# POWERCLASS™

PC2400 / PC2600 / PC21400 OWNER'S MANUAL



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WARRANTY

# Congratulations and thank you.....

for choosing *Precision***Power** audio epuipment. At *Precision***Power** we proudly design, engineer and manufacture audio products at our facility in Phoenix, Arizona. Our award winning engineering team utilizes innovative technology to consistently deliver *Absolutely State of the Art*<sup>™</sup> performance, sound quality, reliability, and value. This *Precision***Power** product reflects our commitment to offer you unparalleled versatility and quality for years of dependable service and listening enjoyment.

### Service



Do not attempt to service *PrecisionPower* products yourself. Performing exploratory surgery on your audio equipment yourself will void the warranty. Many parts of your *PrecisionPower* gear are custom built to our specifications. Our factory parts are not made available to anyone else nor are they for sale. Our goal is to make sure that your *PrecisionPower* product will always sound as good as the day it was purchased. Contact your authorized *PrecisionPower* dealer about obtaining any warranty service through *PrecisionPower*.(See Warranty insde back cover)

# M o d e l \_\_\_\_\_\_ Serial Number \_\_\_\_\_ Purchase Date \_\_\_\_\_

# Caution!



The extended use of a high powered audio system may result in hearing loss or damage. While *PrecisionPower* systems are capable of "Concert Level" volumes with incredible accuracy, they are also designed for you to enjoy at more reasonable levels all of the sonic subtleties created by musicians. Please observe all local sound ordinances.

### FEATURES / SPECIFICATIONS

Adaptive MOSFET Switching Power Supply

Fully Complementary Triple Darlington Output Stage

**AM IV** Protection Circuitry

**QBASS PLUS** TM Bass Boost

QBASS REMOTE<sup>™</sup> Compatible

Advanced Buss Technology

Forced Air Thermal Management

Two-Way 24dB/Octave Linkwitz-Riley 90Hz Crossover

Crossover Line Outputs

Balanced Differential Input Stage

High Voltage Input Capability with Input Attenuation Switch

Gold Plated RCA Input and Output Connectors

PowerLock Speaker and Power Wire Connectors

Mixed Mono/Stereo Operation

Three Year Warranty when installed by an Authorized Precision Power Dealer

Completely Designed and Handcrafted in the USA

# **Specifications**



Power Bandwidth 4.5 Hz - 100 kHz

Total Harmonic Distortion 0.02 % Input Topology Differential

Input Sensitivity 150mv - 12 volts RMS

Input Impedance 10 k Ohms Load Impedance (stereo) 2 - 8 Ohms Load Impedance (bridged) 4 - 8 Ohms Supply Voltage 11 - 15 volts Damping Factor >500

Slew Rate >50 V/μS QBASS PLUS™ Up To +18dB Boost

30Hz, 36Hz, 44Hz and 60Hz Frequency Centers

Idle Current: PC2400 1.5 Amps PC2600 2 Amps

PC21400 3 Amps

Two Way, 24dB/Octave Linkwitz-Riley Crossover

90Hz Crossover Frequency

# Continuous Output Power



PC2400 100 WRMS x 2 @  $4\Omega$  per channel

400 WRMS x 1 @  $4\Omega$  bridged

200 WRMS x 2 @ 2Ω per channel

PC2600

150 WRMS x 2 @  $4\Omega$  per channel 300 WRMS x 2 @ 2Ω per channel 600 WRMS x 1 @  $4\Omega$  bridged

PC21400

350 WRMS x 2 @  $4\Omega$  per channel 700 WRMS x 2 @ 2Ω per channel 1400 WRMS x 1 @  $4\Omega$  bridged

# **Dimensions**

Length - 15.75" Height - 2.25" Width - 8.9"

Length - 17.75" Height - 2.25"

Width - 8.9"

Length - 25.25" Height - 2.25" Width - 8.9"

# QBASS PLUS™

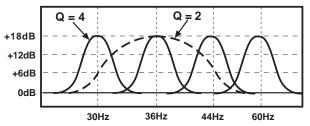
# QBASS PLUS™



On *PC2400*, *PC2600* and *PC21400* amplifiers, we've taken bass control to a higher level with *QBASS PLUS*<sup>™</sup>. The two *QBASS* switches (labeled 1 and 2) on the front end of the amplifier allow you to select one of four frequency centers - 30Hz, 36Hz, 44Hz and 60Hz. The Q SELECT switch determines the width of boosted frequencies. A 'Q' of 2 (switch out) will give you a wide boost while a 'Q' of 4 will boost a narrow range of frequencies (See chart below). On the rear end panel you will find the *QBASS*<sup>™</sup> level control and the plug-in for an optional *QBASS REMOTE*<sup>™</sup> dash mounted level control. Adjust the level control clockwise for up to 18dB of boost at your selected frequency and Q.

