

# LC8<sup>tm</sup>

## Eight Channel Line Output Converter

For interfacing with factory installed audio systems

**G**reetings from the rainforests of the Pacific Northwest. We would like to congratulate you on your purchase of the LC8; an eight-channel, high-performance, line-output converter. This unique product will accept two, four, six or eight channels of speaker-level signal from a factory-installed amplifier or source unit and convert it to a high-quality, low-noise pre-amp signal. Therefore the LC8 is an ideal OEM (Original Equipment Manufacturer) interface component as it will allow you to use your factory-installed source unit but give you the ability to add really good aftermarket amplifier(s) and processor(s). Whether this is your first product from the rainforest dwellers of AudioControl, or you are already a firm believer, you will definitely enjoy how great the LC8 can make your performance system sound.

Now before you start salivating just thinking about the benefits and all of the nifty applications for your LC8, take a few minutes to sit back, have a cold beverage, and read through this manual. We always love to get calls from our customers, but have tried to answer all of your questions in this manual so it contains lots of useful facts and information - - and besides, we spent a lot of time writing it!

### Key Features of The LC8

Here are some of the cool features that your LC8 offers:

- Eight input and output channels
- Speaker-level inputs – can accept 400-watt signals!
- Channel summing
- GTO™ - signal-sensing inputs
- Level matching controls
- 12 volt trigger output
- Input for optional subwoofer level control
- Cardboard box for easy storage

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## **Features and Highlights**

### **Speaker-Level Inputs**

If you are like many people who like the look and features of their factory-installed source unit but feel your system overall is lacking power and bass, we have good news. The LC8 has high-impedance speaker-level inputs that allow it to accept amplified signals from most factory-installed source units (even Bose) and output a high-quality pre-amp signal via standard RCA connectors. This will allow you to add better-quality aftermarket amplifiers, processors and speakers while keeping the convenience features of your factory-installed source unit. Unlike inexpensive speaker-level and line-output converters available, the LC8 offers the highest sound quality and can handle the full signal strength of a 400-watt amplifier.

### **GTO™ Signal-Sensing Inputs**

Most factory-installed source units lack the features that make it easy to upgrade with really good-sounding, performance aftermarket products. One of those key features is a 12-volt trigger that will turn on devices like the LC8 and your external amplifiers. Therefore, we have equipped your LC8 with our unique GTO™ (Great Turn On) signal-sensing inputs. Once the GTO input of your LC8 detects a speaker-level signal on the Main Inputs, it powers up. When the speaker-level signal goes away, your LC8 will automatically turn-off. Optionally, your LC8 is also equipped with a standard 12-volt trigger (Remote In) that will allow you to turn on your LC8 in the traditional manner.

### **12-Volt Output**

Since you will be using an external amplifier(s) and processor in your system, you will need the ability to “trigger” or turn-on these devices (a romantic dinner won’t quite work here). Your LC8 has a high-current 12-volt output (labeled Remote Out) that will provide a trigger to these remote devices, when the LC8 is powered up. Please note that this output is not to be used as the main power for these devices.

### **Summable Outputs**

The LC8 has the unique ability to sum together multiple (4, 6, or 8) input channels from the factory source unit into 2 channels. This is particularly handy when using the LC8 with a factory system that has multiple, actively crossed-over signals being sent from the OEM source unit or amplifier(s). For example, in some vehicles there is an actively crossed-over tweeter, midrange, and woofer all in the front of the vehicle. The LC8 lets you take all of those signals and sum them together to get a high-quality, full-range, pre-amp signal without the use of any additional cables or hardware.

## **AutoMode Inputs**

Sometimes in life (and car audio) we need more outputs than inputs. Therefore we have equipped your LC8 with AutoMode inputs that take the Channel 3 signal and automatically feeds it to the Channel 4 outputs, provided there is no signal present on the Channel 4 inputs. This means your LC8 will accept two input channels and give you four output channels. Or it can accept four input channels and give you six output channels...or it can accept six and give you eight!! It stops at eight by the way.

## **Output Level Controls**

Your LC8 has level controls for each pair of channels. These controls allow you to adjust the signal level from your factory-installed amplifier or source unit to match up with your aftermarket amplifier or processor.

