



Cooustic[®]
CAR AUDIO

Owner's Manual
for **320QE, & 480QE**
Four Channel Power Amplifiers

OUTPUT FRONT REAR
MODE FRONT FREQ. MODE REAR FREQ.
OFF OFF LPT 50% 75% OFF OFF LPT 50% 75%
SENS 11 100% 50% SENS 11 100% 50%
100% 100% 100% 100% 100% 100% 100% 100%

www.cooustic.com

Welcome

...to the Coustic world of power and clarity. These new Coustic QE Series 4-channel power amplifiers deliver the cleanest music you've ever heard at any power level in the 12-volt environment.

Besides their sleek contoured design, the new 320/480QE power amplifiers offer the latest and most sophisticated audio features. This booklet offers you a guided tour of all these exciting features. For the best sonic reproduction, please follow the installation suggestions and recommendations as closely as possible. The time you spend will prove to be worthwhile when you sit back and enjoy the high fidelity music!

To further explore the potential of your Coustic amplifier, we recommend you match it with our full-feature high performance AM/FM CD/cassette source units, dynamic full-range speakers or subwoofers, state-of-the-art equalizers and electronic crossovers.

Whatever you need for your ultimate car audio system, look to Coustic - we have the fullest range of car audio components to meet the most critical demands.

Coustic...a sound investment.

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Please take a moment to complete and mail in the Owners' Registration Card. (The serial number of your amplifier is marked on the bottom of its metal chassis.) Please also record the serial number of your amplifier in the space provided below and keep this manual for future reference.

Serial Number: _____

Date of Purchase: _____

FEATURES**MULTI-FUNCTION / MULTI-CHANNEL CIRCUIT DESIGN**

The 4-channel 320/480QE amplifier can be configured as a 4-, 3- or 2-channel amplifier with built-in high-pass/low-pass filters. Each of the front and rear stereo amplifiers can be bridged to provide maximum system design flexibility. With the filters switched off, this amplifier can be configured as 2 separate quasi 3-channel amplifiers where each amplifier is capable of simultaneous mono (subwoofer) and stereo (mid-range) operation.

BUILT-IN ELECTRONIC CROSSOVER WITH CONTINUOUSLY ADJUSTABLE CROSSOVER FREQUENCIES

You have the choice of selecting full-range, high-pass only or low-pass only. These filters feature 18 dB per octave high-pass and low-pass. Furthermore, the crossover frequencies are continuously variable for fine-tuning of your audio system.

OVER-CURRENT, SHORT CIRCUIT AND DC OFFSET PROTECTION

The sophisticated circuitry monitors abnormal conditions such as voltage spikes, oscillation, DC offset or short circuit. When any of these undesirable conditions exceed their respective preset limits, the circuit will shut down the audio system briefly and light up the protection indicator to identify the problem for immediate attention. Once the problem is resolved, the amplifier will resume operation automatically.

TRIPLE DARLINGTON HIGH CURRENT/HIGH VOLTAGE FULLY COMPLEMENTARY OUTPUT STAGE

Complementary output stage audio circuitry has long been a hallmark of "exotic" home amplifier design. Coustic is one of the very few car audio manufacturers to incorporate such elaborate audio circuitry into its power amplifiers. Triple Darlington configuration ensures the audio amplifier is always operating under optimum conditions.

LINE OUTPUTS

The full-range line outputs can be used to feed signals to another amplifier for your future expansion or for setting up a more sophisticated system.

WIDE RANGE INPUT SENSITIVITY ADJUSTMENT

The input sensitivity level of the Coustic QE Series amplifiers can be easily varied from as low as 100 mV to as high as 5.0 volts by adjusting the control on the End Panel.

HIGH/LOW IMPEDANCE INPUT

If you are using a floating or common ground car stereo, these amplifiers are the best fit for your system. They are compatible with floating or common ground car stereo speaker outputs even without a floating ground adapter. If, in the future, you decide to change to a higher quality aftermarket source unit with RCA pre-amp outputs (like the Coustic CD527), this same amplifier is there to give you improved frequency response and better sonic performance.

STABLE INTO 2-OHM LOADS

With the over-designed power supply section and a sophisticated power management circuitry, these amplifiers can maintain their stability even in the highly reactive low impedance environment.

ADJUSTABLE BASS BOOST

This feature allows you to enhance the bass performance of your sound system. The control is continuously variable with a maximum boost level of 18 dB.

BUILT-IN REMOTE SUBWOOFER LEVEL CONTROL PORT (not available on 320QE)

This amplifier has a built-in remote subwoofer level control input port. With the optional RS remote control, the subwoofer output level can be adjusted to compensate for bass fluctuations in a moving vehicle.

