

# **PCE 440**

## **Noise Gate**

*Operators Manual*

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**CONGRATULATIONS AND THANK YOU** for your choice of a *PrecisionPower*, Inc, high performance mobile audio signal processor. *PrecisionPower* is proud to be a world leader specializing in the design, engineering, and manufacture of "State of the Art" mobile audio electronics. Our success is derived from the fact that we do not incorporate gadgets or passing fads into our products. Sound engineering practice, combined with deceptively simple yet highly effective circuit designs, characterize every PPI product. Yet, our demand for maximum value dictates that every ounce of fat be trimmed if it does not contribute to sound quality or reliability. This is why PPI products have consistently enjoyed an unparalleled reputation for sound value. We are sure that your new PCE 440 will provide you **The State of the Art** in mobile audio electronics.

# Important Safeguards

The following list of Important Safeguards have been compiled to help you achieve optimum satisfaction and the highest quality performance from your new mobile audio signal processor. **Please take time to review these safeguards before operation and/or installation of your new PCE 440.**

## 1. Read Instructions

We all have a tendency to read instructions only after something doesn't work as anticipated. This manual provides specific information concerning the operation and installation of your new PCE 440.

**Please read this manual thoroughly and retain for future reference.**

## 2. Keep Your Sales Receipt

Your PPI mobile audio signal processor has a two year limited warranty. To establish the starting date of warranty coverage, a copy of your sales receipt must accompany your PCE 440 for all warranty service. Please file your sales receipt away for future reference. For your convenience, a complete limited warranty statement is located at the back of this manual.

## 3. Follow Instructions

All use and installation instructions should be followed to assure proper operation of your new PCE 440.

## 4. Heed All Wiring Requirements

A high-performance mobile audio signal processor requires minimum wire gauges be used for the Power, Ground, and Remote Turn-On cables. To assure proper operation of your PCE 440, please follow all wiring requirements.

## 5. Heed All Fusing Requirements

The fusing requirements of your PCE 440 have been established for its continued safe operation. Do not attempt to service the unit as this may result in damage and voiding of warranty. If a problem should occur, contact your Authorized PPI dealer or call *PrecisionPower* at 1-800-62-POWER for replacement service.

## 6. Installation Accessories

The PCE 440 will require non-supplied installation accessories. Please refer to the *installation* section of this manual for a list of requirements or consult your Authorized PPI dealer before installation.

## 7. Water and Moisture

Never mount the PCE 440 in a location which would subject it to immersion or exposure to water.

## 8. Servicing

Do not attempt to service this mobile audio signal processor yourself. Opening or removing covers may void your warranty. For service information, consult your Authorized PPI dealer or call *PrecisionPower* at 1-800-62-POWER. Our customer service representatives are available Monday through Friday from 8am to 5pm Mountain Standard Time.

## Caution

The use of a high powered audio system may cause hearing loss or damage. While PPI systems are capable of "Concert-level" volumes with incredible accuracy, they are designed for you to enjoy the subtleties created by musicians while listening at reasonable sound pressure levels. The use of a high powered audio system may impair your ability to hear traffic sounds, and therefore, may constitute a traffic hazard. We advise lower volume levels while driving.

## **Glossary**

*The following terms are used in this manual. Since they may be unfamiliar, the following definitions are provided.*

<b>Expansion Ratio:</b>	The amount of input signal change (over the- threshold setting) it takes to fully open the "gate".
<b>LDR:</b>	Light-Dependant Resistor
<b>L.E.D.:</b>	Light Emitting Diode. Red L.E.D. indicates power on/off. The Green L.E.D. indicates when the "gate is open".
<b>Noise Gate:</b>	Signal processor designed to eliminate steady background noise from high performance audio systems.
<b>Remote Turn-On:</b>	Low current automatic switching circuit that turns the PCE 440 on and off. Typically connected to the remote antenna or amplifier turn-on lead of most car radios, cassettes, or CD players.
<b>Threshold Level:</b>	Level of input signal necessary to make the gate open.
<b>VCA:</b>	Voltage-Controlled Amplifier

## **FEATURES**

Four Input and Output Channels  
20 dB of system background noise reduction  
Adjustable Threshold Range  
Adjustable Expansion Ratio  
Two Year Limited Warranty  
Manufactured in the U.S.A.