## **Input For Optional Subwoofer Level Control**

With the addition of performance, aftermarket amplifier(s) and speakers, you may feel the need to have more control over your system. The Remote Subwoofer Level Control (sold separately along with undercoating) allows you to add a dash-mounted control to your LC8 that will adjust the level of the Channel 4 output, often used for the subwoofer. This output is full range so it may need to be crossed over depending upon your application.

## **Bulletproof Warranty**

The most important feature of all. Every AudioControl product is selflessly designed and manufactured in our factory located in the rainforests of the Pacific Northwest. We take every effort to ensure that you will have many years of enjoyment out of your LC8. To ensure optimal performance we highly recommend that you allow your authorized AudioControl dealer to perform the installation. Not only do they have all the right knowledge and tools, but also in the unlikely chance your LC8 should stop working, we will back it with a limited five years parts and labor warranty. Should you choose to install it yourself we will still give you a one-year parts and labor warranty. To activate your warranty, you need to **FILL OUT AND SEND IN YOUR WARRANTY CARD!**



We also recommend that you save your invoice or sales slip as proof of installation and ownership. Not only is it necessary for warranty purposes, but should your LC8 “walk away” one day while your car is parked at your local latte’ stand, you will find insurance companies very unforgiving without proof of purchase.

## Quick Installation Information

For those of you short on time but high on ambition, we offer the following section to speed up your installation of the LC8:

1. Physically mount the LC8 in a location that keeps it away from soda spills, food crumbs, and curious fingers. You will want to select a location that allows you access to the level controls. In many cases you can find factory speaker leads in the rear of the vehicle that are easy to access.

2. The LC8 needs to be installed in the signal path between your OEM source unit or factory-installed amplifier(s) and an aftermarket external amplifier and/or processor(s). Locate the speaker wires that are coming from your factory source unit and/or amplifier and connect them to the speaker-level inputs on your LC8.

3. Connect the Output RCA connectors to cables that run to your aftermarket external signal processors and/or amplifiers. If this is not obvious to you, quickly pack up your LC8 and run to your nearest authorized AudioControl dealer to have them perform the installation. You will thank us later.

4. Connect +12 power, ground, and remote turn-on (if applicable).

5. Level match your LC8 to your source and amplifiers.

*Note: You will want to turn the gains DOWN on your aftermarket amplifiers to maximize your systems performance and minimize any HISS.*

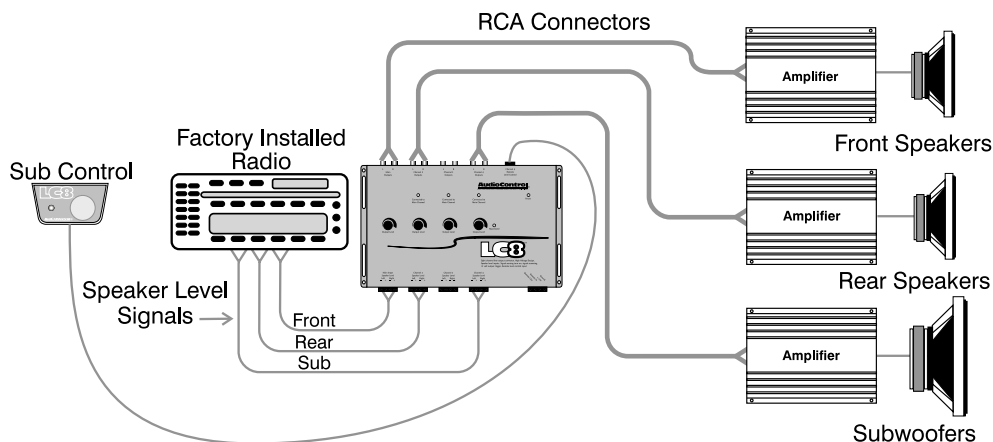


Figure 1: Basic LC8 System

If you need to know more, then read on. Heck, if you don't need to know more, still read on, because you can never know too much and as much as we would like to get your calls and e-mails, most of the answers to your questions are in this manual!

## A Guided Tour of the LC8

① **Speaker-level Inputs:** The LC8 has eight speaker-level inputs. These inputs get their signals from the speaker-level outputs of your factory-installed source unit or amplifier (if your vehicle is so equipped). If your source unit has front, rear, and subwoofer speaker-level outputs, connect them to the first three sets of inputs on your LC8. If the source unit only has front and rear inputs, the Auto Mode circuitry in your LC8 automatically routes the Channel 3 input channels to the Channel 4 (subwoofer) channels.