CONTROLS, INDICATORS, AND TERMINALS

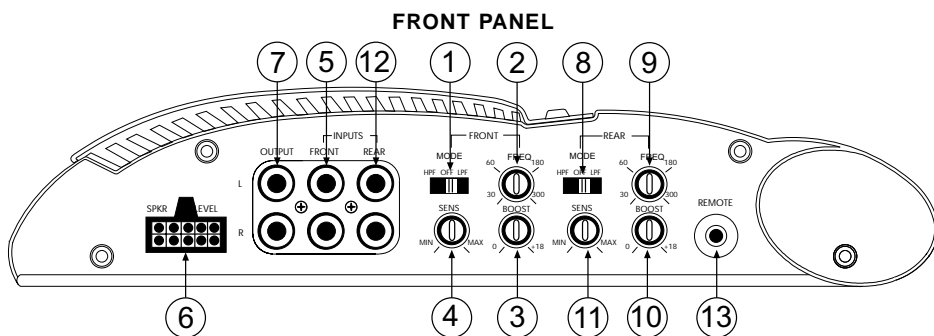


Figure 1: Front Panel Terminals and Controls

1. **FRONT CHANNEL FILTER MODE SELECT SWITCH (MODE)**
 "HPF": Slide switch to this position if the amplifier is used as a mid/tweeter amplifier.
 "OFF": Slide switch to this position if the amplifier is used as a full-range amplifier.
 "LPF": Slide switch to this position if the amplifier is used as a subwoofer amplifier.
2. **FRONT CHANNEL HIGH-PASS / LOW-PASS FREQUENCY SELECTOR KNOB (FREQ)**
 Select a high or low-pass crossover frequency between 30 to 300Hz.
3. **FRONT CHANNEL BASS BOOST CONTROL (BOOST)**
 Select a boost level between 0 dB and +18 dB to enhance the bass performance of your sound system.
4. **FRONT CHANNEL INPUT SENSITIVITY LEVEL CONTROL (SENS)**
 The input sensitivity level can be varied from 5.0 volts to 100 mV depending on the output voltage of the source unit (refer to sub-section titled INPUT SENSITIVITY ADJUSTMENT).
5. **FRONT CHANNEL HIGH IMPEDANCE INPUT**
 To be connected to RCA pre-amp outputs from a source unit (i.e., radio, tape deck or CD player).
6. **FRONT/REAR CHANNEL LOW IMPEDANCE INPUT**
 To be connected to speaker outputs from a source unit when pre-amp outputs are not available.
7. **LINE LEVEL OUTPUT**
 This output can be used to connect to another amplifier for system expansion.
 Note: This line level output is full range.
8. **REAR CHANNEL FILTER MODE SELECT SWITCH (MODE)**
 "HPF": Slide switch to this position if the amplifier is used as a mid/tweeter amplifier.
 "OFF": Slide switch to this position if the amplifier is used as a full-range amplifier.
 "LPF": Slide switch to this position if the amplifier is used as a subwoofer amplifier.
9. **REAR CHANNEL HIGH-PASS / LOW-PASS FREQUENCY SELECTOR KNOB (FREQ)**
 Select high or low-pass crossover frequency between 30 to 300Hz.
10. **REAR CHANNEL BASS BOOST CONTROL (BOOST)**
 Select a boost level between 0 dB and +18 dB to enhance the bass performance of your sound system.

11. **REAR CHANNEL INPUT SENSITIVITY LEVEL CONTROL (SENS)**
 The input sensitivity level can be varied from 5.0 volts to 100 mV depending on the output voltage of the source unit (refer to sub-section titled INPUT SENSITIVITY ADJUSTMENT).
12. **REAR CHANNEL HIGH IMPEDANCE INPUT**
 To be connected to RCA pre-amp outputs from a source unit (i.e., radio, tape deck or CD player). If there is only one input available, connect it to the front input so that signals can automatically be directed to the rear channels.
13. **REMOTE SUBWOOFER LEVEL INPUT (not available on 320QE)**
 To be connected to the optional RS remote subwoofer volume control.

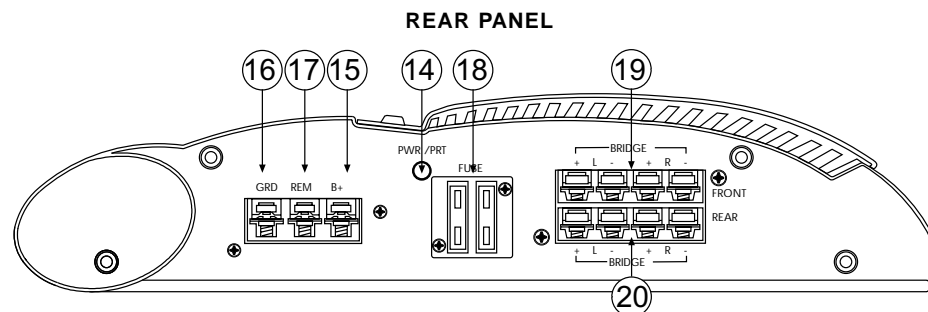


Figure 2: Rear Panel Terminals and Indicators

14. **POWER AND PROTECT INDICATOR (PWR/PRT)**
 Green light indicates that the amplifier is "ON."
 Red light indicates either a high current, short circuit or DC offset is detected at the speaker outputs. The amplifier will revert to normal operation once the problem is rectified.
 This indicator also lights up at a high operating temperature. Under this condition, the amplifier will automatically shut down. As soon as the temperature falls to a safe level, the amplifier will automatically resume operation.
15. **POWER INPUT TERMINAL (B+)**
 To be connected to the positive terminal of the vehicle's battery or other constant +12 V source.
16. **GROUND INPUT TERMINAL (GND)**
 To be wired to the vehicle's chassis for ground.
17. **REMOTE TURN-ON INPUT TERMINAL (REM)**
 To be connected to the remote control wire or power antenna lead of the source unit for remote ON/OFF.
18. **FUSE RECEPTACLE**
19. **FRONT CHANNEL LEFT/RIGHT SPEAKER OUTPUT TERMINAL**
 For connection to the front speaker system.
20. **REAR CHANNEL LEFT/RIGHT SPEAKER OUTPUT TERMINAL**
 For connection to the rear speaker system.

SYSTEM CONFIGURATION

By purchasing the 4-channel 320/480QE amplifier, you are already one step closer to experiencing the purest and most natural sound quality in the automobile environment. To take full advantage of the potential of this amplifier, before installation, we strongly recommend that you acquaint yourself with all its available features and then spend some time in designing a system most suitable for you. Take into consideration the components you have now and those that you plan on adding or upgrading in the future.