## **TECHNICAL SPECIFICATIONS**

Input Impedance: 10 k Ohms  
Input Level: 100 mV RMS minimum, 2.5 V RMS maximum  
Input to Output Gain: 0 dB +/- 0.5 dB gated, -20 dB minimum not gated  
Threshold Range: 1 mV to 20 mV  
Power Requirements: 11 - 15 VDC, 0.1 amps  
Dimensions: 1" X 4.12" X 3.1"

## ABOUT YOUR NEW PCE 440

As a world leader in the design and manufacture of high-performance mobile electronics, *PrecisionPower, Inc.*'s commitment to being "Absolutely State of the Art" demands that we create products that offer high reliability and superior sound quality. To do this, we must recognize and find solutions to the unique problems which affect the performance of electronics in the mobile environment.

At PPI, we build upon experience. We currently design and manufacture over 37 different mobile audio products. Each is designed to be application specific, either for amplification, signal processing, or digital control. This large reservoir of knowledge provided us with the innovative design solutions found in the PCE 440.

As you review this section, keep in mind that the features found in the PCE 440 directly influence its performance and, therefore, must be understood before operation and/or installation. Please take a few minutes to review the following information. The user benefit and operational parameters of the PCE 440 are detailed below.

### LDR vs VCA

The PCE 440 is a four-channel Noise Gate designed to eliminate steady background noise from high-performance car audio systems. It does this by blocking signal flow from a source when there is no music present. Its Light-Dependent Resistor (LDR) technology was chosen for superior musicality over conventional Voltage-Controlled Amplifier (VCA) methods.

A common method of noise gating is to use a VCA to open and close the "gate". A Voltage-Controlled Amplifier looks at changes in an electrical signal which triggers the gate. With a low (electrical) signal level, the gate remains closed and the audio signal is blocked, at a high (electrical) signal level, the gate opens to pass audio. The draw-back to the use of VCA's is that the electrical control signal can bleed-through into the audio signal. This type of "cross-talk" will adversely affect the quality of the audio signal passing through the "gate".

PPI chose to use Light-Dependent Resistors because they have very low distortion and will not affect the quality of the audio signal. When light from an L.E.D. hits the LDR, it changes from high resistance which blocks signals, to low resistance, which passes signal. Since the command signal which opens the gate is light, this command signal cannot contaminate the audio.

### The "Gate"

The PCE 440 has four inputs and output channels, labeled 1 thru 4. (These input / output labels are arbitrary - all the channels are identical). When music is present, the input is passed straight through to the corresponding output with no modifications, that is, no gain or equalization. Its purpose is to eliminate background noise, especially "hiss", that is present when the system is on but not playing music.

To make the decision about whether or not to open the gate, the PCE 440 looks for signal at any of the four inputs. Very low and very high frequency signals that might be noise are ignored, but when mid-frequency signals get bigger than a user-set threshold, the gate opens and lets audio signal through. As long as the signal stays bigger than the threshold, the gate stays open. The PCE 440 waits for a while after the input level drops to make sure that it's not going to get louder again, then closes the gate.

### Threshold Level and Expansion Ratio

The PCE 440 has two front panel controls: Threshold Level and Expansion Ratio. The Threshold control sets the input signal level at which the gate will open. On the PCE 440, the threshold control should be adjusted so that the gate opens for signals which are *just* louder than the background noise of the system. If the threshold is set higher than this, it may block desired signals. Turning the control clockwise reduces the threshold and makes the gate open with a smaller input signal. A green L.E.D. indicator on the front panel is lit when the "gate" is open (Refer to Fig. A).

