Futura and Caponord dash repair

So..... Most of us know about the issues that some have had with their instrument cluster going deal. Some have had it happen while riding while others have had it happen after changing the battery, pulling the dash, etc..... My cluster recently took a crap on me after pulling it just to do a headlight bulb change. I pulled the connectors, changed the bulb, and the dash never came back on after I plugged it back in with the exception of the oil pressure, kickstand, and neutral lights. Every other function, including the backlights, were dead as hell. No speedo, no tach, no readouts at all. Incidentally, my dash was replaced under warrantee while the original owner had it.....

Anyways, since I head up a rather large electronics repair facility and have dealt with electronics for over 20 years, I figured that I would be better off taking a looks to see if I could figure out WTF was wrong. I mean, what's the worse that could happen? I guess I could screw up something that was already broke..... Screw it, I'm going in!

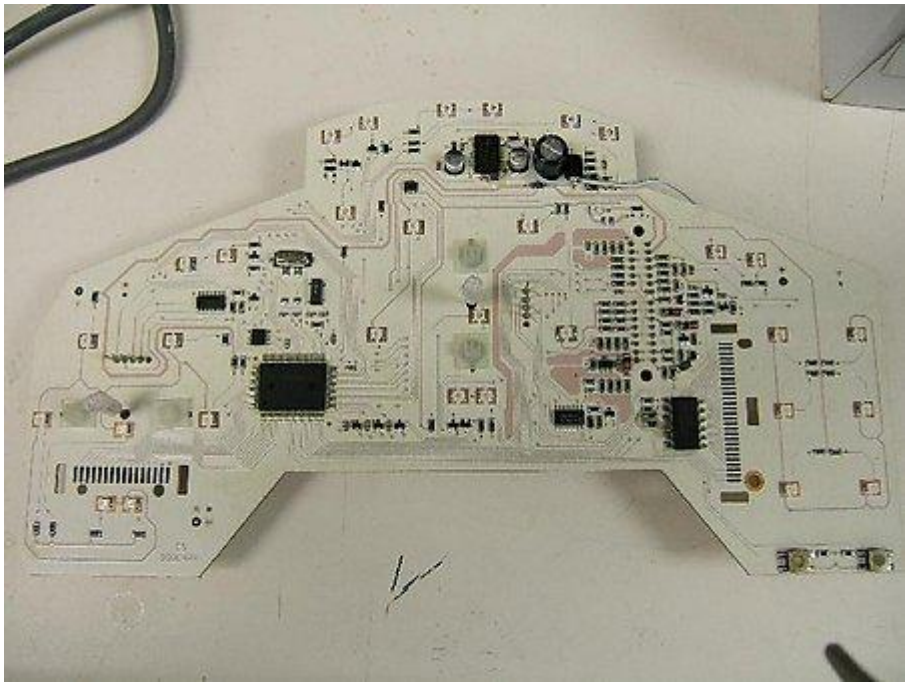
Before I go any further, I have to add an additional thanks to CapoGrandad, another Aprilia owner with the knowledge to check it out, and Joe, a guy that works for me. Without these two guy's assistance, I would not have gotten this solved as fast as I did!

Here we go!

Pulling the dash itself is easy: Remove the fluse cover, dash side panels, you know, those ones that fill in the space around the fairings and dash, and two bolts hold the cluster in place. Once those bolts are removed, it is easiest to move the panel to the right for access to the two connectors on the back. Remove those connectors and pull the dash out.

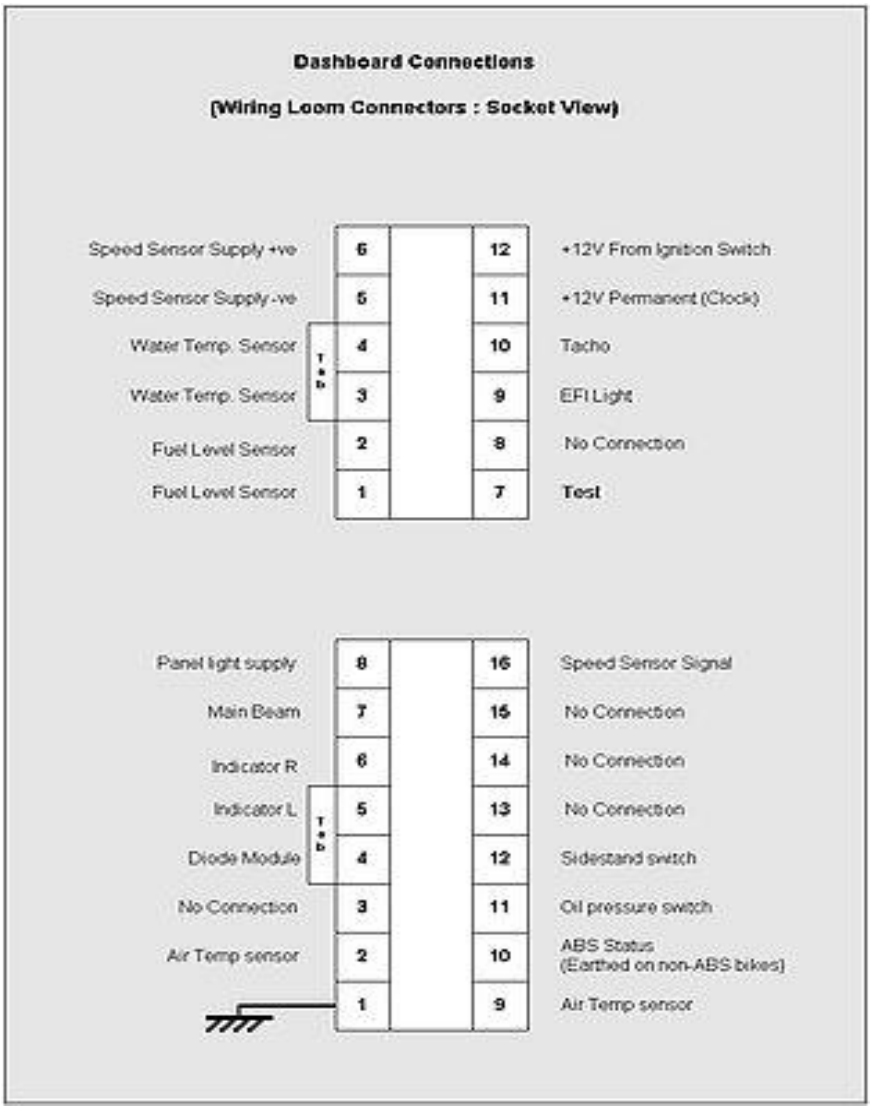
Pulling the dash apart is not too bad either..... There are retainer tabs around the perimeter of the housing that you can easily unclip and pull the two housing halves apart. From there, it gets a bit more difficult. I found that I could NOT get the speedo and tach needles off the drive pins. I pulled them about as hard as I dared, but they would not come off, so I ended up using an exacto knife to carefully cut them off. This is required in order to gain access to the actual circuit board. A couple other guys have said they had no problems pulling the needles off, but mine were stuff on there good! Once you either pry the needles off, or cut them off, you can carefully pull the retainer tabs away from the board housing to release the circuit board and get to the goodies!

