

# 162F FADEC display modification

Al Yard  
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This is a recommended modification to address a design flaw in the FADEC display unit. This design flaw can, in some circumstances, damage components on the 162F ECU printed circuit board. This damage occurs mainly while doing work on the electrical system and can occur even if the ECUs have been turned off.

This is NOT a flight safety issue. First, the damage generally occurs when the electrical system is being worked on, which is unlikely to happen while in flight ... and second, the damage does not cause the ECU to fail, only the FADEC display will fail. The affected circuit is the power supply in the ECU that feeds 5V power to the FADEC display. This 5V power supply is isolated from the ECU power supplies and its failure does not affect the operation of the ECU.

Essentially, this is a problem of alternate ground paths. The 5V power supply ground is connected to the FADEC display through the ground wire in the FADEC display cable. The shielding around the cable is connected to the case of the ECU, which is connected to helicopter ground via a braided ground strap. But, inside the FADEC display, the power supply ground is connected to the cable shielding. This causes 2 problems. The first problem, this provides an alternate ground path that can allow ground currents to flow from the ECU to the FADEC display and back through the cable shielding to system ground. The power supply ground wire is protected by ferrite beads to block EMI/RFI, and these ferrite beads can only handle a small amount of current. The second problem, this allows eddy currents to flow through the cable shielding, which can radiate interference.

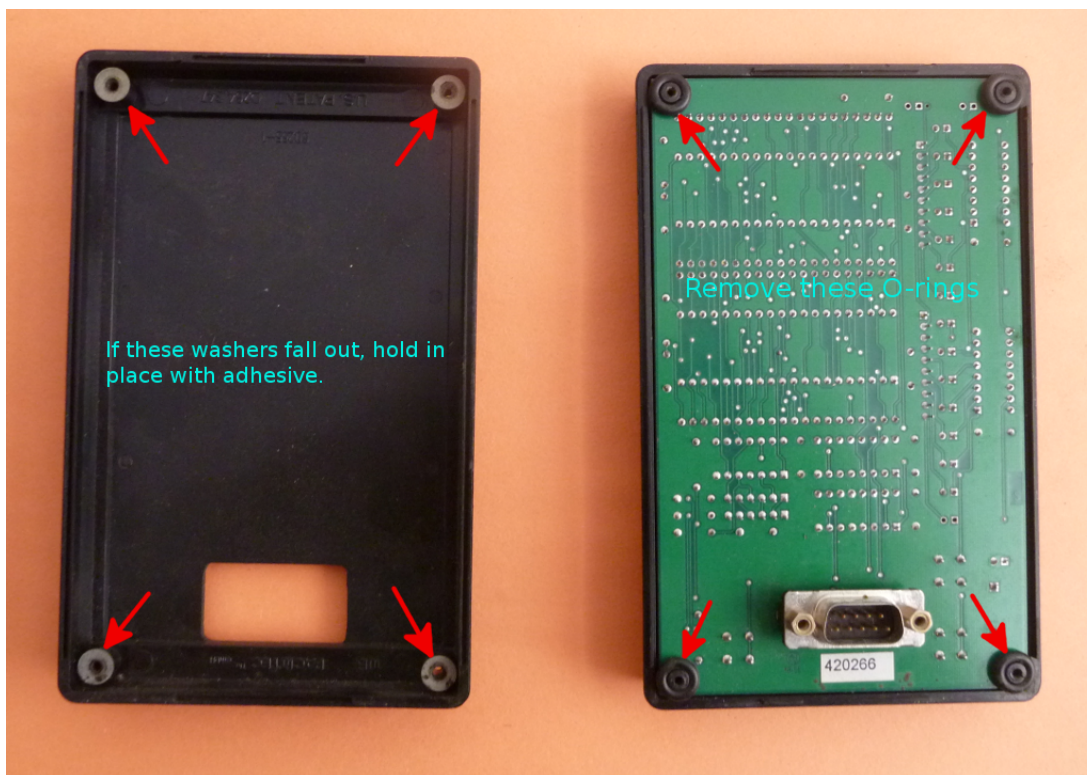
The object of this fix is to break the connection, in the FADEC display, between the ground wire and the shield wire.

## Step 1:

Remove the FADEC display from the helicopter and lay it face down on the table. Remove the 4 screws, one from each corner. Carefully lift off the display back.