### **QBASS™** Settings 1 2 Freq. IN IN 30Hz IN OUT 36Hz OUT IN 44Hz OUT OUT 60Hz

# QBASS PLUS™



**CAUTION:** *QBASS PLUS*<sup>™</sup> should only be used in systems with strong subwoofers. 18dB is a lot of bass boost and could damage full range speakers.

Optional **QBASS REMOTE**™

This boost control can be mounted in the dash and will supersede the boost

control on the endplate.

Optional *QPORT*<sup>™</sup> expansion module allows one boost control to operate multiple amplifiers. Each

**QPORT**<sup>™</sup> has outputs for four amplifiers as well as another **QPORT**<sup>™</sup> for greater expansion. See your Authorized *Precision***Power** 

Dealer for more information!

### INSTALLATION

# Tools/Parts needed for Installation (not supplied)



Small flat blade screwdriver Phillips Screwdriver (#2 or medium sized)

Wire cutters

Wire strippers

- 4 #6 round head screws, and 1 #8 sheet metal screw (or nut, bolt, and star washer)
- 2 Ring connectors (large enough to accommodate your method of grounding)

In-line fuse or circuit breaker - see fuse chart below

Power and ground wire - see Power Wire Calculator on page 3

Speaker wire - 16 gauge or larger

Grommets (sized to work with the power wire you plan to use in your installation)

Tube of silicone sealant

# Fuse requirements



Amplifier	Maximum Fuse Rating
PC2400	60 Amp
PC2600	80 Amp
PC21400	160 Amp

You will need to install an in-line fuse or circuit breaker in the power wire within 18" of the battery. This fuse or circuit breaker is to protect your vehicle from fire in case the power wire shorts to the vehicle body. If you are only using one amplifier, use the fuse rating indicated in this chart. If you are using more than one amplifier, add up the fuse ratings for all the amplifiers. This sum is the rating for your fuse or circuit breaker. You may also want to add a power distribution block near your amplifiers to keep the wiring tidy.

### WIRING

The following is a basic formula to be used as a guide to determine current draw. A 50% amplifier efficiency rating is used as an average. Your new **POWERCLASS™** amplifier is more efficient, other amplifiers will probably be less. This formula is to be used as a guideline. Using wire of a larger gauge can only improve the current transfer of your system. Do not use smaller gauge wire.

Total RMS output x = 2 Total Input Wattage

<u>Total Input Wattage</u> = Current Draw (in Amps) Supply Voltage

Example: A **POWERCLASS**<sup>TM</sup> 2600 amplifier has two channels at 150 watts per channel RMS rating into 4 Ohms (150 x 2 = 300). You would use the formula in the following way:

 $300W \times 2 = 600W$ 

 $\frac{600W}{12V}$  = 50A Total current draw.

If the same amplifier is driven into a 2 Ohm stereo or 4 Ohm mono load, double it's 4 Ohm RMS rating. All **POWERCLASS™** amplifiers will effectively double their power at this load.

 $300W \times 2 \times 2 = 1200W$ 

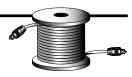
 $\frac{1200}{12}$ W = 100A Total current draw.

If you are using more than one amplifier, add up the total current draw for all of them and choose the appropriate gauge based on the grand total.

