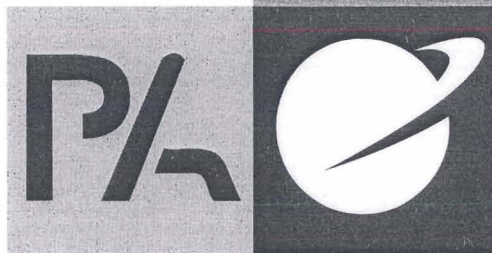


User's Manual

HIGH POWER CAR AUDIO AMPLIFIER

• AP250.2 • AP500.2 • AP500.4 • AP800.5



YOUR FINAL
DESTINATION

Planet Audio[®]

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Introduction

Welcome to a new planet....

Introducing five incredible new amplifiers, all made in the United States of America. Orbiting Planet Audio are three 2-Channel amplifiers, one 4-Channel amplifier and one 5-Channel amplifier.

This series of Planet Audio amplifiers has been built and tested to the highest standards. These amplifiers follow a "Zero Compromise" design philosophy. The built-in features permit them to accommodate almost all installation situations. The heat sinks are truly massive, weighing almost twice as much as would be required for their power categories. When you review the features and specifications for these amplifiers, you will agree that these new amplifiers from Planet Audio set a new standard of excellence for car audio performance.

Planet Audio.

Planet Audio

Planet Audio

Features

Power Supply

- Fully regulated, Pulse-Width Modulated supply assures constant power delivery at all battery voltages between 11.5V and 16V.
- Remote input is optically isolated from internal amplifier circuitry.
- High-current MOSFETS in the push-pull output stage.
- Multiple bypass capacitors on the incoming 12V supply, located physically on the printed circuit card to reduce inductance on ground planes and switching losses.
- Pure totem-pole drive from the PWM controller to the gates of the power MOSFETS.
- 35 nanosecond rectifiers reduce losses in secondary circuits.
- Full regulation of power supplies for all low level circuits, using discrete regulator and filter circuits.
- Comprehensive protection circuits assure reliable operation, including,

DC protection, which guards against speaker damage, in the unlikely event of an audio output stage failure.

Short circuit protection, which protects the amplifiers against shorted and mismatched loads.

Thermal protection, Which shuts off the amplifier at 80 C.

Reverse polarity protection, which prevents power supply failure in the event that the power leads are connected in reverse.

- Active thermal management circuits continuously monitor the heatsink temperature, and allows the amplifier to operate over a much longer time period without thermal shutdown.
- Multiple time-delay circuits and optically isolated current drive circuits ensure an absolutely quiet turn-on and turn-off cycle.
- Custom, heavy-duty nickel-plated connectors accept 4 gauge wire for power and 8 gauge wire speaker connections.

Audio Amplifiers: Preamp Circuits

- Front end preamplifiers accept up to 8 volts of signal input.
- One-band parametric equalizer allows more flexibility for tailoring the response of the system.
- Low pass crossover on features an 18dB/octave Butterworth slope.
- High pass crossover on features an 12dB/octave Butterworth slope.
- Continuously-variable phase control for time-alignment of speakers, permitting adjustments in speaker placement.
- True line outputs in AP250.2, AP500.2, AP500.4, and AP800.5 allow for connection of other amplifiers in multi-way systems.

Audio Amplifiers: Power Amplifier Circuits

- Thermally-compensated constant-current circuits, which are optically-driven from the power supply, control the front end differential stages. These circuits control and minimize amplifier thermal drift, increase common mode rejection ratio, and lower the distortion of the input differential amplifiers.
- Locally-degenerated, fully-complementary Class A differential amplifiers have very wide bandwidth, before global feedback is applied.
- Fully-complementary Class A voltage amplifiers are locally degenerated, and drive the output stages with very low impedance drive.
- Output stages are wide bandwidth, compound-emitter followers, utilizing high current, bi-polar transistors.

Specifications

	AP250.2 2 Channel Amplifier	AP500.2 2 Channel Amplifier	AP500.4 4 Channel Amplifier	AP800.5 5 Channel Amplifier
Continuous Power, into 4 Ohms, 20Hz-20KHz	125W x 2	250W x 2	125W x 4	125W x 4 +300W x 1
Continuous Power, into 2 Ohms, 20Hz-20KHz	250W x 2	500W x 2	250W x 4	250W x 4 +300W x 1 +600W x 1
Bridged Power into 4 Ohms	500W x 1	1000W x 1	500W x 2	500W x 2 +300W x 1 N/A
THD at 1 Watt, 4 Ohm	Less than 0.05 %	Less than 0.05 %	Less than 0.05 %	Less than 0.05 %
THD at Rated Power	Less than 0.05 %	Less than 0.05 %	Less than 0.05 %	Less than 0.05 %
IMD at Rated Power	Less than 0.05 %	Less than 0.05 %	Less than 0.05 %	Less than 0.05 %
Signal-to-Noise Ratio, below rated power output	108dB	105dB	102dB	102dB
Frequency response, at 1 Watt, 4 Ohm	5Hz to 100KHz -3dB	5Hz to 100KHz -3dB	5Hz to 100KHz -3dB	5Hz to 100KHz -3dB
Frequency response, at rated power, 4 Ohm	10Hz to 30KHz -0.25dB	10Hz to 30KHz -0.25dB	10Hz to 30KHz -0.25dB	10Hz to 30KHz -0.25dB
Phase Shift	Logging 10 degrees at 20KHz	Logging 10 degrees at 20KHz	Logging 10 degrees at 20KHz	Logging 10 degrees at 20KHz
Damping Factor, at 20 Hz, 4 Ohm	200	120	80	80
Channel Separation, 1 KHz	93dB	88dB	85dB	85dB
Crossovers: Low Pass	45Hz-5KHz, 18dB/octave	45Hz-5KHz, 18dB/octave	45Hz-5KHz, 18dB/octave	45Hz-5KHz, 18dB/octave
High Pass	45Hz-5KHz, 12dB/octave	45Hz-5KHz, 12dB/octave	45Hz-5KHz, 12dB/octave	45Hz-5KHz, 12dB/octave
Phase Control	Variable from 0 to 180°	Variable from 0 to 180°	Variable from 0 to 180°	Variable from 0 to 180°
Equalizer	One band, parametric	One band, parametric	n/a	n/a
Input Sensitivity	100mV to 2V	100mV to 2V	100mV to 2V	100mV to 2V
	2V to 8V	2V to 8V	2V to 8V	2V to 8V
Input Impedance	22K-Ohm	22K-Ohm	22K-Ohm	22K-Ohm
Line Output Level	equal to input signal level	equal to input signal level	equal to input signal level	equal to input signal level
Line Output Phase	0	0	0	0
Line Output Impedance	620 Ohm	620 Ohm	620 Ohm	n/a
Peak Current consumption, at rated power into 4 Ohms	44 Amps	95 Amps	95 Amps	135 Amps
Peak Current consumption, w/average music into 4 Ohms	8 Amps	18 Amps	18 Amps	25 Amps
Dimensions (W x H x L)	12 1/4" x 3" x 22 1/4"	12 1/4" x 3" x 27 1/4"	12 1/4" x 3" x 21 3/8"	12 1/4" x 3" x 26 1/8"

*Depends on the actual level setting on the amplifier.
Level is 2.6v when amplifier is delivering rated power

Installation

Things To Remember When Installing Your (AP200.5 • AP500.2 • AP500.4 • AP800.5)

Because the power supplies are so highly regulated, do not connect speakers with impedance is less than 2 ohms/ channel (4 Ohm in bridged mode for AP500.4 , and AP800.5).

