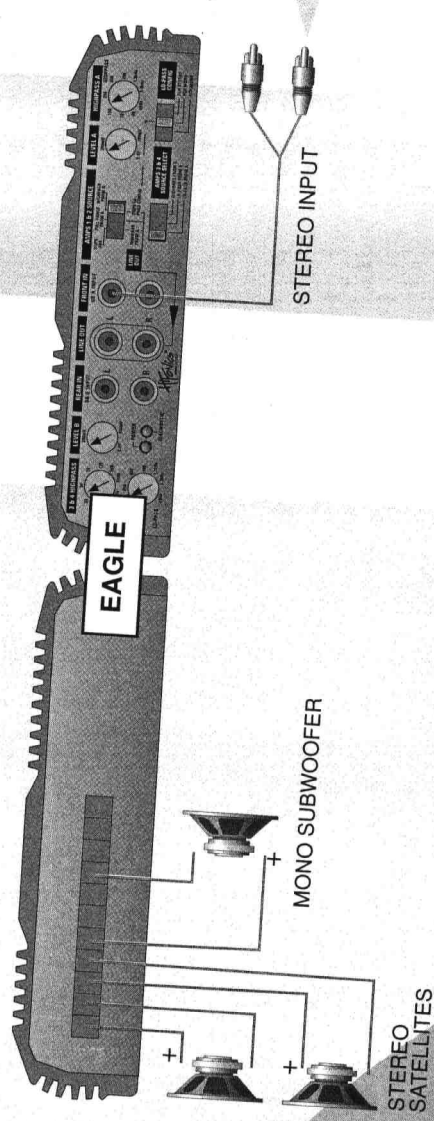


2 WAY ACTIVE SYSTEM, WITH MONO SUB BASS, AND SUBSONIC FILTER

Or, how to build a 2 way satellite/mono sub bass system with only one amplifier:

This setup is similar to the one described in section P22, with the following changes:

- 1) Set the **LO-PASS CONFIG** switch to **2 CH MONO**.
- 2) Connect a single subwoofer as indicated, in the mono bridged mode.
- 3) The **HIGHPASS A** and **LO-PASS** frequency settings should be in the 80 Hz to 120 Hz range.
- 4) **3 & 4 HIGHPASS** still functions as a subsonic filter.



2 WAY ACTIVE SYSTEM, WITH STEREO SUB BASS, SUBSONIC FILTER. WITH THE HIGH AND LOW PASS DERIVED FROM SEPARATE SOURCES

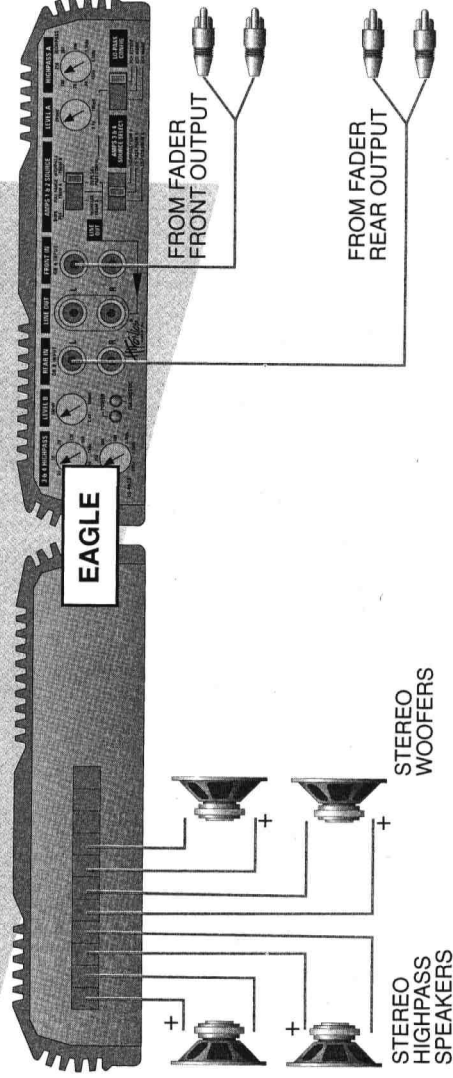
What is the reason for separate sources for high and low pass?

