

# **JDSPORSCHE**

# **PROGRAMMABLE EPROM MODULE (PEM)**

# **USER MANUAL**

## **1) Introduction:**

The JDSPorsche Programmable EPROM Module (PEM) enables “flash” programming to the 928 from MY87 to 95. That is, it allows remapping of the LH and /or EZK ECUs by connecting a laptop to the car’s diagnostic system via a (SharkTuner box) without the need for a ribbon cable to the EPROM socket..

Once a PEM is installed in the ECU, the box can then be closed, and the ECU re-installed in the car. No other connections are needed between the SharkTuner and the car other than via the diagnostic connector in order to remap. You will of course require the usual WBO2 sensor input for remapping the LH ECU.

Once remapping is complete for the session, save the file and then just unplug the SharkTuner, the new remapping parameters are stored in the PEM. The next time any tuning is required, the file in the PEM can be loaded into the SharkTuner and modified as required, or used for datalogging.

### **NOTE:**

If you save a bin file previously created in previous versions of SharkTuner (i.e. previous to Ver 5.0.10) it will then NOT be backwards compatible and cannot be used with the older version of SharkTuner". Always archive the file before loading it into the PEM.

The PEM can be repeatedly reprogrammed, and the data is secure even with the ignition off, or the ECU removed from the car. Also secure when the PEM is removed from the ECU (store the removed PEM in antistatic packaging).

The PEM can be used in either LH or EZK ECUs. If PEM’s are fitted to LH and EZK ECUs then both can be tuned in the same session without any other setup needed. This makes it possible to switch rapidly from LH to EZK optimisation. Simultaneous datalogging of both LH and EZK is also possible. The data in a PEM is guaranteed to be secure for a minimum of 10 years.

If you wish to remove the PEMs after tuning, to use in another car, then you can save the bin files and blow standard EPROMS to fit to the tuned car, the same procedure as with a ribbon cable connected SharkTuner.

Another option available is to use the ribbon cable and adaptor to one ECU, and a PEM in the other ECU.

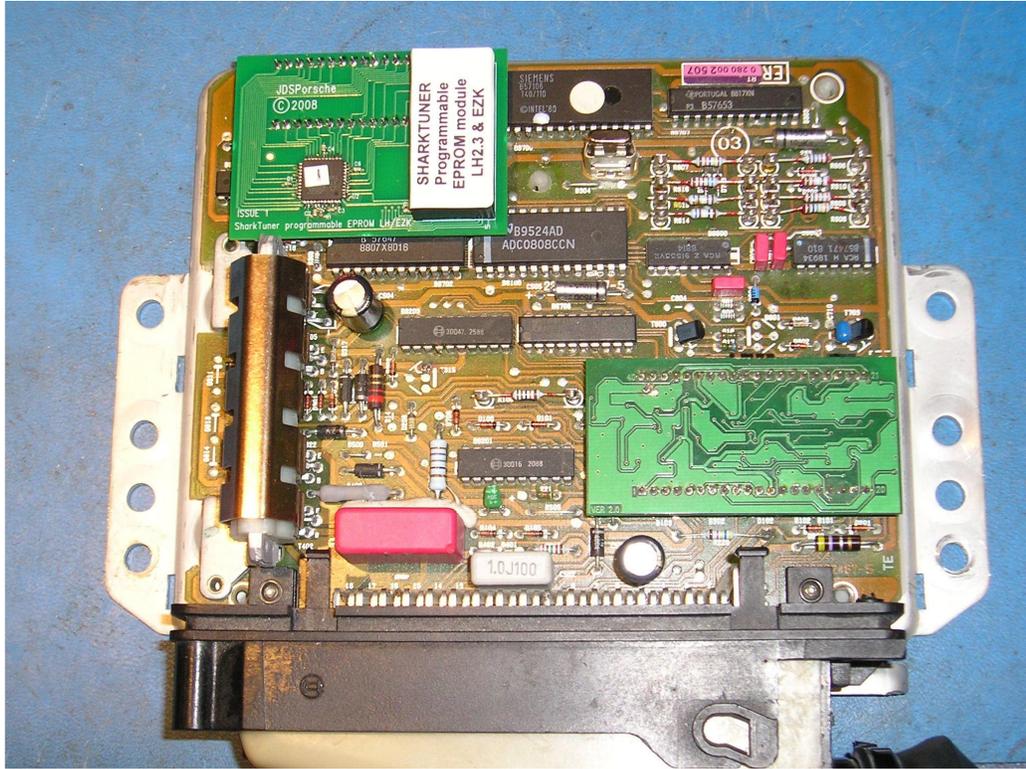
Diagnostics with the Bosch “Hammer” or similar tester is not possible with PEMs fitted. The SharkTuner has sufficient monitoring to facilitate most fault finding tasks.

## **2) Installation of PEM in LH ECU :**

Open LH ECU case by bending back the tabs. Remove the existing EPROM carefully and store it in some antistatic material.