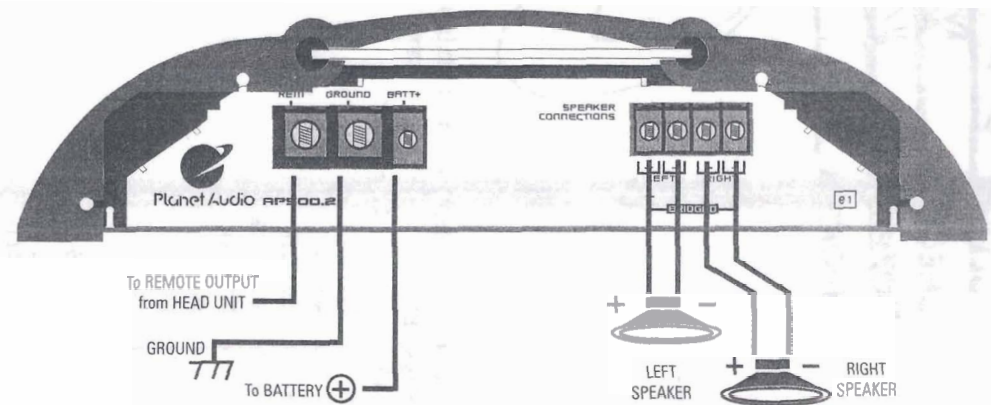
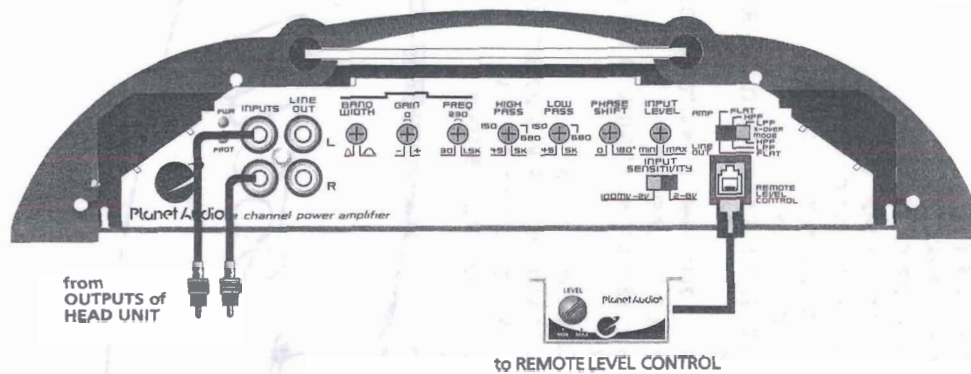
These amplifiers draw large amounts of current. Under normal conditions, the rated fuse is sufficient. However, if the amplifiers are connected to 2 Ohm loads per channel, and the fuse blows with continuous loud program material, then upgrade the fuse as follows:

- 1** Mount the amplifier so that air flow is not restricted.
- 2** Mount the amplifier to a solid surface, as these amplifiers are extremely heavy.
- 3** Take extreme caution when mounting the amplifier, so as not to damage the chassis with a drill or screwdriver.
- 4** Run a #4 wire from the battery, using a fuse within 12" (300mm) of the positive battery terminal. This fuse is to protect the battery, in case this wire connects to ground on it's run to the amplifier.
- 5** Place the supplied fuse holder near the amplifier on the 12V POSITIVE lead.
- 6** Run a 4 gauge ground wire (as short as possible) to the closest chassis ground point. Be sure to remove the paint at the connection to the chassis of the vehicle for a good electrical connection.
- 7** Run a 12 gauge (or larger) wire to the remote turn-on lead of the head unit.
- 8** Connect the speaker(s) as per the wiring diagrams in this manual.
- 9** Using RCA interconnect cables, connect all line input and outputs per the wiring diagrams which follow. If possible, keep the RCA cords away from the 12V power and ground wiring.
- 10** Set the controls as described in the following sections of this manual.

These amplifiers are designed to run with a minimum load of 2 Ohms per one channel (4 Ohm mono bridged for AP500.4 and AP800.5). Operating these amplifiers with a load or speaker impedance less than 2 Ohms could result in poor sound quality and/or damage to amplifier.

System # 1

Two Channel Amplifier System
AP250.2 / AP500.2



Amplifier Settings:

Set all EQ Phase and level controls to suit your musical taste.

If speakers are full range...

Set Selector to Flat

If speakers are mid/high frequency drivers...

Set selector to High Pass, and set High Pass crossover to suit your preferred frequency response.

If speakers are subwoofers...

