










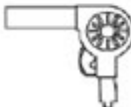




## Amplifier Installation Guide

### Topics Covered

- Required tools
- Installation locations
- Making power connections
- Making signal connections
- Removal of; door scuff plate, seat belt, pillar trim panel, & kick panel
- Routing of wire behind dash, & for components & power connections
- Amplifier mounting & connections
- Multi amplifier installations

This installation guide offers examples of amplifier installation types and suggested system layouts. The installation of your amplifier will depend on the make and body style of your vehicle, as well as the equipment purchased. **Tools needed,**

 Panel Tool / Retaining clip remover	 Phillips Screwdriver	 Flat Blade Screwdriver
 Utility Knife	 Electric Drill & Bits	 Soldering Iron
 Wire Stripper	 Socket & Ratchet Set	 Pliers
 Heat Gun	 Heat Shrink Tubing	 Electrical Tape

## Planning ahead:

Choosing your location according to these guidelines will help your installation go smoothly:

- The amp should be at least three feet from the receiver to avoid noise radiated from the vehicle's electrical system. The amp can also interfere with the receiver's AM/FM reception.
- An amp produces some heat during operation, which its heatsink absorbs and radiates, so it needs a few inches of air space to stay as cool as possible. When mounting an amp on a side wall, make sure the fins on the heatsink are vertical. Never mount an amp upside down, as dissipated heat will radiate back into the amp.
- There must be enough room on either side to make the wiring connections and adjust the controls (gain, crossover, bass boost, etc.).

## Good locations include:

- **On the firewall (passenger side).**

**Pros:** Short wires and patch cords required. You won't have to remove a seat or climb into the trunk.

**Cons:** Only very small amps fit here. Closer to some common noise sources.

- **In the trunk or hatch area.**

**Pros:** Plenty of room for large amps. Near the rear speakers.

**Cons:** You sacrifice some cargo space. Longer wires and patch cords required. If working in the trunk, tape over the latch, so you won't get trapped inside accidentally.

- **Under a seat.**

**Pros:** Closer to the receiver, so you can use shorter patch cables and signal cables, which are less prone to noise and signal degradation. Closer to the front speakers, so running wire to them will be easier. No cargo space sacrificed.

**Cons:** You may have to remove the seat to do the installation. *Warning: removing your seat could deactivate your vehicle's SRS system.* Larger amps might not fit. You must elevate the amp to avoid contact with water from rain or snow brought in on passengers' shoes.

## IMPORTANT:

Follow the manufacturer's recommendations for mounting the amp and make sure it's secure. An amp that isn't secure could break loose in an accident and injure a passenger as it flies through the vehicle.

## Making the power connections

1. Set the parking brake and disconnect the negative terminal from your battery to prevent any electrical short.



**Route the red wire from your amp wiring kit through a hole in your vehicle's firewall.**

2. Remove the red power wire from your amp wiring kit (usually 5-6 meters in length). Locate a hole on the firewall; most cars have a predrilled one you can use. If not, you'll have to find a good place to drill one. Once you've found or drilled a suitable hole, run the power wire through the hole into the engine compartment. (Note: Please be sure to use a rubber grommet to avoid a short circuit).

3. The red power wire from your amp wiring kit may have a fuse holder installed. If so, go to step 4. If not, find a good spot close to your battery to place your fuse-holder (included in the kit) — less than 150mm from the battery is best. Cut a short piece off the end of the power wire (to cover the distance from the battery to the fuse holder location), and strip the insulation off both ends with a wire stripper.

Crimp the terminal ring (included in the kit) onto one end of the short piece of wire, and crimp the fuse holder onto the other end. Strip the insulation off the end of the red power wire that leads into the passenger compartment, and connect it to the other end of the fuse holder.