# Power Wire Calculator



### Recommended MINIMUM Gauge



Total Current Draw

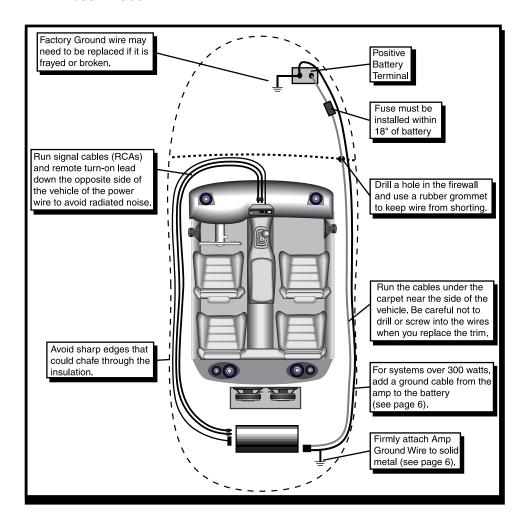
Length Of Wire To Be Run

( in Amps)	Up to 4ft.	4 to 7ft.	7 to 10ft.	10 to 13ft.	13 to 16ft.	16 to 19ft.	19 to 22ft.	22 to 28ft.
0-20	14	12	12	10	10	8	8	8
20-35	12	10	8	8	6	6	6	4
35-50	10	8	8	6	6	4	4	4
50-65	8	8	6	4	4	4	4	2
65-85	6	6	4	4	2	2	2	0
85-105	6	6	4	2	2	2	2	0
105-125	4	4	4	2	2	0	0	0
125-150	2	2	2	2	0	0	0	00

**NOTE:** The ground wire should be the same gauge as the power wire.

### WIRING

Before beginning, disconnect the negative (-) terminal of the battery prior to working on the positive (+) terminal to prevent a short to ground. This is important, unless you want to spend the rest of your life with a nickname like "Sparky," or "Smokey." Reconnect the negative terminal only after all connections have been made.



### Warning!

Fuse must be installed within 18" of battery

# **POWER / GROUND**

# Grounding



Locate an area near the amplifier(s) that is metal and clean an area about the size of a quarter to bare metal. Inspect the area around and underneath to be sure you won't drill into wires, brake or fuel lines, etc. Drill a pilot hole in the middle of this area. Terminate the ground wire with a ring connector and attach it to the bare metal using a #8 sheet metal screw and washer or preferably, a bolt, nut and a star washer (not supplied). We suggest crimping and soldering this connection. After the connection is complete, coat the area (on both sides) with silicone or some similar material to prevent rust from developing on the bare metal.

If your grand total current draw is over 50 amps (or total output power is over 300 watts), you should run a ground wire beside your power wire from the battery to the amplifier(s) in addition to your regular ground wire. Keep the ground and power wires as close together as possible, and use the same gauge wire for both. This will ensure that you have a good ground path, and may eliminate such potential problems as engine noise and overheated amplifiers.

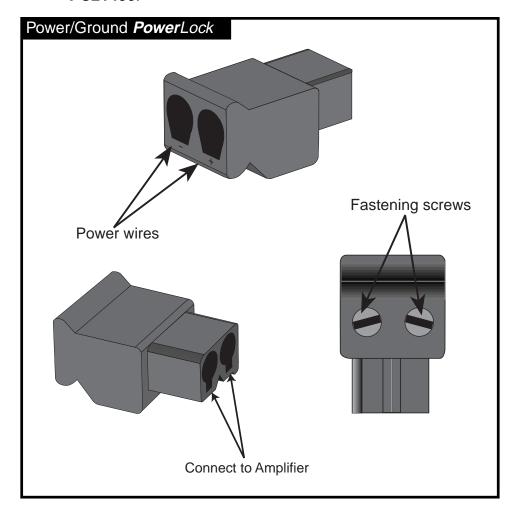
# **Charging System Considerations**



If your grand total current draw is over 100 amps (or total output power is over 600 watts), you are probably exceeding the capability of your charging system. Dimming lights and fluctuating voltage are solid indicators that you need to upgrade your alternator, battery (or go to multiple batteries), or both. Keep in mind that your amplifiers simply convert electrical energy to acoustical energy, and any electrical deficiency will compromise the performance of your sound system. For more information about charging system upgrades, see your local authorized *PrecisionPower* Dealer or call the *PrecisionPower* technical support office at *1-800-62POWER*.

# **POWER / GROUND and REMOTE**

Once you have run both the power and ground wires, it's time to connect the cables to the amplifier. Cut off excess wire and, using wire strippers, strip the ends of the power and ground cables approximately 1/4 inch. Locate the *PowerLock* power and ground connector (supplied). With a small flat bladed screw driver, loosen the screws before attempting to insert the cables. Insert the wires into the appropriate hole, and tighten the screws. Once the wires are secure, the *PowerLock* may be plugged into the amplifier. The Power/Ground *PowerLock* will accommodate 4 gauge wire for the *PC2400*, *PC2600* and *PC21400*.