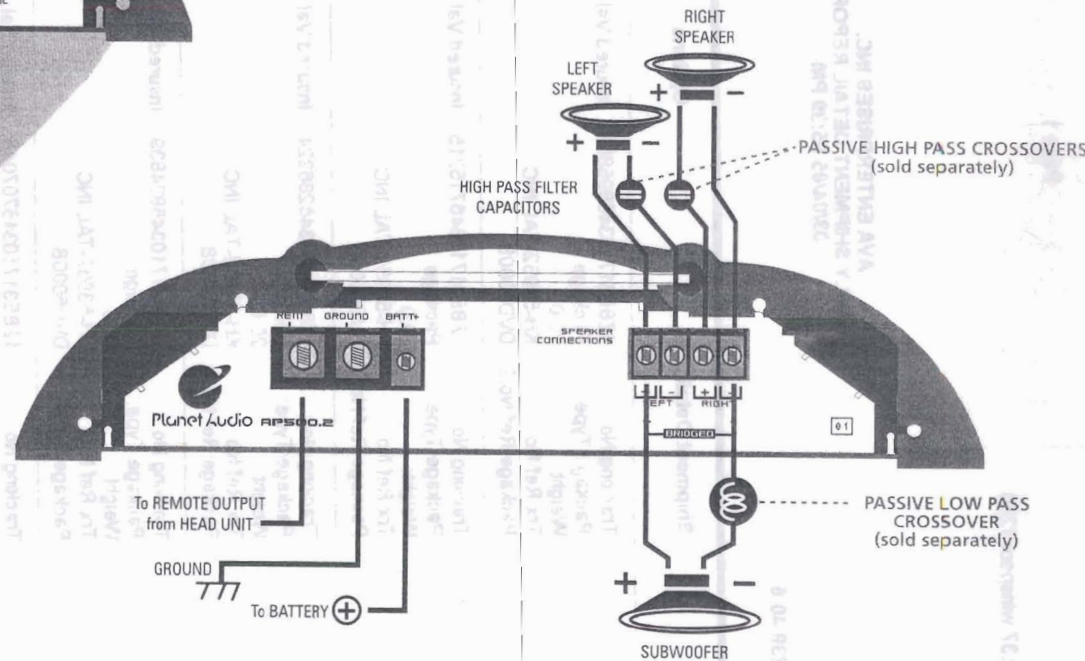
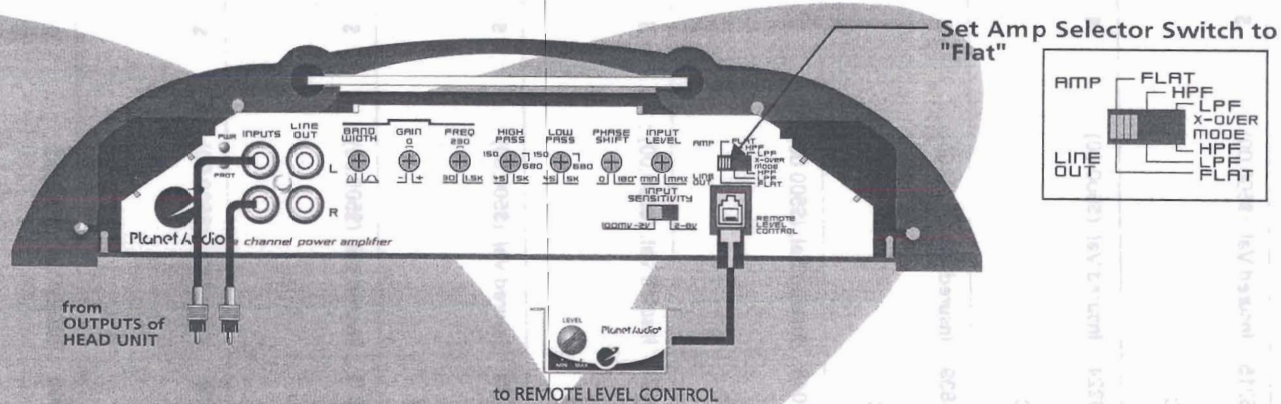
Set Selector to Low Pass, and Set Low Pass Crossover as desired.

**MINIMUM SPEAKER
IMPEDANCE IS
1 OHMS/CHANNEL!!!**

System #2

Two Channel Amplifier in Tri-Mode
AP250.2 / AP500.2

"Tri-Mode" refers to simultaneous stereo and bridged operation.

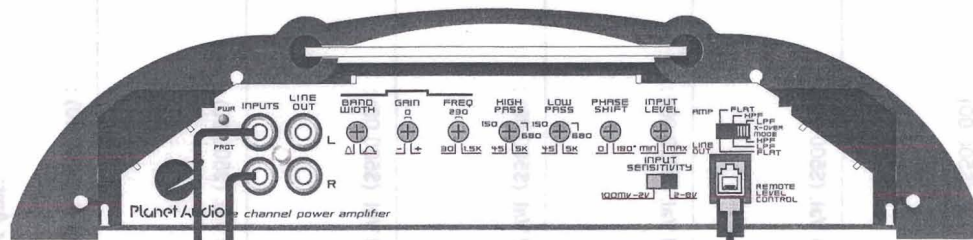


**IF SATELLITES ARE 4 OHMS EACH -
WOOFER MUST BE
MINIMUM 8 OHMS!!**

**IF WOOFER IS 4 OHMS -
SATELLITES MUST BE
MINIMUM 8 OHMS EACH!!**

System #3

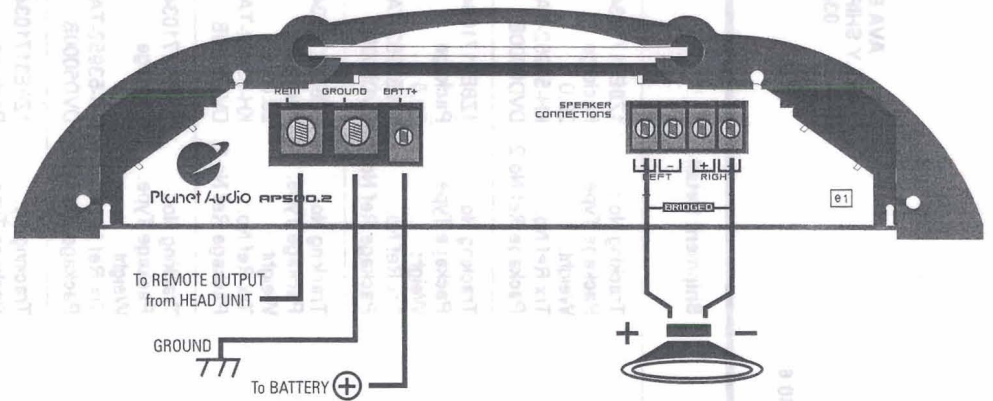
Two Channel Amplifier in Bridged Mode
 AP250.2 / AP500.2



Y ADAPTOR (sold separately)