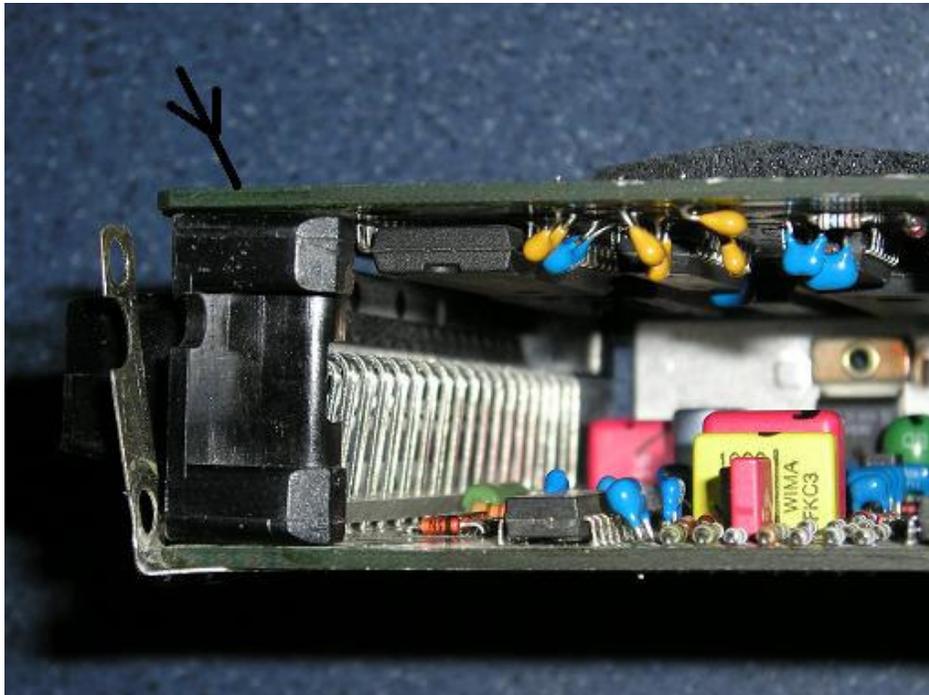
Plug in PEM module as shown in the picture, be sure to fit the pins correctly into the EPROM socket, no “spare” pins !

Refit the lid on the LH ECU..