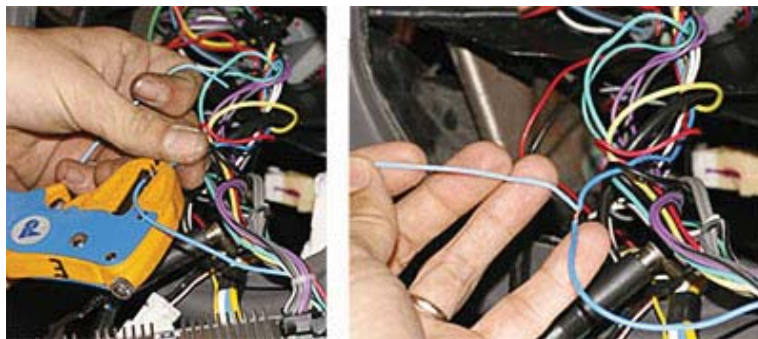
**Fuse installed on power wire, and secured in engine compartment.**

4. Attach the power cable to the positive battery terminal (not directly to the battery post itself). For top-mounted battery posts, the most common way to do this is to crimp an eye/ ring terminal onto the end of the power cable (most cables in wiring kits come with it already attached). Remove the battery terminal's nut, slip the power cable's ring over the bolt that secures the battery terminal to the battery post, and replace the nut.

Thread the wire loom (included with some kits) over the red power cable until it reaches the firewall and cut to fit. Thread another piece over the short power wire running from the fuse holder to the battery.

Anchor the fuse holder to a suitable spot with a self-tapping screw (see photo above).

5. Remove the radio from the dash to access the turn-on wire (usually a blue wire). The turn-on wire will "tell" your amplifier to turn on whenever the receiver is powered up (usually, whenever the vehicle is turned on).



**Locate the remote turn-on lead behind your radio (usually a blue wire), and connect the turn-on lead from your amplifier wiring kit to it.**

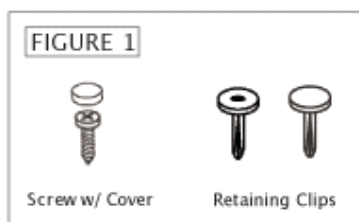
Strip the insulation off a small section of this wire coming from the radio, wrap the blue turn on lead (included with the amp wiring kit) around it, and solder. Or, use crimp connectors and a crimp tool to connect the blue turn on lead to the wire coming from the radio. Wrap the solder or crimp connection with harness tape (or use a heat gun to apply heat shrink tubing) to guard against a short. Using cable ties (included with the kit) to secure the wire, route the blue turn on lead behind your dash all the way over to the place where the red power wire comes through the firewall.

## Making the signal connections

6. If your in-dash radio has preamp (RCA) outputs, connect the RCA patch cables (included with most kits) to these outputs, taping them together so they won't come apart. Route the patch cables (again, using cable ties) to the OPPOSITE side of the vehicle from the power cable and blue turn on lead. It's important to separate the patch cables from the power wires to avoid potential noise problems. Now you can partially re-install the radio in the dash (don't push it all the way in, in case you need to fix a problem later).

## Wire routing

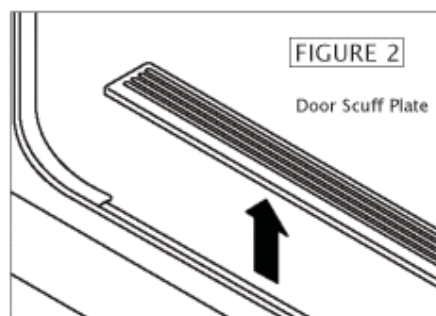
All system wiring should be concealed for safety, and to give your installation a nice, finished look. Wires should be secured so that they do not interfere with safe vehicle operation. Depending on the vehicle and the location you choose for your amplifier, the wiring for your system may need to be run under the dash, door scuff plate, pillar trimpanel, or kickpanel. The instructions below address, in general, what panels may need to be removed and how they typically come off. Often, panels can be pried up at edges. Screws and retaining clips might also be present that will require removal (Figure 1). To prevent damage, always use care when removing panels — a panel tool is helpful.



**Figure 1: Screws and retaining clips might be present that will require removal**

## Door scuff plate removal

The plates are usually removed by prying up the edges to release clips. Some vehicles will have screws present which will need to be removed (Figure 2).



