

Audi Climate Control LCD Rebuild Kit

Restores cracked, leaking or missing segment LCD's for the following vehicles:

- 1997-98 Audi A4 with electronic climate control center
- 1995-97 Audi A6 with electronic climate control center
- 1997-98 Audi A8 with electronic climate control center
- 1993-95 Audi 90 with electronic climate control center
- 1992 Audi 100 with electronic climate control center
- 1995-97 Audi S6 with electronic climate control center
- 1994-98 Cabriolet with electronic climate control center

Thank you for the purchase of this kit. Our new LCD panel offers a cost effective means of restoring your climate control panel to like new appearance and functionality! The included premium LCD panel has extended temperature range to eliminate future problems. If you have a flickering display or display that dims; the problem may be with the LCD controller IC and not LCD panel related. Please contact us at (208) 892-0764 or email gavin@circuitsolutions.info if you have any questions.

Contents of Kit:

- Green base lamp (2)
- Felt bumpers (4)
- Toothpick (1)
- Premium custom LCD (1)
- Alcohol swab (2)
- Cotton inspection glove (2)



Required Tools:

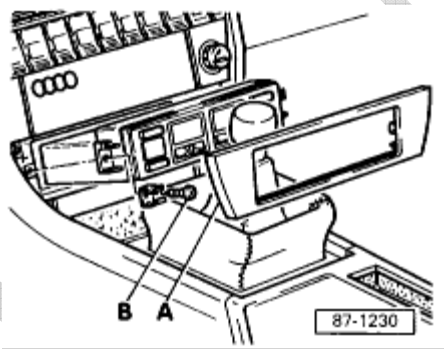
- Needle nose pliers
- Utility or Xacto knife
- #2 Phillips head screwdriver.



Please read and become familiar with these instructions before performing the actual repair. The LCD panel is fragile and can be damaged if incorrectly installed. Installation is very simple and straightforward. Many color photos are included to ensure a trouble free installation. Place several paper towels on your work surface so as not to scratch the buttons on your climate control panel.

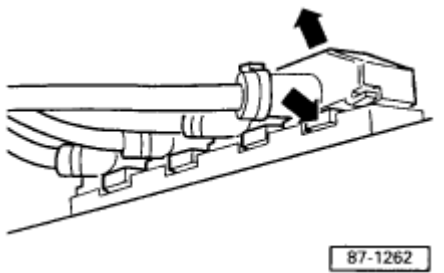


1) Remove controller from the center console



Gently pry wood trim fascia panel (A) from center console using a flat edge tool. A flathead screwdriver with an overlay of electrical tape will prevent any marring of surfaces.

Remove the two Phillips head screws on left and right sides (B). Climate control center will slide out.



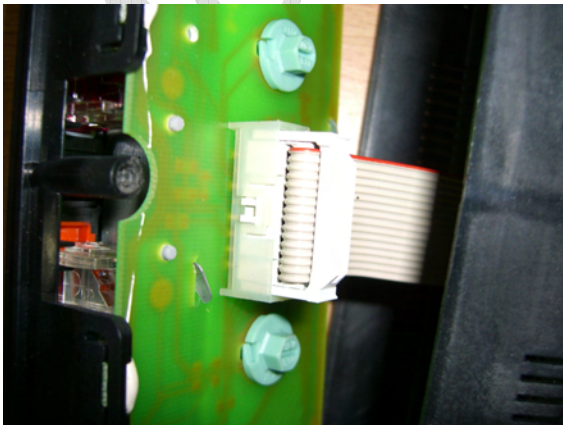
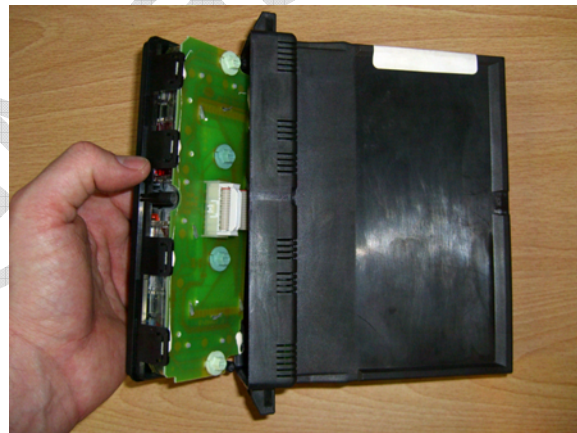
Remove all four electrical connectors by simply pushing the tab in with your thumb and pulling the connector away from its socket. All four connectors are mechanically different to prevent mismatch upon assembly.

2) Taking your controller apart



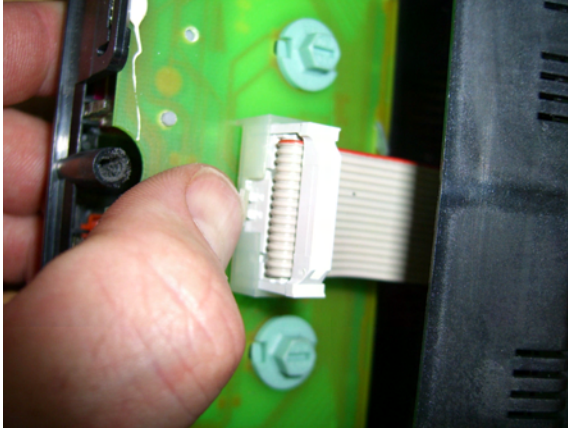
Remove the three Phillips head screws from holding the front control panel to the controller housing. In this photo two screws can be seen at the top. The 3rd is on the bottom side. If you do not have the four turquoise lamp holders as seen in this photo, your controller is LED backlit. Rebuild is the same, but you will not need the lamps provided in this kit. **If your controller is an early version with a white enclosure, please go to the appendix for updated information.**

Gently pull the front panel away from the housing to expose the LCD controller board and its ribbon connector.