BUILT-IN ASYMMETRICAL ELECTRONIC CROSSOVERS

An electronic crossover has many advantages over passive crossovers - lower cost, simplified, yet more flexible system design, lower distortion and higher gain structure. The 320/480QE power amplifiers are equipped with built-in 18 dB per octave continuously adjustable electronic crossovers. The front and rear channels can be configured separately for full-range, high-pass or low-pass applications.

The line output is designed to provide additional expansion capability to your sound system.

BI-AMPLIFICATION

A bi-amplified system normally consists of an active crossover and two amplifiers. The active crossover divides the audio frequency spectrum into two ranges: frequencies below the crossover point are directed to the amplifier driving the subwoofer(s), while all frequencies above the crossover point are directed to the amplifier driving the mid-range/tweeters.

Because of the versatility of the Coustic 4-channel amplifier - the capability of being a 4-, 3- or 2-channel amplifier - you are quite free to build whatever mobile audio system you want or to plan a long term expansion scheme for your car's audio system.

For example, with the low impedance input, you can use the 320/480QE as a 4-channel amplifier to upgrade your existing factory sound system to drive the stock front and rear speakers.

Or you can bi-amp your system using the front amplifier to drive a pair of high-passed mid/tweeter speakers while using the rear amplifier to drive a pair of woofers/subwoofers.

You can also configure the 320/480QE as front and rear high-passed mid/tweeter amplifiers and use the output for connection to another subwoofer amplifier.

If you need more power, you can use the amplifier as a 2-channel subwoofer amplifier to drive a pair of subwoofers. The full-range line output can be used to drive an additional amplifier driving the rear full-range speaker.

3 CHANNEL CONFIGURATION

When the mode switches are set at the OFF position, the amplifier can be configured as two separate amplifiers. Each amplifier can be configured as either a 1-channel, bridged, mono amplifier driving a single speaker, a 2-channel, stereo amplifier driving a pair of speakers, or with the addition of passive crossovers, a quasi 3-channel amplifier driving a pair of left- and right-channel, full-range mid-tweeters and a mono woofer simultaneously. Care must be taken to choose capacitors and inductors of correct value; otherwise damage could be done to the speakers and/or the amplifier.

For the approximate passive crossover components' value, please refer to Coustic's website, <http://www.coustic.com>.

MULTI-FUNCTION PROTECTION INDICATOR

When the red protect indicator lights up it signifies a high operating temperature is detected and the amplifier is temporarily shut down to allow for a cooling period. As soon as the temperature returns to a safe level, the amplifier will restart and resume normal operation.

This indicator also lights up when the amplifier detects either an over-current situation, shorted speaker outputs or a DC offset at the outputs. Turn off the amplifier, double-check all inputs and speaker connections to make sure there is no short or inappropriate inputs. If all connections are in order, turn on the amplifier to resume operation.

SPEAKER IMPEDANCE

Although extremely low impedance speaker loads will not damage the amplifier, for stereo mode, we recommend speaker loads of 2, 4 or 8 ohms; for bridged mono mode, 4 or 8 ohms.

(Note: In bridged mono mode, the amplifier sees only half of the speaker impedance).

NOTE: Remember that we are not defying the laws of Physics! IF you decide to connect ANY Coustic amplifier into a bridged mono load BELOW 4 ohms, Physics dictates that current draw doubles! This is not too big a problem with the 320QE. But with the 480QE this is DANGEROUS. The current draw could be as great as 150 amps (peak). Make sure you wire your system properly.

POWER CABLES

Power cables are as important as battery capacity. Use only high quality power cables of gauge size AWG 8 (AWG 4 for the 480QE) or bigger for installation.

YOU CAN NEVER HAVE TOO BIG OF A POWER/GROUND WIRE!

CIRCUIT BREAKER/FUSES

It is also advisable to install a circuit breaker/fuse close to the battery. This would effectively lower the risk of the power cable catching fire should a short circuit occur in the audio system. A circuit breaker or fuse with 50% the rating of the main batteries amp hour rating is recommended. Going larger in circuit breaker or fuse value means that you have NO protection. **DO NOT** over fuse! Fuses on the amplifier **DO NOT** protect the amplifier, they protect the car.

SPECIAL PRECAUTIONS & ACCESSORIES

Quality equipment, and proper system design and installation are the ingredients for the ultimate car audio system. With your wise decision to purchase this Coustic amplifier, you are already one big step closer to realizing your dream. The next step is simple - have an experienced professional Coustic dealer install your audio system. However, if you prefer to install the system yourself, we have the following recommendations for your reference:

Caution: Improper installation will void the product warranty and Coustic is not responsible for any consequential damage to the amplifier and/or other audio components and/or electrical components of the vehicle.

TERMINALS, LUGS AND CONNECTORS

High current terminals, lugs and/or connectors are also required to ensure a safe and sure electrical connection and conduction.

NEGATIVE GROUNDING SYSTEM

The 320/480QE power amplifiers are designed for use with a 12-Volt negative ground system. Installing this amplifier in a vehicle with a POSITIVE ground system will result in severe damage to the amplifier, other audio components and/or the vehicle's electrical components. If your vehicle happens to run on a positive ground system, please consult your Coustic dealer.

WARNING: The 320/480QE power amplifiers are very powerful. We strongly recommend installation in the following manner:

- (1) *by professional mobile audio installers; and*
- (2) *incorporating all of the above special precautions and accessories.*

Failure to comply with either one or both of the above conditions will render the warranty void and Coustic is not responsible for any consequential damage to the amplifier, other audio components and/or electrical components of the vehicle.