- 1) It is often desirable in car stereo systems to be able to adjust the high and low pass levels with respect to each other to achieve the desired tonal balance.
- 2) Obviously you can accomplish this by adjusting the individual level controls for the high and low pass amplifiers in an active system as described in the foregoing applications. Unfortunately this means a trip to the vehicle trunk every time you need to do this.
- 3) If the system is a 2 way active, without rear satellites, we can use the fader on the head unit or dash mount equalizer for this purpose.

Connection and setup checklist:

- 1) Set the **1&2 SOURCE SELECT** switch to **HIGHPASS FROM A**.
- 2) Set the **3&4 SOURCE SELECT** switch to **LOWPASS FROM B**.
- 3) Set the **LO-PASS CONFIG** to **2 CH STEREO**.
- 4) Connect the inputs to the front and rear outputs of the signal source as shown.
- 5) Connect the loudspeakers as shown.
- 6) Set **HIGHPASS A** and the **LO-PASS** filter controls for the desired high pass frequency, according to the loudspeaker requirements.
- 7) Connect the loudspeakers as shown.
- 8) Set the **A LEVEL** (for highs) and **B LEVEL** (for lows) controls as per section P6, with the head unit fader in its center position.
- 9) Now, when fading to the "front", low frequencies will be attenuated, and towards the "rear", high frequencies will be attenuated.
- 10) **3&4 HIGHPASS** functions as a subsonic filter, of course.

***Note:** For mono sub bass operation, set the **LO-PASS CONFIG** to **2 CH MONO** and use the usual mono bridged connections for a single subwoofer on the 3&4 amplifier pair.



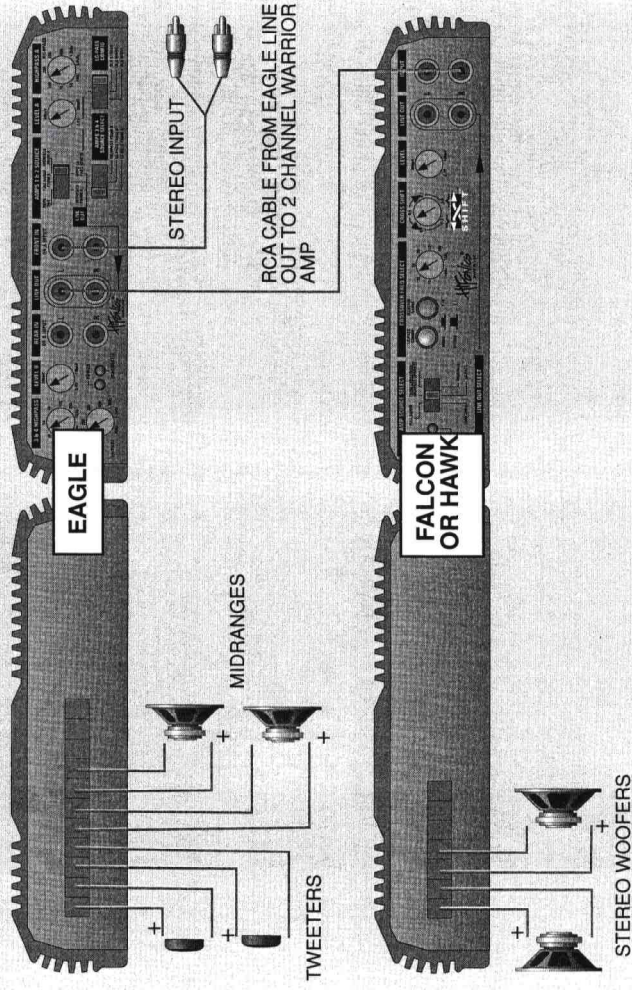
3 WAY ACTIVE SYSTEM, USING AN EAGLE FOR MIDS AND HIGHS, AND A HAWK OR FALCON FOR LOW FREQUENCIES

More background on active crossover systems:

- 1) By splitting the full audio bandwidth (20 Hz to 20 KHz) into 2 or more bands with an active crossover, amplifiers will be more efficient in the narrower frequency they have to amplify.
- 2) The more frequency bands, or "ways" in an active system, the more control each amplifier has over the speaker/s connected to it, without the vagaries of passive crossovers getting in the way of the sound quality.
- 3) In this application we will show how to use an Eagle, in combination with a 2 channel amplifier, such as a Hawk or a Falcon, to put together a simple, but effective 3 way active system (low, mids and highs), subsonic filter and all!