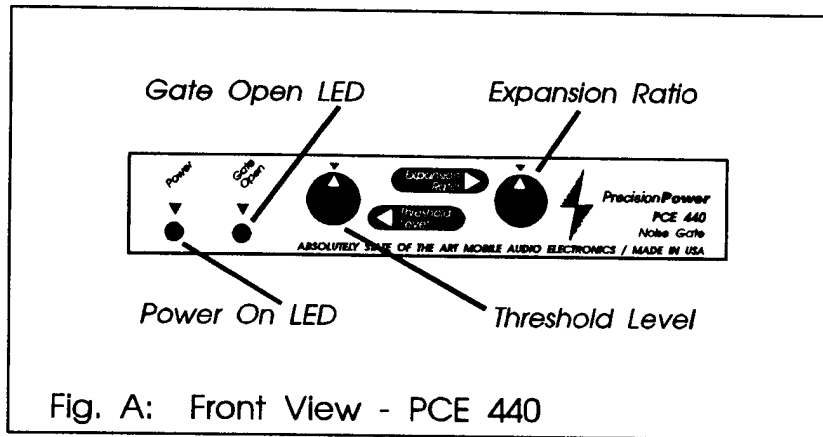


Fig. A: Front View - PCE 440

The Expansion Ratio control determines how much input signal change (over the threshold setting) it takes to fully open the gate. The gate opens almost instantly - in a few milliseconds. The sharpness of the transition from "closed" to "open" is adjustable with the Expansion Ratio control. At the counter-clockwise extreme setting, the gate opens gradually; the output level increases gradually as the input goes over the threshold. As the control is turned clockwise, the amount of signal change necessary to fully open the gate is reduced. At the fully-clockwise setting, there is essentially no in-between; the gate is either *fully closed* or *fully open*. The Expansion Ratio control setting is a matter of user taste; at some settings, the action of the gate will be more obvious.

### Maximizing the Performance of your PCE 440

It is important to note that the exact settings of both the Threshold and Expansion Ratio must be user defined. Their settings will vary, from system to system, depending upon a number of variables. These include: type of components used in your system, number of components in the audio signal path, gain / level settings of each component, and where the PCE 440 is placed within the signal path.

So with all these variables, where do you place the PCE 440 in the signal path to achieve maximum performance? Since the purpose of the PCE 440 is to block background noise, it must go in the signal path after the point at which the noise is introduced into the system. In many systems, it is the head unit (Radio, CD, Cassette) which determines the background noise,

but if other signal processors such as an equalizer are used in the system, they may contribute significantly to background noise, and in this case, the PCE 440 should be inserted in the signal path after such processors. If the PCE 440 is inserted after an electronic crossover, you must make sure that it gets midbass or midrange signal on at least two of its inputs to ensure proper gating (Remember, the PCE 440 looks for midrange frequencies when deciding whether or not to open the gate).

Once you have determined where the PCE 440 is going to fall in the signal path, mount it in a convenient location - keep in mind that the front panel controls must be accessible for final adjustments. For more information on adjusting the PCE 440, please refer to the *Adjusting the PCE 440* section of this manual.

### Installation

**PRIOR TO INSTALLATION** of your new PCE 440, it is important to consider the following: In your profession, your abilities and expertise ensure a job well done. Trained professional car audio installers are no different. It's their chosen profession, and what they do best. PPI believes so strongly in its responsibility to you, that we invest heavily in the hands-on training of professional installers. Our comprehensive system design and installation seminar provides our authorized dealers with the latest techniques to deal with the complexities of car audio today. There is more than meets the eye to ensure that a car stereo reaches its fullest potential. The trained professional, through experience, can approach, recognize, and address all the needs of the mobile audio environment. **PPI highly recommends that this signal processor and/or any other mobile audio equipment be installed by a trained professional.**

### Tools / Parts Needed for Installation (not supplied)

- |  |  |
|--|--|
| 7/64" Allen Wrench   | Drill & Bit (.110 bit for #6-metal screws) |
| Wire cutters   | Wire strippers                             |
| Soldering iron   | Solder / Flux cleaner                      |
| 1 #8 metal screw & washer                                    | 2 #6 sheet metal screws and 2 washers      |
| Heat Shrink  | Ring connector                             |
| Ring connector   |  |
| Power, Ground, and Remote Turn-on wires - 18 gauge or larger |  |

## Mounting

To prevent damage to the PCE 440 while driving, mount it in a secure place. Choosing the appropriate location will depend upon your vehicle and the complexity of your system design. Two types of brackets are provided which allow the PCE 440 to be mounted in-dash, under-dash, or in any compatible space that is convenient to your needs.