In the display back, you should see 4 nylon washers. On some display units, these are held in place with an adhesive. If they fall out, don't lose them. In this case, it's a good idea to glue them in place with an adhesive (contact cement or similar), this will make reassembly much easier.

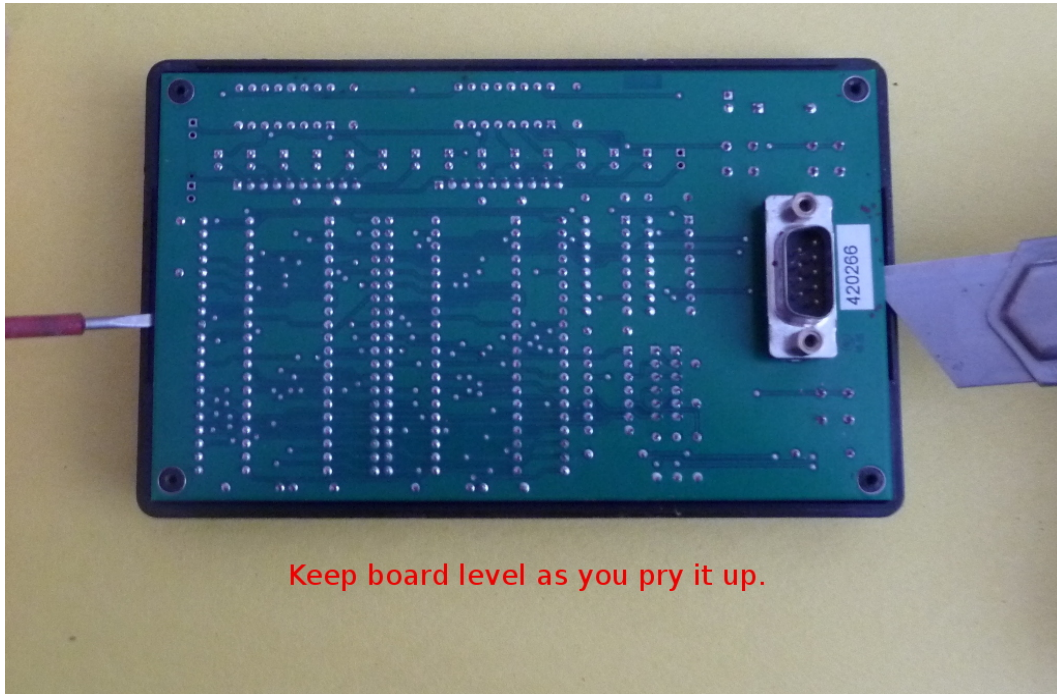
Remove the 4 O-rings from each corner of the printed circuit board. On some displays, these are held in place by an adhesive. If, after you have removed the O-rings, there is still adhesive on the posts, use a pick and remove this adhesive from the posts.



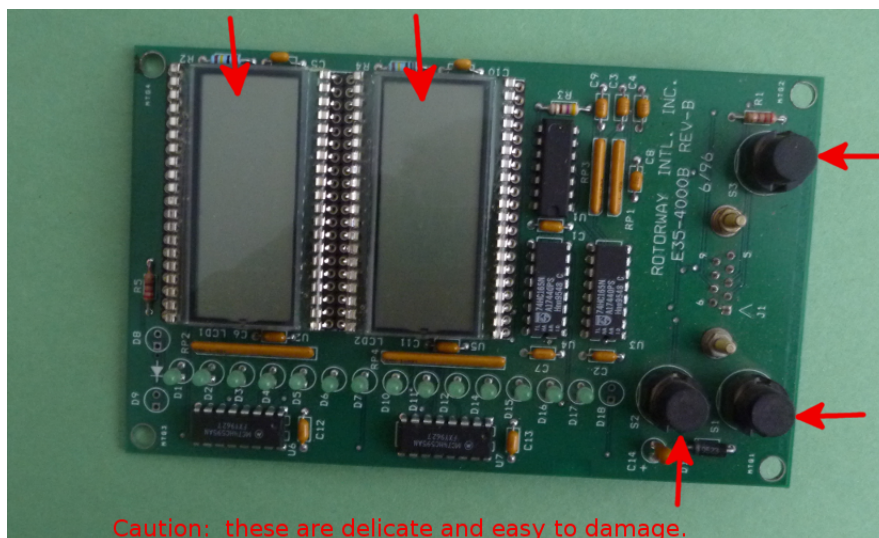
## Step 2:

Using a pair of tiny screwdrivers or the tip of a box-cutter, carefully pry the printed circuit board up. Try to keep the board as level as possible as you pry up until the LEDs and buttons have cleared the holes in the front of the case. This will be about where the printed circuit board clears the posts.