Connection and setup checklist:

- 1) Set the Eagle's AMPS **1&2 SOURCE SELECT** switch to **HIGHPASS FROM A**.
- 2) Set the Eagle's AMPS **3&4 SOURCE SELECT** switch to **LOWPASS FROM A**.
- 3) Set the Eagle's **LO-PASS CONFIG** to **2 CH STEREO**.
- 4) Set the Eagle's **HIGHPASS A** and **LO-PASS A** to the desired crossover frequency for the split between the midrange and highs speakers (tweeters), typically 2 KHz to 5 KHz, but please consult the loudspeaker manufacturer's recommendations for this information.
- 5) Set the Eagle's **3&4 HIGHPASS** to the desired crossover point between the woofers and midrange speakers, possibly 80 Hz to 700 Hz, depending on the loudspeakers used.
- 6) Connect the A INPUTS of the Eagle to a stereo source.
- 7) Connect the 2 channel amplifier's input to the Eagle's **LINE OUT** with an RCA to RCA cable.
- 8) Set the 2 channel amplifier's **AMPS SOURCE SELECT** to **HIGHPASS**.
- 9) Set the 2 channel amplifier's **LO-PASS CONFIG** to **STEREO**.
- 10) Set the 2 channel amplifier's variable frequency and frequency select switch combination to the same frequency as the Eagle's **3&4 HIGHPASS** control.
- 11) Connect the loudspeakers as shown.
- 12) Level controls:
 - a) The Eagle's **LEVEL A** will set the highs, or tweeter level.
 - b) The Eagle's **LEVEL B** will set the midrange level.
 - c) The 2 channel amplifier's **LEVEL** will set the low frequency, or bass level.
 - d) Set each level control individually as per section P6.
 - e) We have, in effect, a 3 band equalizer, so these level controls can be used to achieve the desired tonal balance easily after initial setup.



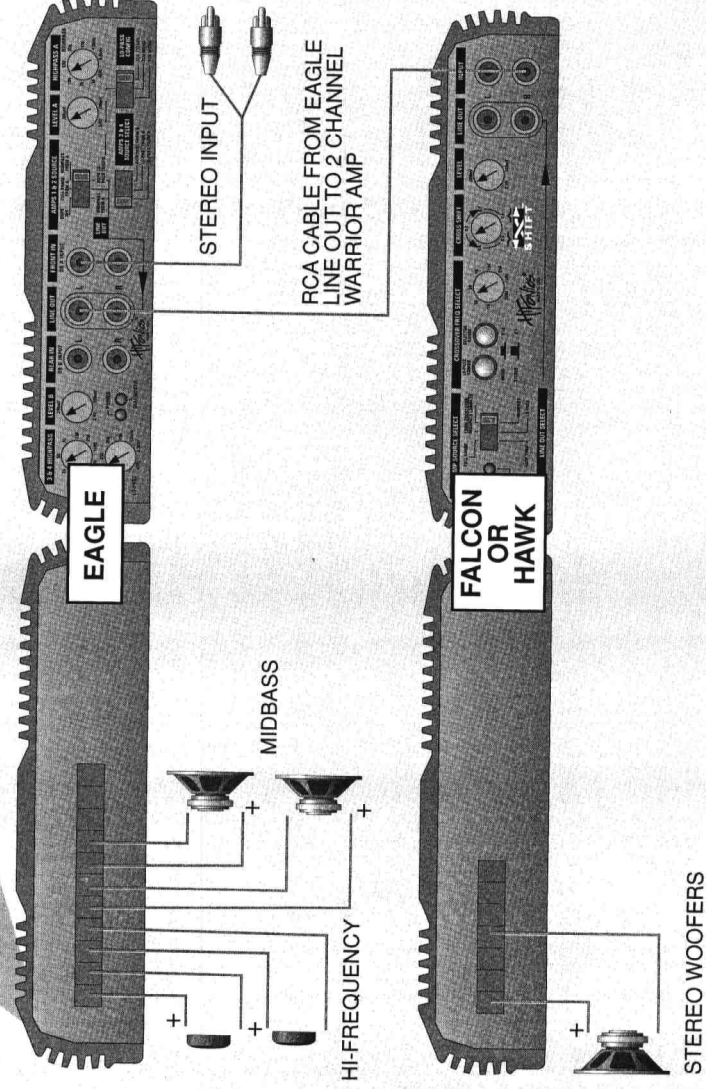
3 WAY ACTIVE SYSTEM, USING AN EAGLE FOR HIGHS AND MIDBASS, WITH A HAWK OR FALCON FOR MONO SUB BASS