Here is a pic of the whole circuit board. I never took any pics of the board before doing any repairs, so try to ignore those wires up towards the top right now. We'll get to those soon enough.....

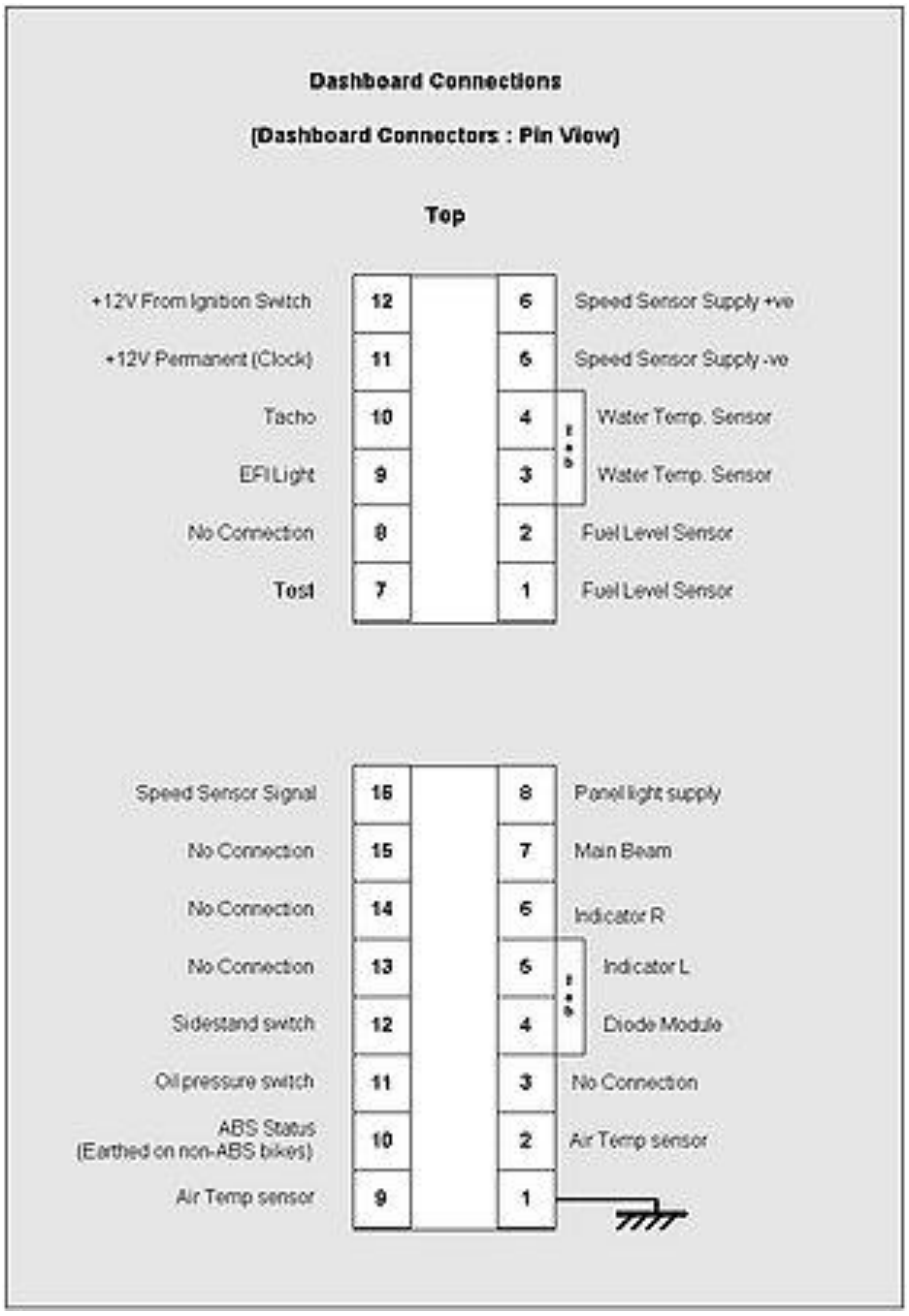


Next we have a couple pics of the connector pin out diagrams.....

Wiring harness side.....



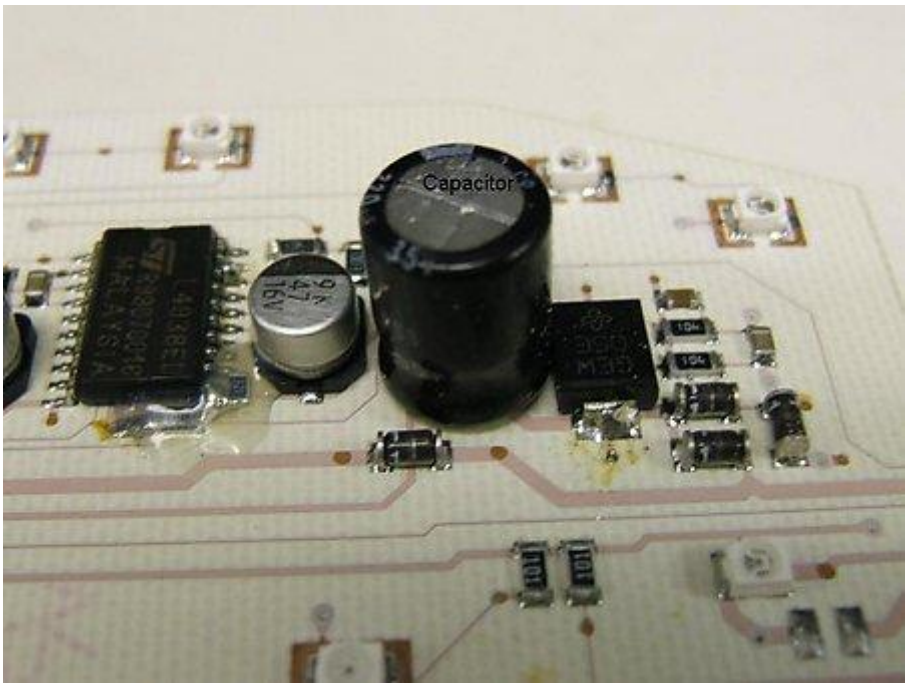
Cluster side.....