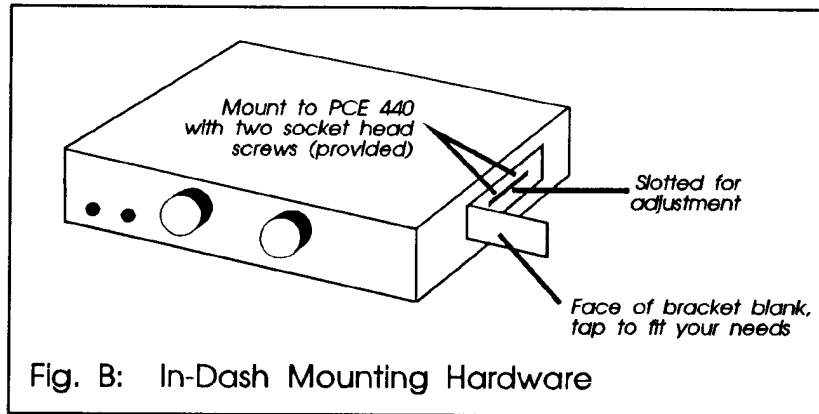


Fig. B: In-Dash Mounting Hardware

If the unit is to be mounted in a dashboard, console, or other type of panel, a 3 1/32" x 6 25/32" rectangular hole should be cut to clear the chassis. A minimum depth of 3 3/4" is required behind the panel to allow space for the connecting cables. The noise gate can be secured in place with the two supplied brackets (Refer to Fig. B & C). The brackets are connected to the PCE 440 by two 6-32 x 1/4" socket head cap screws (supplied). The brackets are adjustable to compensate for panel thickness. Since all dashboards are unique, the face of the brackets have been left blank for the installer's individual needs. The face brackets can be secured with nuts and bolts - (we suggest #6 metal screws).

## Power, Ground, and Remote Turn-On

**Before beginning, disconnect the negative (-) terminal of the battery while working on the mobile audio sound system to prevent a short to ground. Reconnect the negative terminal only after all the connections have been made.**

The PCE 440 is designed to operate from a car's 12 volt, negative ground, electrical system. The power, ground, and remote turn-on cables should be 18 gauge (minimum) in size.

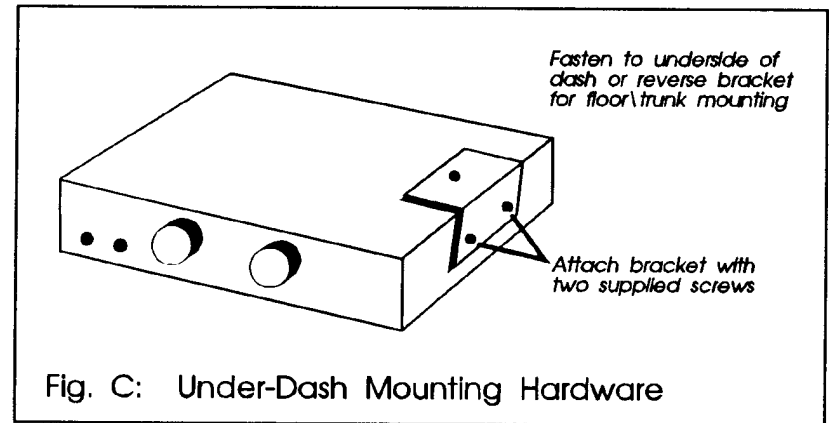


Fig. C: Under-Dash Mounting Hardware

The PCE 440 is connected to +12 Volts, chassis ground, and a remote switching +12 Volt source for turn-on via the (supplied) three wire harness which plugs into a mating socket on the rear panel of the PCE 440 (Refer to Fig. D). The wires are color-coded as follows:

<b>Red Wire</b>	<b>+12Volts</b>
<b>Black Wire</b>	<b>Chassis Ground</b>
<b>Blue Wire</b>	<b>Remote Turn-On</b>

If the PCE 440 does not power-up, contact your authorized *PrecisionPower* dealer or contact PPI at 1-800-62-POWER for assistance.