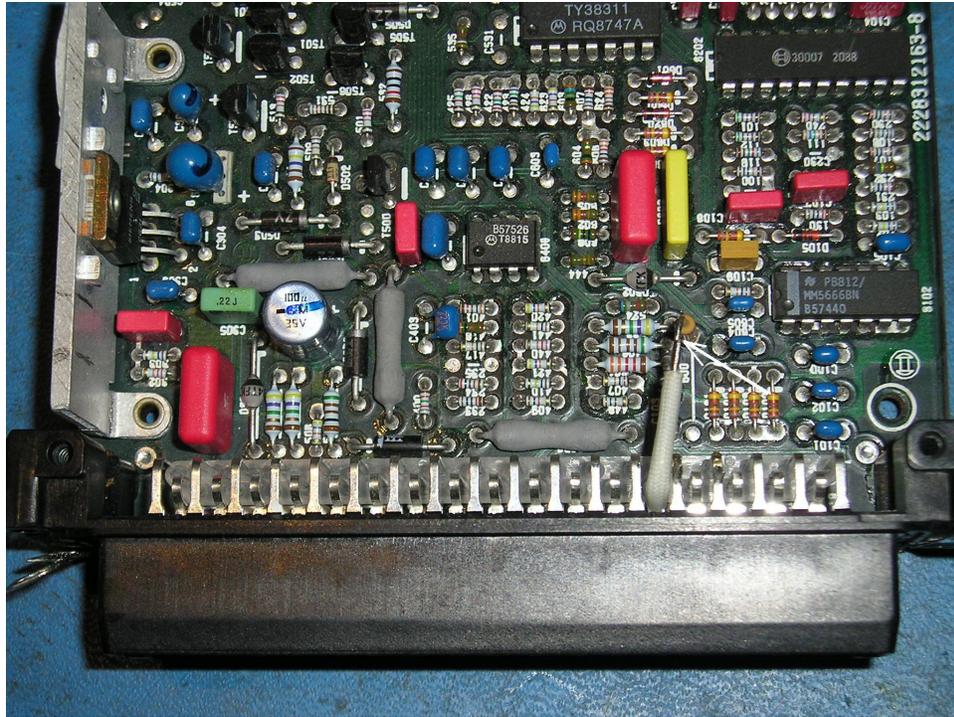


### 3) Installation of PEM in EZK :

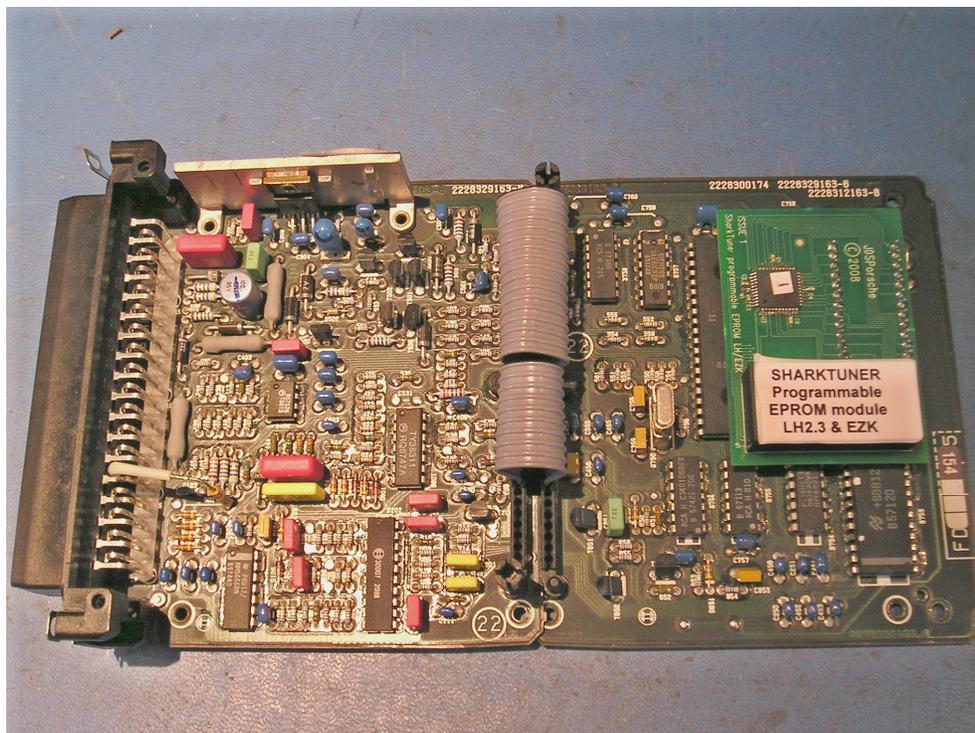
Open up the EZK case by removing 4 x screws at each end of case. Remove the two screws that hold top and bottom together. See picture below –



Unfold the two board by releasing the two post clips at the rear. Remove EPROM and store in antistatic material. Bend resistor lead **carefully** to the right, as viewed in this picture, in order for it to not interfere with the side of the PEM when the boards are folded together :-



Then install PEM, taking care that pins are inserted correctly, no “spare” pins !

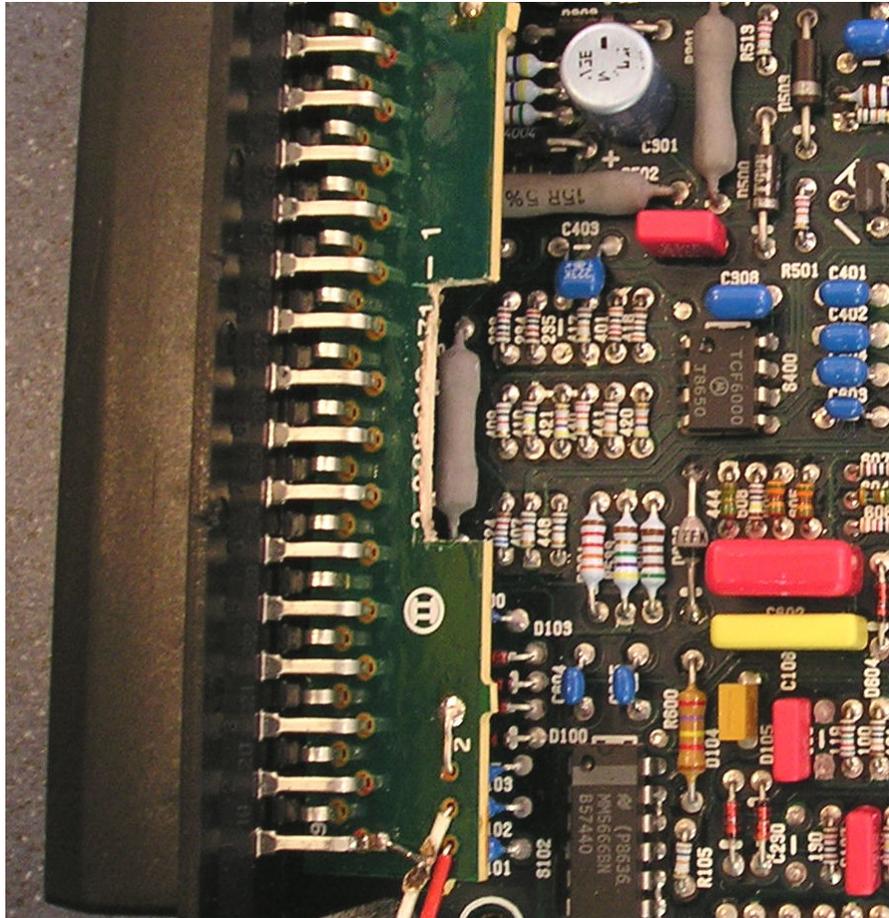


Fold the two boards together, refit the two screws holding the boards together and re-assemble the case of the EZK ECU.

Some early EZK ECU's, mainly MY 87 with part number 928 618 124 10 have a circuit board attached to the 35 way connector which is not present on the later boards.