from
 OUTPUTS of
 HEAD UNIT
 or MONO SOURCE

to REMOTE LEVEL CONTROL



To REMOTE OUTPUT
 from HEAD UNIT

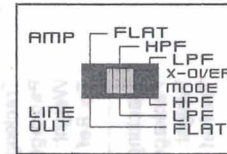
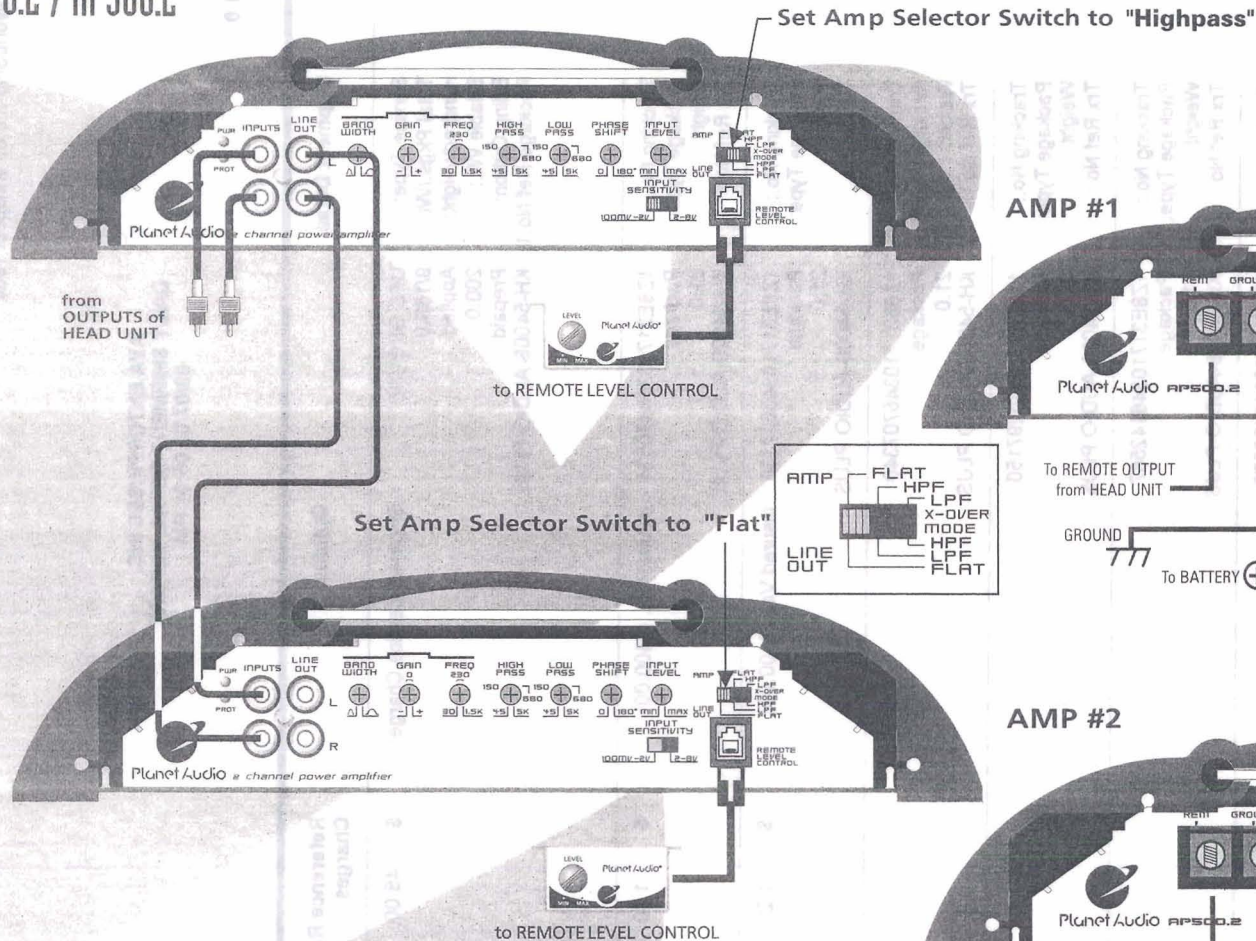
GROUND

To BATTERY +

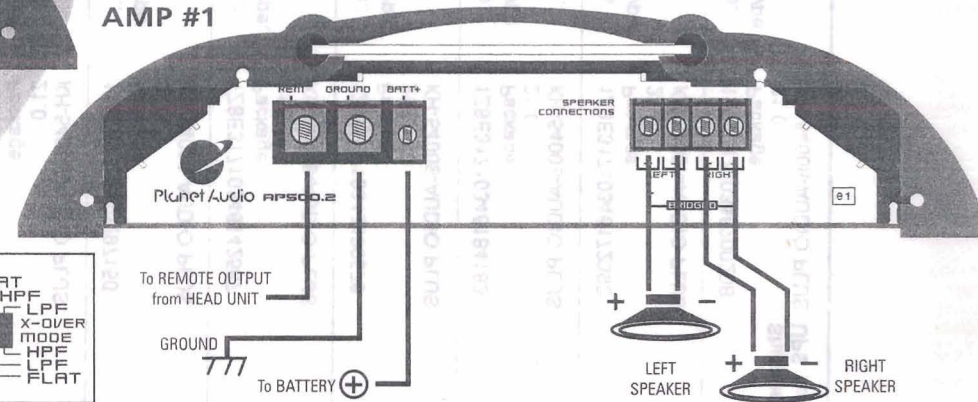
**MINIMUM SPEAKER
 IMPEDANCE IS
 2 OHMS/CHANNEL!!!**

System #4

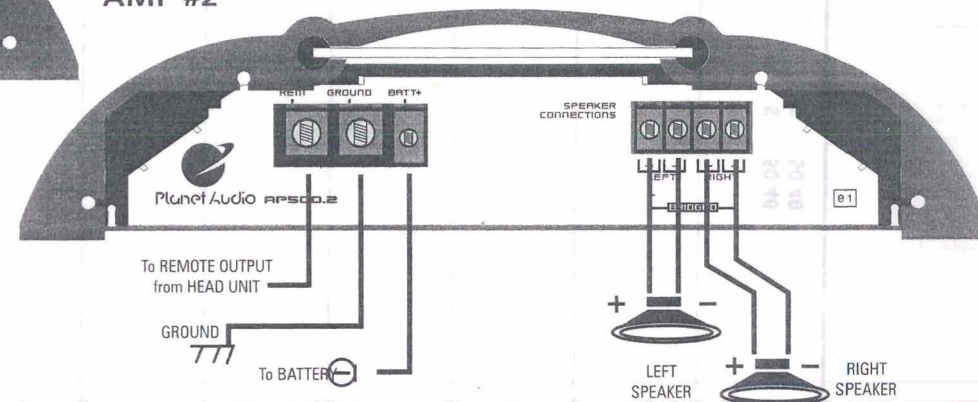
Bi-amplified System using Two Channel Amplifiers
AP250.2 / AP500.2



AMP #1



AMP #2



Amplifier Settings:

Amplifier #1 Selector switch to High pass ("Amplifier")
High Pass Crossover to suit satellites
Low Pass Crossover to suit woofers