Once the board is clear of the posts, grasp it by the connector and carefully lift it clear and lay it face up on the table.



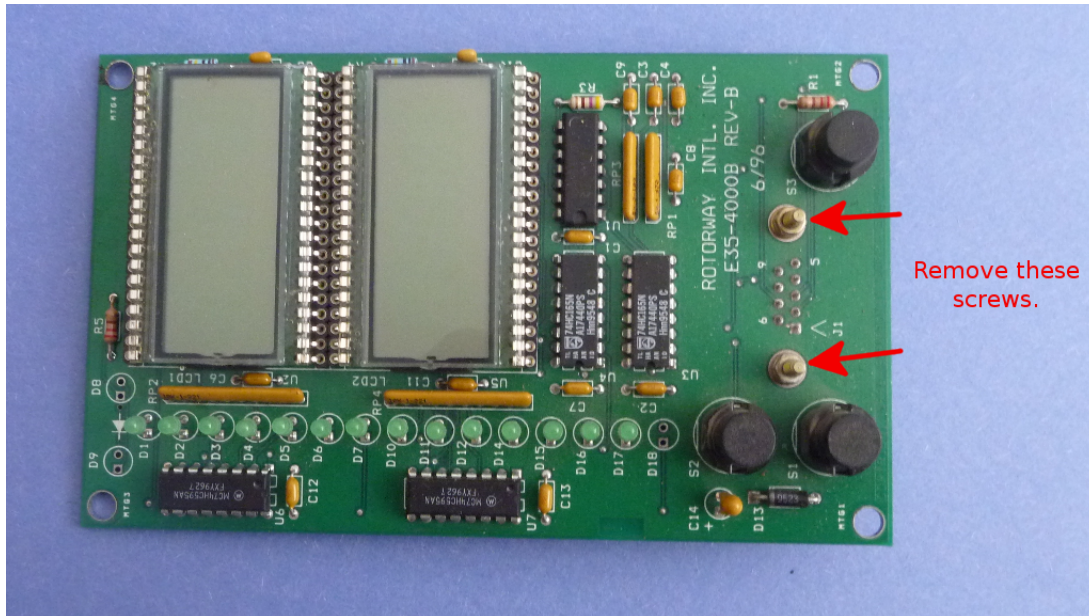
Be careful in the following steps. The push-buttons and LCD displays are delicate and are easy to break.



### Step 3:

Using a pair of 3/16 sockets or nut drivers, remove the 2 screws that fasten down the connector. You can use other tools, but it's much easier with sockets.