This board interferes with the fitment of the PEM module when the boards are folded together.

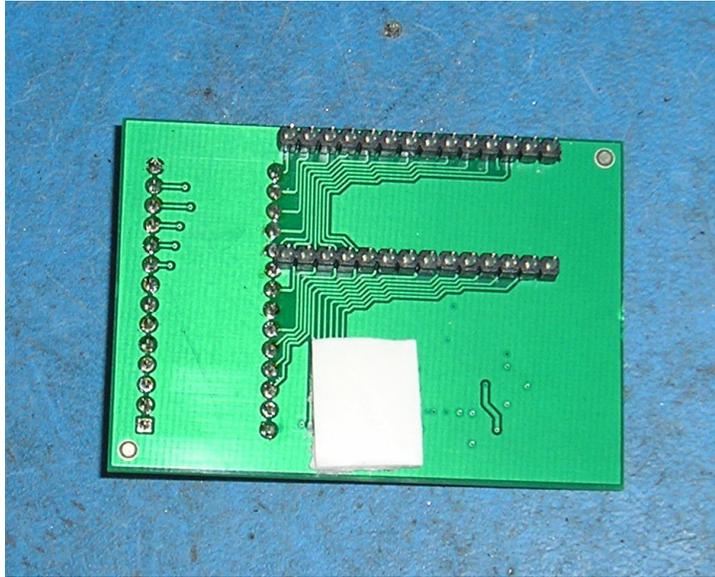
The problem can be cured by cutting away part of the additional circuit board, as shown in the next picture:-



Cut the two short sides of the required break out, then with suitable pliers break out the longer side. Several surface mount capacitors will come away with the removed section. These are not essential to the operation of the EZK. Look under the board and cut away any remaining loose copper tracks.

If you are not confident to do such a modification, please send the unit to JDSporsche for modification for the cost of return postage.

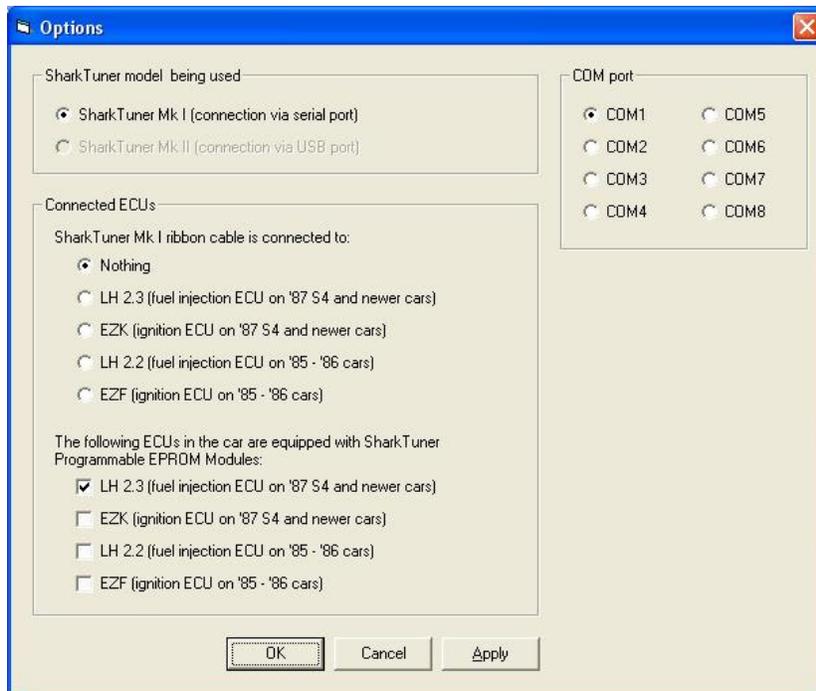
For long term installation, it is recommended to fix the PEM into place using the foam pad supplied.



Remove the keeper layer on the outside, and then fit the PEM into place and ease the edge with the foam pad onto the integrated circuit under that edge.

#### 4) Software Setup:

After installing the software and starting Ver 5.0.10. , and accepting any upgrade of the firmware that may be offered automatically, select the Tools >> Options menu which has new items added. The following screen will be shown :-



Select the options for your present hardware setup. Check “Apply” and then “OK”.

You then have two options

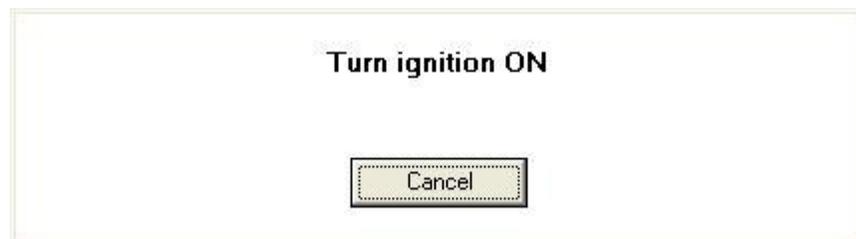
- 1) Load new or old bin files into either PEM or -
- 2) You can upload the files already in the PEMs to the laptop for further edits or datalogging

For option 1) on the “File” menu select the required LH file option required “New” for a new base file, or “Open” to load a previous SharkTuned file.