Amplifier #2 Selector switch to Flat

Amplifier #1 EQ affects Amplifier #2

Amplifier #1 Phase Control affect only Amplifier #2

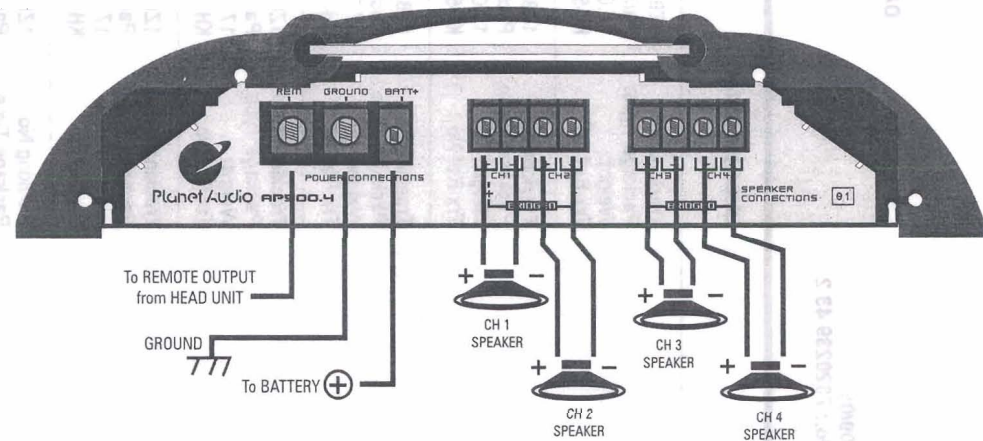
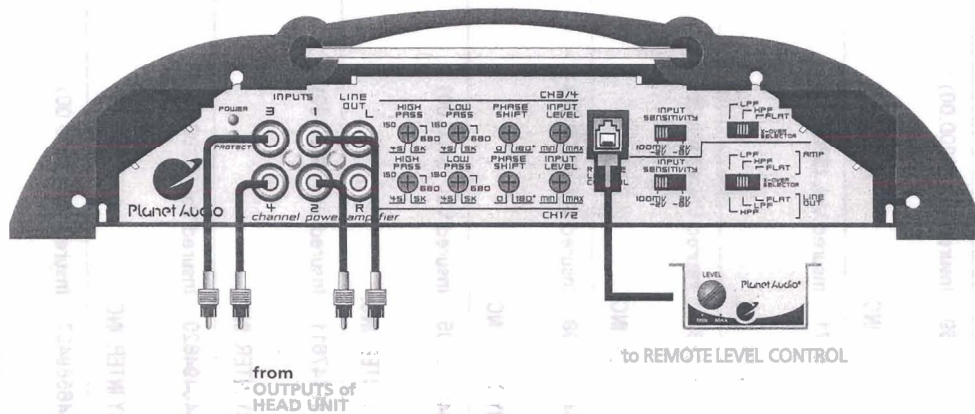
Amplifier #2 EQ and Phase Control affect only Amplifier #2

Alternate Setup

Feed BOTH Amplifiers #1 and #2 with the signal input, and run Amplifier #1 as the high frequency amplifier, and run Amplifier #2 as the low frequency amplifier.

System #5

Four Channel Amplifier System AP500.4



Amplifier Settings:

Set all EQ Phase and level controls to suit your musical taste.

If speakers are full range...

Set Selector to Flat

If speakers are mid/high frequency drivers...

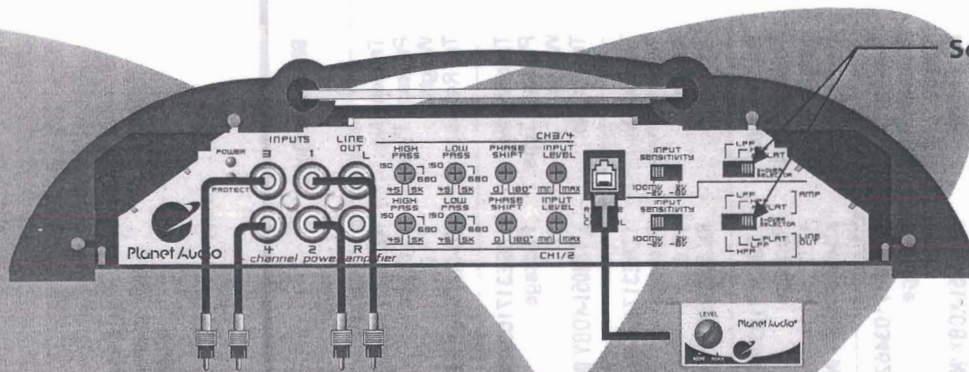
Set selector to High Pass, and set High Pass crossover to suit your preferred frequency response.

If speakers are subwoofers...

Set Selector to Low Pass, and Set Low Pass Crossover as desired.

System #6

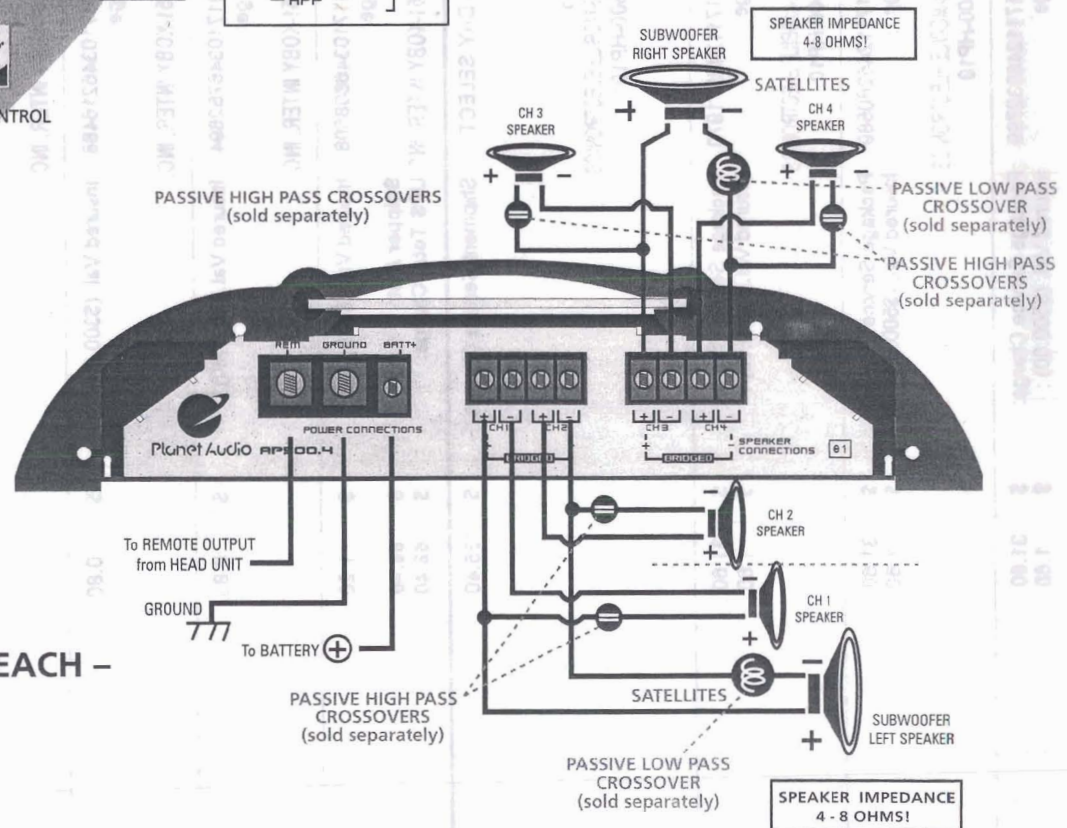
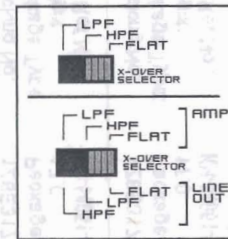
Four Channel Amplifier in Tri-Mode "Tri-Mode" refers to simultaneous stereo and bridged operation.
 AP500.4



from
 OUTPUTS of
 HEAD UNIT

to REMOTE LEVEL CONTROL

Set Amp Selector Switch to "FLAT"