INSTALLATION

Caution: Please follow all the installation recommendations and instructions in this manual. Installing and/or using the amplifier in methods other than those outlined herein may reduce the performance capability of the amplifier. Any such installation or usage renders the product warranty void.

LOCATION

Ventilation: The primary deciding factor of amplifier location is heat dissipation. Despite its highly efficient heat dissipation design, the amplifier can be crippled by inadequate ventilation. Prolonged operation at high volumes, combined with inadequate ventilation, may cause the amplifier to overheat and trigger the automatic shut down circuit until the temperature returns to a safe level. To ensure adequate ventilation, the ideal location for the amplifier is a spot away from any heat source, with at least 2 inches of clearance above and around the unit.

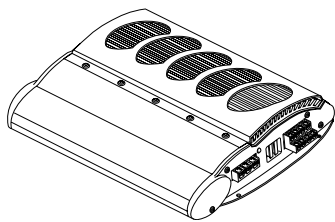


Figure 3: Upright Mount on Horizontal Surface

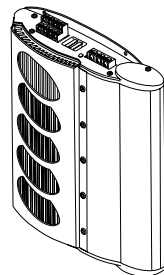


Figure 4: Parallel Mount on Vertical Surface

The amplifier may be mounted upright on a horizontal surface (see Figure 3) or parallel to a vertical surface (see Figure 4). However, the amplifier should never be mounted upside down (see Figure 5) for the simple reason that the hot air generated by the amplifier would have to go through the unit internally on its natural upward path (i.e. "feedback" into the unit) and would result in increased internal temperature. This would speed up the thermal shut down of the amplifier.

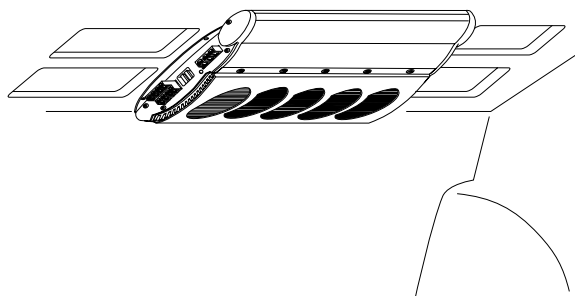


Figure 5: Inverted Mount (Not Recommended)

Vibration: Constant vibration could eventually cause the amplifier to come off its mount, resulting in stress on wire connections, which, in turn, results in an "open" or "short" circuit. For this reason, a location with minimum vibration and a flat surface for secure and firm mounting should be chosen for the amplifier.

Moisture: The amplifier should also not be exposed to moisture and water.

Taking all the above into consideration, the best mounting position for the amplifier would be the floor of the trunk or behind the rear seat back.

WIRING LAYOUT

Once the location of all the components has been determined, plan the best routes for all the necessary wiring, making sure that the wires are easily accessible without dismounting the various components.

MOUNTING

1. Place the amplifier at the desired location and use it as a template to determine the exact position of the mounting holes.
2. Mark the mounting holes with a felt pen.
3. Put the amplifier aside.
4. If the mounting surface is carpeted, cut out small circles of the carpet and padding around the four mounting holes to expose the metal underneath.
5. Use a center punch to ensure drilling the exact position for the screws. **DO NOT BEGIN DRILLING UNTIL YOU HAVE PUT THE AMPLIFIER ASIDE. USING THE AMPLIFIER AS A DRILLING GUIDE MAY CAUSE IRREPARABLE DAMAGE TO THE AMPLIFIER.**
6. Mount the amplifier with the screws provided.

WIRING

Routing audio cables and power cables together would invariably cause radiated engine noise in your audio system. If possible, run audio cables on one side of your car and power cables on the other. Never route these wires underneath the vehicle body.

Note: The battery ground should remain **DISCONNECTED** at all stages of installation.

CONNECTION

Connect the front and rear RCA input jacks of the Amplifier to the outputs of the Source Unit (e.g. radio, cassette player or CD player). If line level output is not available, connect the speaker outputs of the source unit to the Loz input of the amplifier.

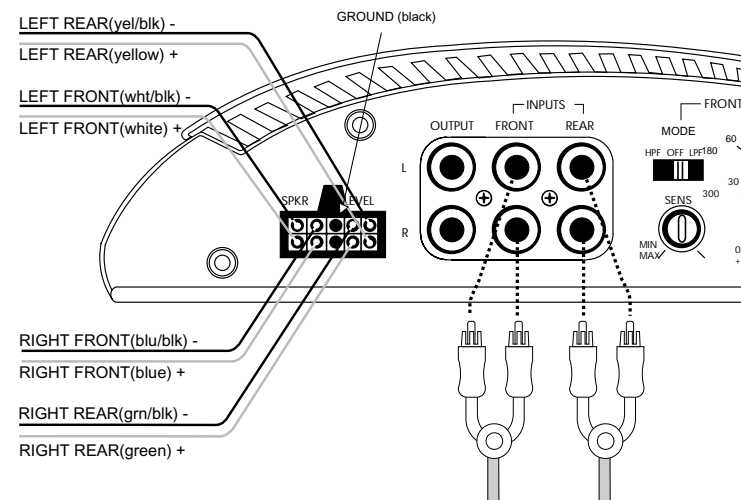


Figure 6: High/Low Impedance Inputs

Note: Connect the black ground wire to the source unit ground **only** if alternator noise is present.

Connect the Amplifier to the Speakers. Use thicker speaker wires (e.g. 8 - 10 gauge desirable) for these connections.

