Technical Guide

How To:

Install a Thor combined "Speedo Converter and Top Speed Delimiter"

Applicable to all pre-facelift models

(NA/TT, Manual and Auto)

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'Draft' status until I've drawn up my version of the wiring schematic and added a few extra words about the wiring.

This is my first ever 'how to' write up, so be gentle!

Any questions or if you spot anything I've missed or that isn't clear, please give me a shout and I'll add it in/see if I can address it.

How To…. Install a Thor <u>combined</u> "Speedo Converter and Top Speed Delimiter" to a pre-facelift mkiv Supra.

The unit is available from here.

Note: Top Speed Delimiter (TSD) is also known as Speed Limit Defender (SLD)

<u>What you will need:</u>

- Between 2 hours and anything up to a full day depending on if you've done this before. Anyone who can use a screwdriver and read a schematic can do this, just be patient and allow for the fact it might take you a while – i.e. don't start this if you need to drive somewhere in an hour.
- A metre or two so of decent electrical wire to extend the TSD wire down into the passenger footwell where the ECU lives
- A Philips (X-head) screwdriver
- Wire cutters
- Wire strippers – I recommend decent 'automatic' ones as you have limited lengths of wire to work with and can't afford to make mistakes!
- A socket set to get at the ECU
- Heat shrink (and something to heat it with) for a proper job of covering joined wires & providing strength, or insulation tape as a second best.
- Insulation tape as well as the above to;
- -Fasten wires out of the way to keep everything tidy and avoid weight transfer putting any stress on the joins you'll be making
- -Tape the unit itself to something so it won't rattle around
- -Insulate 3-way joins (splicing) & any joins where heat shrink just doesn't fit

  ...and either…
- Solder & soldering iron to join wires together. Although a good solder join is ideal compared to the alternatives, be careful – you're working in tight confines with a hot iron that can easily burn through wires you didn't mean to touch or mark previously immaculate dash panels or drop blobs of hot solder into the dashboard inners/carpet/your legs, lol.
  …or…
- Some <u>decent</u> electrical connectors instead. NB: I'm happy to take advice here as I used the solder approach, but I would suggest bullet connectors or spade connectors, not terminal blocks. Whatever you use, make sure it's **a) solid** ,

and **b) insulated** so it can't short to anything metal or another wire/connection.

Before you start: Advice & 'Lessons Learned' from when I did it!:

1. **Be. Very. Patient.** Remember how much you love this car, I'm talking mainly here about removing the dash panels – unclipping the connections to the instruments and especially the console items can be an utter, utter b*stard to fathom out be really is quite simple once you get the hang of it. To try to save you the pain I've described them all in detail in the 'connectors' section. Be warned, I am extremely patient but it is still very easy to get angry and frustrated and start yanking at things, **don't**. Go make a brew and come back later instead!
2. **Check and double check everything** you plan to cut before cutting it. I didn't make this particular mistake but you could easily mess things up and/or spend a lot of your time fault-finding by rushing into the task and getting it wrong. Also take a moment to consider the best position along each wire to cut it; this will depend on whether you will need to work with both ends or just one, and whether you're connecting in a 3rd wire from the chip or not. Usually you will have too much wire coming from the converter chip and may want to consider trimming it back slightly, so everything is tidy.
3. **Don't** expect it to work fully the first time you put it all back together, even if you're positive you've done it all correctly. Just 1 messed up connection will lead to spurious outcomes, so my advice is don't tape all your connections up and don't bother to screw all your dash panels back in at the stage you think you're ready to roll. Simply push the dash panels back into their positions so they won't go anywhere and take it out for a test drive (see test drive below). It takes less than 5 mins to get the dash out if you do this in order to then make everything tidy, rather than the hour plus it'll take you to remove the dash and insulation tape so that you can start the fault-finding.
4. Don't wear shorts or anything synthetic if you plan to solder. Really, ***really*** watch where you put that thing when it's hot!