A close up view of the LCD controller board ribbon connector. Note the small retaining latch preventing the connector from being unplugged. LED backlit boards have a lower profile blue connector instead of the white.

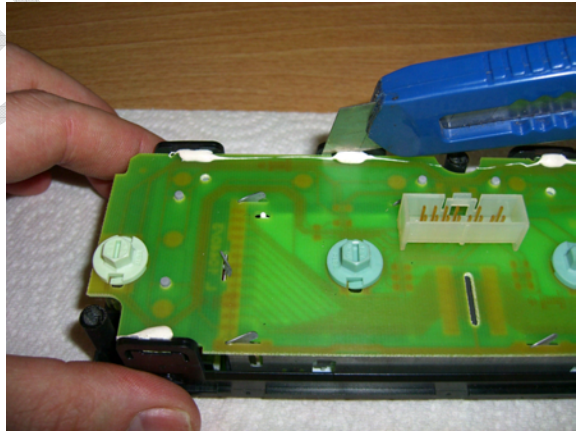
3) Removing the circuit board from the plastic switch panel



Gently pry outwards on the socket's retaining tab with your thumbnail or flathead screwdriver as shown. Be careful not to pry too much or it may break. Then at the same time pull apart the connector from the socket.

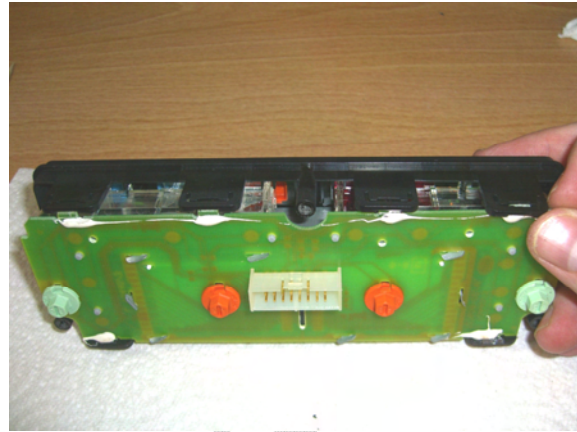
If you have the LED illuminated display, the connector is permanently soldered in place and does not need to be disconnected. Proceed with the board still attached to the controller.

Using your utility knife, slice through the silicone rubber used to secure the circuit board to the fascia retaining tabs. There are four retainers on the bottom and two on the top. It is common to find the two tabs on the top broken. Do not be concerned if your tabs are broken, this will be remedied later in the rebuild. Note that the board is actually upside down in the photo; as we are working on it. The four "bottom" tabs are actually at the top of the photo.

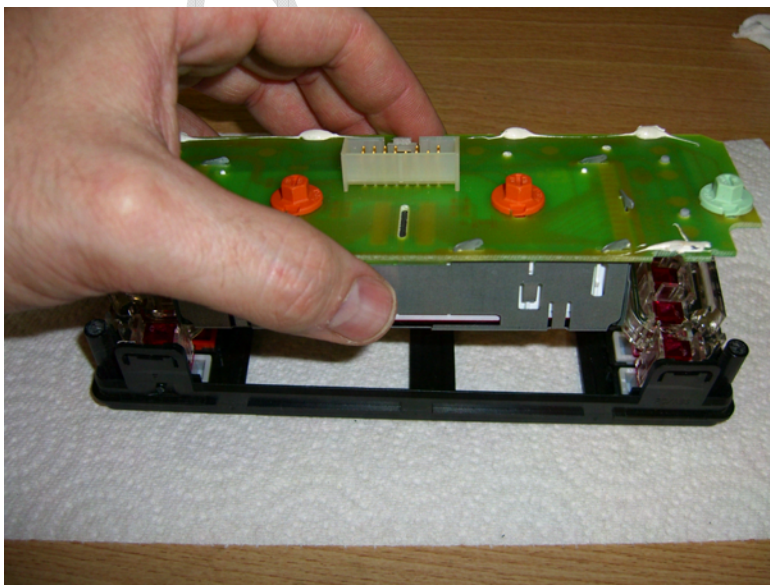


Begin separating the printed circuit board from the fascia panel by gently pushing the tab with your thumb and at the same time pulling the board away with your forefinger in a twisting motion. Lift the circuit board's tab out of the slot. Start at the leftmost of the four tabs.....

Work your way across until all four tabs of the circuit board have been released from their retaining slots. The panel has been lifted to show more clarity. Keep your panel facing down at all times, otherwise the buttons will spill out.

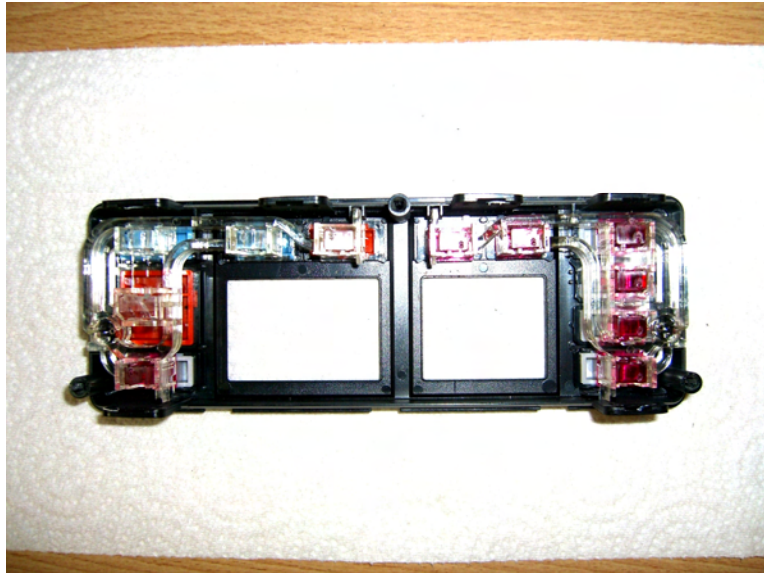


Now do the same on the side with the remaining two tabs; until all tabs of the circuit board are free.