**Figure 2: Door scuff plate**

## Seat belt removal

A seat belt may be located on a panel that needs to be removed. Most seat belt anchor covers pry off. The seat belt anchor is secured with a large nut or bolt (Figure 3).

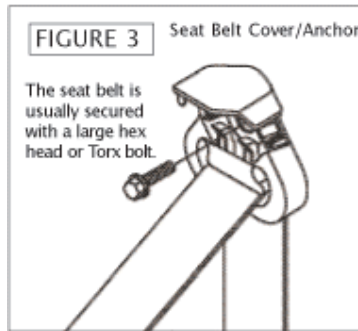


Figure 3

## Pillar Trimpanel removal

Remove seat belt if present. Remove screw covers, screws, and plastic retaining clips if present. Pry up edges of panel to remove (Figures 4 & 5).

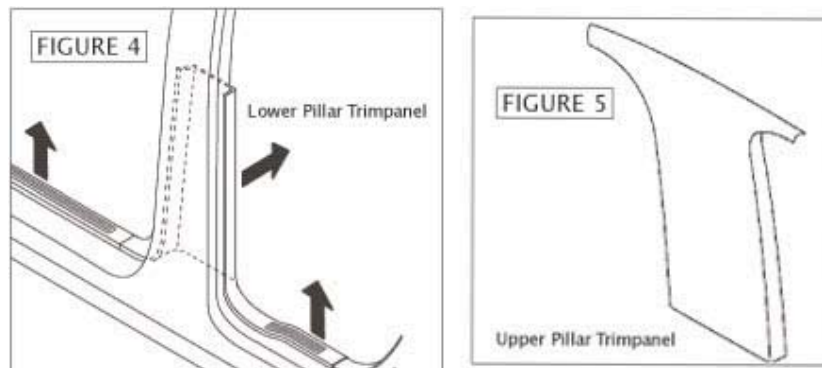


Figure 4: Removal of pillar trimpanel

## Kickpanel removal

Look for screws and pry-out retaining clips to remove.

Pry out edges of panel to release and remove

(Figure 6).

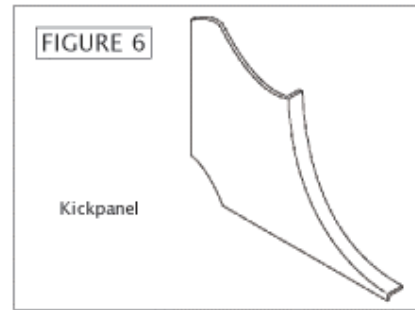


Figure 6

## Routing wire behind dash

Route wire behind dash and secure with plastic wire ties. Be sure that wire doesn't interfere with any moving parts to ensure safe operation of vehicle.

## Routing wires for components and power connections.

Determine desired locations for each component. Use the most direct route for wires. Remove panels necessary to route and conceal wires. Test system before re-installing panels.

## Amplifier mounting and connections

7. After routing the power and signal cables to your amplifier, using the techniques described on page 3, you're ready to mount and hook up the amplifier. First, remove a bolt near the planned amp location. Crimp a eye/ring terminal (included with the kit) to the short piece of black ground cable (also in the kit). Scrape away any paint and clean the bolt location thoroughly (improper grounding is the #1 cause of noise problems), and then bolt the terminal tightly to the vehicle's metal chassis. If you can't find a convenient ground screw or bolt, drill a hole for one — be careful not to drill into the gas tank or a gas or brake line.



Bolt the ground terminal tightly to the vehicle's metal chassis.



8. Mark off the amp's location on the floor or seat back (or your chosen location), also noting the location of the power connections, speaker outputs, and preamp inputs. Make slits in seat back fabric (or carpet, if the amp is to be mounted on the vehicle's floor), and run the power, speaker, and RCA wiring under the material to the appropriate slits.



**A wiring snake can come in handy for pulling wires to the amp mounting location.**

9. Install grommets and terminals (included in wiring kit) at the ends of the power, ground, and turn-on leads, and connect them to the amplifier. Hook up speaker wire and RCA patch cables to the amp. Reconnect your car's negative battery cable, turn on the radio, and the amp should fire up. Start your car, rev the engine, and listen for any engine whine coming through the speakers. If there are no noise problems, re-install the radio and mount the amplifier in place using self-tapping screws.