② **Ground:** Connect to a good, verified chassis ground (the battery comes to mind.) Warning: Factory ground wires typically already have multiple devices connected to them and are not recommended.

③ **+12 Volt:** Connect to a good source of power (the battery comes to mind again)

④ **Remote In:** Allows your LC8 to be turned on remotely with a 12-volt signal.

⑤ **Remote Out:** Outputs 12 volts when the LC8 is powered up so you can turn on external devices like signal processors and external amplifiers.

⑥ **Maximized Indicator:** This brightly colored LED indicates when your signal level is just below clipping your LC8. When properly level matched, this LED should flicker occasionally when your system is playing at its maximum volume level.

⑦ **Power:** If you have connected all of your power wires correctly, this light should be bright red when your system turns on.

⑧ **Remote Subwoofer Level Control Input:** This input allows you to add an optional (sold-separately-not-included) remote that will allow you to control the subwoofer output of your LC8 from your dashboard.

⑨ **Pre-Amp Outputs:** These RCA connectors should be connected to the next component after the LC8, such as a signal processor, crossover or amplifier. Do not connect any speakers directly to your LC8. (Definitely don't connect to any home appliances, like your microwave.)

⑩ **Level Controls:** These knobs allow you to adjust the signal level from your source unit to match that of your aftermarket amplifiers. Because they are amplified, most factory-installed source units have relatively high signal voltage output, which will require you to decrease the signal level.

⑪ **Channel Summed Indicators:** Under the cover of your LC8 are jumpers that will allow you to sum selected channels into the main channels. This is especially useful for factory-installed systems with actively crossed-over speaker systems. These indicator LED's let you know which channels are being summed into the main inputs.

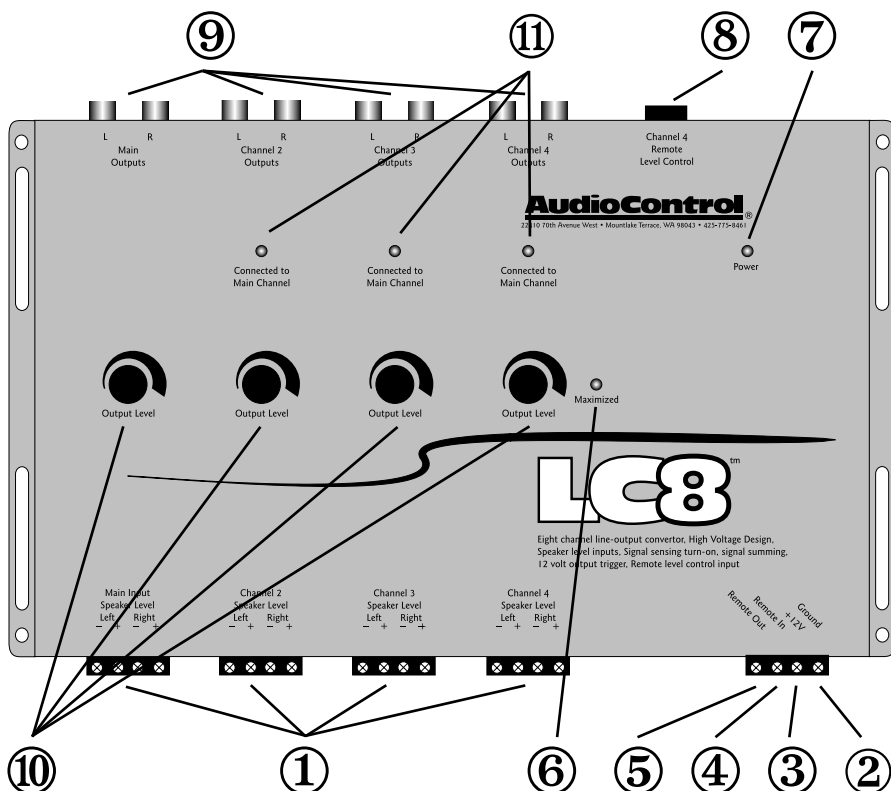


Figure 2: LC8 top cover

## Under the Covers

**Output Summing Jumpers:** These jumpers allow you to select which input signals will be summed into the Main outputs. When the jumper is in the Summed position, there will also be a corresponding green indicator light on the front of the LC8. The shipped-from-the-factory setting is in the separate position.