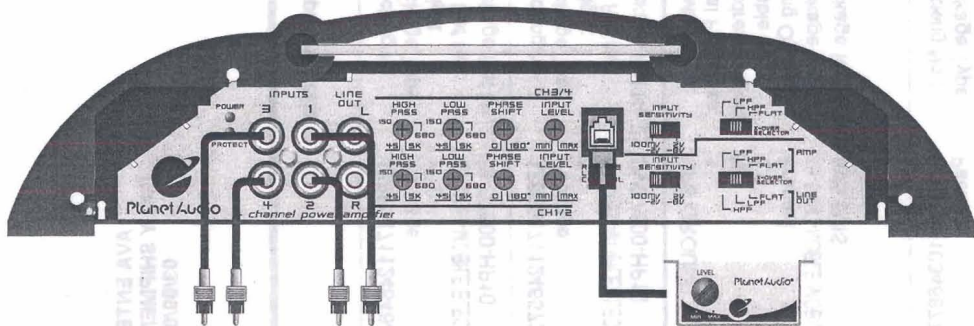
**IF SATELLITES ARE 4 OHMS EACH –
 WOOFER MUST BE
 MINIMUM 8 OHMS!!**

**IF WOOFER IS 4 OHMS –
 SATELLITES MUST BE
 MINIMUM 8 OHMS EACH!!**

**SPEAKER IMPEDANCE
 4 - 8 OHMS!**

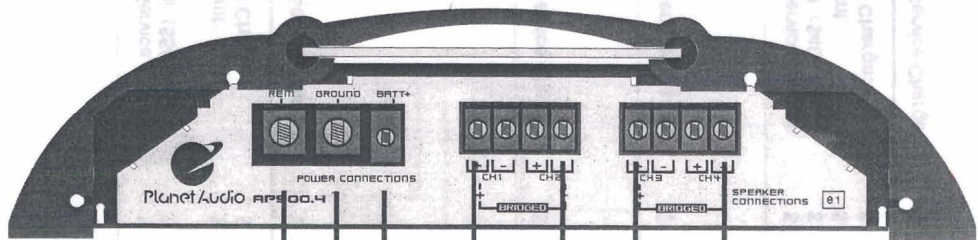
System #7

Four Channel Amplifier in Bridged Mode AP500.4



from
OUTPUTS of
HEAD UNIT

to REMOTE LEVEL CONTROL



To REMOTE OUTPUT
from HEAD UNIT

GROUND

To BATTERY (+)

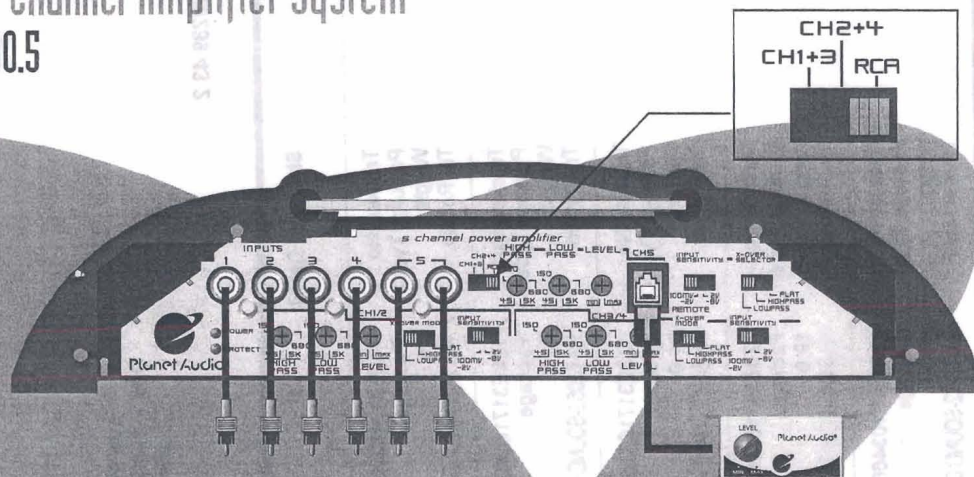
SUBWOOFER
LEFT SPEAKER

SUBWOOFER
RIGHT SPEAKER

**SPEAKER IMPEDANCE
4 - 8 OHMS!**

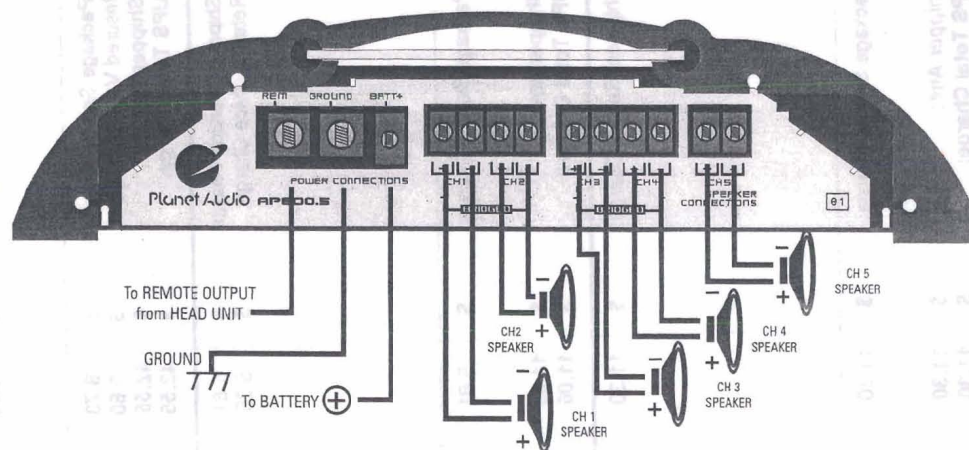
System #8

Five Channel Amplifier System AP800.5



from
OUTPUTS of
HEAD UNIT

to REMOTE LEVEL CONTROL



Amplifier Settings:

Set all EQ Phase and level controls to suit your musical taste.