According to the hardware setup in the Options screen the file will then be ready to be loaded to the PEM. Check “OK” and this screen is shown –



Check “OK” if you have met the conditions requested..... then this is displayed



Turn on ignition and a file loading progress indicator will be displayed.

After loading is complete, the file name is displayed on the EPROM screen.

Repeat the same procedure for the EZK ECU, if applicable to the hardware configuration in use. The EPROM screen will then also display the loaded EZK bin file name, and the Menu bar at the top of the window will now show the combined LH and EZK menu selections :-



For option 2) select “Load from SharkTuner or PEM” from the file menu. Follow the prompt to switch the ignition on. The LH bin file will then be uploaded into the SharkTuner program on the laptop, automatically followed by the EZK bin file.

With the ignition on, and engine running, it is also possible to download the bin files to the PEMs. Download speed under these conditions is much slower (approx. 2 minutes per file) than when starting a download with ignition initially off. Download speed is slower with higher engine speeds.

When you make edits, they are done "live." i.e. any changes you make are applied immediately to the PEM. All parameters used by the ECU when it is running are taken from the PEM.

The Save or Save as function saves the current EPROM to a bin file on disk. It does nothing else.

So, if you wanted to modify a certain parameter in a car which has a PEM, you could just plug in the ST, do "Load from PEM", modify the parameter, then unplug the ST. You need to use Save only if you then want to save a copy of the current bin in the PEM to disk.

## 5) Editing

Please note :

- a) The ignition must be **on** for any changes made on screen to be written to the PEM.
- b) Changes are written immediately into the PEM, so always make sure you have made a “Save as” of any file from PEM to your laptop before making changes/edits. This ensures that if your wish to revert to an earlier iteration of the file , you have the previous version available.

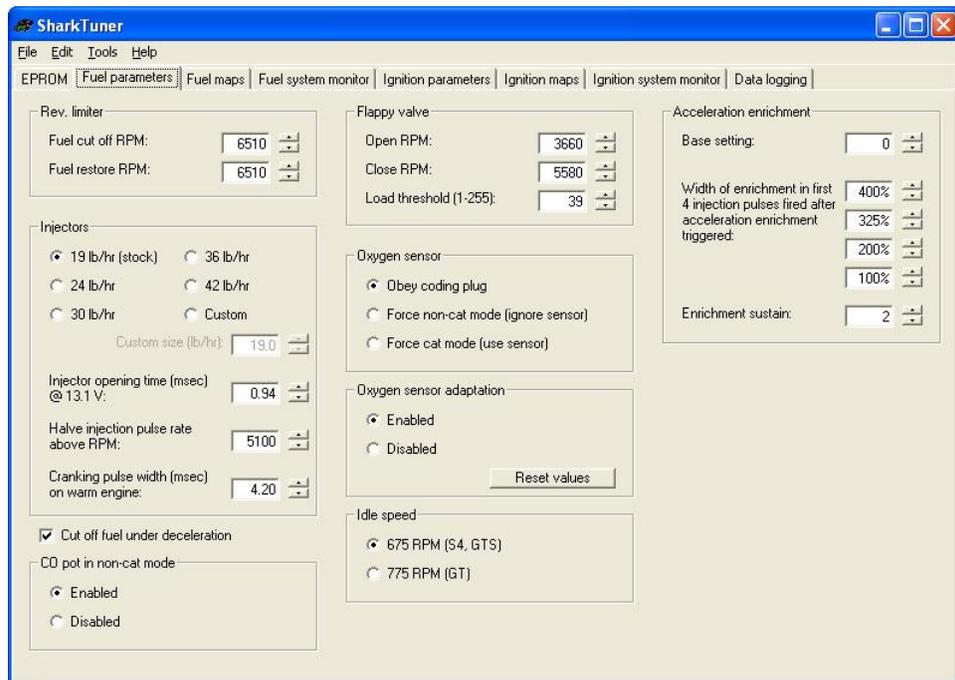
## 6) Stopping and starting the PEM software

When you want to stop the engine, always select the EPROM screen first. When restarting the car, do this from the selected EPROM screen.