# **ENDPLATE DIAGRAM**

### 2400 / 2600 / 21400

# 1. $\textit{QBASS REMOTE}^{\text{TM}}$ plug in

Plug in the data cable from the optional **QBASS REMOTE**<sup>™</sup> dash mount level control here. (This will bypass the amplifier's on board QBASS control)

2. COOLING VENTS (see page 13).

### 3. POWER / GROUND POWERLOCK

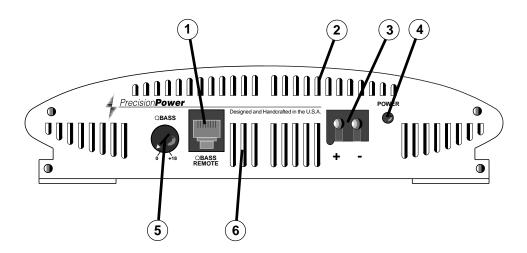
After you have securely connected your power and ground wires, plug in the Power / Ground **POWERLOCK** connector here (see page 7).

### 4. POWER indicator

A green light indicates that the amplifier is on. **5.** *QBASS*™ **Level** 

Turn this control clockwise to boost the *QBASS PLUS*™ circuit by up to 18dB.

6. FORCED AIR INTAKE VENTS (see page 13).





### **ENDPLATE DIAGRAM**

### 2400 / 2600 / 21400

### 1. FRONT INPUTS

Plug in the RCA leads from your head unit here (see page 11).

### 2. GAIN

Use this control to match the output level of the head unit to the amplifier (see page 12).

### 3. HP/LP switch

This switch is used to select whether the amplifier will provide a high pass (switch in) or low pass (switch out) signal to the speakers. (see page 12).

### 4. *QBASS* 1

Use this switch with the QBASS 2 to program the QBASS PLUS™ circuit. (see page 2).

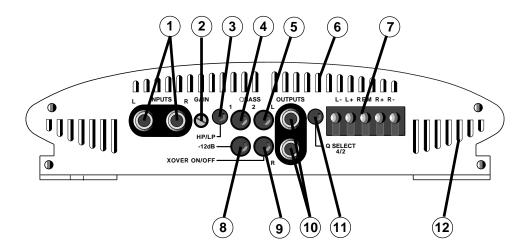
### 5. QBASS 2

Use this switch with the **QBASS 1** to program the **QBASS PLUS**™ circuit. (see page 2).

### 6. FORCED AIR EXHAUST VENTS (see page 13).

### 7. SPEAKER/REMOTE CONNECTOR

After connecting remote and speaker wires, plug in the *PowerLock* connector here (see page 10).



### 8. -12dB

For use with high level inputs (4V up to 12V). Push this switch in to attenuate the input by 12dB (see page 11).

### 9. XOVER ON/OFF switch

Push this switch in to activate the crossover, or out for full range speaker outputs (see page 12).

### 10. OUTPUTS

Left and Right RCA outputs provide high pass or low pass signal to another amplifier (see page 12). NOTE - RCA outputs are always high pass or low pass.

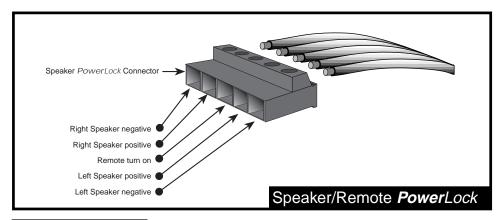
### 11. Q SELECT 4/2

Push this button in for a Q setting of 4 and out for a setting of 2 (see page 2).

### 12. FORCED AIR INTAKE VENTS (see page 13).

# SPEAKER WIRING

Using 16 gauge or larger, run the speaker wires from the amplifier location through the vehicle to the speakers. Observe the same precautions for routing these wires that you followed for running the power and remote turn-on wires. Cut off excess and, using wire strippers, strip 1/4 inch of insulation. Locate the speaker/remote turn-on *PowerLock* connector. Loosen the four outer screws on the underside of the connector. Insert the speaker leads into the end. Check to be sure you've maintained proper polarity before securing each wire, and plug the *PowerLock* into the amplifier.



# Bridging



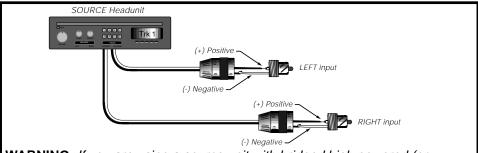
All two-channel **POWERCLASS™** amplifiers are capable of being bridged into a 4 ohm mono output without switches or bridging modules. This feature permits the creation of a mono channel for a subwoofer or center channel.