Before you begin:

Please note that your trip 1 and 2 odometer readings will get reset to zero when you remove the connector (which supplies the power) to the odo unit. If you depend on these to remind you of service/oil change intervals or something, note them down before you start. The odo reading (your vehicle's mileage) however is stored in non-volatile memory and won't be affected (or reset to zero, sorry)

Go for a drive near to you. Reset a trip counter as you set off and note where you are when 1.6 kilometres racks up. After the job is done repeat your course and if all is well your trip counter will read 1.0 (if you choose to convert it to miles that is!). During the drive, note revs Vs speed, e.g. how fast does your speedo read if you going at 2,500revs in 3rd gear? Remember this, and compare it after the conversion

for a quick check to see if it works as expected (e.g. 50kph = 31mph). You might want to document (film) this process to aid selling the car in future, to prove to a buyer when the speedo was converted and what the odo reading was.

If you have an airbag, I believe you should remove the battery connection before removing the dash as you'll get reports of an error afterwards if you don't. I've seen notes about this and how to fix it if you forget but it didn't affect me as I've not got an airbag. However before you unplug your battery(!), consider; will it affect your alarm and/or stereo?

Step 1 - Removing the dash:

Combine Heckler's guide, here with the pictures in the 'Connectors' section below so you can see how each panel's instruments are attached to make the job as easy as possible. If you have the stock dash covering be very careful not to scratch it, especially mind the main dash panel rubbing/catching on the steering wheel tilt lever as you remove that panel; it's easy to scratch it without realising… like I did.

Connectors:

Top panel – there are 2 connectors on the left (hazard warning switch, left hand warning lights cluster) and 1 on the right (right hand warning lights cluster). You should be able to lower the panel enough to get at these quite easily. They undo by pressing the central clip down, into/towards the connector.

Top dash panel, right hand connector

To remove the larger dashboard panel - the one with the clock, cigarette lighter (power, surround light), 2 x heater controls, "slip cont"/similar, I found working from top to bottom easiest…

Clock – undo by pressing (inwards towards/into the connector) the clip located half

way down the side of the connector.

Clock (rear)

Cigarette lighter (2 connectors) - pull the L shaped connector backwards (away from you & towards the engine) to remove. the light twists through 90 degrees then

should pop out.