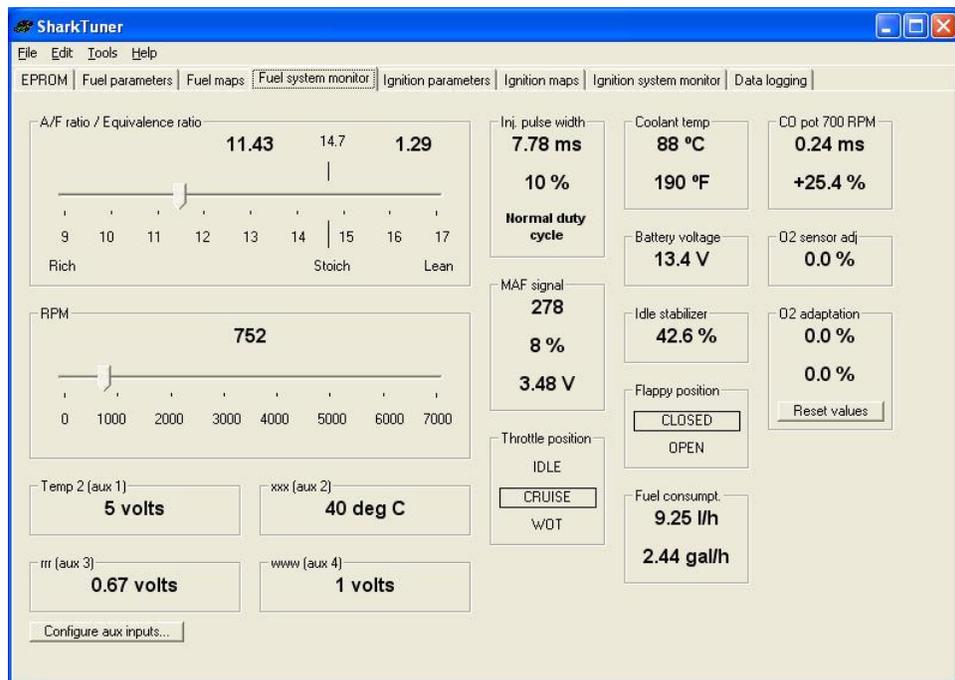
## 7) New feature – Oxygen adaptation monitor and inhibitor.

It has been noted with previous issues of the SharkTuner that the O2 sensor adaptation software routine in the LH software can come into conflict with the Autotune function of the SharkTuner, especially when Autotuning around idle speeds.. In Ver 5.x.x software, there is the facility to cancel the O2 adaptation while SharkTuning the LH ECU.

This feature can be disabled or enabled from the Fuel Parameters screen – (lower centre of window)



..... and on the Fuel System Monitor screen the real time values of O2 adaptation can be monitored when O2 adaptation is enabled....and values reset if required.



The upper value is used when the tank venting (carbon canister) valve is not venting. i.e. engine warmup. The lower value is used once venting has commenced, even if it is subsequently inhibited as normal as when the throttle is closed on the over-run.

**Otherwise usage of Ver 5.0.10 software is the same in principle as outlined in the LH2.3/EZK SharkTuner User Manual.**

### 8) Using ribbon cable/PEM combinations of hardware configurations.

If the SharkTuner program is open, close the program, restart and then select in Tool>Options your hardware configuration. The check “apply”, then “OK”. Load the bin file required into the cable connected ECU device **first**. Then if a PEM is used in other ECU, load that next with the required file, or if the PEM already has the required file in it upload the file from the PEM to the SharkTuner

If one of your ECUs has a stock EPROM fitted (i.e. one not created by a SharkTuner) then the SharkTuner will recognise this bin file and report that the “file type is not a SharkTuner type file”. Ok this window. This is not a problem, but of course you will not be able to modify or datalog an ECU with a stock EPROM.

9) **Modification to 19 way and 12 way diagnostic plugs.**

It is **ESSENTIAL** to make a simple modification to the 19 way and 12 way diagnostic plugs

- a) Undo the two screws of the cable clamp piece...



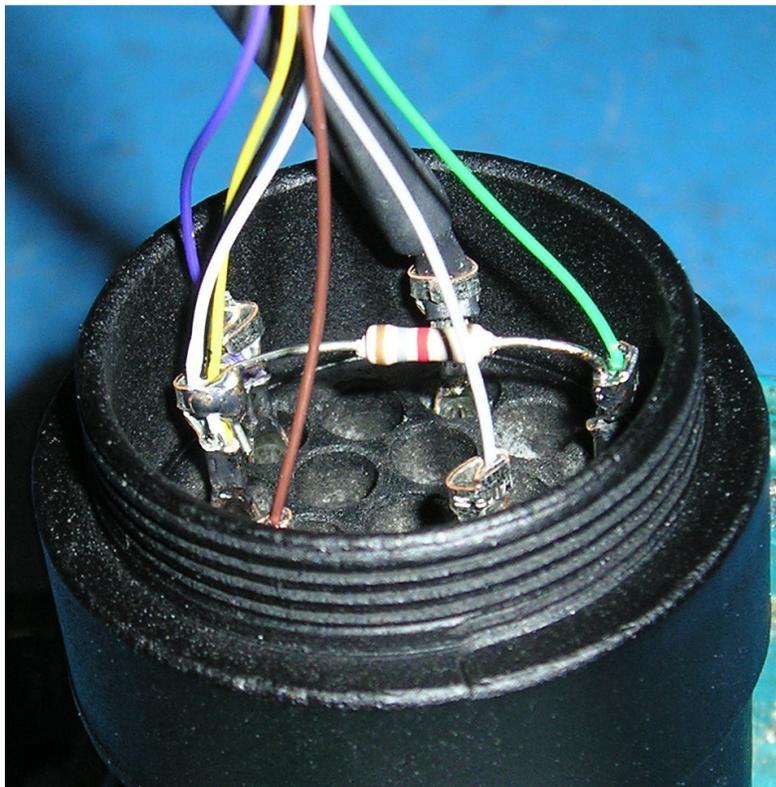
Then slide the cable clamp out of the plug top and up the cable....