Deriving the mono channel is accomplished by using the left channel positive wire as the positive speaker wire and the right channel negative wire as the negative speaker wire.

NOTE: It is important that a minimum 4 ohm impedance is observed. If the impedance drops below 4 ohms while the amplifier is wired in the bridged configuration, the amplifier's protection circuitry (AM IV) may engage.

### **INPUTS**

There are two sets of RCA jacks on the front end of your amplifier. The RCA cables from your head unit go in the set labeled INPUTS. If your head unit doesn't have RCA outputs don't worry. Simply add a set of RCA plugs (available at your dealer) to your front or rear set of speaker leads (see drawing below), plug them into the input jacks, and push in the -12dB input attenuation switch.



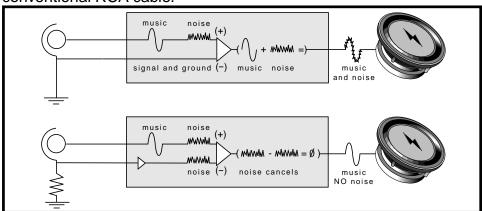
**WARNING:** If you are using a source unit with bridged high powered (or "floating ground") speaker outputs, a suitable high to low level adapter must be used. If you are unsure about your head unit see your local Precision**Power** dealer or call 1-800-62**Power** 

# **Balanced Differential Inputs**



This circuitry reduces noise radiated into your signal cables by up to 40dB. This is equivalent to a noise reduction of approximately one hundred times what the noise level would be without this circuitry. It provides all the benefits of a true 'balanced' line without the need of any special cables (see diagram below). This type of input works with any

conventional RCA cable.



# CROSSOVER and GAIN CONTROL

### Crossover



Your new **POWERCLASS™** amplifier has a 90Hz fourth-order Linkwitz-Riley type, 24dB per octave phase correlated crossover built in to provide system flexibility without the added expense and installation of an outboard crossover. The speaker outputs of your amplifier are high pass or low pass according to the HP/LP switch on the front endplate.

You would choose low pass (switch out) to use this amp for subwoofers, or choose high pass (switch in) to use this amp for full range speakers. The RCA outputs are controlled by the same HP/LP switch, but are always the inverse of the speaker output crossover. If the HP/LP switch is out (LP) the RCA outputs will be high pass, and if the HP/LP switch is in (HP) the RCA outputs will be low pass. In addition, the speaker outputs can be all pass (no crossover) by setting the XOVER ON/OFF switch to the off (out) position.

**NOTE:** The RCA outputs are always crossed over. The System Diagrams beginning on page 14 show several ways to use the internal crossover in your system.

# Adjusting The Amplifier Input Gain



- 1. Adjust all amplifier input gain controls to just above minimum sensitivity (fully counterclockwise).
- 2. Using the cleanest source (CD), with music playing turn up the head unit until you can hear distortion. Now turn it down a bit until you cannot hear the distortion.
- 3. Increase the Amplifier gain (clockwise) until the onset of audible distortion. Then decrease the gain to the point just before the distortion starts. This setting minimizes background noise and prevents overload.
- 4. Repeat step 3 for any remaining amplifiers in the system.

# THERMAL MANAGEMENT

# **Heatsink Cooling**



The unique heatsink on your *POWERCLASS™* amplifier has been designed with fins on the inside of the aluminum mass. This allows for the transfer of heat from the

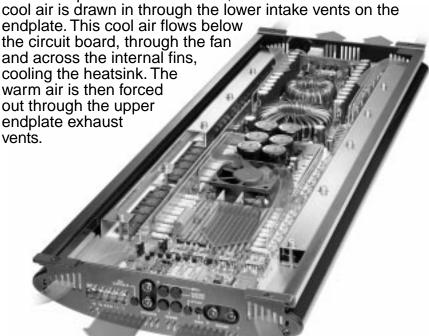


circuitry to the heatsink fins and out through the vents in the endplates. Be sure you have ample space around the amplifier for cooling, at least 2" on all sides.

# **Forced Air Thermal Management**



To manage the additional heat associated with higher output capability, a thermally controlled fan has been designed into the *PC2600* and *PC21400*. When the heatsink temperature reaches a pre-determined value, the fan is activated and cool air is drawn in through the lower intake vents on the



Warm Air Exhaust

Cool Air Intake

# TROUBLE SHOOTING

NO SOUND

Is the LED lit?