For Stereo Mode

1. Connect the front left negative ("-") speaker output of the amplifier to the negative terminal of the left speaker.
2. Connect the front left positive ("+") speaker output of the amplifier to the positive terminal of the left speaker.
3. Connect the front right ("-") speaker output of the amplifier to the negative terminal of the right speaker.
4. Connect the front right ("+") speaker output of the amplifier to the positive terminal of the right speaker.
5. Repeat the same for the rear channel speaker connections.

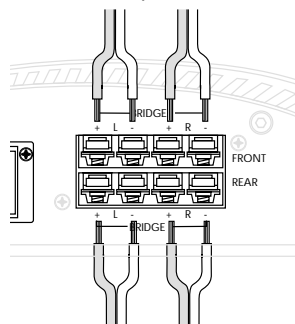


Figure 7: Stereo Connection

For Bridged (Mono) Mode

1. Connect the front left positive ("+") speaker output of the amplifier to the positive input terminal of the speaker.
2. Connect the front right negative ("-") speaker output of the amplifier to the negative input terminal of the speaker.
3. Repeat the same for the rear channel.
4. Make sure that ALL RCAs (front and rear left/right) are plugged in, other wise bass response and output will suffer.

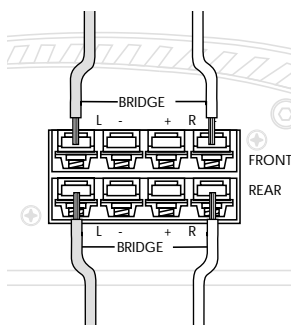


Figure 8: Bridged Single Woofer Connection

CAUTION: ANY DEVIATION FROM THE ABOVE SPEAKER CONNECTION MAY CAUSE SERIOUS DAMAGE TO THE AMPLIFIER AND/OR SPEAKERS. PLEASE DOUBLE CHECK THE CONNECTION BEFORE TURNING THE SYSTEM ON.

Connect the Amplifier to the Battery

Heavy gauge wire is preferred. Add a fuse or circuit breaker to any power wire that runs through a firewall or sheet metal to protect the battery, the vehicle, and more importantly, you. It is highly recommended that installation is carried out by an authorized Cooustic dealer.

Connect the Amplifier Remote Control

Connect the remote input terminal of the amplifier to the remote output terminal of the source unit to establish amplifier remote on/off through the power on/off of the source unit. If the source unit does not provide a remote output, connect to its power antenna lead or other switched 12-volt source, e.g. ignition switch.

Connect the Amplifier Ground to Vehicle Chassis

Find a good ground spot in the vehicle and connect the ground terminal of the amplifier to this point via a large gauge ground cable.

Reconnect the Battery Ground to the Vehicle Chassis

Double check all the previous installation steps, in particular, the wiring and component connection. If everything is in order, complete the installation by reconnecting the battery ground to the vehicle chassis.

Optional RS Remote Subwoofer Level Control (not available on 320QE)

If the optional remote subwoofer level control (model RS) is used, connect the plug of the RS to the port on the end panel of the amplifier.

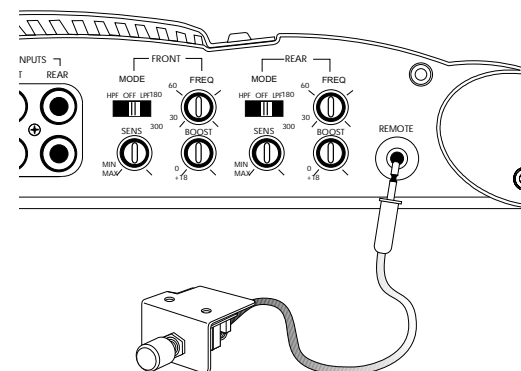


Figure 9: Remote Subwoofer Level Control (480QE only)

FINAL SYSTEM CHECK

INPUT SENSITIVITY ADJUSTMENT

The Input Sensitivity Control is located on the Front Panel. The objective of input sensitivity adjustment is to match the output of the source unit with the input of the amplifier. The output voltage of individual source units can vary. For example, some radios have an output of 200 mV and others have 5 Volts or more. To cater to these variations, the QE amplifier has an adjustable input sensitivity level that ranges from 100 mV to 5 volts.

Adjusting this control requires some experimenting. Basically, you want all the gain at the beginning of the system, NOT at the end (amplifier). Turn your headunit UP and keep your amplifier gains at the minimum possible setting (counter-clockwise). This will give you the best sound and lowest signal to noise ratio.

Besides better sonic reproduction, proper input sensitivity also helps to prolong the reliability span of your amplifier by eliminating excessive internal temperature generated by incompatible source unit output and amplifier input.

Note : Turning the input gain UP does NOT indicate MORE power. Just MORE noise. The input gain control IS NOT a power control. REMEMBER that the input gain control has nothing to do with the power output of the amplifier

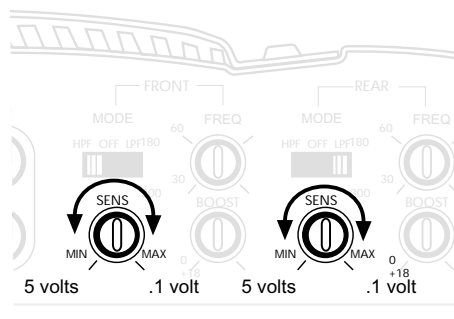


Figure 10: Input Sensitivity Control

1. Turn the Input Sensitivity Control all the way down (counter clockwise).
2. Set the volume control of the source unit to approximately 2/3 of its maximum output.
3. Turn the balance control of the source unit to its center position.
4. Leave the tone (bass/treble) controls at their usual position.
5. Play a CD or tape track with great dynamic range.
6. Use the Bass Boost Control to enhance the bass performance (if desired).
7. To locate the optimum input sensitivity setting, ask the person assisting you to turn the Input Sensitivity Control clockwise until audio distortion starts to develop. Turn the sensitivity control backwards slightly to minimize the distortion.
8. If you constantly switch between CD/tape and radio, you will need further adjustment since radio output level differs from that of CD or tape. In this case, you need to locate a balanced sensitivity setting which is best for both the output level of radio and that of CD or tape.