### Ground Isolation Selector:

Occasionally alternator noise may appear in a system because the source unit and amplifier are using different grounding schemes. To help in this situation, we have provided alternative grounding connections. Make sure your system is turned OFF before you move these jumpers.

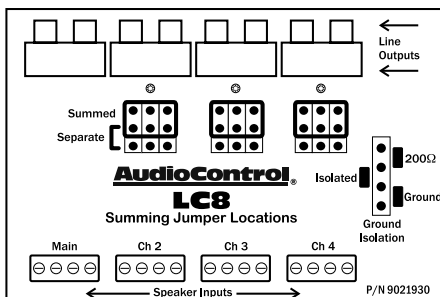
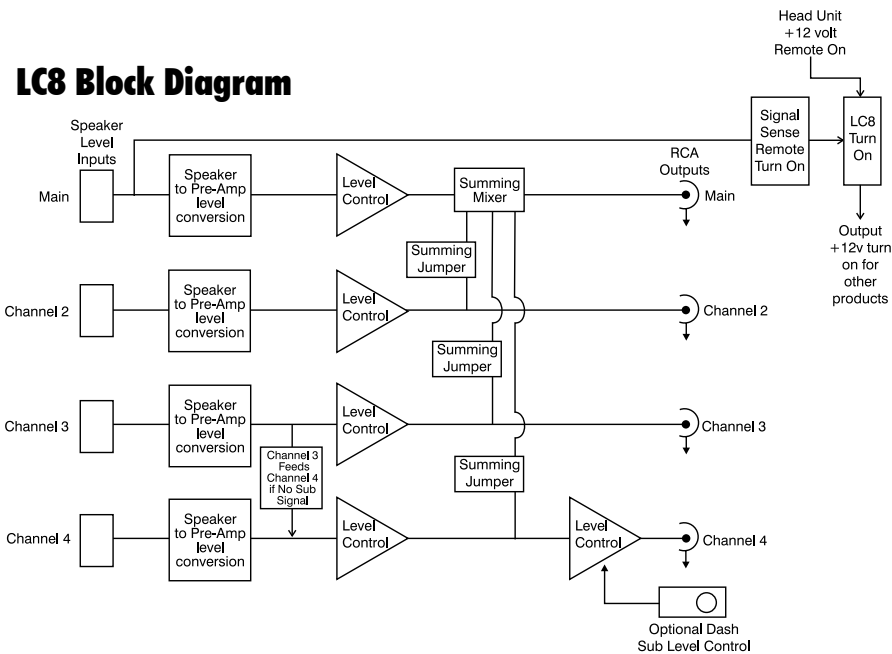


Figure 3: Inside view of LC8

Factory Settings – Internal Jumpers

	Shipped	Options
Ground isolation	Isloated (but not lonely)	200 ohm or Ground
Summing Jumpers	Separate	Summed
Weather	Rainy	Overcast

LC8 Block Diagram



Installing Your LC8

By this time we are sure that you are chomping at the bit to install your LC8. Up to this point, everything you have read has served to educate you on the operations of LC8. Therefore if you are still with us we recommend you read the following sections very carefully.

## Placement & Mounting of the LC8

Your LC8 can be physically installed in numerous locations like behind your dashboard, under a seat, or even in the trunk. Since you will be connecting to the speaker wires from the factory source unit or its amplifier(s), you should select a location that is convenient for wiring. Once you have selected a permanent mounting location, position the unit and mark the appropriate mounting holes with a felt-tip pin or scratch awl. Before doing anything else, make sure you are not about to drill a hole in a gas tank or pierce any existing wiring. Nothing ruins your day more than an expensive repair bill. Drill a few small pilot holes and secure the chassis of the LC8 with self-tapping screws.

### LC8 Power Wiring

**WARNING:** Failure to disconnect the negative terminal of your battery prior to the installation of your LC8 can result in a warm tingly feeling.

**(+12V) Positive Connection:** Insert a 12 to 18 gauge wire into the connector labeled “+12” on the nifty connector of your LC8. Connect it to a good constant source of 12 volts (we suggest the battery), fused at 1 amp.