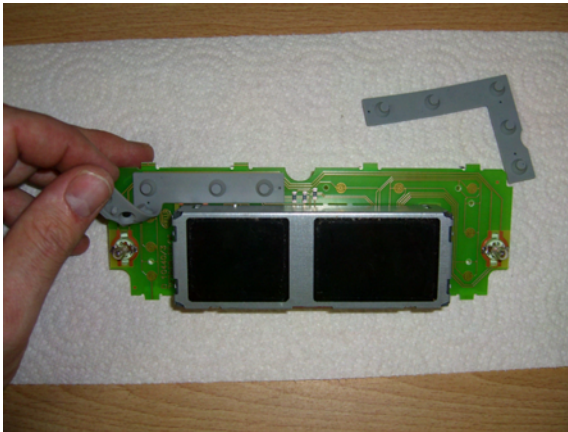


With the control panel housing facing down, lift off the printed circuit board with the LCD display. Set the plastic face panel in a safe place keeping it face down. If you turn it over, all the buttons will spill out.

In the unfortunate event that you have pieces of the button mechanism fall out, here is a photo of how the pieces are arranged. A front view of the controller and button placement can be found at the end of these instructions.



4) Removing the LCD unit from the printed circuit board

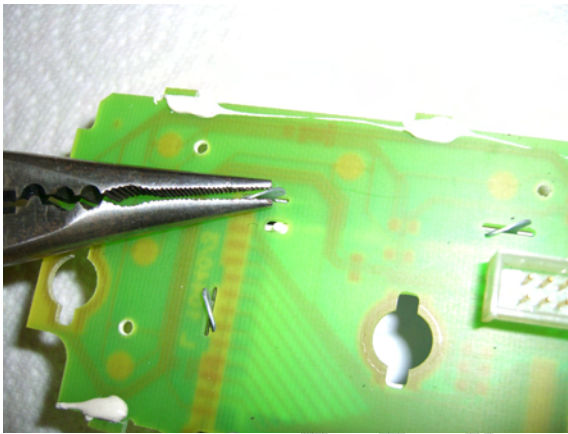
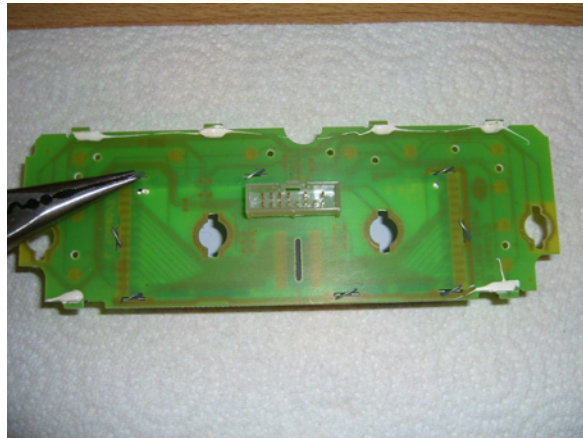


Remove the two silicone button pads from the circuit board. They are simply held in place with integral rubber “rivets” molded into the silicone pads themselves. Simply lift them off the board. Set the silicone pads aside for later.

Remove the old light bulbs. There are four total. Simply grab the hexagonal body of the bulb and twist $\frac{1}{4}$ turn counterclockwise. The bulb will then pull out. Continue with the other three until all bulbs have been removed. Save the center two bulbs (orange or blue base) as they will be reused. The outermost green base lamps will be replaced with new units provided in the kit.

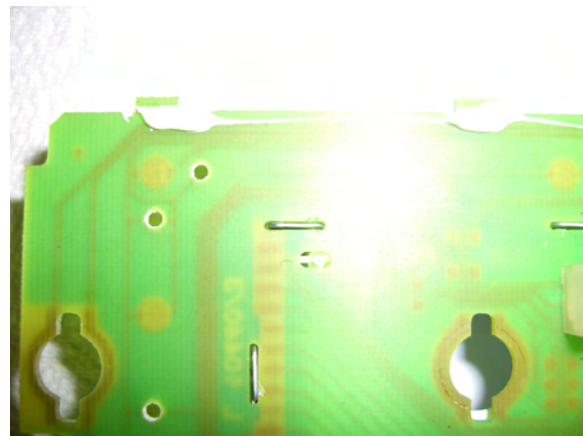


This is the board with the lamps removed. Now is the time to begin disassembly of the LCD itself! The LCD is contained within a steel cage attached to the circuit board by 8 twist lock tabs. Untwist the tabs using your needle nose pliers so the tabs will pass through the slots in the circuit board.



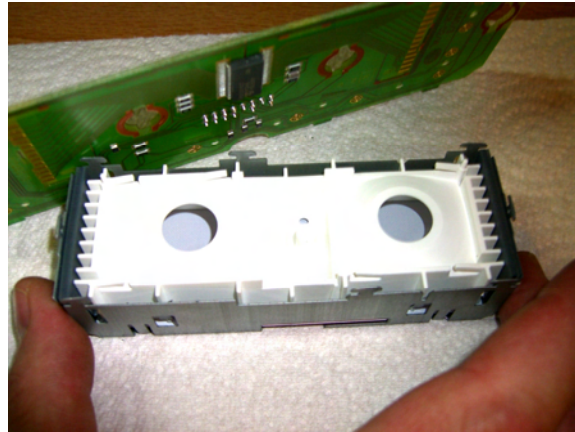
Here is a closer view.

Straighten all 8 tabs so they can pass through the circuit board as seen in this photo.