CROSSOVER SELECTION

The amplifier has built-in high-pass/low-pass filters for both front and rear channels that can be defeated by sliding the switch to the OFF position.

1. When the high-pass is selected, the amplifier will be devoted to mid/tweeters.
2. When the low-pass is selected, the amplifier will be used to drive woofers/subwoofers. With this setting, the optional RS can directly control the amplifier playback level.
3. When the filter is switched off, the amplifier is used as a full range amplifier.

CROSSOVER FREQUENCY SELECTION

Both the high-pass and the low-pass section offer continuously adjustable crossover frequencies between 30 and 300 Hz. Adjust the setting according to your speaker component specification or to your particular preference.

BASS BOOST CONTROL (BOOST)

Select a boost level between 0 dB and +18 dB to enhance the bass performance for your sound system. BASS BOOST is NOT free! Every 3dB of boost costs you twice as much in power. Make sure to set the final gains... after setting the Bass Boost to work best with your subwoofer/enclosure combination. More is NOT always better!

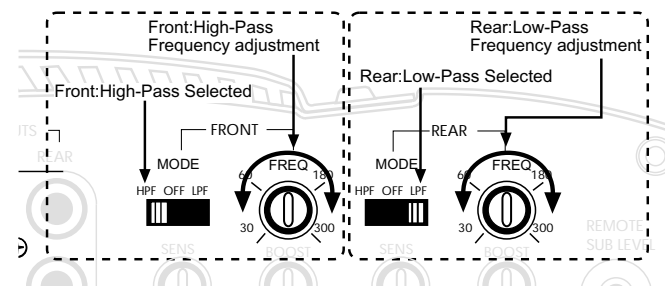


Figure 11: Crossover Frequency Adjustment

SETTING UP 480QE USING RS (Remote subwoofer control)

If you are using the RS control, make sure to take this into account during set-up procedures of the subwoofer amplifier. You should set the system up with the RS plugged in, and with the level knob turned all the way down (counter-clockwise).

NOTE: the RS ONLY works in the "rear channel", and ONLY when you've selected the LPF (low-pass) crossover configuration.