The unscrew the plug top ....



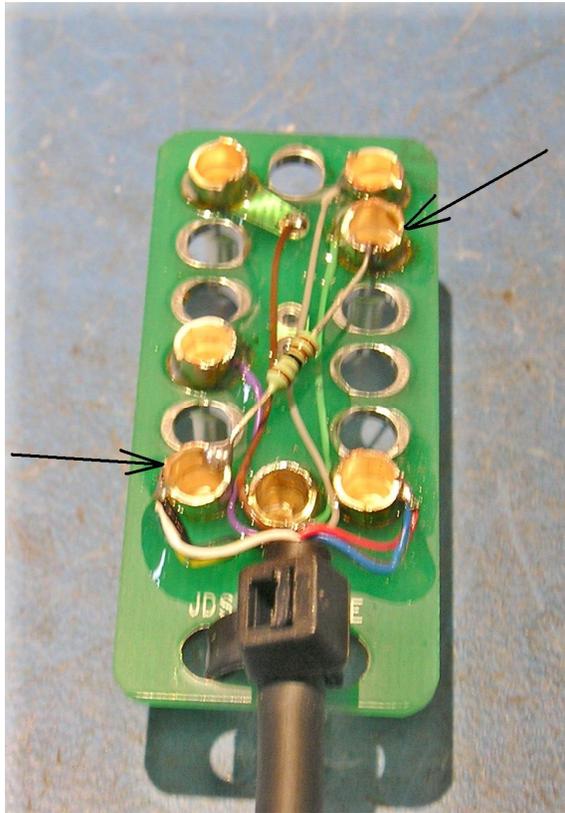
Then fit and solder the 1k8 resistor between two terminal pins – one with the YELLOW/WHITE/BLACK wires connected to it, and the other terminal with the GREEN wire .... keep soldering time and heat to a minimum.



Refit plug top, being careful not to cross thread the plug top onto the plug body. Then refit the cable clamp, ensuring about ½ inch of the cable sheath projects through it into the plug interior. Then refit and tighten clamp screws.

**12 way diagnostic lead:**

Then fit and solder the 1k8 resistor between two terminal pins – one with the YELLOW/WHITE/BLACK wires connected to it, and the other terminal with the GREEN wire ....keep soldering time and heat to a minimum.



## 10) Disconnection of K line to Digi-dash .

It is **essential** to make a temporary disconnection of the K data line to the digi dash used of MY 89 and later cars, due to the added capacitance this adds to the data line.

Proceed as follows.....

### **On MY 89 cut L15 (k line to digi-dash) as below :-**

Locate the "L" plug wiring assembly under the relay bank in the footwell of the passenger side.

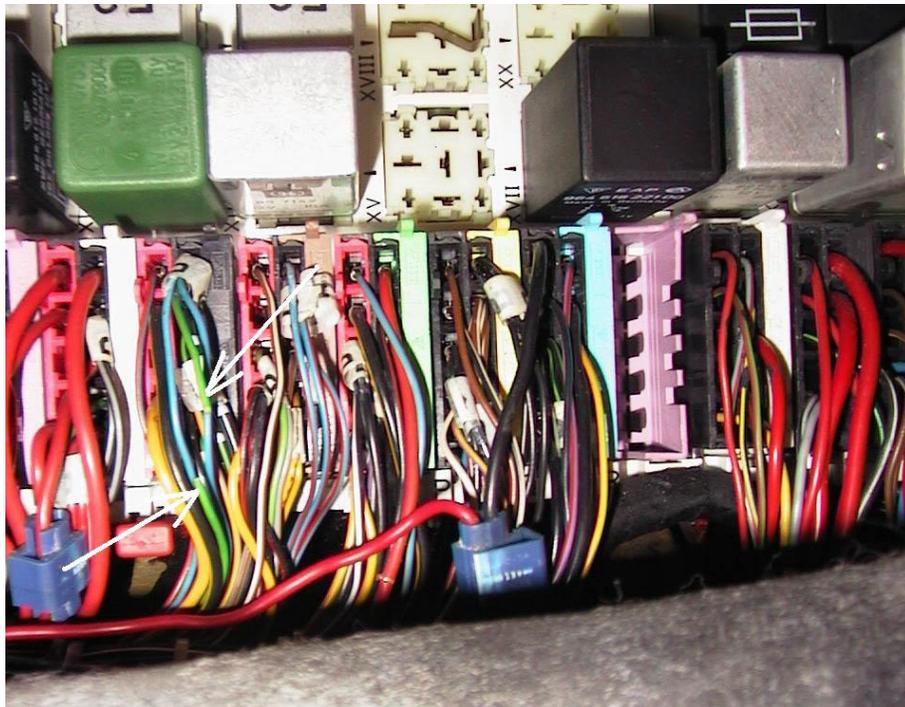
You will see two green wires in the #15 position or #5 position on the plug assembly (mine is numbered 1-5 bottom to top), but it is the upper left hand corner as you look at the assembly and is the only position with two wires in the "L" assembly.