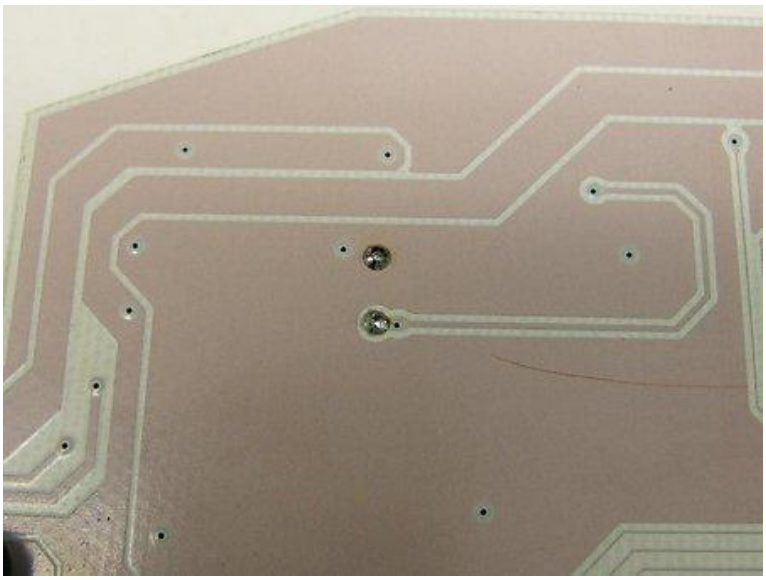
I should note that once you have the circuit board out and if you have access to a multimeter, you can hook it back up to the bike for some additional tests. I used a power supply for my tests, but you CAN do it on the bike with the key on. The biggest thing you need to look for is applied voltage to a couple different places. With the multimeter connected to ground, you can check to ensure that you are getting voltage to the board by checking the 12V+ locations on the connector, then check at the bottom side of the zener diode where you should see 12V, and finally, on pin 19 on the IC chip. At all locations you should see 12VDC. If you have 12VDC at the Zener Diode, but not at the IC chip, then the fault is more than likely a bad solder connection under the large capacitor. You can check this as well by check for voltage on the back side of the board where the capacitor is soldered on. Check from ground to the bottom solder joint for the capacitor and you should see 12vdc. (It goes without saying that these tests need to

be done with the key ON!)What is happening is that the top side of the feed through does not have any solder on the feed paths on the top of the board. This is causing the capacitor to loose the connection to the output of the Zener Diode so the IC chip that is the voltage regulator is not receiving any power.

In this pic, it shows the Capaciter (marked) and Zener Diode. (To the right of the capacitor.) The Zener Diode test point is the lower solder joint on the diode.



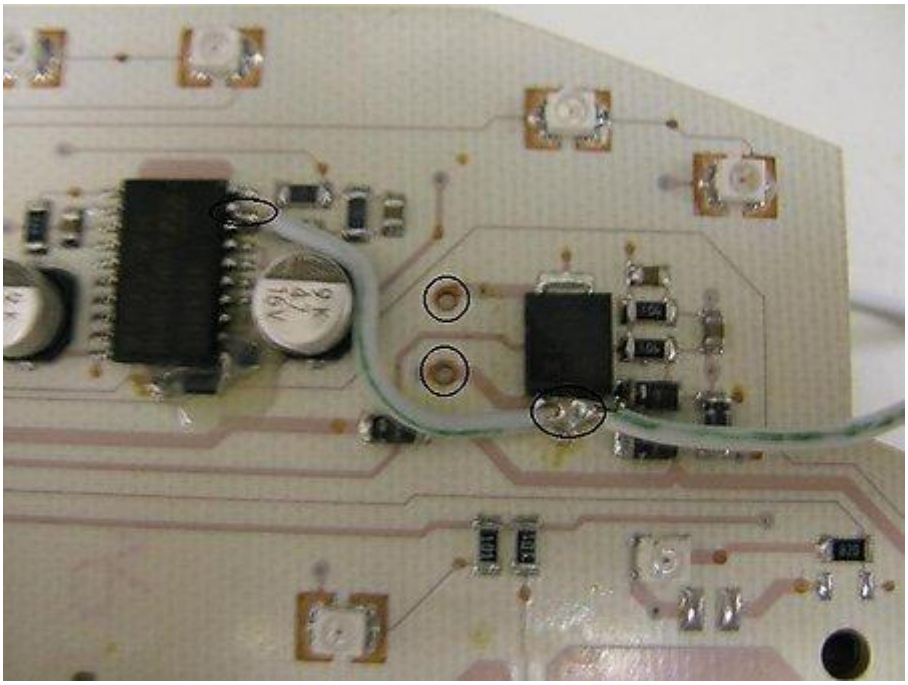
This next pic shows the back side of the board where the capacitor is soldered. The lower solder joint is your test point.