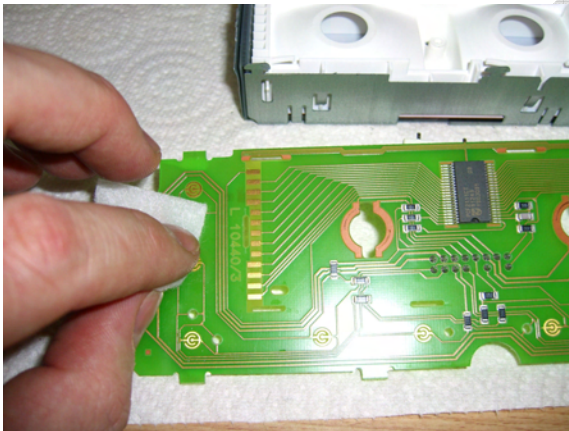


Keeping the LCD face down with one hand; lift the circuit board away using the other hand. The metal enclosure is called the “LCD cage”. If you have a controller with LED backlighting, the cage is much thinner than the one shown in the photo.

LCD installation is a no solder procedure. However, if you know how to solder; please read the appendix at the end of this document before proceeding any further.

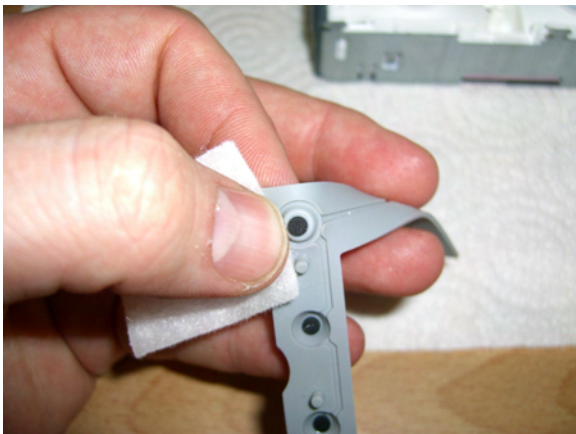


5) Prep and cleaning of printed circuit board and switch contacts



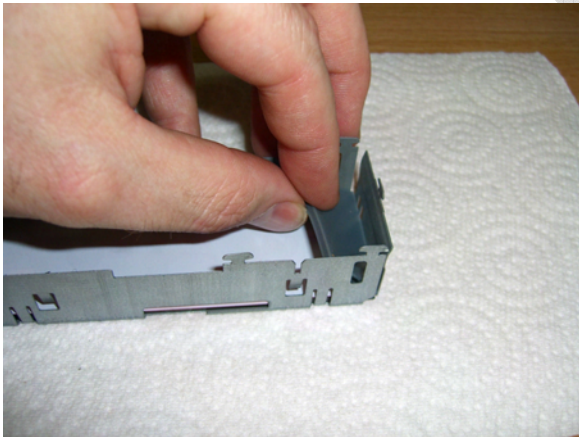
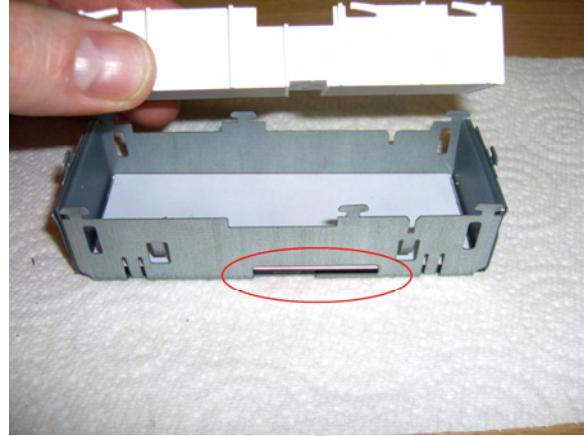
Set the LCD unit aside. Open one of the two alcohol swab pads and use it to wipe down all metallic gold pads on the circuit board. In this photo you can see six gold switch pads and one of the two vertical rows of gold LCD contacts. After cleaning, avoid touching the gold surfaces with your fingers.

Using the same alcohol pad, clean off the elastomer contacts that are part of the silicone switch pad. The contacts are actually black conductive rubber “buttons” fused to the gray silicone pad. Wipe down all of the **black** contact surfaces on both silicon switch pads. After cleaning, avoid touching the black contacts with your fingers. Handle only by the gray portion only.



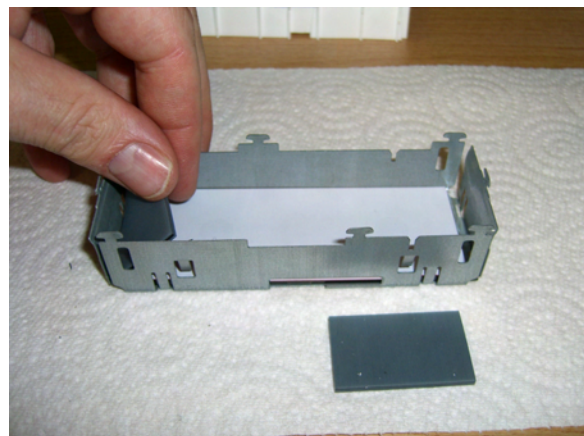
6) LCD disassembly; removing reflector and cleaning “zebra” connectors

Now it is time to work on the actual LCD. Make sure that your LCD unit is arranged so that the large slot circled in red is facing towards you. Then lift the white reflector out of the LCD cage. If the reflector is dirty, feel free to wash it using warm water and detergent. Be sure to observe the reflector's orientation. The smaller reflector goes to the right when replacing. LED backlit displays will have a much lower profile reflector.