If speakers are full range...

Set Selector to Flat

If speakers are mid/high frequency drivers...

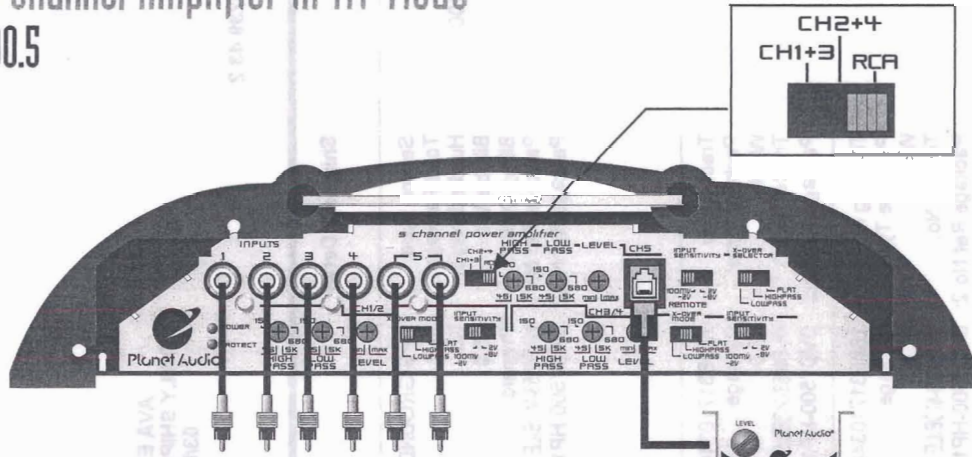
Set selector to High Pass, and set High Pass crossover to suit your preferred frequency response.

If speakers are subwoofers...

Set Selector to Low Pass, and Set Low Pass Crossover as desired.

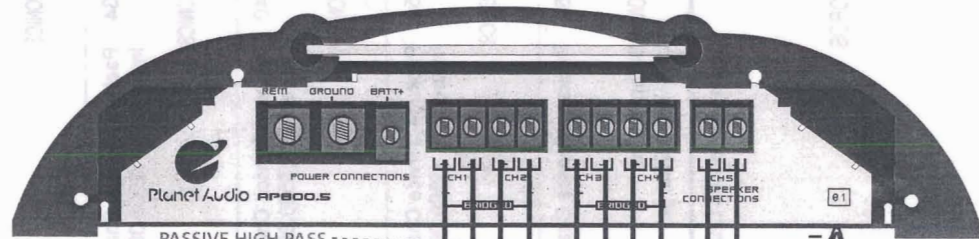
System #9

Five Channel Amplifier in Tri-Mode
AP800.5



from
OUTPUTS of
HEAD UNIT

to REMOTE LEVEL CONTROL



PASSIVE HIGH PASS
CROSSOVERS
(sold separately)

CH 1
SPEAKER

PASSIVE LOW PASS
CROSSOVER
(sold separately)

SUBWOOFER
LEFT SPEAKER

CH 2
SPEAKER

CH 5
SPEAKER

CH 4
SPEAKER

SUBWOOFER
RIGHT SPEAKER

CH 3
SPEAKER

PASSIVE HIGH PASS
CROSSOVERS
(sold separately)

**IF SATELLITES ARE 4 OHMS EACH –
WOOFER MUST BE
MINIMUM 8 OHMS!!**

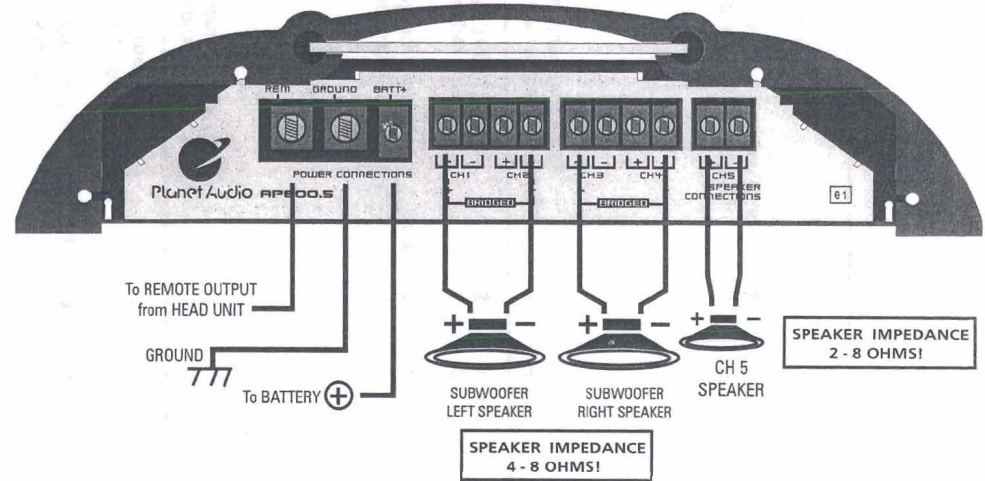
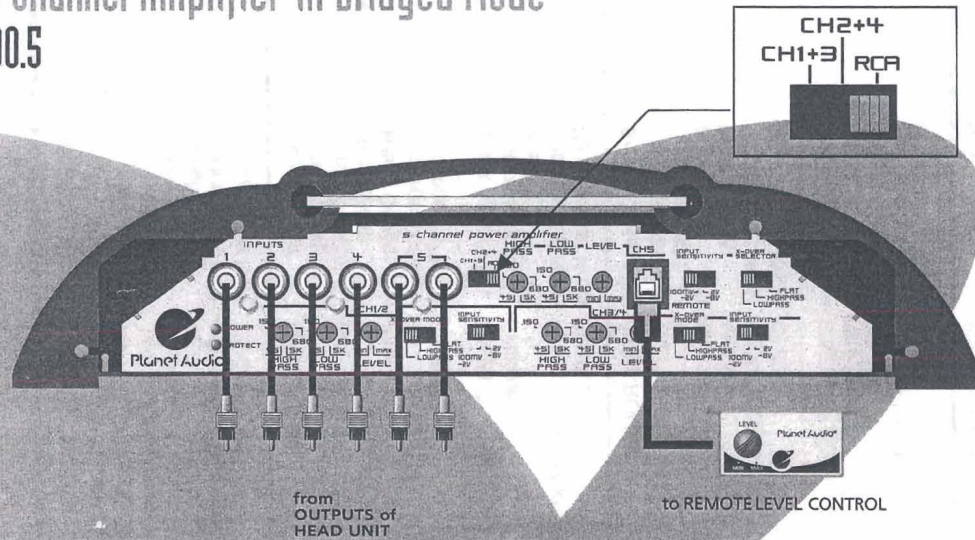
**IF WOOFER IS 4 OHMS –
SATELLITES MUST BE
MINIMUM 8 OHMS EACH!!**