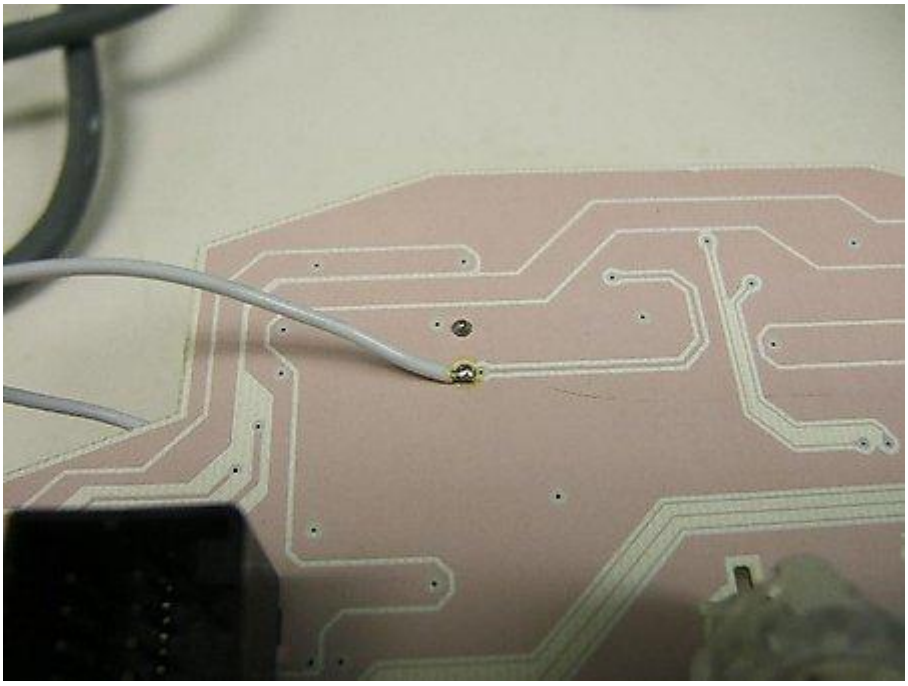
Once you determine that this is your problem, there are three ways to fix it, one which works, but bypasses the capacitor (Not recommended), one does not require removal of the capacitor, and one that is the technically "correct" way to fix it.

1: You can run bypass wires from the Zener Diode to Pin 19 on the IC chip. This takes the capacitor out of the loop and is not recommended since this acts as a filter to avoid voltage spikes to the chip.

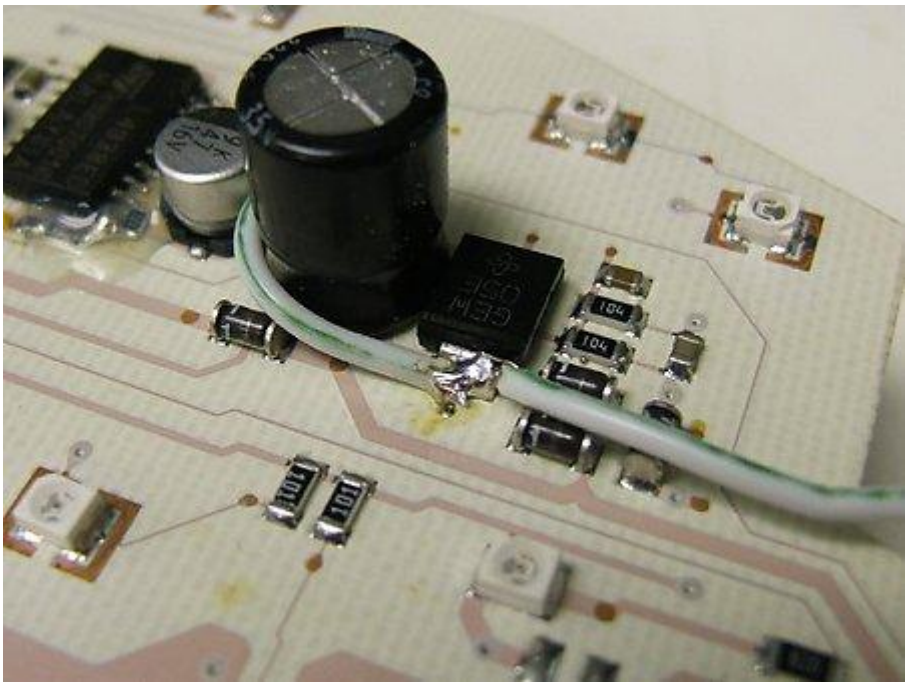
This pic shows the wires going from the Zener Diode to both the IC chip, Pin 19, and the capacitor. I took the cap out for this pic to show thing a bit more clear:



2: You can run a feed wire from the Zener Diode to the back side of the board to the lower solder point of the capacitor. This eliminates the need to pull the capacitor and works just as well.



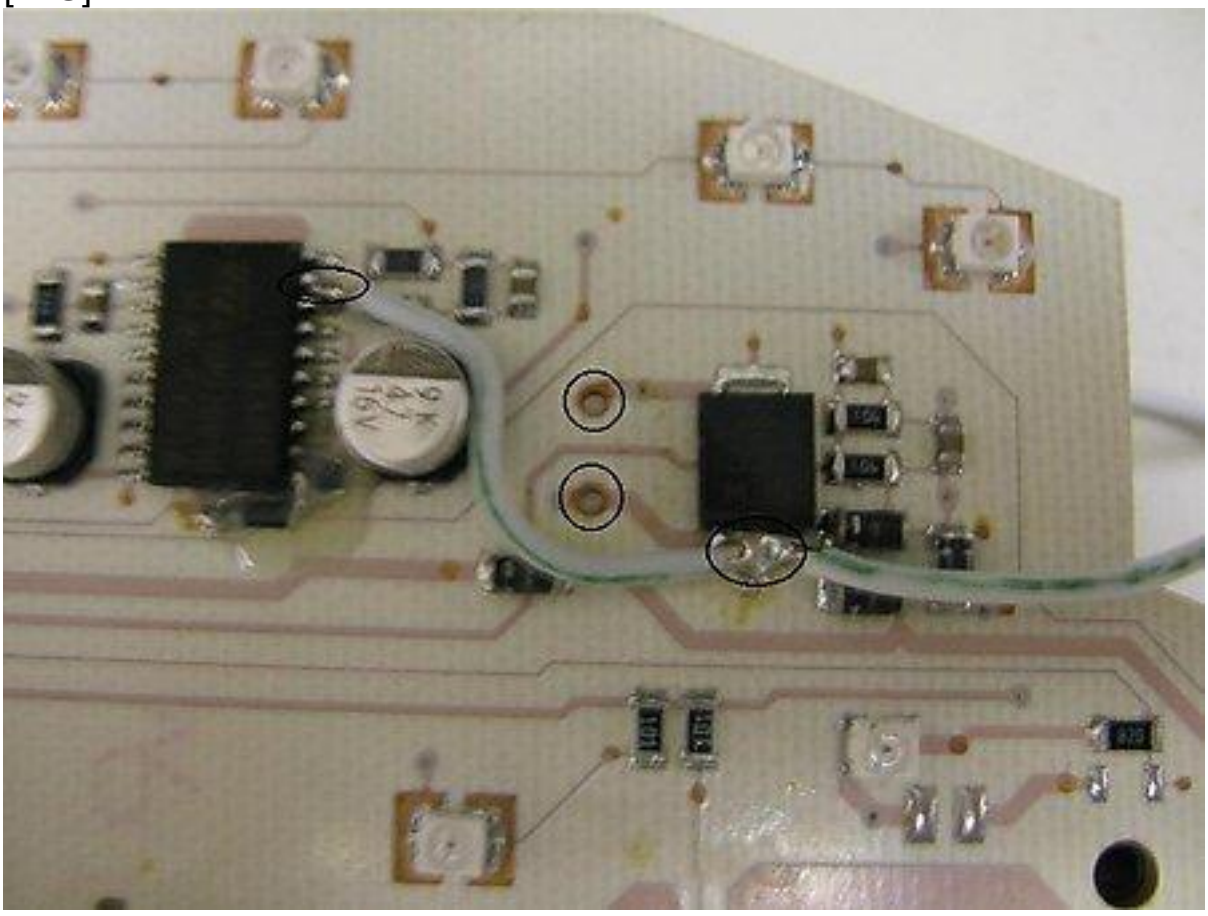
This one shows the Zener Diode soldering point:



3: You can pull the capacitor (being careful to note which pin is in which hole) apply solder to the mounting pad, and then replace the capacitor and then check your voltages again.

This pic shows the clean mounting pads on the upper side of the board which is the cause of this problem to begin with. To fix, use a soldering iron to apply solder to these pads before reinstalling the capacitor:

[IMG]



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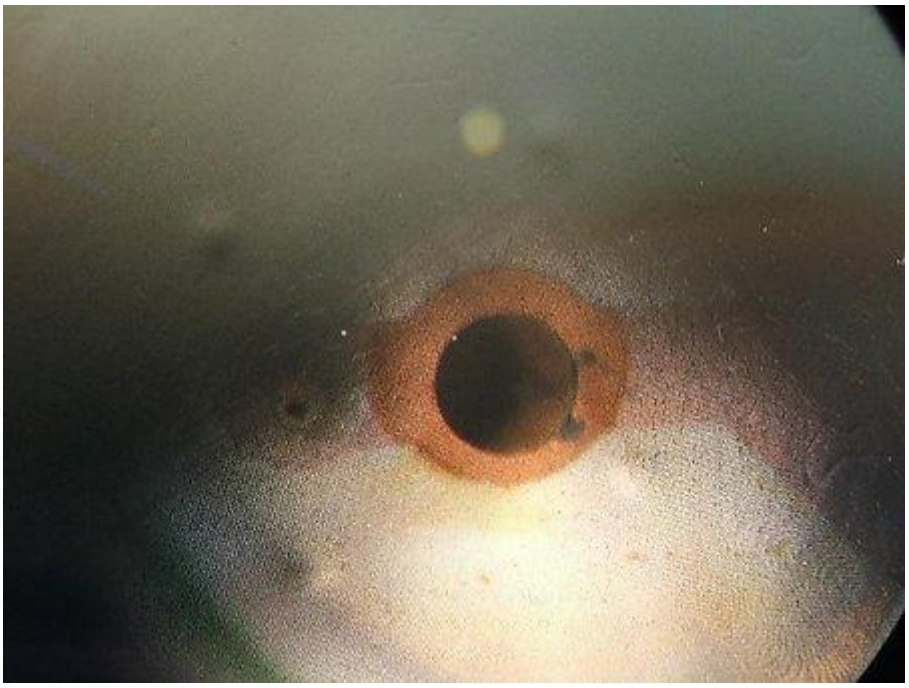
Here is a microscope view of the capacitor mounting pads. You can easily see that there is NO solder to make a connection:



This is a pic of the micro miniture soldering station I used for these repairs, but you can do it with a low heat soldering iron without too much trouble.

I checked all three methods and they ALL work, but ended up doing the correct fix.

Once you are getting lights on the board again, you can put everything back together and keep on rocking! For those that have to cut their needles off, I used JB Kwik Weld after making sure I had everything oriented right and it works with no problems!

DISCLAIMER! This may NOT fix your cluster. You may have other issues or you may screw it up worse! If you want, you can send them to me and I

can fix it, or, armed with this thread and pics, get someone else to fix it, but play at your own risk here!

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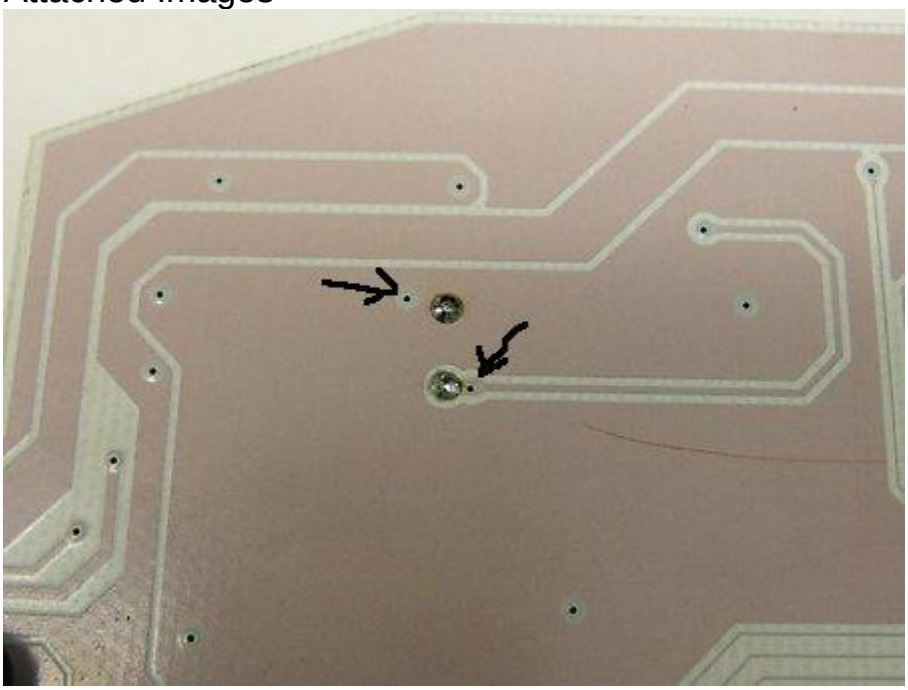
Ron
MSgt USMC
Semper Fi

he track from the diode to the regulator passes through the board at the capactor connection. If the through-plated hole is good, no problem. If the plating is poor or cracked, the then when the board is first soldered the solder does not run up through the hole to make a good joint on both sides of the board, and the through plating is the only connection. If there is a crack in the plating, it may make so-so contact for a while, but eventually it will fail and then the dashboard 'dies'.