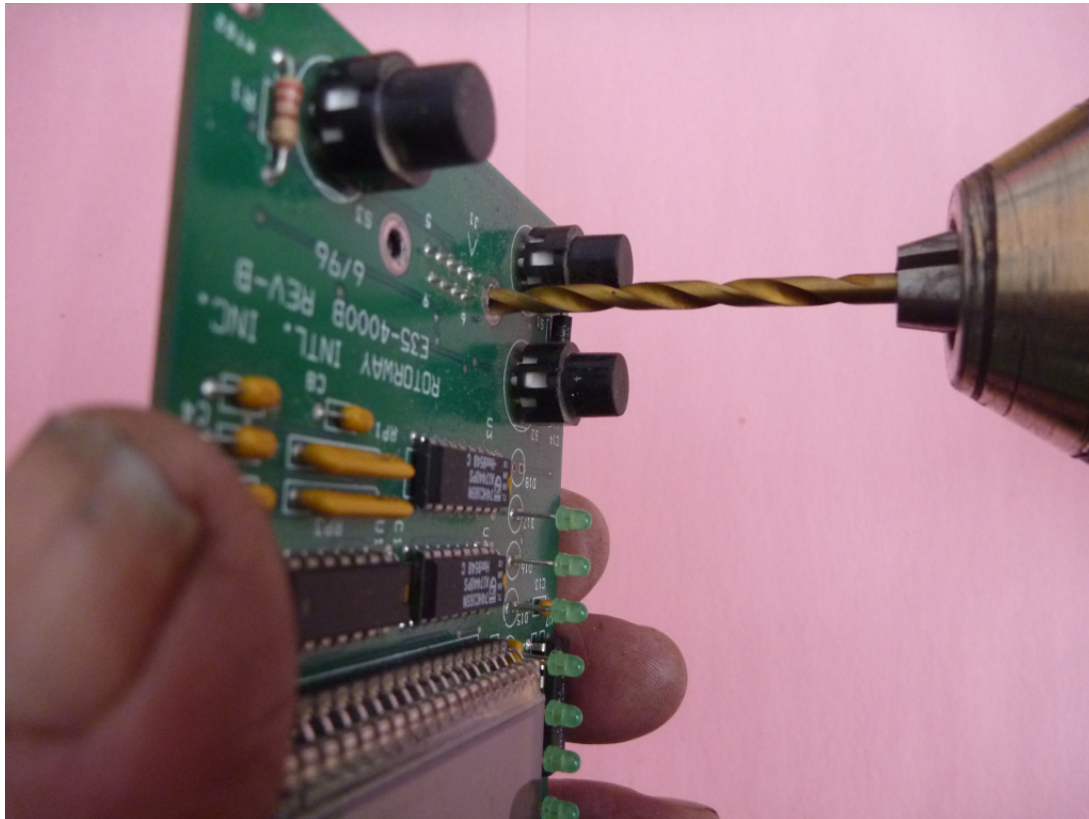
This is where it's handy to have an extra pair of hands to hold the board while you remove the screws.





## Step 4:

Grasping the board from the backside, very carefully drill out the 2 holes with with a #28 drill. Do not drill all the way through. Drill to just short of the metal on the connector on the backside of the board. If you accidentally drill all the way through, it's not a big deal, the danger is if the drill bit grabs while going through the metal, it could do damage.