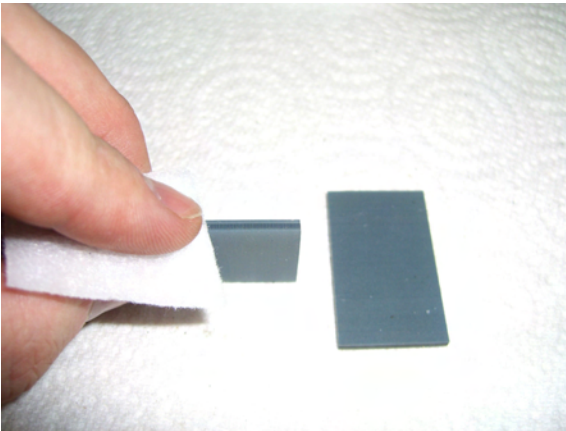
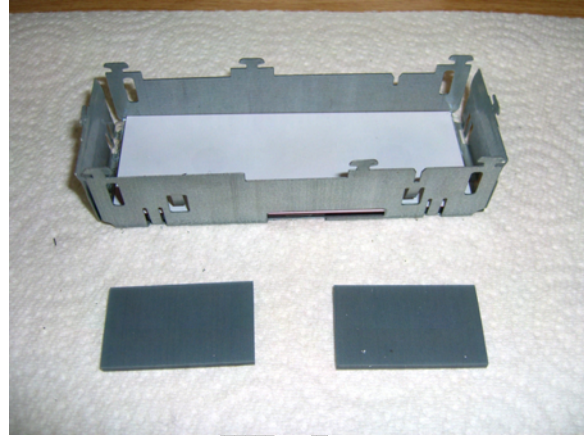


Now remove the right side “zebra strip”. The Zebra strip is made from rows of conductive and insulating channels that transfer electrons from the gold pads on the circuit board to the contacts on the LCD glass. The striped pattern is where this connector gets its name. Gently push the zebra connector to the side to release from the LCD and lift it away.

Repeat for the other side...



LCD unit with both zebra strips removed.
LED backlit displays will have shorter zebra
strips



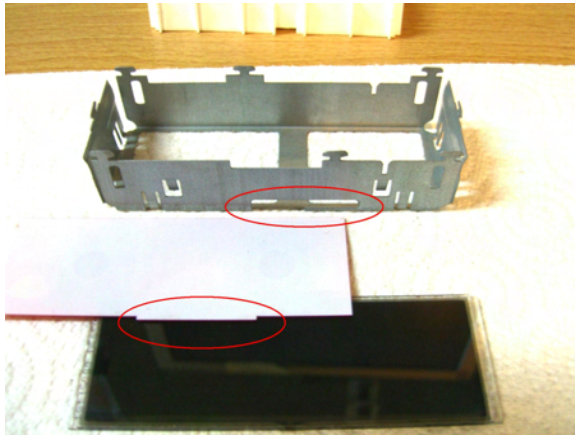
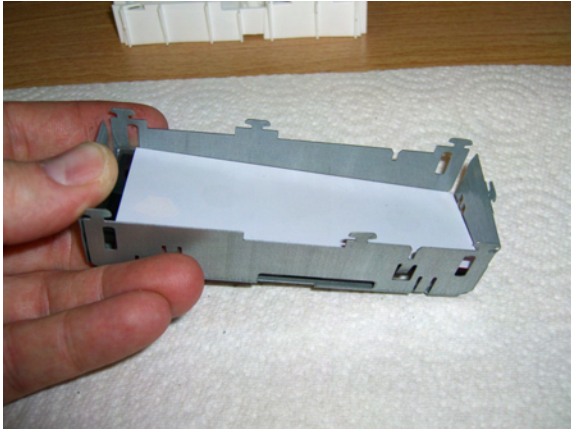
Clean both zebra strips with the second alcohol swab. Wipe down all sides of the zebra strip handling it by the large flat sides paying particular attention to cleaning the edges. Do not allow your fingers to touch the edges after cleaning. If you do by accident touch the edges, just wipe that area again with the swab.

Set the zebra strips to the side for later. Be careful to only handle them by the large flat sides as in this photo once cleaned. Avoid touching the tiny striped contacts along the edges.



7) LCD disassembly; removing color filter and LCD glass

Make sure that the same large slot in the steel LCD cage is facing you as before. Using a finger, simply lift the LCD glass out of the cage as shown.

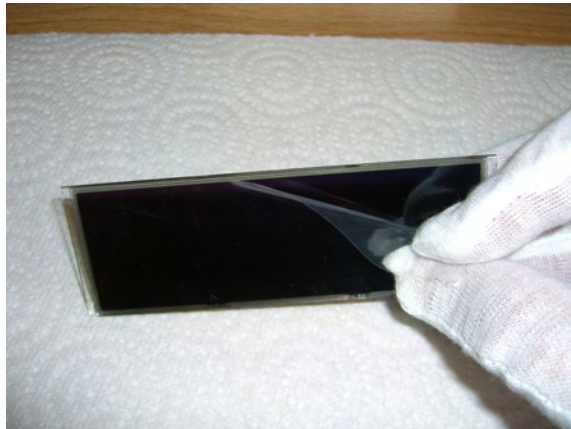


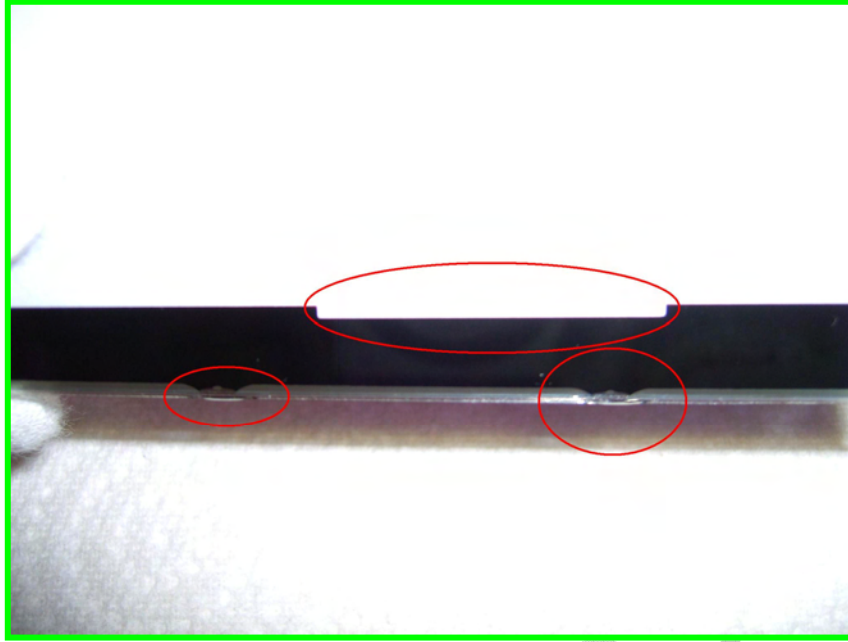
The LCD panel (black) and its color filter (white) removed from the LCD cage. Note how the tab on the color filter fits into the large slot on the LCD cage. If the color filter or the LCD cage require cleaning; do so using only detergent and water. Solvents may damage the paint on the color filter.