Ron .....Would you agree that the smaller pad next to the Capacitor could be used to repair any broken or unsound trough plating? I'm thinking that a pin soldered on both sides would make the connection more secure.

These are the pads I mean, if indeed they are pads.
Attached Images



YES!! I now know what time it is!! :)

I now know what time it is, not to mention how fast I'm going!!

I just got done doing the smoke test after doing the fix and it works!! What I did with respect to Ron's instructions was this:

1) Remove the solder off the capacitor leads coming through the pc board (get Radio Shack desoldering braid or similar, or desolder bulb). Remove the cap.

2) Tin the leads of the capacitor (flow a little solder on them).

3) Tin the 2 pads on the circuit board where the cap goes being careful not to use too high a heat and separate the pads from the board.

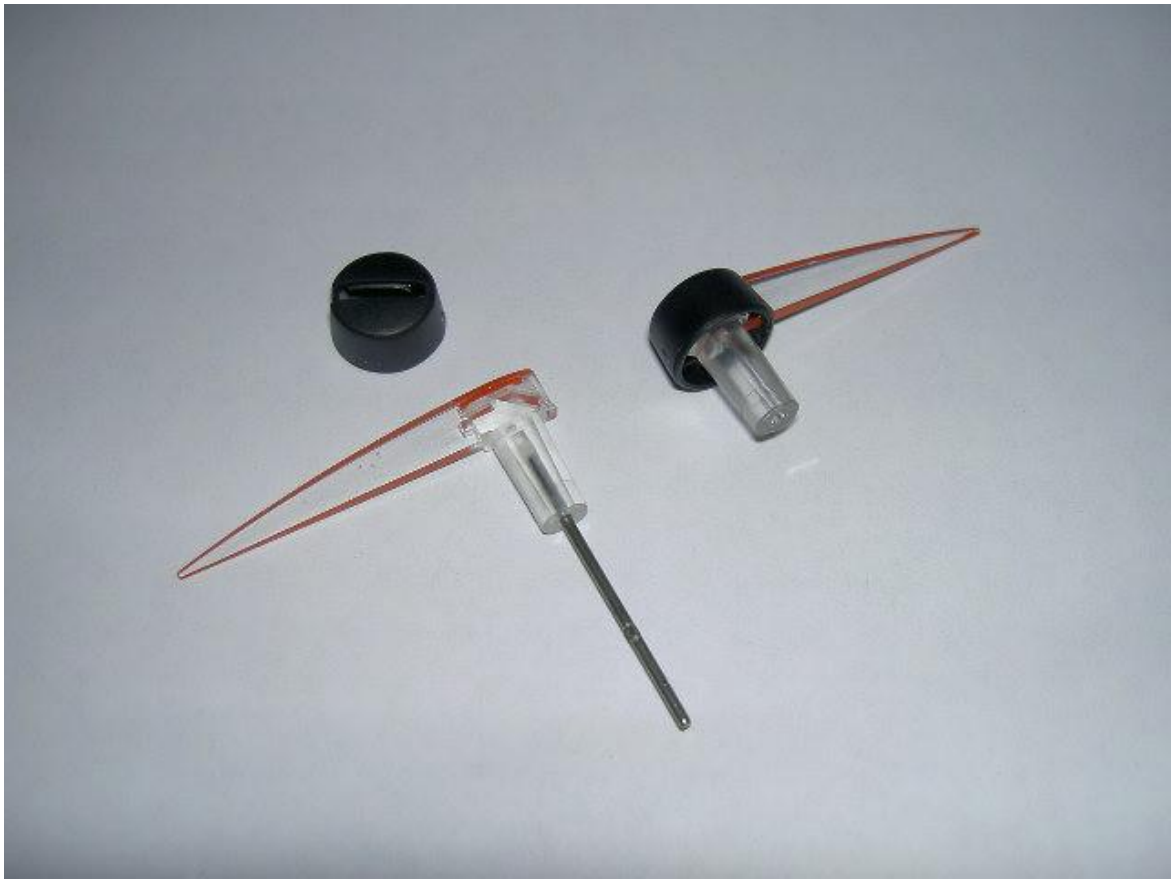
4) At this point the holes were pluged with solder so I went to the backside of the board and used my desoldering braid with the soldering iron to clear the hole. Heat the braid up over the hole and it just flows the solder out of the hole onto the braid.

5) Replace cap. I was careful not to push the cap all the way down to where the cap was touching the board. I wanted a tiny bit of space such that the solder would flow properly between the hole and lead once I soldered the leads on the other side of the board.

6) Solder cap leads making sure enough time and temperature allows the solder to flow on both sides of the board. Pretty nebulous, eeh?

I realize I'm not a pro like Ron, but hopefully this gives another perspective from one not so talented