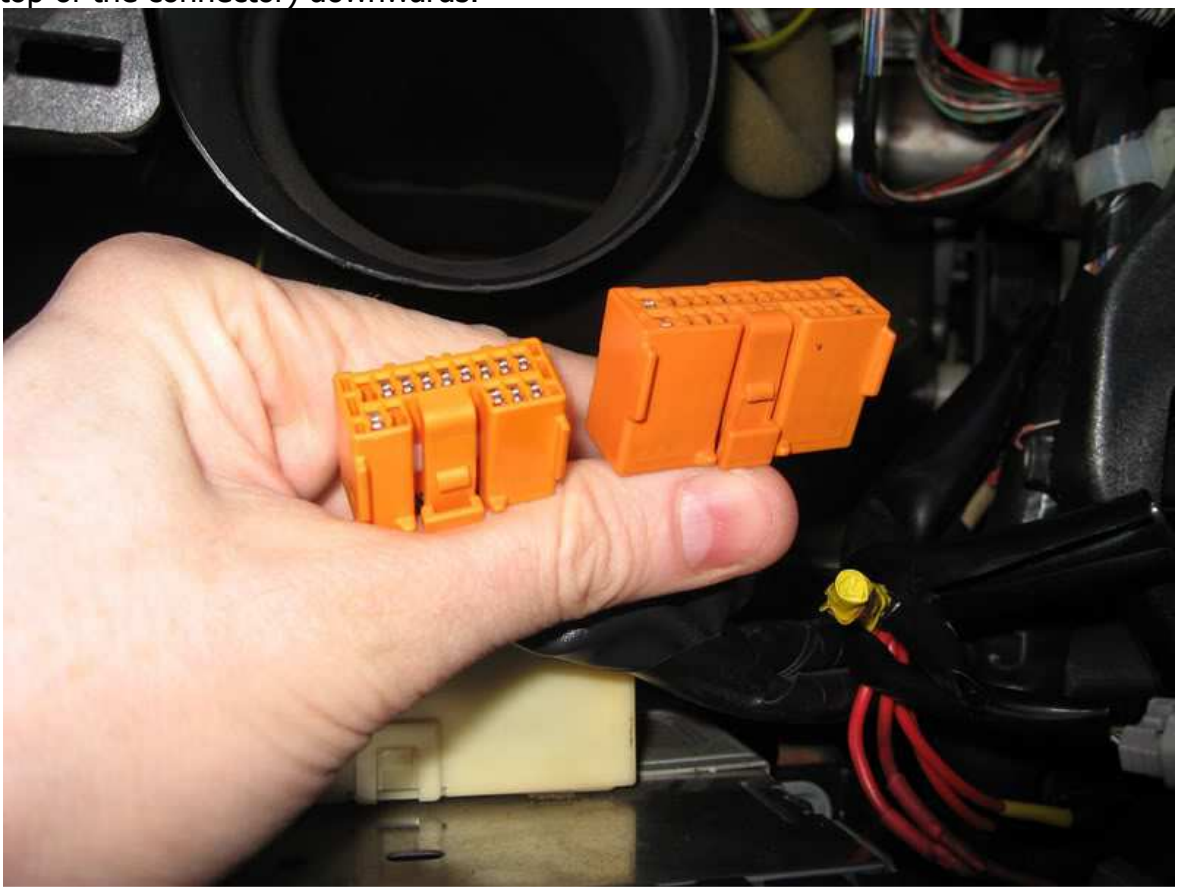
Cigarette lighter, power connector

Cigarette lighter, light

Cigarette lighter (rear) - shows L-shaped power connection and above that, the 'socket' for the light

Heater controls (2 connectors) - Press the top bit of each clip (in the middle of the

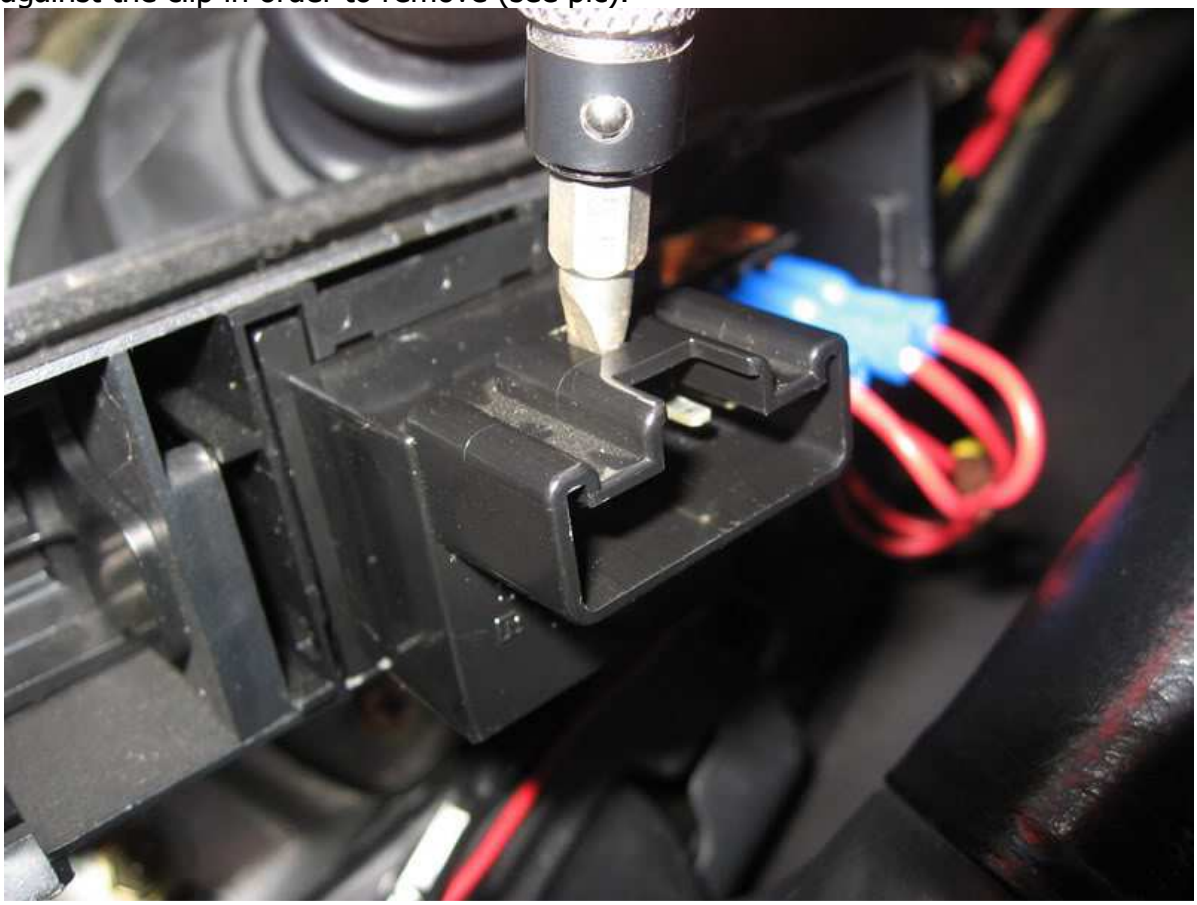
top of the connector) downwards.