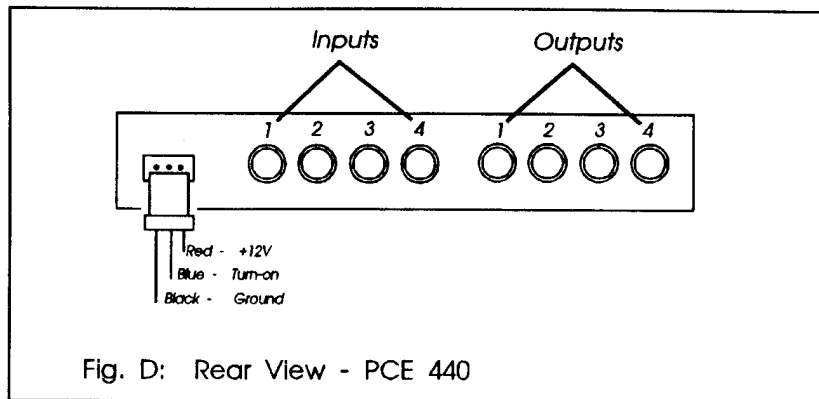


Fig. D: Rear View - PCE 440

If a power cable is run from the PCE 440's location to the battery, care should be taken to avoid sharp corners, creases, and sharp body parts. When passing through any metal wall (i.e. fire wall, etc.) a grommet must be used to prevent the wire from chaffing and shorting to ground. For safety reasons, PPI recommends that the +12 Volt power source (cable) be fused (1 Amp) at the positive terminal of the battery. If this fuse is not installed, and the power wire shorts to ground (between the battery and the PCE 440), a fire can result. Consult your Authorized PPI Dealer for an appropriate in-line fuse holder that meets the needs of your installation. We suggest crimping and soldering all wire connections. Insulate the connection with heat shrink to prevent a short to ground. If connecting to an existing +12 Volt power source, be sure the line is fused at the battery.

The ground wire should be of the same gauge as the power wire. Use as short a length of wire as possible. Locate an area near the PCE 440 that is metal and clean an area about the size of a quarter to bare metal. Drill a pilot hole in the middle of this area. Be Careful! Inspect the area underneath to be sure you aren't drilling into wires, brake lines or fuel lines, etc. Terminate the wire with a ring connector and attach it to the bare metal using a #8 sheet metal screw and washer (not supplied). We suggest crimping and soldering this connection. Insulate the connection with heat shrink. It is important that this connection be solid. After the connection is complete, coat the area with silicone or some similar material to prevent rust from developing.

Locate the three-wire harness. Connect the remote turn-on cable to the blue wire. We suggest crimping and soldering this connection. Insulate with heat shrink to prevent shorts. Be sure the connection is tight (Refer to Fig. D).

## Inputs and Outputs

On the rear panel of the PCE 440 are 8 RCA jacks. Four input jacks and four output jacks - labeled 1-4. Each input jack corresponds to the identically numbered output jack. Care should be taken to maintain proper (left / right) channel continuity when installing the input and output cables (Refer to Fig. D).

## System Tuning

In order to achieve maximum signal-to-noise performance from a high quality mobile sound system, it is desirable to use high signal levels wherever possible in the interconnection cables. High signal levels will reduce the effect of induced noise. The peak level of an audio signal is usually determined by the clipping level of electronic components. The following procedure should be used as a guide when the system installation is complete.

### Adjusting Equalizer Input Gains:

1. Turn the equalizer's volume control to minimum.
2. Turn the source unit volume 1/2 to 3/4 of maximum. If available on your unit, set the output level to maximum. Some units may have a switch.
3. If available, set selector switch to either input 1 or input 2.
4. Adjust all equalizer input gains to minimum.
5. For the chosen input, play the respective music source. A loud music passage is desired.
6. For the chosen input, increase the left input gain control until the onset of audible distortion. Then decrease the gain prior to the immediate point of audible distortion. This setting will minimize system background noise and prevents overloading of the equalizer. Adjust, for the same input, the right input gain control for proper left/right balance.
7. Set selector switch to the alternative source unit, if used, and repeat steps 5 and 6.
8. Adjust crossover next.