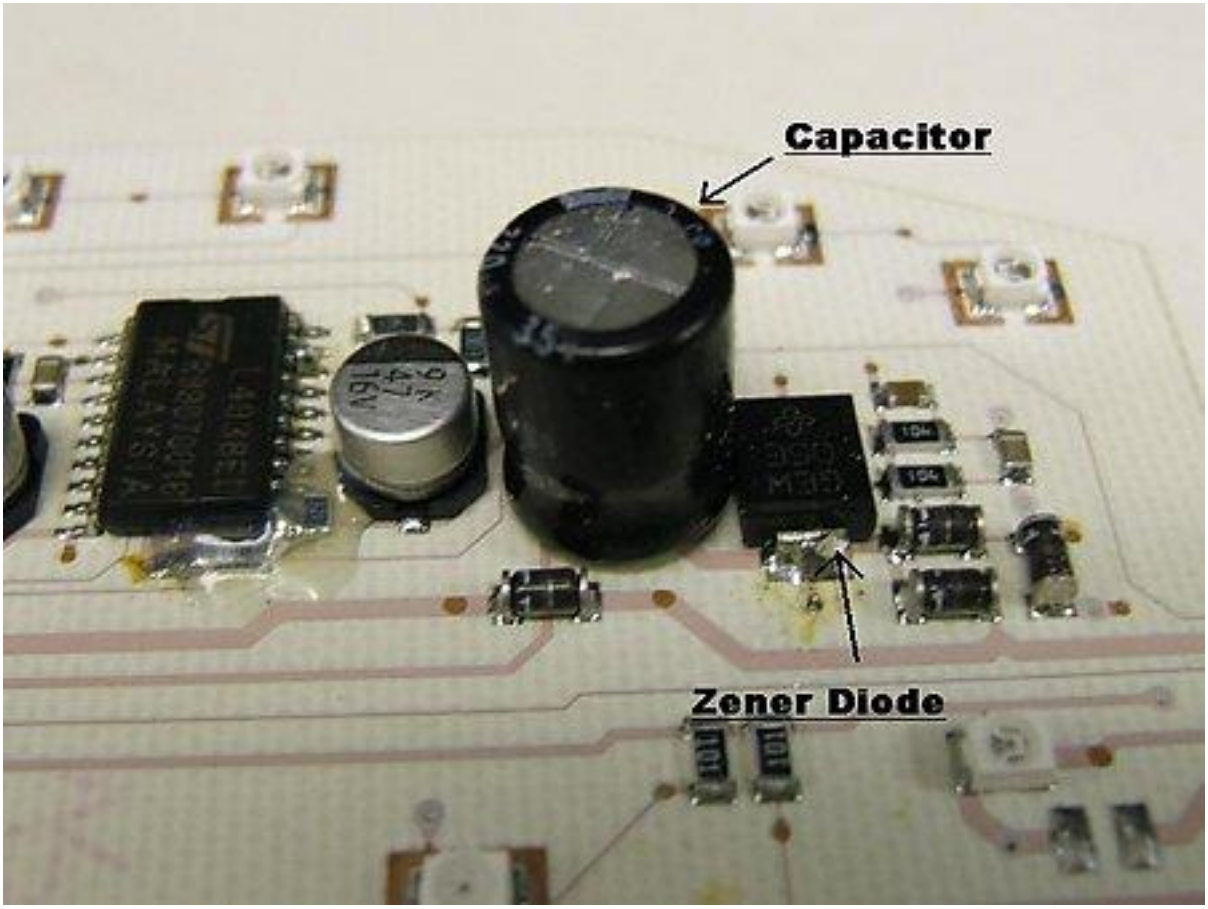
Oh, getting the needles off the second time was easier. I did not use any tools just fingers. The needle that came off with the shaft was still a bit tough though. The black caps come right off the needles if need be to make things easier. Hope this helps and adds to Rons work



Wiring mod to fix these

After doing a couple of these boards for a couple members, I have come up with a simple fix that does not require any sort of special stuff with the exception of a low heat soldering iron and a little solder. The hardest part of this is to pull those freaking needles off the speedo and tach!

Anyways, the primary problem with these boards is the loss of contact between the zener diode and the capacitor. (See labeled pic below)



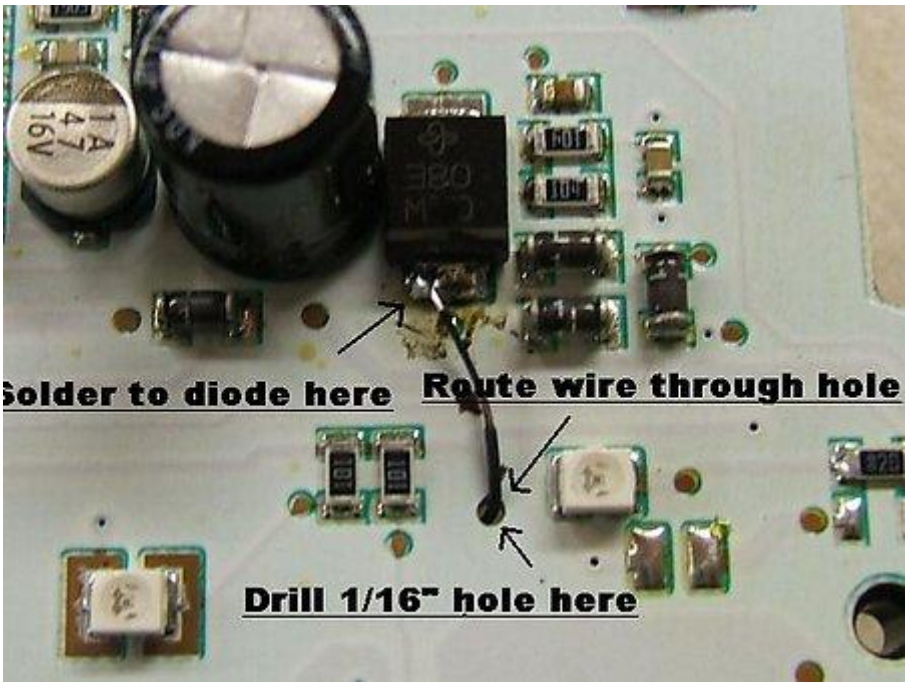
In order to fix this and completely alleviate the problem, as well as making sure it does not happen again, I have found that the best way is to not bother removing the capacitor, but rather, run a wire from the diode to the capacitor. This, in essence, replaces the run on the circuit board and takes the pass through connection out of the picture as well. It is also easy to do!