YES

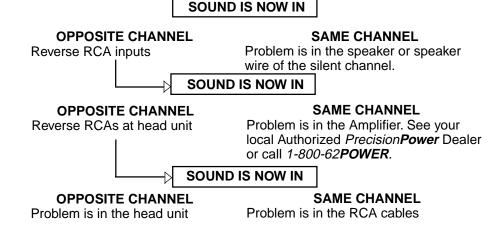
NO

Check Power and Remote turn-on wire for voltage. Make sure Ground wire is secure.

**STILL NO SOUND** - See your Authorized *PrecisionPower* Dealer or call *1-800-62POWER*.

### **SOUND IN ONE CHANNEL ONLY**

Reverse left and right speakers by unplugging the speaker connector, turning it over and plugging it back in.



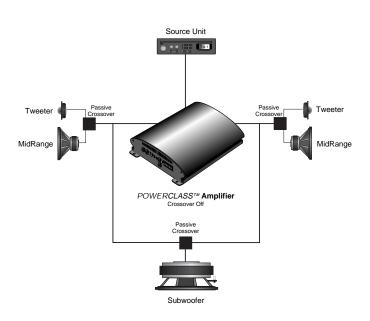
### **AMPLIFIER TURNS DOWN**

within 2" of the amplifier on all sides.

Both excessive temperature and low impedance (or short circuit) conditions will activate the amplifier's AM IV protection circuitry, which turns down the amplifier's output. When the amplifier cools down, or the impedance is corrected, the AM IV will restore full power. If your amp is turning down check your speakers and wiring for low impedance and short circuits. Also, ensure that there is nothing blocking the normal convective airflow of the amplifier. No obstruction should be

**NOTE:** Low battery voltage will cause the amplifier to run warmer.

### ONE

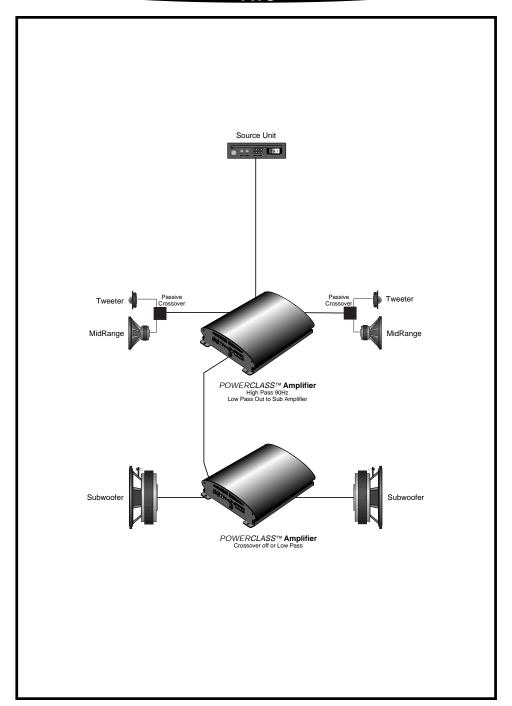


# **Mixed Mono Output**

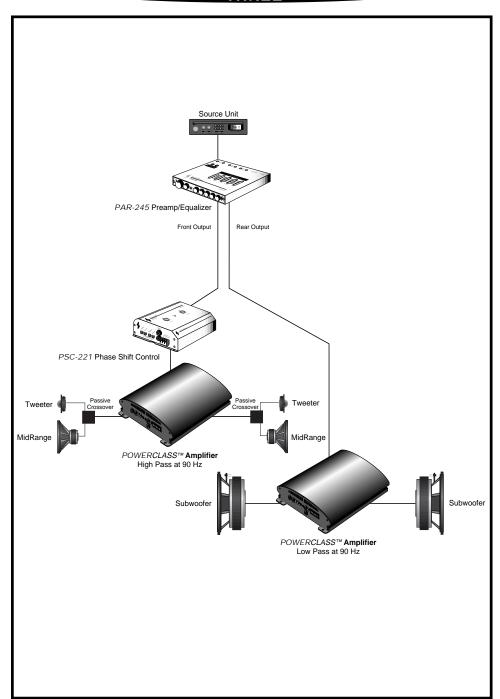
The ability to run stereo speakers while simultaneously running a mono output from the same amplifier is accomplished by running the stereo speakers normally and tapping into the appropriate wires for the "mixed mono" channel (left channel positive for the positive speaker wire and right channel negative for the negative speaker wire). Speaker impedance should be no lower than 2 Ohms on the stereo channels and 4 ohms on the mono channel.