1) LCD assembly; aligning color filter and new LCD glass

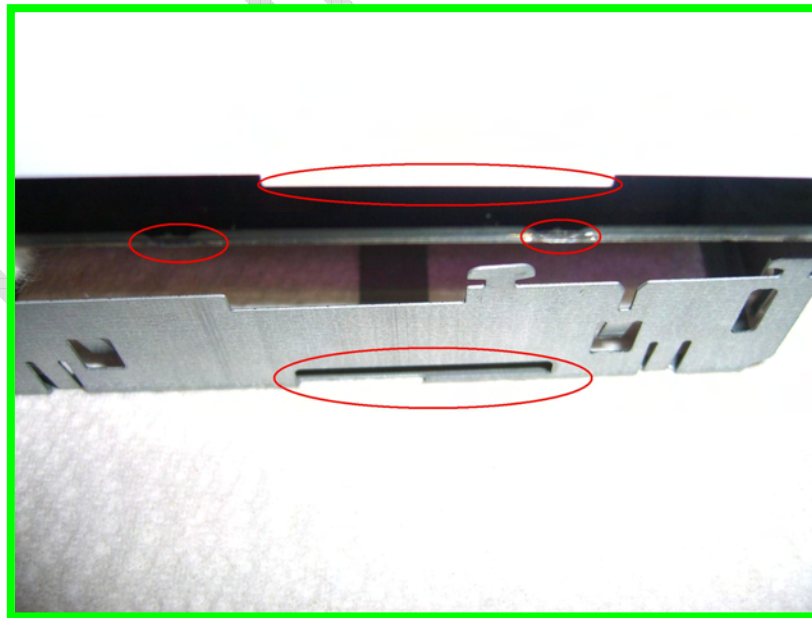
Put on both cotton inspection gloves and remove the new LCD from its packaging. The LCD is protected from scratches/fingerprints by protective films on each side. Peel the film off from both sides of the LCD slowly. Sometimes a white label is attached to make removal easier. Pull on the white label to initiate removal of the clear film.

Circuitry inside of the display may activate and cause segments to appear as you pull the film away. Don't be alarmed as this is harmless to the display.



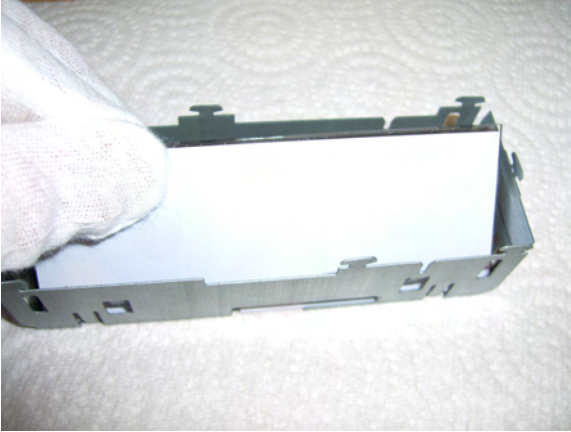


If you examine the LCD, there is a glossy side and a non-glossy side. In addition, the glossy side is a smaller piece of glass as compared to the larger non-glossy piece. The non-gloss side is the face of the display and is the viewing side. Also, if you examine the bottom of LCD, you will see two fill holes sealed with epoxy as circled in the photo above. These were the openings used to fill the LCD with the liquid crystal fluid during manufacture. With the glossy side (smaller glass pane) upwards, place the color filter on top of the LCD with the filter's tab aligned with the two fill holes on the LCD. Both the filter tab and the two LCD fill holes are circled in red and can be seen in the photo above.



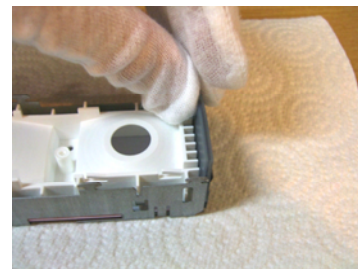
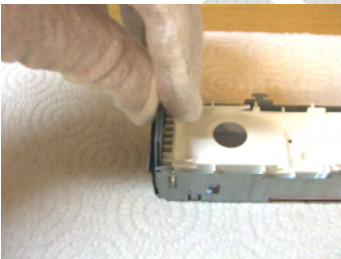
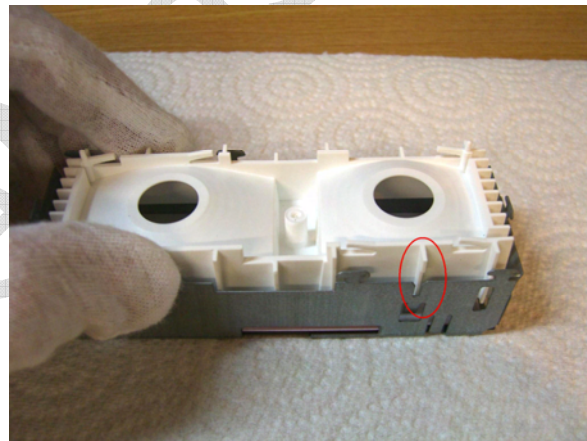
Note that the two LCD fill holes and the tab on the color filter are all oriented the same as the large slot on the LCD cage.