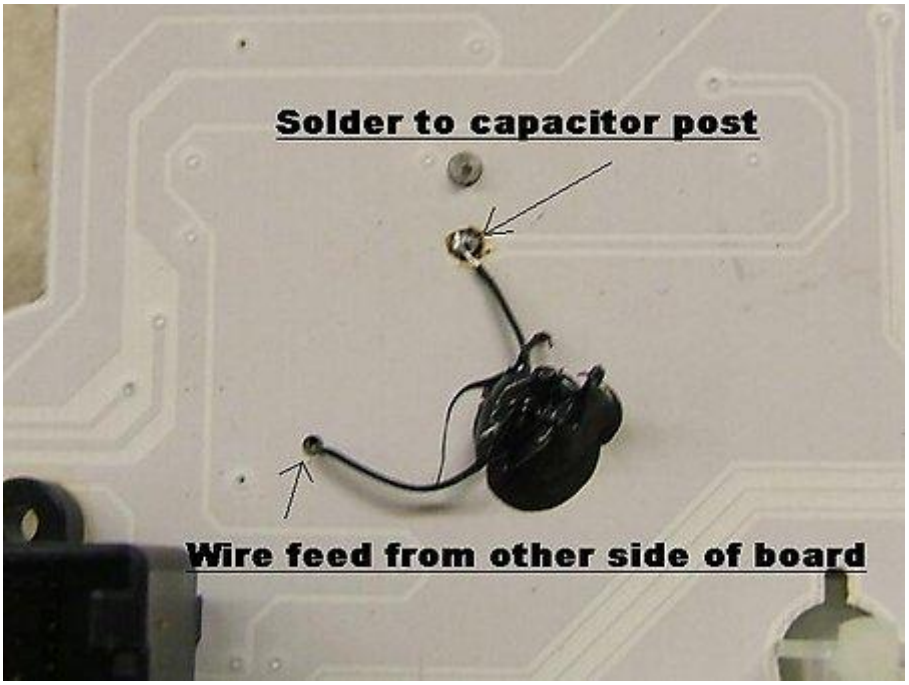
These instructions are assuming that you already have the board out of the casing, so:

Drill a 1/16" hole in the circuit board in the location show. The reason I do this is due to the tight tolerance at the perimeter of the circuit board when mounted in the casing. This helps maintain the weather protection here as well and will not disrupt any circuit runs on the board in this location.

Using an insulated small gauge wire, solder it to the diode where noted. Run the wire through the hole to the back side of the board, and then solder it to the capacitor lead as noted.

I used a little dab of RTV on the wire to ensure it does not vibrate and come loose.





This should make it easy for anyone having problems with a dead dash! As usual though, if you don't trust yourself to take the assembly apart, you are more than welcome to send it to me and I will be happy to fix it and test if before sending back. Any questions, drop me a PM!

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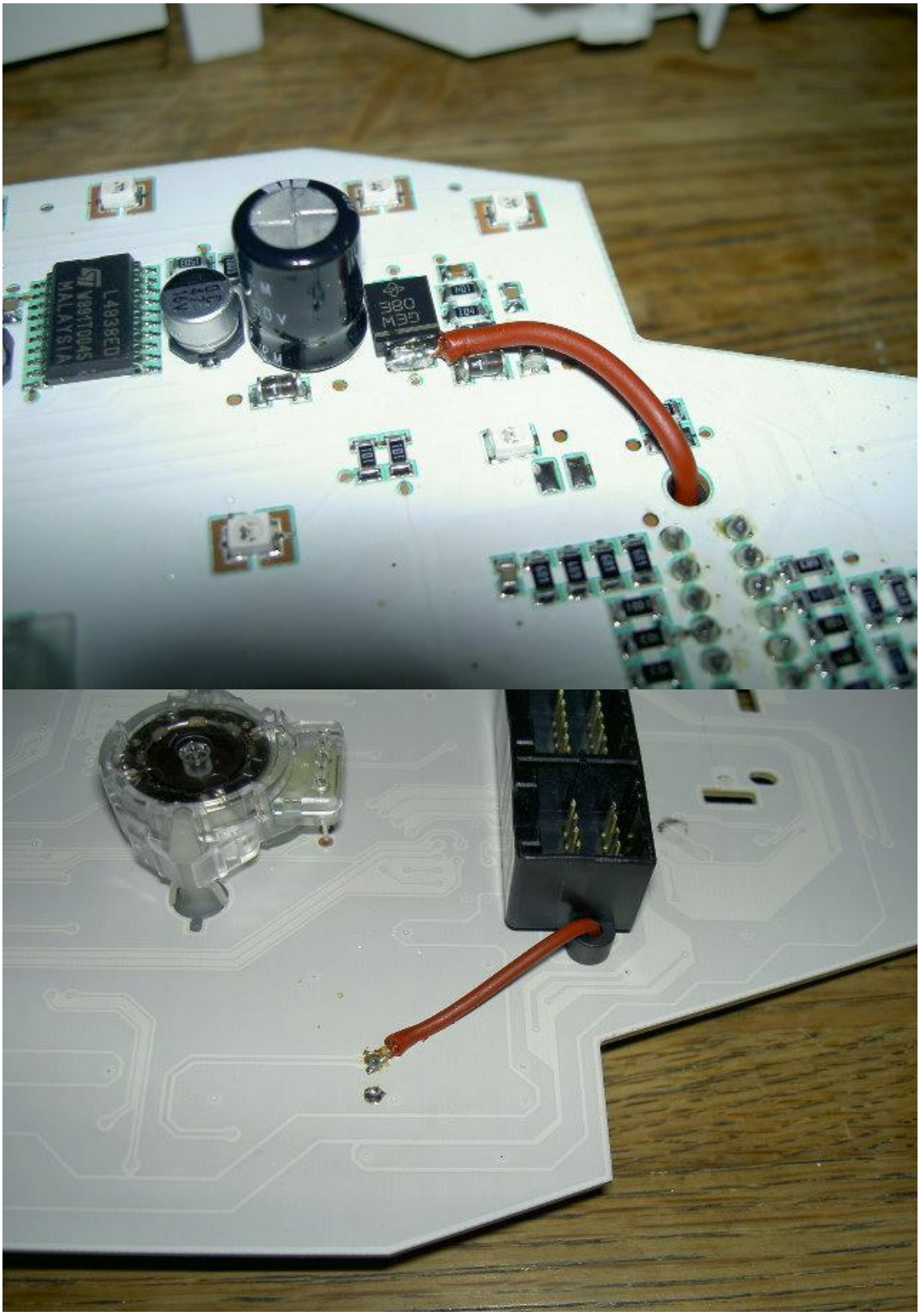
Don't need to drill!

My fix where I just put solder on the pads and resoldered the cap finally failed. I tried to repeat doing the same fix, but did not work. So I proceeded to put a jumper in from the diode to the capacitor. I went through the hole in the multipin connector to get to the backside of the board and it worked fine. No drilling was necessary. There is enough clearance for the wire when you reassemble the dash. You do need to make sure that you don't get too near an led that is in the area but if you put a bit of a curve in the wire as in the

picture, your fine.



The wire I used was a little on the large side. Would be better a bit smaller