**Ground Connection:** Use the same gauge wire as you did for the positive connector and run it from the “Ground” connector on your LC8 to the negative terminal of the battery, a ground bus, or a verified ground location. The factory head unit ground is not a good ground!

**Remote In:** Connect a 22 to 18 gauge wire from the source unit’s remote turn-on or other trigger to the Remote connector on the LC8. As we previously mentioned, your LC8 is equipped with GTO signal sensing which allows it turn on when it detects a signal at the **Main** speaker-level inputs so you may not need to use the “Remote In” feature.

**Remote Out:** If you are going to use the LC8 to turn on any external signal processors or amplifiers, connect an 18 to 22 gauge wire from the Remote Out on the LC8 to the remote turn-on of the processors or amplifiers. Depending upon how many you are turning on, you may need to connect this wire to a relay and route 12 volts from another source.

Once the electrical connections are complete, you will want to reconnect the negative terminal to your battery, however continue to act positively.

### LC8 Audio Wiring

The LC8 needs to be installed in the signal path after your factory source unit or amplifier but definitely before your aftermarket amplifiers and/or any signal processors. You may already have guessed there are numerous ways to configure the LC8 in your audio system so we recommend you spend a little quality time planning out your system and even sketching it out on paper.



## Interfacing with factory-installed radio

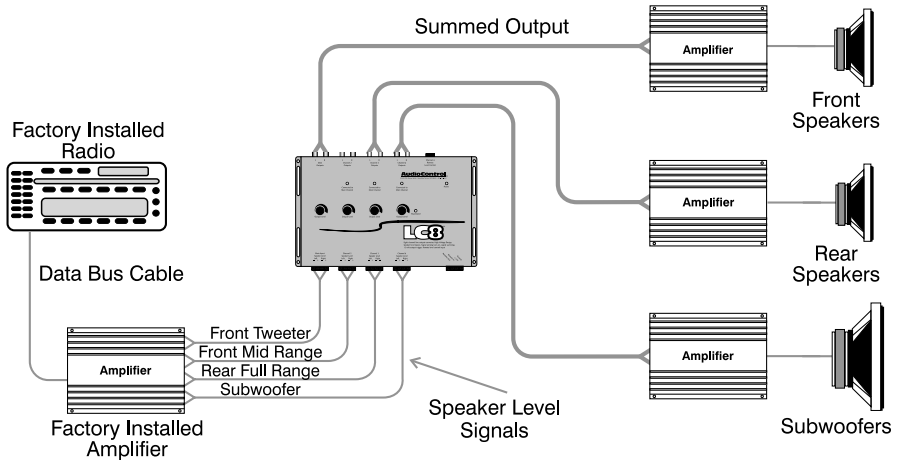


Figure 5: LC8 system using summing functions – 2 way front plus rear full range and subwoofer

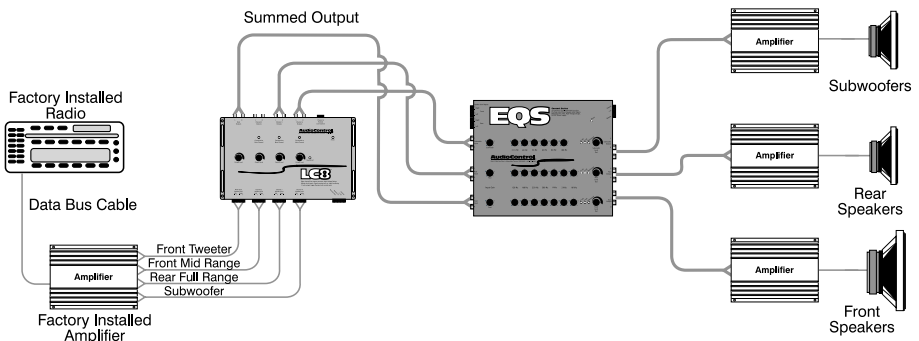


Figure 6: Six channel system with LC8 and EQS

## Speaker-Level Inputs

The LC8 is designed to accept an amplified, speaker-level signal from a factory source unit or amplifier. You will want to refer to a factory service manual or wiring-harness schematic to determine which wires are the speaker wires for your system. If you are unsure which wires are the speaker wires, it is recommended you look at the color of the speaker wire connected to the speakers and follow them back to the factory source or amplifier. Connect the speaker wires to the Speaker-Level Inputs on your LC8. Make sure to get your “pluses” and “minuses” connected properly.