## Adjusting Crossover Input Gains:

1. Adjust all crossover gain controls to 0 dB, 1/2 of maximum sensitivity.
2. Adjust all amplifier gains to 1/2 of maximum sensitivity.
3. Turn the volume knob on the equalizer to a maximum of 3 o'clock.
4. Increase the gain of the crossover until the onset of audible distortion. Then decrease the gain prior to the immediate point of audible distortion. This setting will minimize system background noise and prevents overloading of the crossover.
5. Repeat step 4 for any remaining crossovers in the system.
6. Adjust the amplifier's input gain next.

NOTE: In many multi-crossover/accessory systems, the gain of some crossovers and accessories may need to be further decreased to achieve proportional balance.

## Adjusting the Amplifier(s)

1. Adjust the amplifier's input gain to 1/2 maximum sensitivity.
2. Turn the volume knob on the equalizer to a maximum of 3 o'clock.
3. Increase the gain (clockwise) of the amplifier until the onset of audible distortion. Then decrease the gain counter-clockwise prior to the immediate point of audible distortion. This setting will minimize system background noise and prevents overloading of the Art Series amplifier.

NOTE: Depending on the sensitivity of the system's pre-amp(s), the gain of the amplifier(s) may not need adjustments. Also, in many multi-amplifier systems, the gain of some amplifiers may need to be further decreased to achieve proportional balance.

## Adjusting the PCE 440

For a starting point, set both the Threshold and Expansion Ratio controls to the fully clockwise position. Turn on the system and confirm that the red Power L.E.D. indicator on the PCE 440 is lit.

## Threshold Level

Play a music selection that has fairly consistent average loudness. Turn up the system volume above minimum and confirm that the green - Gate Open L.E.D. is on and that the system has an output. Next, turn down the system volume until the music level is about as loud as the background noise. This should be *considerably below* the quietest volume at which the system will be listened to. The car's engine should be off, because its mechanical noise may mask background noise.

Now turn the Threshold Level control counter-clockwise until the green Gate Open L.E.D. just goes out and the sound from the speakers is muted. Turn up the volume a small amount and confirm that the gate opens. If it doesn't, turn the Threshold control back clockwise a little. Now play the head unit between music tracks, in the pause mode, or, if available, play a "zero data" track on a test CD. The green Gate L.E.D. should be off. When the Threshold Level control is properly adjusted, the Gate will be closed whenever the system is on and there is no music signal from the head unit.

## Expansion Ratio

The Expansion Ratio control only affects how the transition from "gate closed" to "gate open" sounds. In general, it will be set near clockwise extreme because at this setting the action is the least obvious, but this is completely a matter of taste - experiment with various settings!

## Troubleshooting

If for some reason your system fails to operate properly, please refer to this guide. If you are unable to resolve the problem, consult your Authorized PPI Dealer or call 1-800-62-POWER.

### NO SOUND

Is the power LED illuminated? Check fuses in power wire. Be sure turn-on lead is connected.

### NO SOUND IN ONE CHANNEL

Check pre-amp leads. Reverse left and right leads to see if the problem is before the amplifier. Check speaker leads and inspect for a short to ground or an open connection. If the problem is in the amp, have your Dealer inspect the unit.

## PPI Products

### Amplifiers:

#### Art Series

All amplifiers are rated @ 4 ohms from 11 - 15 VDC. Power is doubled into 2ohm loads. All amplifiers are internally bridged. Distortion is limited to .02% at full rated power. AM II protection circuitry.

#### 2 Channel Models

A300 2x 75WPC  
A600 2x 150WPC

#### 4 Channel Models

Ax400 4 x 50 WPC with two-way  
electronic crossover

#### AM Series

All amplifiers are rated @ 4 ohms from 10.5 - 15 VDC. Power is doubled into 2ohm loads. All amplifiers are internally bridged. Distortion is limited to 0.02% at full rated power. AM protection circuitry.