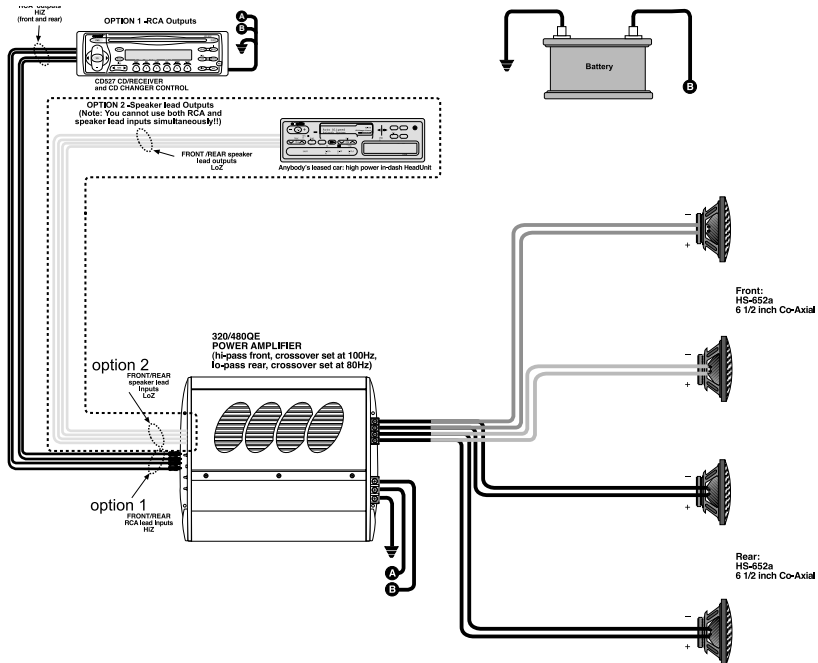


Figure 12: Typical Full Range System

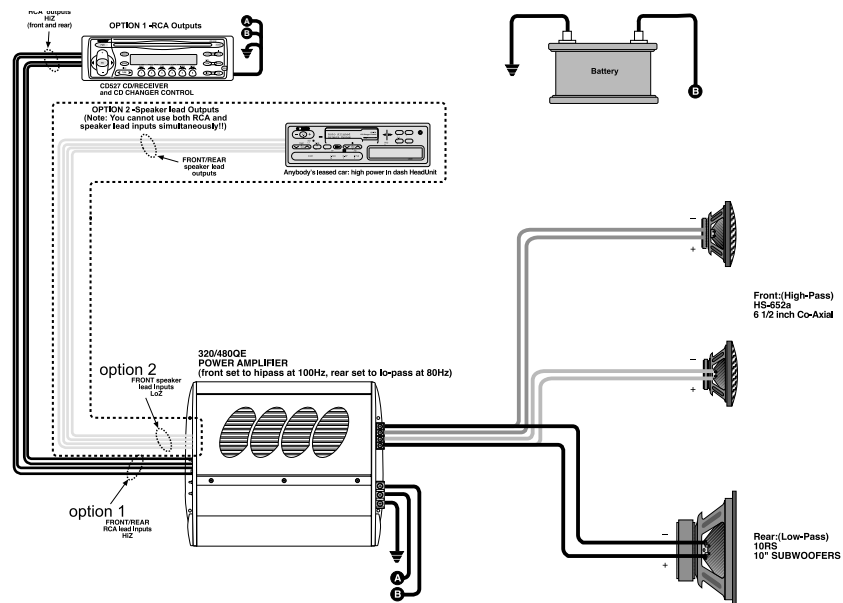


Figure 13: Typical High/Low pass System with one amplifier

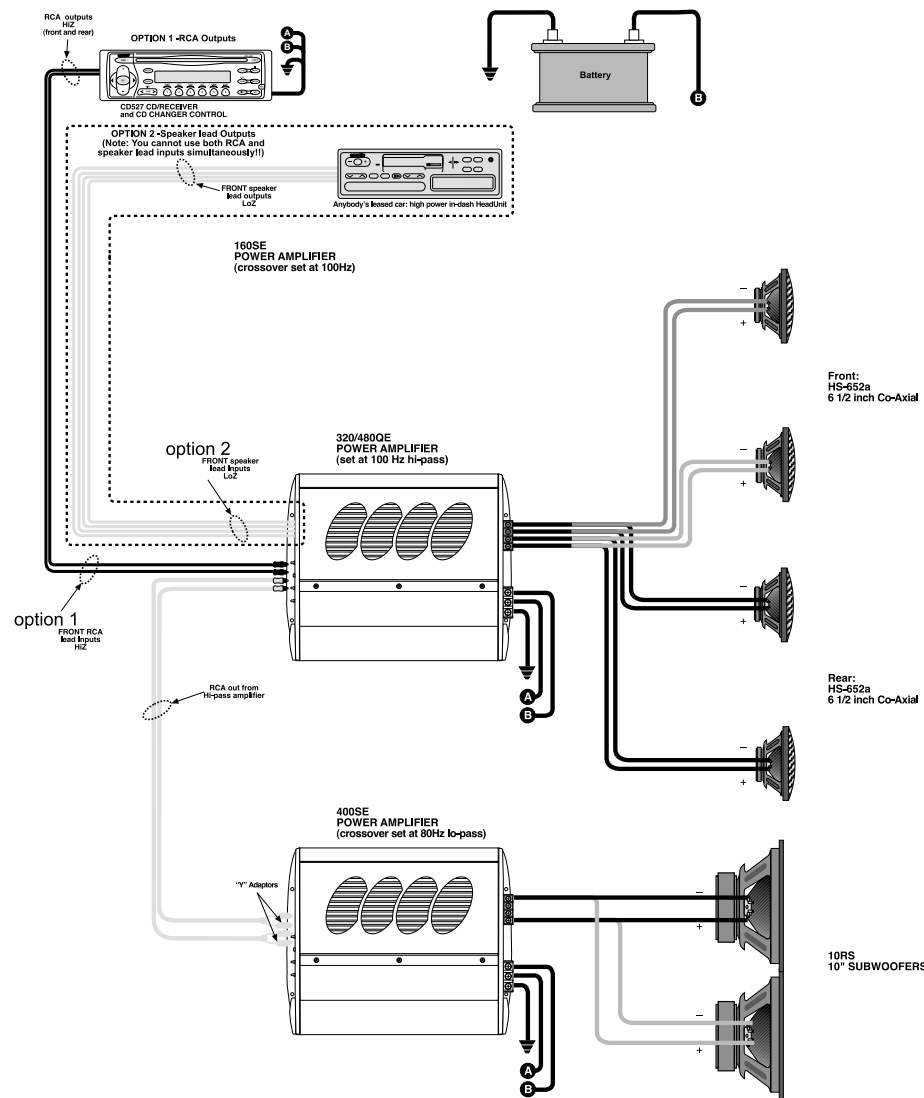


Figure 14: Typical High/Low pass System with two (2) amplifiers

TROUBLE-SHOOTING SECTION

SYMPTOM

1 No power

PROBABLE CAUSE

Check connections to the amplifier's Ground, B+ & Remote terminals. Check connection at "+" terminal of the battery. Check the remote turn-on terminal. Ensure it receives power when the source is turned on (or when the switch is turned on). Refer to the Installation Section. Check the power line fuse: if fuse is blown, replace it; if fuse continues to blow, check the power wire and also the amplifier for a short. If the short is in the power wire, fix it; if the short is in the amplifier itself, see your Coustic dealer.

Check the voltage at the amplifier, and the remote ON/OFF lead. The voltage should measure between 11 V-15V. If the measurement is beyond this range, have the source unit checked out by an authorized dealer.

2. Power without sound with red power/protection indicator on

Turn the amplifier off, and Check all input & output signal cables and connections. Check the speakers for a short with a VOM or by connecting them to another audio system. After making sure everything is normal, turn the amplifier on again.

3. Power without sound with red power indicator on

The continuous red light of the power indicator signals a high internal operating temperature which results in the amplifier switching off temporarily; when the amplifier cools down to a safe level, the amp will automatically restart.

4. No sound from one side

Check balance control.
Check speaker connections.
Check signal input connection.

5. Very low sound from both radio & tape

Check your radio's fader control.
Check the amplifier's Input Sensitivity Level.

6. Frequent automatic amplifier shut down

This indicates that the amplifier is operating at a continually undesirable high internal temperature.
High operating temperature caused by inadequate ventilation. (Refer to the sub-section titled LOCATION for a better amplifier location.)
High operating temperature can be caused by an excessively low impedance load, say below 2 ohms. Check for bad speakers and/or electronic crossover, proper passive crossover components; if all else fails, try rewiring the entire system. A high operating temperature can be caused by an incorrect input sensitivity level (refer to sub-section titled INPUT SENSITIVITY ADJUSTMENTS for correct setting).