Heater control connectors (2)

Slip Cont/etc - get a screwdriver as this a real pain, and press firmly downwards

against the clip in order to remove (see pic).



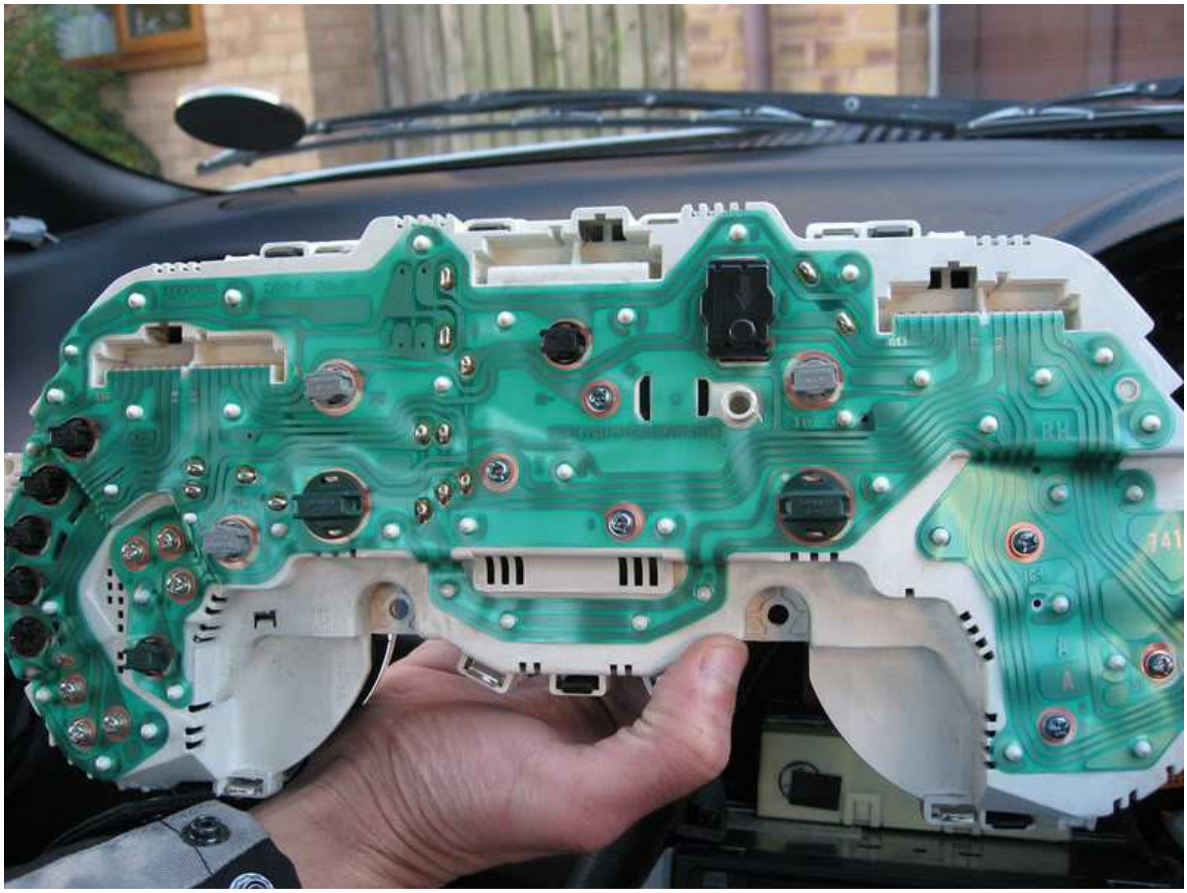
"Slip Cont" button, rear - use screwdriver to prise connector away (already removed)

"Slip Cont" button connector

Removing the instrument cluster is pretty simple & easy (refer to Heckler's guide). Remove the central dash panel (that encloses the instruments) unscrew the instrument cluster (2/4? screws at the sides), detach the 3 connectors from the back

and remove the instrument cluster.