#### 2 Channel Models

PPI 2025 2x 25 WPC  
PPI 2050 2x 50 WPC  
PPI 2075 2x 75 WPC  
PPI 2150 2x 150 WPC  
PPI 2200 2x 200 WPC  
PPI 2300 2x 300 WPC  
PPI 2350DM 2x 350 WPC

#### 4 Channel Models

PPI 4100 4x 25 WPC  
PPI 4200 4x 50 WPC  
PPI 5075DX 2x50 & 2x 75 WPC  
with digitally controlled,  
2-way electronic  
crossover

#### ProMOS Series

All amplifiers are rated @ 4 ohms from 10.5 - 15 VDC. Power is quadrupled into 1 ohm loads. All amplifiers are internally bridged. Distortion is limited to .02% at full rated power.

#### 2 Channel Models

ProMOS 12 2x 12.5 WPC  
ProMOS 25 2x 25 WPC  
ProMOS 50 2x 50 WPC

#### 4 Channel Models

ProMOS 425 4x 25 WPC  
ProMOS 450 4x 50 WPC

#### Sedona

All amplifiers are rated @ 4 ohms at 14 VDC. All amplifiers are internally bridged and 2 ohms stable. Distortion is limited to .08% at full rated power. "Tri-Tech" protection circuitry.

#### 2 Channel Models

APA 50 2x 25 WPC  
APA 100 2x 50 WPC  
APA 200 2x 100 WPC

#### Multi-Channel Models with 2-way electronic crossovers

APA 430 ix 4x 30 WPC  
APA 630 ix 6x 30 WPC

### Signal Processors:

#### Preamp / Equalizer

PEQ 114  
PAR 225  
EQM 300

Preamp with 4 bands of equalization  
Preamp with 5 bands of parabolic equalization. 2 switched inputs  
Module with 2 bands of fixed equalization

#### Electronic Crossovers

EPX 205  
FRX 322  
OMX 432  
DCX 1000  
RCM 1000  
PSM 100  
NET 450

Two-way electronic crossover.  
Two-way electronic crossover featuring dual high-pass and sub output  
Three-way or four-way electronic crossover  
Two, three, or four-way digitally controlled electronic crossover  
Remote Control Module for DCX 1000.  
Regulated power supply for use with accessories  
Digital Data Distribution Hub

## Two-Year Limited Warranty

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. *PrecisionPower, Inc. (PPI)* warrants its amplifiers and accessories to be free from defects in materials and workmanship under normal use and service for a period of two (2) years from the date of original purchase. The extent and conditions of PPI's Limited Warranty are as follows:

1. PPI warrants that it will either repair or replace at no charge, to the original purchaser, any unit which PPI's examination discloses to be defective and under warranty, provided the defect occurs within two (2) years from the date of purchase, and the product is returned immediately to PPI. This warranty is not transferable.
2. The date of purchase of a PPI amplifier and / or accessory must be established by an original sales receipt which must accompany the article being returned for warranty work.
3. This warranty shall NOT apply to any PPI unit found to have the *original factory serial number removed or defaced*. All products, received (by PPI) 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.
4. The provisions of this warranty shall not apply to any PPI unit 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 PPI's owner's manual. Nor shall this warranty apply to any part which has been subject to misuse, neglect, or accident.
5. PPI 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 PPI APPLICABLE TO ITS PRODUCTS. ANY IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE APPLICABLE TO PPI'S AMPLIFIERS AND / OR ACCESSORIES IS LIMITED IN DURATION TO THE DURATION OF THIS LIMITED WARRANTY. PPI 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.
6. Your unit will be serviced on an in-warranty basis within the warranty period for the correction of warranted defects. If improper operation of your PPI product should occur, contact your Authorized PPI Dealer for assistance with the return and factory repair of your PPI product. If an Authorized PPI Dealer is not available, return the unit including your name, telephone number, and return address with a description of the problem to:

*PrecisionPower, Inc.*  
Warranty Department  
4829 S. 38th Street  
Phoenix, AZ 85040

**TO RETURN PPI 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 PPI 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.