Notes:

- 1) This is basically the same idea behind the 3 way system described in section P25, but with a more specific focus, mono sub bass, midbass and highs.
- 2) The term midbass as opposed to midrange, implies a more limited range of frequencies for the bandpass of these speakers.
- 3) Generally mid bass frequencies fall in the 70 Hz to 250 Hz range or so.
- 4) This implies that the high frequency speakers in this type of system have to be capable of operating down to 250 Hz, up to 20 KHz, typically requiring a 2 way passive system, with say, a 4" midrange and tweeter.

Connection and setup checklist:

- 1) Follow the instructions for the system shown in P25, with these changes:
Set the Eagle's HIGHPASS A and LO-PASS frequencies to the crossover point between the midbass and high frequency speakers, around 150 Hz to 500 Hz, depending on the speakers used.
- 2) Set the Eagle's **3&4 HIGHPASS** to about 70 Hz to 90 Hz.
- 3) Set the 2 channel amplifier's **LO-PASS CONFIG** to **MONO**.
- 4) Set the 2 channel amplifier's **SELECTOR RANGE** switch to X1.
- 5) Set the 2 channel amplifier's variable frequency control the same as the Eagle's **3&4 HIGHPASS** setting.
- 6) Connect a single 4 ohm subwoofer to the 2 channel amplifier as shown.
- 7) Level controls will behave as described in section P25.



USING AN EAGLE 4 CHANNEL AMPLIFIER TO GET THE MOST OUT OF A BASIC FRONT/REAR SYSTEM

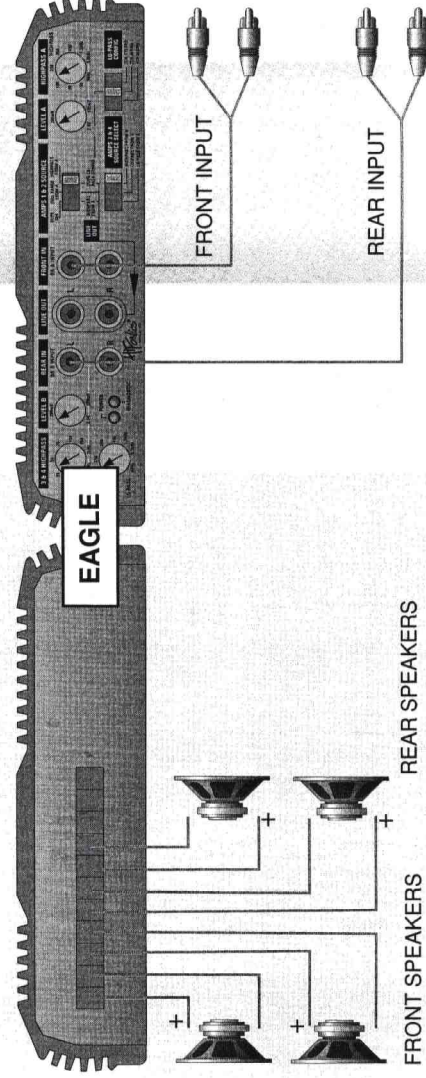
Basics:

If you are installing a basic system, consisting of 2 front door mounted speakers, and 2 rear deck mounted speakers, the high pass filters in the Eagle can be used to improve the sound quality quite dramatically:

- 1) Typical door mounted speakers have limited power handling at low frequencies, causing bass distortion.
- 2) Rear deck speakers, such as 5 1/4" and 6 12" coaxials, or 6"x9" drivers, will also benefit from a bandwidth limited signal.
- 3) If we limit the lowest frequency with high pass filters, less distortion, and more efficient use of the available amplifier power will result.

Setup and connection checklist:

- 1) Set the **AMPS 1&2 SOURCE SELECT** switch to **HIGHPASS FROM A**.
- 2) Set the **AMPS 3&4 SOURCE SELECT** switch to **HIGHPASS FROM B**.
- 3) Set the **HIGHPASS A** control for the front highpass frequency, 70 Hz or so.
- 4) Set the 3&4 **HIGHPASS** control for the rear high pass frequency, about 50 Hz.
- 5) After turn on, and initial level setups, adjust these two high pass controls by ear, and find the best settings for minimum distortion and best bass performance.