7. "Motorboating": The amplifier power indicator going off repeatedly when the audio system is on.

Check the amplifier's connection to the battery.
Check battery voltage. If low, recharge or replace battery.
Check all ground connections.

SYMPTOM

8. Whining noise when engine is running with noise varying with the accelerator (noise level varies with source unit volume.control).

PROBABLE CAUSE

Reroute power cable from the battery to the source unit directly, bypassing the battery terminal in the fuse box. Check power connections to be sure they are clean. Check ground connections to be sure the ground wire is in direct contact with the bare metal surface of chassis (with that spot scraped clean of any paint).

9. Constant level whining noise (most noise with source unit volume at minimum)

Check for a ground loop in the system. Turn the system off and one by one change the ground connections (by changing to a different contact point, scraping the level constant irrespective of metal clean of any paint, rust or grease). Turn the system on and check for whining noise after each ground change.

CAUTION:

Do not disconnect the Power Amplifier's ground when the system is on. This could damage the amplifier.

Check for defective signal cables. Disconnect signal cables at the amplifier and listen carefully for noise. If the noise disappears, run a test pair of signal cables. If there is no undesirable whining noise, reconnect to the amplifier with the new pair of signal cables. Check the battery ground connection to the vehicle chassis to make sure it is tight and clean. Check the battery negative terminal connection to make sure it is tight and clean.

10. Radiated noise: crackling noise on FM which is not present when playing tape or CD (noise varying slightly with accelerator, but is present at all times)

Check if the noise is actually radiated noise: Tune a portable radio to the same FM station. Move the portable radio close to the vehicle engine. If the crackling noise comes from the portable radio, then the noise you have in your vehicle audio system is radiated noise.
Check with a VOM to make sure the antenna is really grounded to the vehicle chassis.
To ensure a true ground, break the plastic covering of the antenna lead and solder a piece of heavy wire (minimum 14-gauge) to the braided shield.
Ground the other end of the wire at the same point as the radio ground.
Check spark plug wires. They should be suppression-type wire and less than 2 years old. Otherwise, replace them with good quality suppression cables.
Make sure the engine block is grounded to the vehicle chassis at a bare metal spot (scraped clean of paint, rust and grease).

Make sure hood is also grounded. If not, use a ground strap (which is available from any auto parts store) to ground the hood to the vehicle chassis.

SPECIFICATIONS:

	320QE	480QE
Rated Power @ 14.4 V (0.1 % THD) : 4 Ohm Stereo	4 x 40 Watts	4 x 60 Watts
Rated Power @ 14.4 V (0.1 % THD) : 2 Ohm Stereo	4 x 80 Watts	4 x 120 Watts
Rated Power @ 14.4 V (0.2 % THD) : 4 Ohm Mono	2 x 160 Watts	2 x 240 Watts
Frequency Response :	20 –20,000 Hz +/- 0.5 dB	20 –20,000 Hz +/- 0.5 dB
Input Sensitivity:	0.1 – 5 V	0.1 – 5 V
S/N Ratio @ rated power :	100 dB	100 dB
High-Pass Filter Crossover Frequency : (Continuously Variable, @18 dB/Oct.)	30 - 300 Hz	30 - 300 Hz
Low-Pass Filter Crossover Frequency : (Continuously Variable, @ 18 dB/Oct.)	30 - 300 Hz	30 - 300 Hz
Bass Boost Level :	0 – 18 dB @ 45 Hz	0 – 18 dB @ 45 Hz
Dimensions:	11" W (280 mm) 2 3/8" H (60 mm) 13 3/16" L (335 mm)	11" W (280 mm) 2 3/8" H (60 mm) 14 3/8 (365 mm)

Limited Warranty*Important Notice to Consumer:*

Coustic offers the following warranty to the ORIGINAL PURCHASER of COUSTIC products within the period stated herein:

Coustic warrants all new products against defects in material and workmanship for a period of ONE (1) YEAR from date of original purchase. The limited warranty is EXTENDED to TWO (2) YEARS from date of original purchase if the product is originally installed by an authorized Coustic dealer and is accompanied by a valid sales receipt showing a charge for installation.

Should a defect occur, Coustic will repair or, at its option, replace defective units/parts with new or factory rebuilt materials without charge for either parts or labor to the original purchaser. Replacement units/parts will be warranted for the remaining portion of the original warranty period.

IMPORTANT: THIS WARRANTY DOES NOT COVER INSTALLATION OR DAMAGE RESULTING FROM ACCIDENT, MISUSE, ABUSE, IMPROPER WIRING, INCORRECT VOLTAGE, OPERATING UNIT AGAINST INSTRUCTIONS IN OWNER'S MANUAL OR ANY PRODUCT WHICH HAS BEEN OPENED, TAMPERED WITH OR SERIAL NUMBERS REMOVED.

This warranty does not cover labor costs for removal and/or installation of the unit for repair. Under no circumstances shall Coustic be liable for any special, incidental or consequential damages or for any other expenses incurred by reason of use or sale of this product. This warranty is in lieu of any other warranties expressed or implied including any implied warranty of merchantability or fitness for particular use or otherwise.

This warranty gives the CONSUMER specific legal rights and he may also have other rights which vary from state to state. Some states do not follow the exclusion or limitation of incidental or consequential damages, hence the above exclusions and limitations may not apply.

If all fails, call us at 1-602-438-2020, or go to our website at <http://www.coustic.com>



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