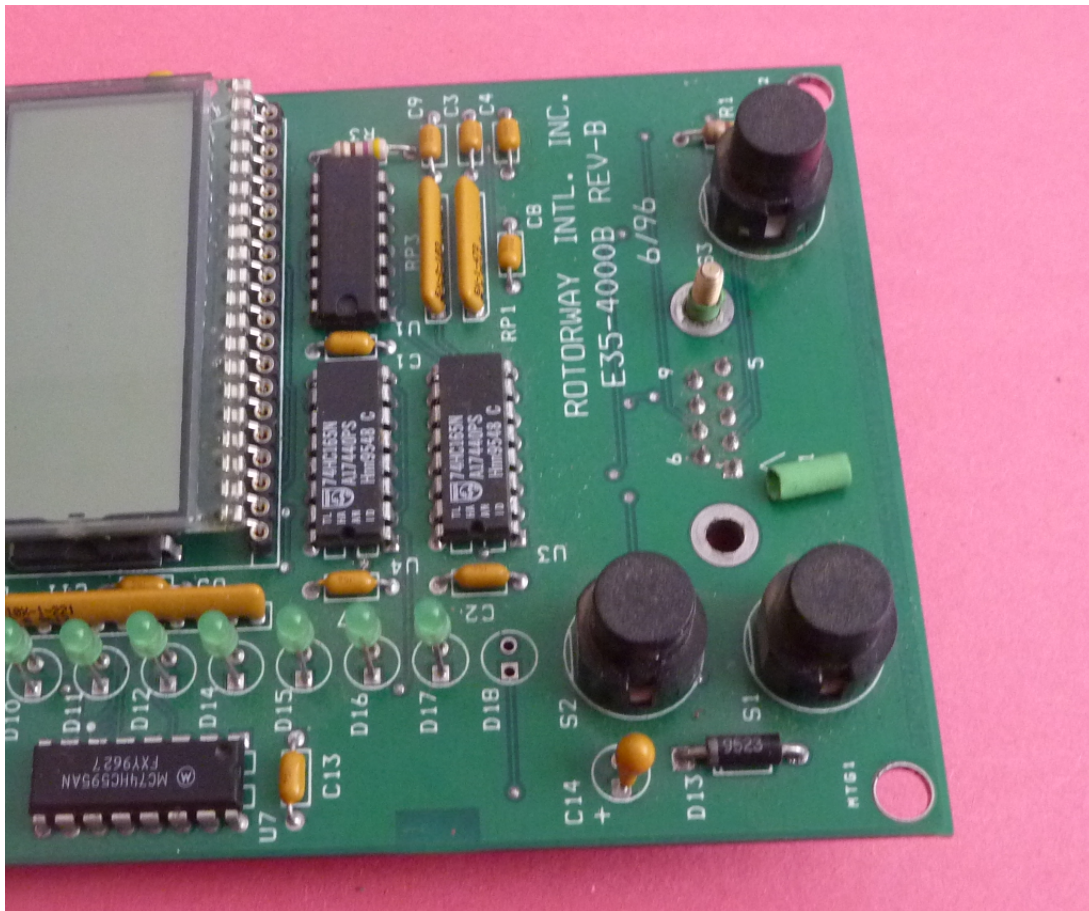


## Step 5:

Take a couple of short pieces of shrink tube or something similar. This tubing must be large enough to go over the screws but small enough to fit in the holes. If need be, you can make the holes a little larger. Once you have the shrink tubes in place, re-assemble the screws and nuts and torque the nuts up lightly snug.

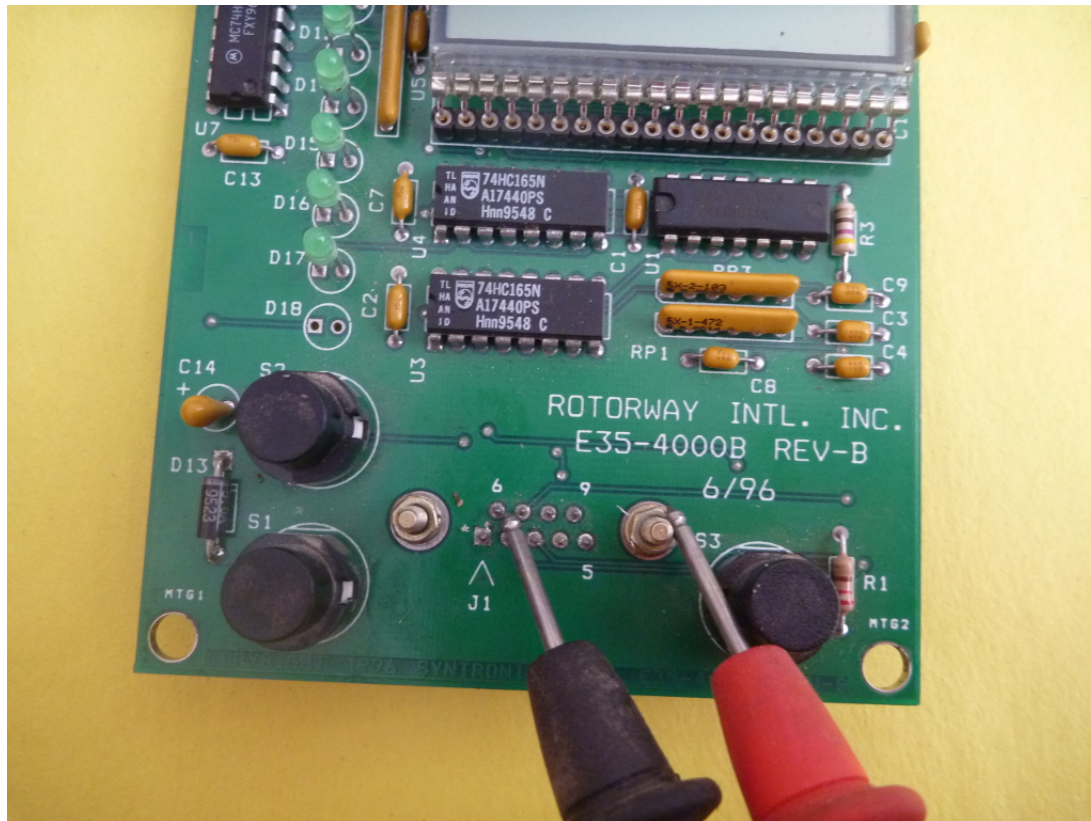
It can help to put a little light oil on the shrink tube, it will slide easier over the threads or in the holes.