**SPEAKER IMPEDANCE
4 - 8 OHMS!**

**SPEAKER IMPEDANCE
4 - 8 OHMS!**

System # 10

Five Channel Amplifier in Bridged Mode
AP800.5



Parametric EQ

Hints on setting the controls on the Parametric Equalizer

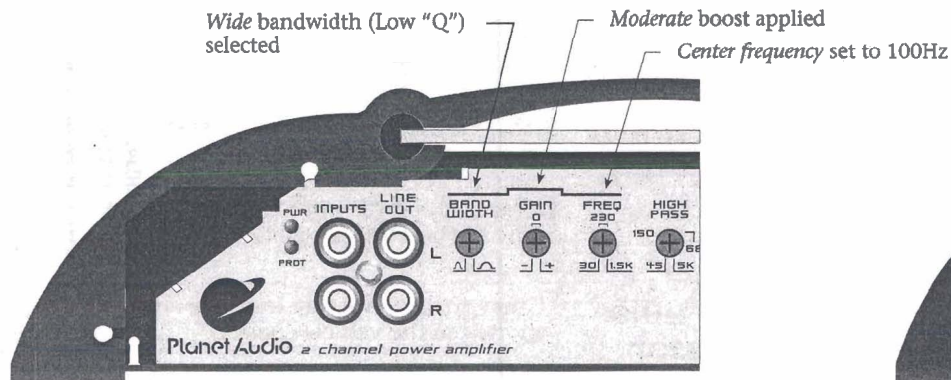
The Parametric Equalizer on this amplifier series differs from "conventional" equalizers in that the frequency at which the boost or cut is applied is variable, as is the "Q"(or bandwidth). Conventional equalizers only allow the boost or cut to affect a fixed center frequencies (Fo), with the "Q" fixed at a certain value as well.

"Q" is a number which describes how wide the bandwidth is on either side of the center frequency (Fo) at which the response is down 3dB.

A simple example (example #1, below): if the center frequency(Fo)is set at 100Hz, and the boost/cut control is set to provide 16dB boost, then an example of a "low"(that is, a wide bandwidth), might be one where the 3dB decrease in bandwidth is found at 45Hz on the low side and 220Hz on the high side. The bandwidth in this case is 175Hz.

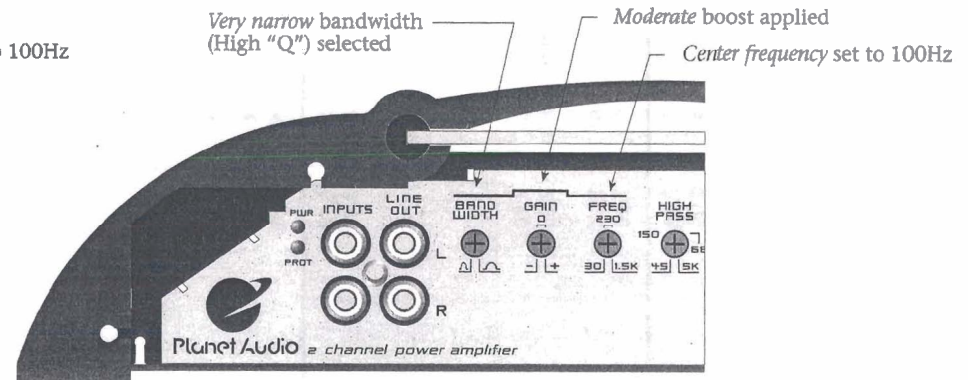
Similarly, if the 3dB decrease is measured at 93Hz on the low side, and 107Hz on the high side, the bandwidth can be calculated at a very narrow 14Hz, which is an example of a high Q value (example #2, below).

The simplest way to use the parametric equalizer is to hook up a real time analyzer to the system and temporarily the parametric equalizer controls temporarily to provide a flat response. Since most installers lack such an analyzer, our ears must suffice. Assuming a boosted response is required, set the boost control to about 30'clock, the bandwidth control to 120'clock and then adjust the frequency control until an improvement in response is heard. Then adjust the bandwidth and boost/cut controls back and forth until the desired result is obtained. Further adjustment of the frequency control should be made at this point.



EXAMPLE #1

Low Q scenario: Boost of 13dB or more occurs in the 45Hz-200Hz range



EXAMPLE #2

High Q scenario: Boost of 13dB or more occurs in the 93Hz-107Hz range

Troubleshooting

Amplifier will not power up.

Check for good ground connection.

Check that Remote Input (turn-on) at amplifier has at least 3 volts DC.

Check that there is battery power on the + terminal.
Check that there is voltage (at least 12v).
Check all fuses.

Check that Protection LED is not lit. If it is lit, shut off amplifier briefly and then repower it.

Protection LED comes on when the amplifier is powered up.

Check for short circuits on speaker leads.

Turn down the volume control on the head unit to prevent overdriving.

Remove speaker leads, and reset the amplifier. If the Protection LED still comes on, then the amplifier is faulty.

No output.

Check that all speaker leads are properly connected.

Check that amplifier is properly grounded.

Check that Remote Input (turn-on) at amplifier has at least 3 volts DC.

Check that RCA patch cords are plugged into correct inputs.

Check speaker wiring.

Low output.

Reset Level Control.

Check Crossover Control settings.

Only one channel works.

Check RCA interconnect cables.

Check speaker wiring.

High hiss in speakers.

Disconnect all RCA inputs to the amplifier(s) – if hiss disappears, then plug in the component driving the amplifier and unplug its inputs. If hiss disappears, go on until the faulty/noisy component is found.

It is best to set the amplifier's input level as insensitive as possible. The best subjective S/N ratio is obtainable this way. Try to drive as high a signal level from the head unit as possible.

High squeal noise from speakers.

This is almost always caused by a poorly-grounded RCA interconnect.

Distorted sound

Check that the Level control(s) is set to match the signal level of the head unit. Always begin at the lowest setting.

Check that all crossover frequencies have been properly set.

Check for short circuits on the speaker leads.

Amplifier(s) gets very hot.

Check that the minimum speaker impedance for that model is correct.

Check that there is good airflow around the amplifier. In some applications, an external cooling fan may be required.

Engine noise (static type)

This is caused primarily by poor quality RCA cables picking up radiated noise. Route all RCA cables away from power wires, and use only the best quality cables.

Engine noise (alternator whine)

Check that the speaker leads are not shorted to the vehicle chassis.

Check that the RCA grounds are not shorted to the vehicle chassis.

Check that the head unit is correctly grounded.