## Pre-Amp Outputs

Connect good quality RCA connectors from these outputs to the inputs of your amplifiers. While we won't get into the discussion as to whether plutonium cables sound better than un-obtainium cables we will tell you that well-constructed cables are less problematic in rugged environment like your car system.

## Summing The Outputs

Under the cover are connection jumpers that allow the Main outputs of the LC8 to receive signals from the inputs of Channel pairs 2, 3, and/or 4. These jumpers allow you to select what input signals will be summed into the Main output. When one of the jumpers is in the Summed position, the corresponding green indicator light on the front of the LC8 will be lighted. The shipped-from-the-factory setting is in the separate position.

When you have summed several channels together, you will want to make sure the output levels are providing a balanced frequency response. A simple technique involves using a pink noise cd and a real time audio analyzer (AudioControl happens to make a great one!)

- 1) Perform all of the steps necessary to install your LC8.
- 2) Connect the Main Outputs from your LC8 to the audio input on your real time analyzer. "Yes", your amplifiers will be disconnected from the LC8 at this time.
- 3) Start playing pink noise on your cd player and raise the volume level until signal is displayed on your real time audio analyzer (RTA).
- 4) Adjust the LC8 input level controls for each pair of channels until your RTA is displaying a smooth or flat response curve.
- 5) If you wish to make any additional frequency response adjustments you may want consider adding an equalizer to your system (we happen to know someone who makes some really good ones - [www.audiocontrol.com](http://www.audiocontrol.com)).

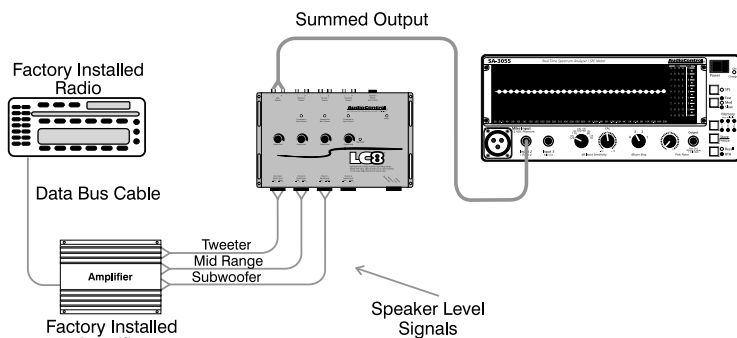


Figure 7: Amplifier using an RTA to measure the Summed Response

## **Level Matching**

If you have ever listened to a friend's "killer" car audio system and heard lots of hiss, clicks or pops, then you may have experienced an improperly level-matched system. When a performance autosound system is properly level matched, you should get the maximum output from your source unit and amplifiers without any clipping or that annoying hiss! The following steps will help you through the process, although at the end of the day, your ears will be your guides!

1. Set your source unit's fader and balance controls to their center positions. If your source unit has subwoofer output (and you are using it), set the output level at minimum.

2. Disconnect the RCA cables between your LC8 and the amplifier(s). Otherwise get some earplugs.

3. Start playing some dynamic music and set the volume on your source unit to about 3/4 of maximum. You should not be hearing anything at this point as the amplifiers are unplugged. If you are hearing music, go back to step #2; if you are hearing voices go see a doctor!

4. Adjust the output level controls until the "Maximized" light starts to flicker. If the Maximized LED does not come on but you are hearing music, fear not. The signal level from your source unit is probably not sufficient enough to trigger the LED. Proceed on.

5. Set the input gains on the amplifier(s) at minimum! This is known as turning down your gains.

6. Double check that you performed Step #5!

7. Decrease the volume control on your source unit and re-connect the RCA's between the LC8 and the external amplifier(s).

8. Now increase the volume on your source unit to your normal listening level. For some of you, this may be louder than others!

9. At this point you may find yourself going back and adjusting the Output Level controls on your LC8 to balance the front, rear, and subwoofer sections of your system to accommodate speaker placement and efficiency. Speakers on the rear deck of your car will probably sound louder than the ones in your doors!

## **Dash Control (available separately)**

### **Placement And Mounting**

The dash control may be mounted under the dash using its own bracket or through a custom hole in the dash. It should be within reach of the driver and in a spot where the LED is plainly visible.