2) LCD assembly; LCD into cage, reflector and zebra strip insertion



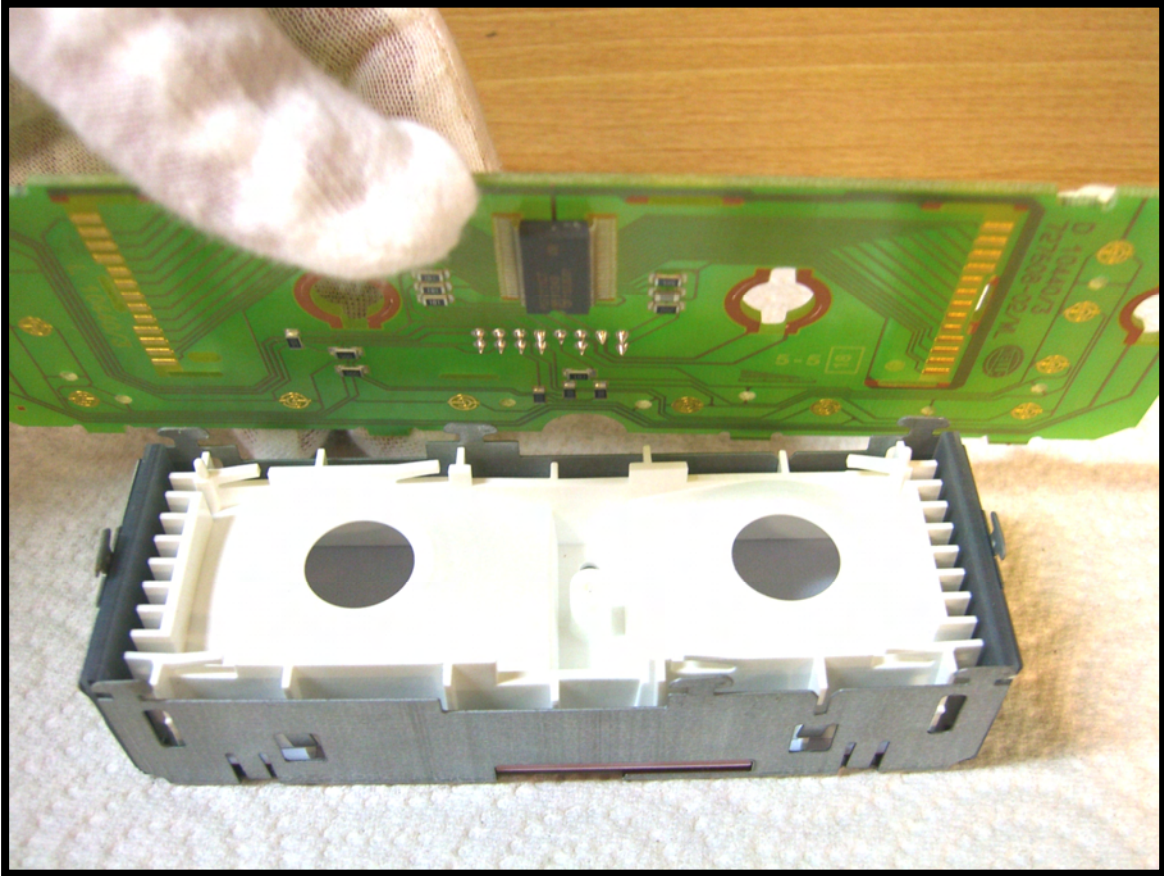
With the color filter stacked on top of the LCD and oriented as instructed, insert them into the LCD cage. Make sure that the tab on the color filter fits into the slot on the LCD cage. Then gently press the filter and LCD flat into the cage. Do not force as they should almost drop into place. If the LCD panel will not sit flat, make sure that the tab of the filter is fitting through the slot on the LCD cage.

Place the light reflector back into place. Note how the right side reflector cavity is smaller. Also verify that the tab on the reflector fits into the groove of the LCD cage as circled in red.

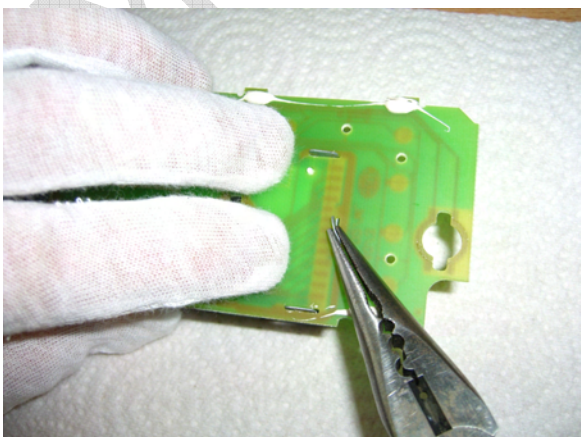


Install the zebra connectors on the left and right sides of the display. Both connectors should drop into place and be the same height. The tops of the connectors should just be slightly higher than the rim of the LCD cage. If protruding 1/16" or more each side above the metal edge of the cage, then make sure the LCD is not upside down. Raise the assembly and examine the LCD through the viewing windows. The LCD surface should be semi-gloss. If glossy, then the LCD is upside down. Disassemble and start over following the assembly instructions again. If one connector sits higher than the other, gently press on it to drop it into place. It is okay to touch the zebra contact surfaces now that you are wearing the inspection gloves.

3) Assembly of printed circuit board with completed LCD unit



The LCD unit is now complete and ready for assembly with the printed circuit board. The tabs are spaced in such a manner that the board only fits one way – the correct way!