NOTE: Passive crossovers must be used for "mixed mono" operation. Choose a low pass crossover around 100Hz for your subwoofer, then choose a high pass crossover for your stereo channels. The high pass crossover must be at the same or slightly higher frequency than the low pass crossover to maintain the correct impedance. See your *PrecisionPower* dealer or call *1-800-62POWER* for more information about passive crossovers.

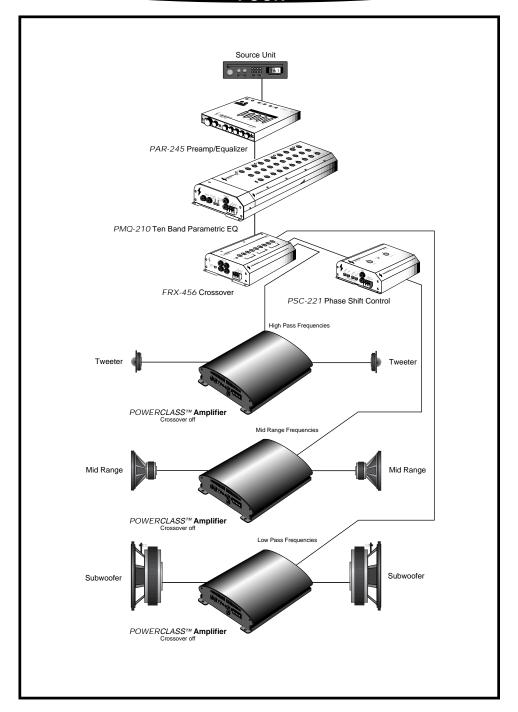
# TWO



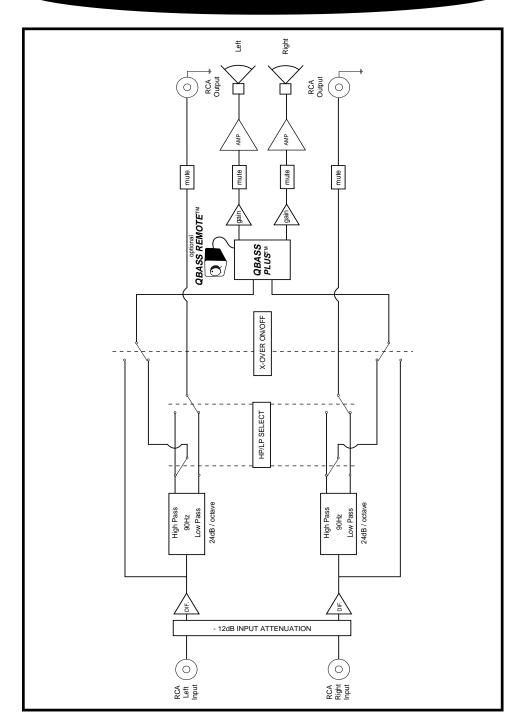
### THREE



# FOUR



# **BLOCK DIAGRAM**

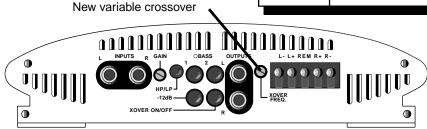


# **POWERCLASS ADDENDUM**

Your new **POWERCLASS**™ amplifier may have been updated to include a variable detented crossover in place of the Q 4/2 function switch. The crossover is adjustable from 20 Hz to 5 kHz. Please refer to the endplate diagram and detent chart provided for frequency adjustments. The XOVER FREQ control has detents, or "clicks" as you rotate it. Each "click" counted from the full counterclockwise position corresponds to a specific frequency. This will add more accurate tuning to your system. Also, refer to your owner's manual

for installation instructions.
As always, *PrecisionPower* will continue to improve the products and services we have to offer you. Thank you for choosing *PrecisionPower!* 