## Dash Bracket Installation

The dash control mounts with two screws, which attach to the underside of the dashboard. Slide under the dash and place the dash control in its mounting position, mark the two mounting holes, drill pilot holes, and secure with two screws.

## Custom Installation

For that custom, finished look, the dash control can be flush mounted directly on the dash-

board (or anywhere else). We have provided an extra label to help make this happen. Referencing Figure 8, disassemble the dash control from the mounting bracket. Start by pushing the LED from its holder followed by removing the circuit board and rotary control from the bracket. Drill a 9/32 hole in the dashboard for the control along with a 1/8 hole for the lock tab and a 13/64 hole for the LED holder. Reassemble the dash control components on the dashboard and apply the new label over the openings

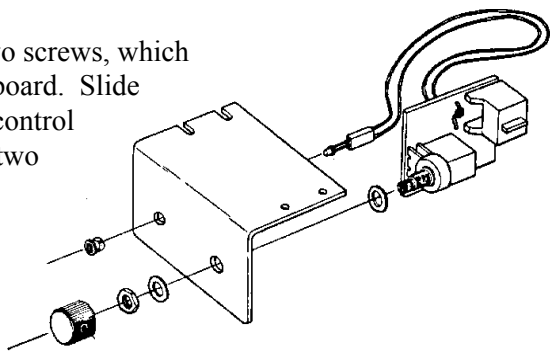


Figure 8: Dash Control Assembly

## Dual-Color Dash Control LED

The LED on your dash control is rainforest green and should brighten or dim when you turn the knob. Should you wish to change the color to amber, remove the plug connected to the LED and turn it 180 degrees and plug it back in.

## Troubleshooting

It is important to remember when installing your LC8 that the engineers who work for the car manufacturers don't spend too much time thinking about interfacing aftermarket products. Therefore you will most likely have to "modify" your traditional wiring and installation techniques when working with these types of systems. Many times traditional 12 volt "turn-on" wires or pre-amp audio signals that you are used to with aftermarket systems don't exist on these newer vehicles.

**No Power:** If the Power LED on your LC8 will not turn on, check to make sure that the power wire and remote turn-on wires are connected or a fuse has not blown, and there is plenty of signal present.

**LC8 Turns Off Intermittently:** If you are using the GTO signal sensing to turn on your LC8 yet your system is turning off, this may be due to a cellular phone interface or navigation system built in to your factory installed source unit. These are known to route the audio signal away from your source unit's outputs. In these situations it is recommended that you connect a 12-volt trigger wire from the Remote In on the LC8.

**Sounds Distorted:** Should your system sound distorted or your speakers are moving way too much, you should make sure you have your levels matched properly and that your amplifier gains are set at minimum.

**System Hiss:** Check to make sure that your amplifier gains are set at the minimum level.

**Turn-On Pop or Turn-Off Pop:** This generally occurs when your amplifiers are turning on or off at a different time than your LC8. Therefore it is recommended that you use the “Remote Out” on your LC8 to turn your amplifiers on or off and eliminate any timing issues.

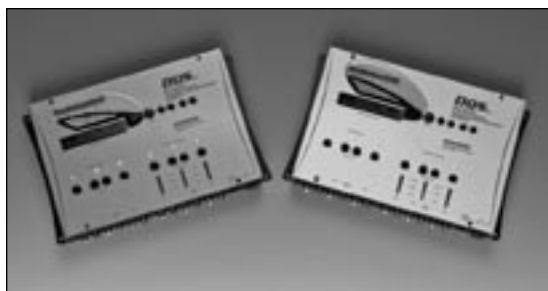
**Low Output:** Depending on the design of your factory-installed system, you may actually be connecting to a pre-amp signal instead of a speaker-level signal. Since the LC8 is a line output converter you may need to turn up the gains on the LC8 or consider adding a pre-amp line driver like the AudioControl Matrix to increase the signal level to your aftermarket amplifiers.

**Maximized LED Does Not Light Up:** If this LED does not come on but your music sounds fine, don’t panic! *Normal* operation for this LED is for it to only flicker at higher levels and remain OFF at lower levels. It is only there to indicate when the pre-amp signal level in your LC8 is approaching the maximum level (a.k.a. “clipping”). If it comes on...and stays on even without music, then you can panic.