HOW TO USE AN EAGLE TO UPGRADE AN EXISTING SYSTEM

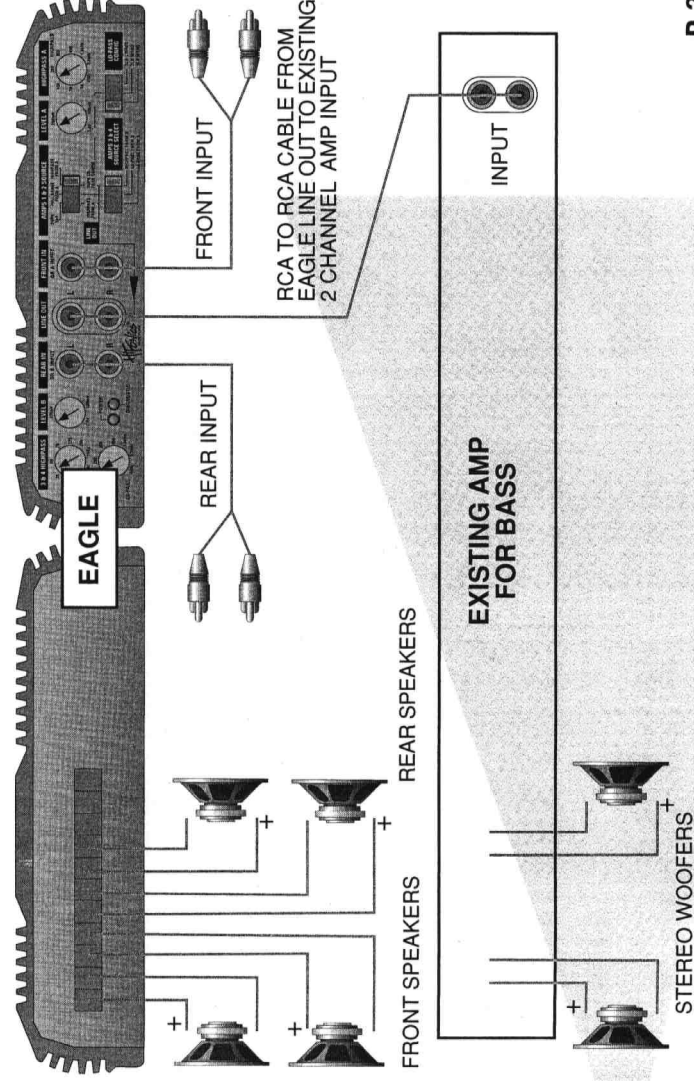
Another upgrade:

- 1) Let's assume you already have a basic system that you wish to upgrade or improve, consisting of a head unit, a 2 channel amplifier and a pair of front door, or rear deck speakers.
- 2) If the budget does not allow for replacing all the equipment at once, the addition of an Eagle 4 channel amplifier, a pair of high frequency speakers, and a pair of woofers, can improve your system.

Connection and setup checklist:

- 1) Set the Eagle's **AMPS 1&2 SOURCE SELECT** switch to **HIGHPASS FROM A**.
- 2) Set the Eagle's **AMPS 3&4 SOURCE SELECT** switch to **HIGHPASS FROM B**.
- 3) Set the Eagle's **LO-PASS CONFIG** to **4 CH MONO**.
- 4) Set the Eagle's **HIGHPASS A** and **3&4 HIGHPASS** controls to about 80 Hz to 120 Hz.
- 5) Set the Eagle's **LO-PASS** control to the same frequency.
- 6) Connect the front and rear outputs from the head unit to the Eagle inputs as shown.
- 7) Use an RCA to RCA cable to connect the Eagle's **LINE OUT** jacks to the input RCA jacks of the existing amplifier.
- 8) Connect all loudspeakers as shown.
- 9) **LEVEL A** and **LEVEL B** on the Eagle will set the front and rear levels.
- 10) The level control on the existing amplifier will set the bass level.
- 11) NOTE: If the existing amplifier is bridgeable, use a mono woofer, and refer to the this amplifier's owner's manual for connection details.

Footnote: Also see section P15 about more upgrade information.