*If the amp fails to turn on, check the main power wire fuse, as well as the fuses on the amp. Also, ensure that the ground cable is connected to an unpainted metal surface, such as seat bolts. If the amp does not turn on, check the remote turn-on lead to verify voltage. To test, disconnect the remote turn-on lead. Then connect a small jumper wire from the main power wire to the remote turn-on terminal of the amp while power wire is disconnected. Replace the fuse and verify that the amp turns on. Also, test it with a multi-meter. This will tell you if the remote turn on is working or not.*





**RCA cables routed through slits in the vehicle's carpet, and connected to the amplifier's signal inputs.**

10. Connect speaker wires to your subwoofer box (or speakers). Then, to maximize clean signal strength from your amp, you need to adjust the gain or input sensitivity settings. Here's how:

- Set the input sensitivity controls of your amplifier to their minimum level (counter clockwise).
- Put in a CD and turn the receiver's volume control up (you might have to raise the amp's gain just a bit to hear the music).
- When you hear distortion, stop. Turn the volume down until it disappears. As much signal as possible is passing from the receiver to the amp. This maximizes the signal-to-noise ratio, and leaves your system less prone to engine noise problems. Keep the volume setting here.
- Now turn the gain controls on the amplifier up until it's as loud as you'll play it. If you hear distortion, slightly decrease the gain settings.

Now you've optimized the amp's output with the receiver's volume set near maximum. You can turn the volume almost all the way up and not damage your speakers or amplify distortion. If you're hooking up a subwoofer, a test disc (or bass-heavy CD) is helpful for making final adjustments.

## Multi-amp installations

**Powering multiple amplifiers:** If you're installing more than one amplifier, run a single heavy-gauge power cable from your battery to a distribution block, and then connect lighter-gauge cable from the block to each amp. This arrangement minimizes potential noise problems and keeps your installation looking neat. Make sure you use power cable that's thick enough to accommodate any amps that you might add in the future.

**Grounding multiple components:** If you're installing several components, use a distribution block to organize the various ground cables into one larger cable. If that's not an option, try to ground each one separately, with about a 15mm of space between each of the grounding points. If you'd rather use a single bolt, place the ground for the component that draws the most current (your most powerful amp) closest to the car body. Put the ground for the component that draws the least current on top.

**Turning on multiple components:** If you have multiple components in your system, you may need a relay to protect your receiver. That's because the receiver's power antenna lead can only supply a limited amount of current. If the components in your stereo system ask for more current than the receiver can supply, you can burn out that circuit in your receiver. A relay connected to the power antenna lead draws a small amount of current from the receiver, but supplies enough current to turn on all your other components simultaneously.

**Power demands of a multi-amp system:** Some cars' systems are designed for additional current loads (trailer towing packages, for example), but most of them are not. Luckily, most manufacturers design their cars' electrical systems with a reserve capacity that is well-suited to supplying power for a sound system. Look at the tag that is riveted or screwed to the side of the alternator. This tag tells you how much current (expressed in amperes or amps, for short) the alternator is capable of producing.

Your car's alternator ampere rating determines how powerful an amplifier you can install. Multiply the ampere rating by 40%, and you'll get a rough idea of how much reserve current capacity your car's system has. Next, you'll need to calculate the approximate current draw of the amplifier you're considering installing.

To calculate the current draw of an amplifier, multiply the number of channels by the RMS watts per channel (a 2 channel amp rated at 300 watts RMS per channel would be 600 watts). Double it to account for amplifier inefficiency ( $600 \text{ watts} \times 2 = 1200 \text{ watts}$ ), then divide by the average output Voltage of an alternator, 13.8 volts ( $1200 \text{ divided by } 13.8 = 87 \text{ amps}$ ). Since the average music signal requires about 1/3rd of the average power in a test tone, divide by 3 ( $87 \text{ amps divided by } 3 = 29 \text{ amps}$ ). The result is the amplifier's approximate average current draw.