These correspond to the L-15 grn wire in the wiring diagram if you have access to one for MY89 cars.

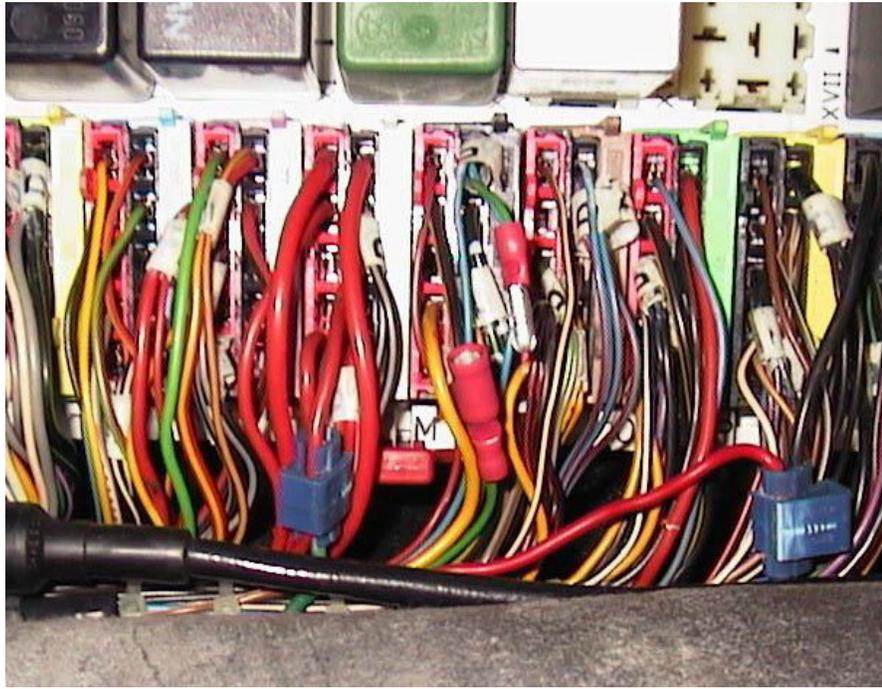
Although both wires are plain green, one wire is a slightly duller, color green and the other a little brighter. The brighter one is the wire that (eventually) goes to the dash panel and is the one that will be cut. Due to the possibility of wiring variation, this should be tested by using a multimeter for continuity, by placing one end of the lead in the #8 hole in the data plug on the passenger side of the car and using a needle probe into the uncut wire should show full continuity on the ohm gauge. If it does not, re-attach the cut wire and follow the same procedure cutting the second wire.

The #8 position on the data plug is the one that connects to the green wire that you solder the resistor to in the ST plug, as described earlier.

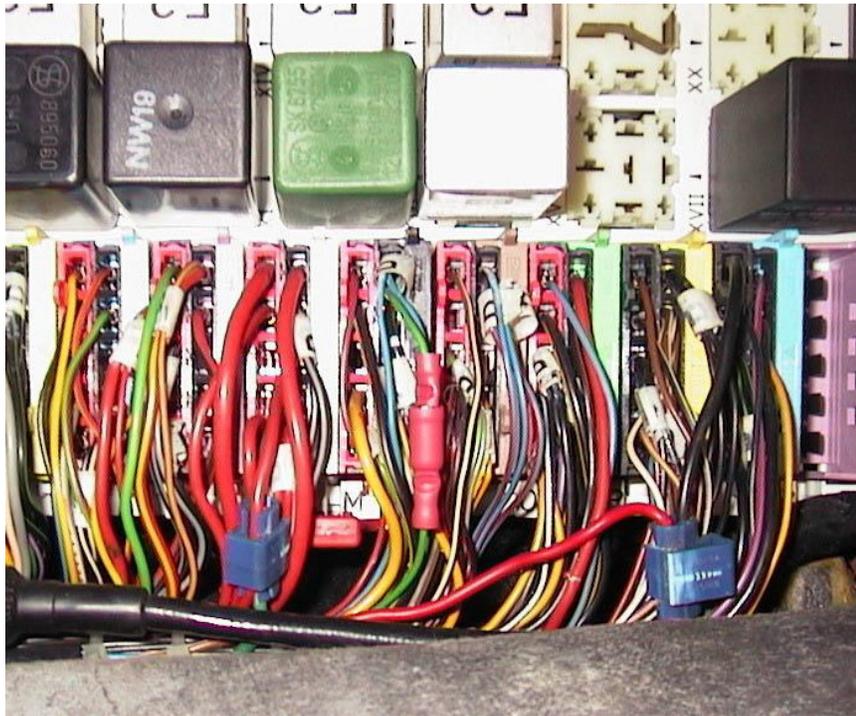
### **Cut GREEN wire at M25 (MY 90 and onwards). to digi-dash**



Then add connector to ends of cut wires for future re-connection....



When SharkTuning is finished, connection can be restored....



NOTE: This modification is also required when Sharktuning EZK with ribbon cable connection with earlier versions of SharkTuner Software.