Instrument panel connectors - blue, brown, white



Instrument panel, rear - 3 sockets along the top, 1 for each connector

The removed instrument panel (note "k" already covered up in speedo section (see step 5 below))

Step 2 – Fitting the Speedo Convertor:

As mentioned above, *don't* expect this to work first time. It is galling to fit, insulate and replace everything perfectly only to find that it doesn't work for some reason. Instead, I suggest you make the connections by simply twisting together the wires you wish to join and temporarily cover each connection with an easily removable piece of insulation tape. If it all works come back and do the job properly, if it doesn't you can begin fault-finding straight away and have saved yourself a LOT of effort undoing patiently soldered/connected wiring. Believe me, it's annoying! lol

Connect the wires in any order you want, by following this schematic.
(A better one will follow; I'll draw one up that is a bit simpler & easier to read, ASAP)

Note the different configurations you can achieve regarding the speedo/odo reading in Miles or Kilometres depending on how you wire it in (not shown here but will be shown on the better diagram).

Once you've done the main power, speed input, speed & odo outputs, connect a decent length of electrical cable to the TSD wire coming from the chip, to extend it into the passenger footwell. Simply route it past the heater outlet pipe and aim it towards the passenger footwell, you should easily find a route through, just don't put it anywhere that might catch/rub/strain the wire; think about where the dash panel and its connectors will need to go.

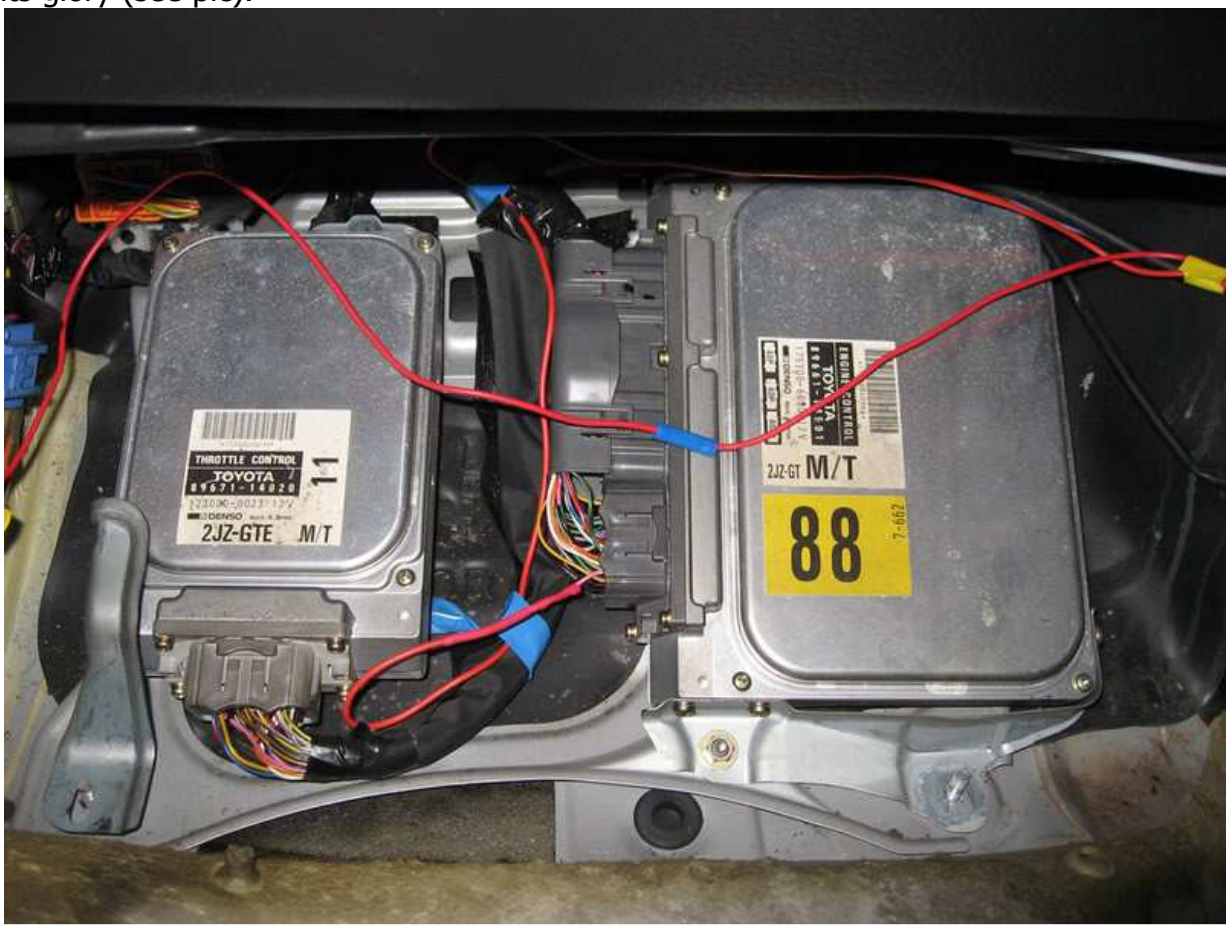
Step 3 – Wiring in the TSD:

If you want, you can leave this until after you've tested the speedo converter is working properly, just note that you will get an ECU warning light appear after a short distance as its confused that the speed readings it's receiving don't match up.

This bit is *extremely* easy compared to the speedo/odo work...

Remove the passenger side "kick panel" the piece of plastic (that has a holder for the flare on J-Spec models) that joins onto the sill that runs the length of the door. These 2 pieces are connected together and it's easier to just pull both out in 1 go than try to separate them; use a screwdriver to poke the centre of the circular thingy holding the kick panel in place and retain for refit later. The rest of the panel and door sill just lifts out of push-clips with a little persuasion.

Pull back the carpet by grabbing the bit nearest the engine end of the car and pull back towards the passenger seat (shove the seat right back to give you most room to work with). You should now see the ECU cover (see pic). Remove the 2 nuts at the bottom using a socket and pull the cover off. You should now see the ECU in all its glory (see pic).



ECU (cover removed)

Don't bother trying to remove the wiring harness from the ECU, this isn't necessary. Locate the wire coming from pin 2 (pink, almost top right in the section of ECU

connector closest to the seat) and snip it leaving a sensible amount to work with.

Wire in the 'extension' you brought down from the chip to the ECU stub of the wire you just cut. Tape up the original wire (loom side) to keep things tidy.

Modified ECU wiring - extension from Thor delimit chip spliced into the pink wire coming from pin 2, original loom end wire with bare end can still be seen

Step 4 - Test Drive, aka "how to test you've done it all correctly!":

Connect all the dash items back up to their connectors and push all the panels back into their respective places. You don't need to worry about the clock/heater controls/ciggie lighter if you don't want to but ensure you do connect things like the hazard warning light connector as the indicators don't work without it!

Go for a drive, see how long it takes to clock up 1.0 on the trip counter, see if the speedo reads a sensible amount, drive for at least a couple of miles at a variety of speeds/gears and check to see if any warning lights come on.

Note: You can do this bit before wiring in the delimit to the ECU, but if you do though, you'll see the engine management warning light appear once you get up to 50~60mph as the ECU is seeing a different speed to the rest of the car's electronics.

Step 5 – Modify the Speedo:

Remove the instrument cluster (speedo, revs, fuel gauge etc) and detatch the clear

front cover by carefully prising apart the many clips along the sides.

Instrument panel, clear cover retaining clip (1 of many)