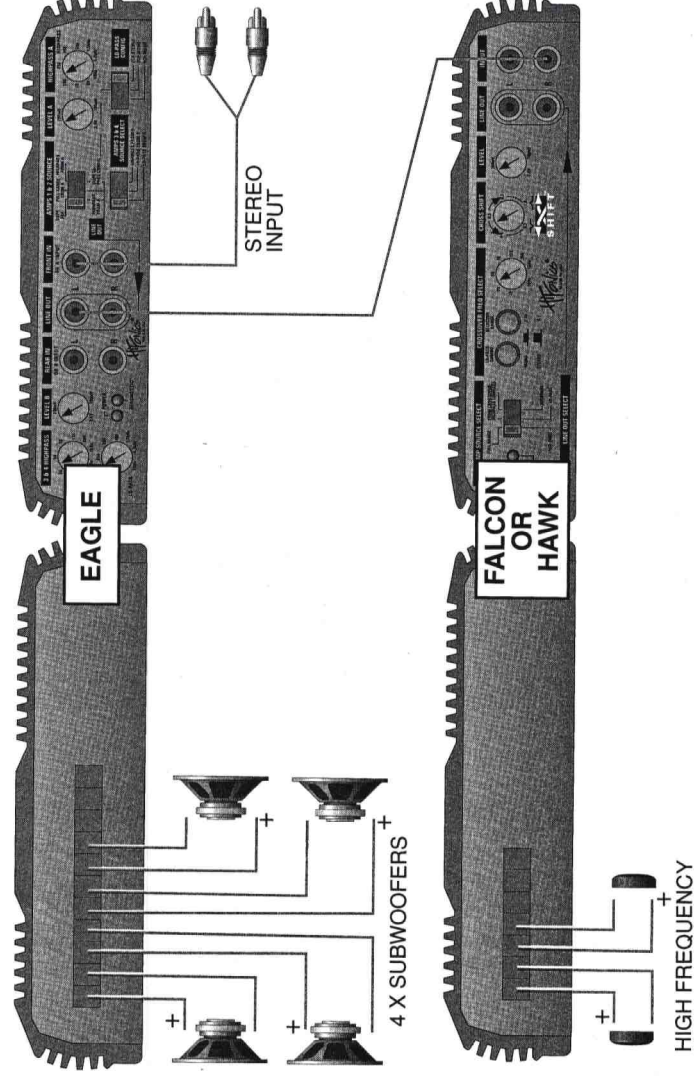
2 WAY ACTIVE SYSTEM, USING ALL 4 CHANNELS OF AN EAGLE FOR SUBWOOFERS, AND A HAWK OR FALCON FOR THE HIGH FREQUENCY SPEAKERS

General notes about applications P29, P30 and P31:

- 1) The applications in sections P29, P30 and P31 all use the **DUPE 3&4** function on the Eagle's **AMPS 1&2 SOURCE SELECT** switch.
- 2) With this switch in this mode, amplifier pair **1&2 EXACTLY** duplicates what the **AMPS 3&4 SOURCE SELECTS** is set at, even the **B LEVEL** (not the **A LEVEL** control) will set pair 1&2 output level, so that all 4 channels will be perfectly synchronised.
- 3) As marked on the **LINE OUT SELECTOR** part (bottom) of the **AMPS 1&2 SOURCE SELECT** switch, the **LINE OUT** signal will be **HIGHPASS FROM A**. Please note that this high pass frequency will be set by the **HIGHPASS A** control, and the **A LEVEL** control will set the output level!

Connection and setup checklist:

- 1) Set the Eagle's **AMPS 1&2 SOURCE SELECT** switch to **DUPE 3&4**.
- 2) Set the Eagle's **AMPS 3&4 SOURCE SELECT** switch to **LOWPASS FROM A**.
- 3) Set the Eagle's **LO-PASS** and **HIGHPASS A** frequency controls to **2 CH STEREO**.
- 4) Set the Eagle's **LO-PASS** and **HIGHPASS A** frequency controls to the desired low pass point between the woofers and high frequency speakers.
- 5) Set the Eagle's **3&4 HIGHPASS** control to a subsonic filter frequency.
- 6) Connect the head unit to the **A INPUT** as shown.
- 7) Connect the **LINE OUT** of the Eagle to the **INPUT** of the 2 channel amplifier as shown.
- 8) Set the **AMPS SOURCE SELECT** on the 2 channel amplifier to **FULL RANGE**.
- 9) Connect all loudspeakers as shown.
- 10) Level controls:
 - a) Use the Eagle's **LEVEL B** to set the bass level.
 - b) Leave the 2 channel amplifier's **LEVEL** control at minimum, and use the **LEVEL A** control on the Eagle to set the level for the high frequency speakers.