## IF YOU LIKE LC8, YOU’LL LOVE...

The EQS six-channel equalizer, is the perfect trunk mount processor for those of you who want to improve the sound and detail of your vehicle. Less than ideal factory speaker locations can make even

the best speaker systems cry out for help. The equalization controls on the EQS provide you with an ideal amount of tone control to tame even the most challenging acoustical situations.



If you want to add the ultimate in system equalization and are ready to step into the digital domain, then the AudioControl DQS six-channel digital equalizer with memories is just for you. The DQS

If you need a crossover for your system that keeps up with your LC8, the 6XS is a 6-channel, 2-way crossover with breath takingly steep 24dB-per-octave slopes. If performance is important to you, then you will appreciate the 6XS. Of course if you are just looking for deeper, chest-thumping bass, then The Epicenter our patented (U.S. patent # 4,698,842) bass restoration processor is just the hot ticket. It puts the woof back in your woofers!



And now a word from the legal department...

## **THE WARRANTY**

People are scared of warranties. Lots of fine print. Months of waiting around. Well, fear no more, this warranty is designed to make you rave about us to your friends. It's a warranty that looks out for you and helps you resist the temptation to have your friend, ...who's "good with electronics", try to repair your AudioControl product. So go ahead, read this warranty, and then take a few days to enjoy your LC8 before sending in the warranty card and comments.

"Conditional" doesn't mean anything ominous. The Federal Trade Commission tells all manufacturers to use the term to indicate that certain conditions have to be met before they'll honor the warranty. If you meet all of these conditions, we will warrant all materials and workmanship on your LC8 for one year from the date you bought it (five years if it is installed by an authorized United States AudioControl dealer). We will fix or replace it, at our option, during that time.

Here are the conditional conditions:

1. You have to fill out the warranty card and send it to us within 15 days after purchasing your LC8.
2. You must keep your sales receipt for proof of purchase, showing when and from whom the unit was bought. We're not the only ones who require this, so it's a good habit to get into with any major purchase.
3. Your LC8 must have originally been purchased from an authorized AudioControl dealer. You do not have to be the original owner, but you do need a copy of the original sales slip.

4. You cannot let anybody who isn't (A) the AudioControl factory; (B) somebody authorized in writing by AudioControl to service your LC8. If anyone other than (A) or (B) messes with your LC8, that voids your warranty.

5. The warranty is also void if the serial number is altered or removed, or if LC8 has been used improperly. Now these sound like big loopholes, but here is all we mean by it.

Unwarranted abuse is (A) physical damage (don't use the LC8 for a jack stand); (B) improper connections (120 volts into the power jack can fry the poor thing); (C) sadistic things. This is the best mobile product we know how to build, but if you mount it to the front bumper of your car, something will go wrong.

6. If an authorized United States AudioControl dealer installs your LC8, the warranty is five years, otherwise the warranty is one year.

Assuming you conform to 1 through 6, and it really isn't all that hard to do, we get the option of fixing your old unit or replacing it with a new one.

## **LEGALESE SECTION**

This is the only warranty given by AudioControl. This warranty gives you specific legal rights that vary from state to state. Promises of how well the LC8 will perform are not implied by this warranty. Other than what we have covered in this warranty, we have no obligation, express or implied. Also, we will not be obligated for direct or indirect consequential damage to your system caused by hooking up the LC8.

Failure to send in a properly completed warranty card negates any service claims.

## LC8 SPECIFICATIONS

All specifications are measured at 14.4 VDC (standard automotive voltage). As technology advances, AudioControl reserves the right to continuously change our specifications, like our Pacific Northwest weather although we are working on changing that.

Maximum speaker-level input .....	400 watts @ 4 ohms
Maximum output level.....	9.5Vrms
Output gain .....	+/-12 dB
Frequency response .....	10Hz-22kHz
Total harmonic distortion.....	0.01%
Input Impedance .....	20 Kohms
Power supply .....	High headroom PWM switching
Power draw .....	200mA
Recommended fuse rating .....	1 Amp
Size .....	10.5" W x 6" D x 1.2" H
Weight.....	3.5 lbs
Remote Trigger Output Current.....	1 Amp

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This manual was conceived, designed, and written while on a road through the Pacific Northwest on a spectacularly rare, sunny, and cloudless day. Country music was playing on the radio and the kids were watching Shrek II.

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