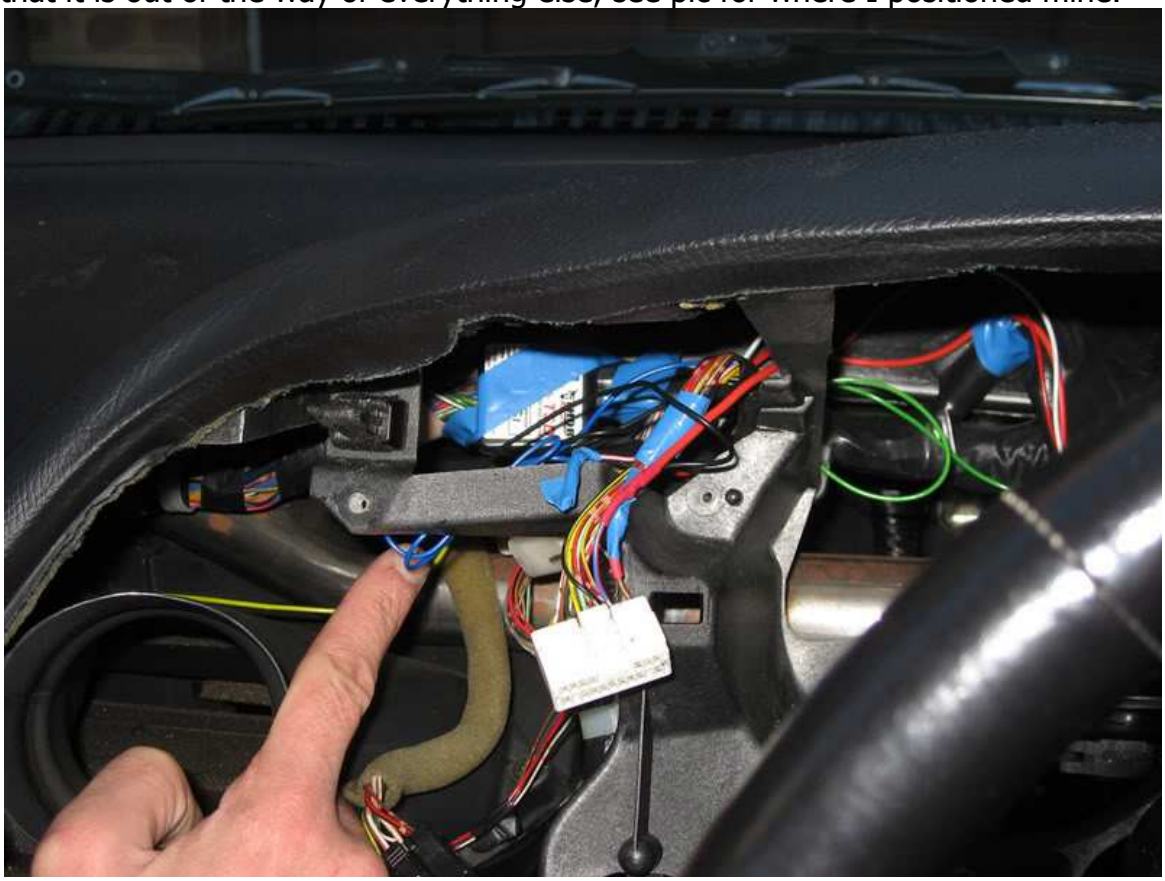
Cut a tiny peice of black insulation tape to size and stick it over the "k" of "km/h", so it reads "m/h". Check it's all dust-free (won't break anything but dust is annoying and spoils the appearance) and put it back together.

Step 6 – Tidy up:

Assuming you've got everything working, remove all the dash panels again and now make the connections *properly*; insulating them as you go. Once that's done, use insulation tape to collect up and fasten wires out of the way and keep everything tidy, ensuring that there is still enough slack where it is needed (e.g. to bring the connectors back to the dash when putting it back together again.)

Use tape to secure the chip itself too – ensure it has no room to rattle about and

that it is out of the way of everything else, see pic for where I positioned mine.



Suggested chip position

Again, use tape to secure the 'extension' wire that feeds into the ECU at convenient points along its path. Replace & refit the ECU cover, carpet and kick panel.

Go for another test drive to check everything again.

Job done!

'Annex A': Potential faults from their symptoms:

(how do I do a proper table??)

Symptom	Potential Causes (likely order)
Speedo and odo are completely dead	1) Chip has no power – bad connection/bad earth
	2) Bad connection from chip to speedo connector
	3) Chip faulty/not programmed
	4) Speedo/odo connectors not reconnected properly
Speedo dead, odo/trip counters work	1) Bad connection from chip to speedo

	2) Speedo connector not reconnected properly 3) Chip faulty
Odo dead, speedo works	1) Bad connection from chip to odo 2) Odo connector not reconnected properly 3) Chip faulty
Intermittent operation (any feature) affected item (e.g. odo/speedo/TSD)	1) Bad/loose connection at the