2 WAY ACTIVE SYSTEM, USING AN EAGLE TO DRIVE TWO WOOFERS IN MONOBRIDGED MODE, AND A HAWK OR EAGLE FOR HIGH FREQUENCY SPEAKERS

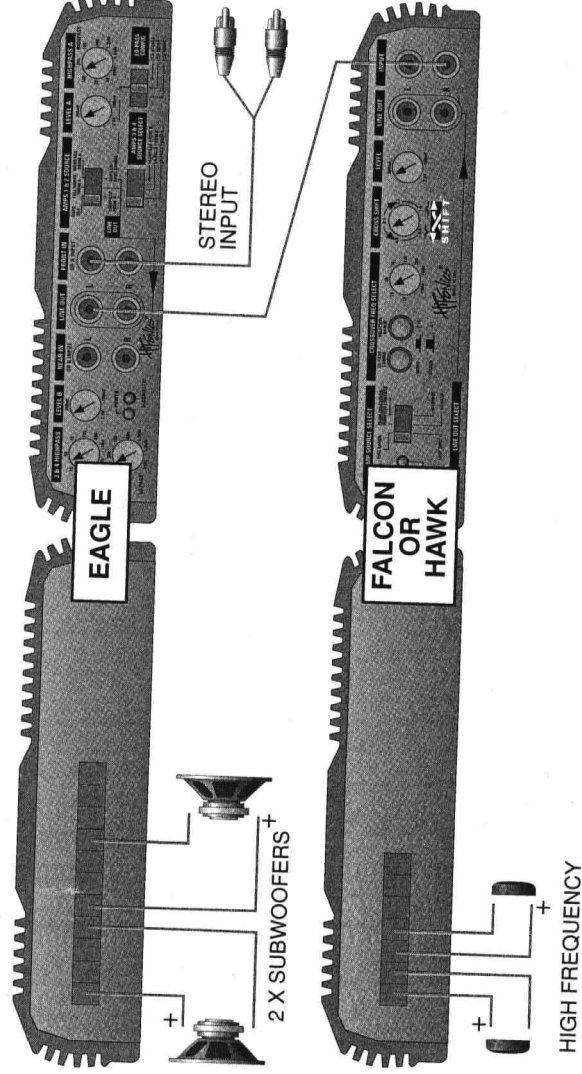
Note: Please refer to the general notes in section P29.

Connection and setup checklist:

This system is almost identical to the one described in P29, but now we can drive two 4 ohm subwoofers with the Eagle.

Follow the instructions in P29 with these changes:

- 1) Connect two woofers as shown to the Eagle, instead of four woofers.
- 2) Set the Eagle's LO-PASS CONFIG switch to 2 CH MONO.
- 3) Level and frequency controls are the same as section P29.



2 WAY ACTIVE SYSTEM, USING AN EAGLE TO DRIVE FOUR HIGH FREQUENCY SPEAKERS, AND A HAWK OR FALCON TO DRIVE A MONO SUBWOOFER

Note: Please refer to the general notes in section P29.

Connection and setup checklist:

- 1) Set the Eagle's **AMPS 1&2 SOURCE SELECT** to **DUPE 3&4**.
- 2) Set the Eagle's **AMPS 3&4 SOURCE SELECT** to **HIGHPASS FROM B**.
- 3) Set the Eagle's **3&4 HIGHPASS** to 10 Hz (or at any frequency lower than the variable frequency control on the 2 channel amplifier).
- 4) Set the 2 channel amplifier's **AMPS SOURCE SELECT** to **LO-PASS**.
- 5) Set the 2 channel amplifier's **SELECTOR RANGE** switch to X1, and its variable frequency control to about 80 Hz to 120 Hz. Set its **LO-PASS CONFIG** to mono.
- 6) Connect the head unit outputs to the 2 channel amplifier **INPUT** jacks.
- 7) Connect the **LINE OUT** of the 2 channel amplifier to the **B INPUT** on the Eagle.
- 8) Connect all loudspeakers as shown.
- 9) The Eagle's **LEVEL B** control will set the level of all four high frequency drivers, and the **LEVEL** on the 2 channel amplifier will of course set the mono subwoofer's level.
- 10) Please note that the controls on the Eagle not mentioned in this section, should have no effect on the sound.