If you are really stuck for tubing, then try putting a little bit of silicon on the screw threads below where the nut will be installed. Insert the screws and watch that they stay centred in the hole while the silicon sets up. Then install the washers and nuts.



## Step 6:

If you want to be sure the job is good, take a multimeter and check for continuity between one of the screws and pin 6 on the connector. If there is no continuity, then your work is good. Otherwise you will have to figure out what went wrong.





## Step 7:

Lay the board on the table face-up. Place a felt marker pen or something similar under one end so that the board sits roughly level.

Examine all of the green LEDs and ensure that they are all straight and evenly spaced. It's easy to have bumped one or more while working on the board.

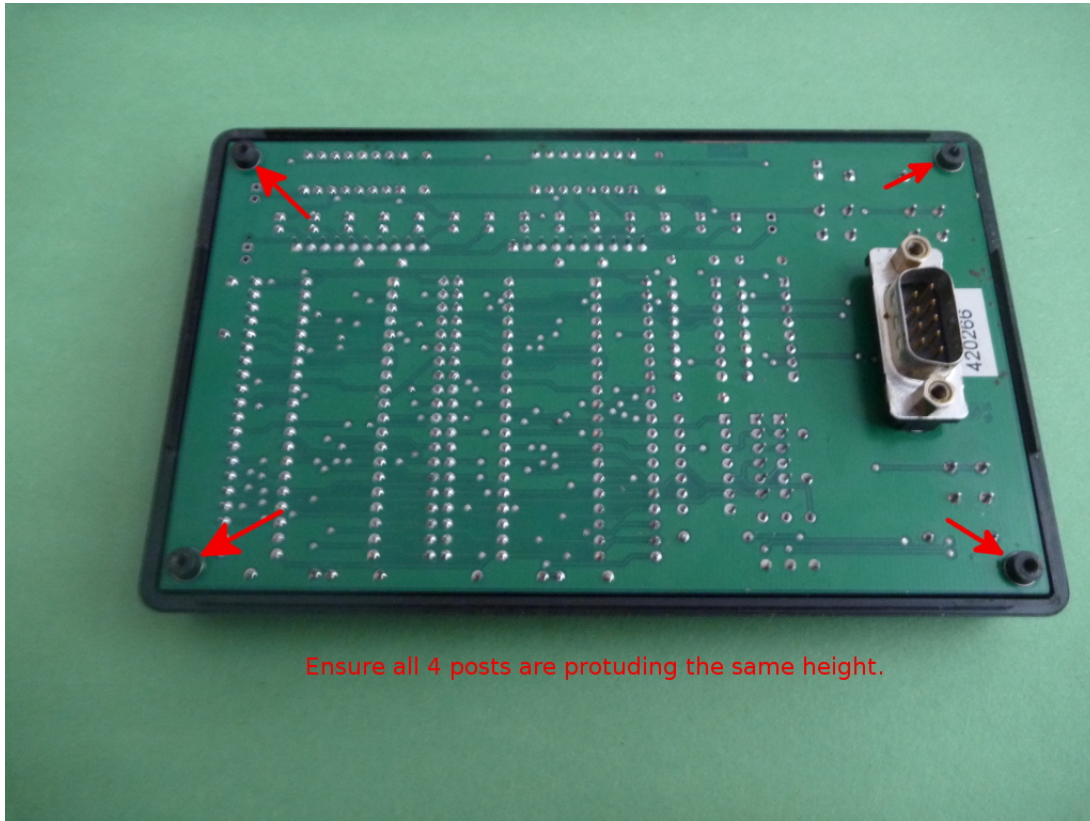


Now comes the tricky part. Gently lower the front cover onto the board. The trick is to get the 4 corner posts, the 3 push-buttons and all of the green LEDs to line up with their respective holes. Do not use any force. If you gently jiggle and rock the cover, and hold your tongue just right, it will fall into place.



## Step 8:

Once you think the front cover is installed correctly, then turn the unit over face down on the table.



Check that all 4 posts are protruding through the same height. Install the O-rings, the posts should now be roughly flush with the top of the O-rings. See photo in Step 1.

Ensure that the 4 white nylon washers are in place in the back cover. Install the back cover.

Install the screws in each corner of the back cover. Be careful to torque them down only lightly snug. They are screwed into plastic and will strip very easily.

You are now all done!! See ..... nothing to it!! And if you are lucky, it will even still work.