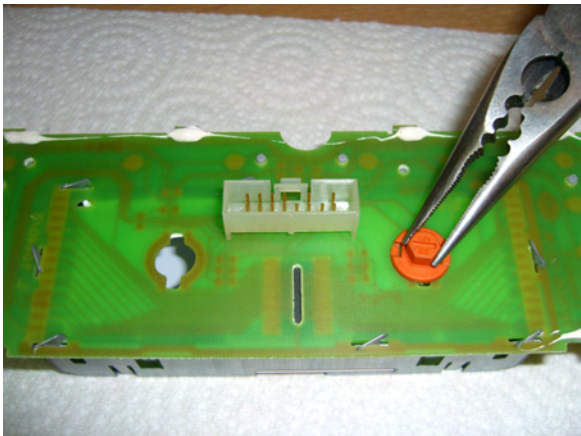
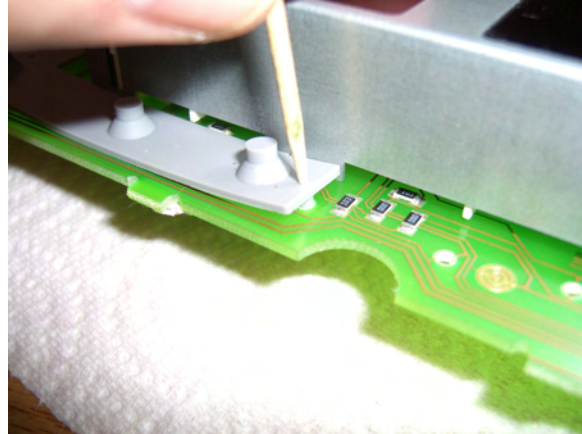


Gently apply downward pressure on the printed circuit board so that the retaining tab can be twisted locking the assembly together.

Only light pressure is needed. If you find yourself forcing and still not able to get the tab to clear the slot for twisting; stop immediately as you could break the LCD. Contact us at (208)892-0764.

4) Assembly of switches and backlight lamps

Using the provided toothpick, insert one end into the hole on the topside of the switch and place into position over the circuit board. Press down on the toothpick to insert and lock the rubber rivet into the circuit board. Proceed with all rivets on the switch pads. You no longer have to wear the gloves, but use caution so as to not touch the gold switch circuitry or the black rubber contacts.



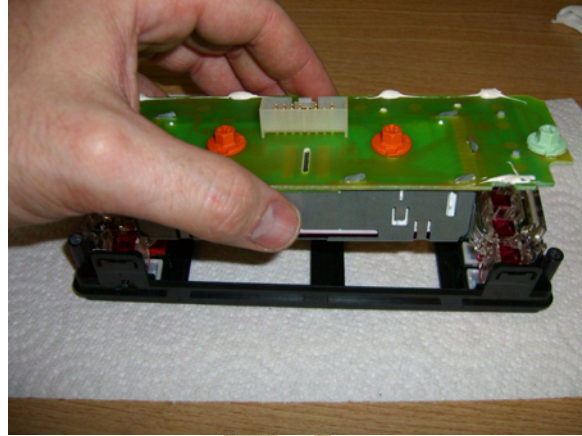
Insert the backlight lamps. These were the two **orange** or **teal** base lamps designed to illuminate the LCD panel. These lamps occupy the two inner holes on the PCB directly behind the LCD unit. Insert and then twist $\frac{1}{4}$ turn clockwise with pliers to lock into place. Repeat with the new **green** base lamps offered in the kit and fit to the two outermost holes on the circuit board.

Final and correct placement of the backlight lamps.



5) Final assembly of circuit board to switch bezel

Place completed circuit board and LCD back into the switch bezel assembly. Start by inserting the four circuit board tabs into the four retaining slots of the plastic housing. Then insert the remaining two circuit board tabs into their respective slots. Exact reversal of the removal process described previously. If the two retaining slots are broken, they will be dealt with shortly.



Turn the complete control panel assembly over and test press each button. You should feel that familiar tactile “snap” feedback from each of them. If any button feels “soft” or different than you recall, then remove the circuit board and make sure that the rubber switch pads are all fully seated against the board. Verify that all of the switch pad rivets are fully seated and locked into the board.

Stack two felt bumpers together and attach them right next to the broken retaining slot. Even if your retainer clip is not broken; this will prevent damage in the future. The bumpers will rest against the climate controller housing once assembled and provide proper support for the circuit board. Repeat for the remaining retainer slot on the other side.



Photo of the properly assembled control panel.



Insert the ribbon connector back into its mating socket on the control panel. There will be an audible click once the connector is fully seated.

Insert the control panel back into the climate controller housing and attach with the screws originally removed. Then install in your vehicle.

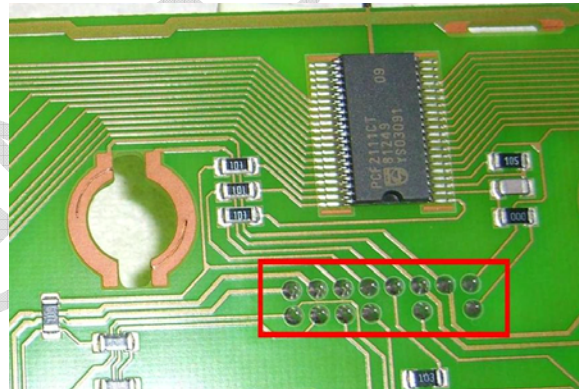


That's it! If all is well, you should have a bright and clear display with fully active segments. Congratulations! If any segments are still missing or the display is still malfunctioning; please contact us at (208)892-0764 for troubleshooting.



Appendix

If you can solder, now is a good time to apply new solder to the pins of the ribbon connector socket outlined by the red box. Sometimes the solder connections fail and can cause problems with push button response and LCD control chip problems. The LCD control chip can be seen in the photo just above the soldered connector socket pins. The LCD control chip takes commands from the microprocessor in the climate control housing and interprets these commands into signals that activate the proper LCD segments.



Early versions of the electronic climate control module incorporated LCD panels without the anti-glare coating directly applied. Instead, they used a separate anti-glare filter. Simply re-use the original anti-glare filter over the new LCD as it is also a required spacer.

Thank you!