DETENT	XOVER FREQ
1 2 3 4 5 6 7 8 9 10 11 2 3 14 15 16 17 18 9 20 1 22 3 24 5 6 7 8 9 30 33 34 5 6 7 8 9 40 41	20 Hz 21 Hz 21 Hz 22 Hz 23 Hz 24.5 Hz 26 Hz 27.5 Hz 30 Hz 35 Hz 39 Hz 43 Hz 49 Hz 56 Hz 64 Hz 73 Hz 80 Hz 114 Hz 134 Hz 160 Hz 134 Hz 160 Hz 260 Hz 320 Hz 368 Hz 496 Hz 320 Hz 368 Hz 496 Hz 497 Hz 498 Hz 498 Hz 498 Hz 499 Hz 490 Hz 490 Hz 490 Hz 491 Hz 494 Hz 494 Hz 494 Hz 494 Hz 494 Hz



### WARRANTY

# Three-Year Limited U.S.A. Warranty

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. *PrecisionPower* warrants its products to be free from defects in materials and workmanship under normal use and service for a period of three (3) years from the date of original purchase when the unit is installed by an Authorized Dealer. Non-Authorized Dealer installed products carry a one (1) year parts and ninety (90) days labor limited warranty. The extent and conditions of Limited Warranty are as follows:

- 1. Authorized Dealer Installed Products: *PrecisionPower* will either repair or replace at no charge, to the original purchaser, any unit which *PrecisionPower's* examination discloses to be defective and under warranty, provided the defect occurs within three (3) years from the date of original purchase when the unit is installed by an Authorized Dealer and the product is returned immediately to *PrecisionPower*. This warranty is not transferable.
- 2. Non-Authorized Dealer Installed Products: *PrecisionPower* will either repair or replace at no charge, to the original purchaser, any unit which *PrecisionPower's* examination discloses to be defective and under warranty, provided the defect occurs within ninety (90) days from the date of purchase and the product is returned immediately to *PrecisionPower*. Warranty claims beyond ninety (90) days for Non-Authorized Dealer Installed Products will be for parts only and will extend for one (1) year from the date of purchase. This warranty is not transferable.
- 3. The date of purchase and proof of Authorized Dealer Installation of a PrecisionPower product must be established by an original sales receipt which must accompany the article being returned for warranty work.
- 4. This warranty shall NOT apply to any *PrecisionPower* product found to have the original factory serial number removed or defaced. All products received (by *PrecisionPower*) for in warranty or out of warranty repair, with their original serial numbers removed or defaced, will NOT be repaired and will be returned to sender, freight collect. Refer to original packaging for the serial number of your component speakers.
- 5. The provisions of this warranty shall not apply to any *PrecisionPower* product used for a purpose for which it is not designed, which has been repaired or altered in any way, or which has been connected, installed, or adjusted other than in accordance with the instructions furnished in *PrecisionPower's* owner's manual. Nor shall this warranty apply to any part which has been subject to misuse, neglect, or accident.
- 6. PrecisionPower does not authorize any other persons to assume any other liability in connection with its products. THIS WARRANTY IS THE ONLY EXPRESS WARRANTY MADE BY PRECISIONPOWER APPLICABLE TO ITS PRODUCTS. ANY IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE APPLICABLE TO PRECISIONPOWER PRODUCTS IS LIMITED IN DURATION TO THE DURATION OF THIS LIMITED WARRANTY. PRECISIONPOWER SHALL NOT BE LIABLE FOR THE INCIDENTAL, CONSEQUENTIAL, OR COMMERCIAL DAMAGES RESULTING FROM THE BREACH OF THIS WRITTEN WARRANTY. Some states or provinces do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty lasts; so the above limitations or exclusions may not apply to you.
- 7. Your product will be serviced on an in-warranty basis within the warranty period for the correction of warranted defects. If improper operation of your *PrecisionPower* product should occur, contact your Authorized Dealer for assistance with the return and factory repair of your *PrecisionPower*

product. If an Authorized Dealer is not available, return the unit including your name, telephone number, return address, a copy of your sales receipt, and a description of the problem to:

PrecisionPower,Inc. Service Department 4829 S. 38th Street Phoenix, AZ 85040-2964

TO RETURN PRECISIONPOWER PRODUCTS OUT OF WARRANTY: Return the unit, postage prepaid, in the original protective carton. Please include a description of the problem and, if desired, a request for an estimate of repair costs. Unless a request for an estimate is included, the unit will be repaired as necessary. Please contact *PrecisionPower* Customer Service at 1-800-62-POWER for questions concerning out of warranty repair charges. Repaired unit will be returned with an itemized statement, C.O.D.