

Wiring:

AIT (air intake temp):

The easiest thing to do here will be to either:

Wire one directly into the AFM/MAF harness, polarity doesn't matter.

1.6L (RED/GRN)



1.8L (RED/BLK)



FUEL PUMP 1.6L only:

Jump with a paperclip or wire in your diagnostics box F/P to GND

WBO2:

The pink wire on the harness (o2). Connect your 0-5v output from your WBo2 to this wire. If you plan on running without this wire then you need to reattach this to the harness.

LC-1 users need to make sure it's outputting 0-5v and 10:1-20:1
AEM make sure it's set to P0 (default)

BOOST SOLENOID:

Connect red wire to the little blue +12v connector near the driver headlight (it has a cap on it, when you pull it off it's just a little spade), or any or switched +12volt source.



But this is the easiest to use as you'll most likely be mounting it there anyways.

Connect the ground to the wire labeled EBC on the MS harness.

The boost goes into the lower port on the side with two. The exhaust to the wastegate is on the side with only one port.

KNOCKSENSEMS:

The main input is the Blue/White wire (IAC – A). Follow the provided instructions to install on your end. Best to buy the mounting solution from FM for \$17.

If you want to be able to log the knock in MS, connect to the RED wire (should be attach to the Yellow wire on the harness). When you view a log in MLV, sharp drops in the CLT temp show knock events. However, you can also log the amount of retard without this wire, so you can still see when the knocksensems is working.

MAP SENSOR:

Run a vacuum line from your intake manifold to the MAP sensor inside MS. Tee off the FPR on the back of the manifold, otherwise the map signal tends to spike when it shouldn't. Consider putting a small filter on the line too.

TPS:

1.6L Standalone users need to unplug your TPS connector. I have prewired these harnesses to work in conjunction with the Wells TPS210 mod as outlined on [miatatubo.net](http://www.miatatubo.net).

<http://www.miataturbo.net/forum/t12239/#post157397>

Software Setup:

You should start with a fresh install of Megatune.

http://www.megasquirtpnp.com/downloads/MSPNP_Setup_021108.exe

1. Run the installation software for MegaTune allow the software to install to the default location.

Open the directory and leaving just the 9093 WITHOUT AFM to use, delete all the remaining 9093 or 9495 folders. Rename it to something like "Project Folder"

then go here: <http://boostedmiata.com/MS/msq/firmware/>

1. Copy msns-extra.ini and msns-extra.ini.hr10 to C:\Program Files\MegaSquirt\MegaTune2.25\mtCfg

Open the Megatune Software

go to file > Configurator

under MegaTune2.25, highlight msns-extra.ini.hr10, then go to file activate.

Now under your project folder name, open up settings.

go to > **Lamda_sensor**

select LC-1 linear 0-5v or AEM linear depending on your WBo2.

I also like to uncheck **Celsius** and **kPa**.

Under map sensor make sure you select 250map or 400map depending on your map sensor (250 is default, 4-bar map daddy users need to select 400)

File > Save

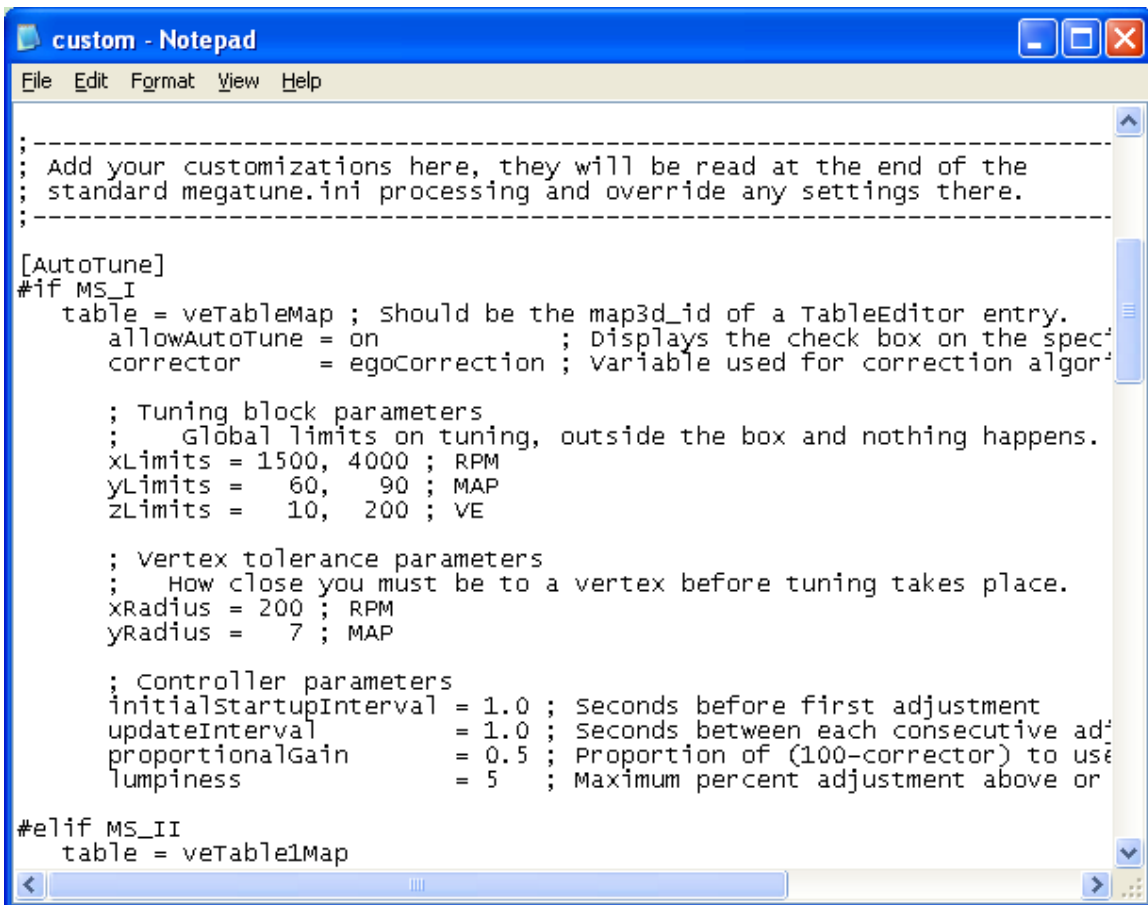
Install your serial cable software and make sure it's working. Find the com port of the cable.

Right click my computer > properties > hardware > device manager.

Scroll to Com ports. Find your device. Right click and search through the properties, you should be able to find the COM port.

Go to c:\programfiles\megasquirt\PROJECT FOLDER\mtcfg\custom.ini

Change this:



```
custom - Notepad
File Edit Format View Help
-----
; Add your customizations here, they will be read at the end of the
; standard megatune.ini processing and override any settings there.
-----
[AutoTune]
#if MS_I
    table = veTableMap ; should be the map3d_id of a TableEditor entry.
    allowAutoTune = on ; Displays the check box on the spec
    corrector = egoCorrection ; Variable used for correction algor

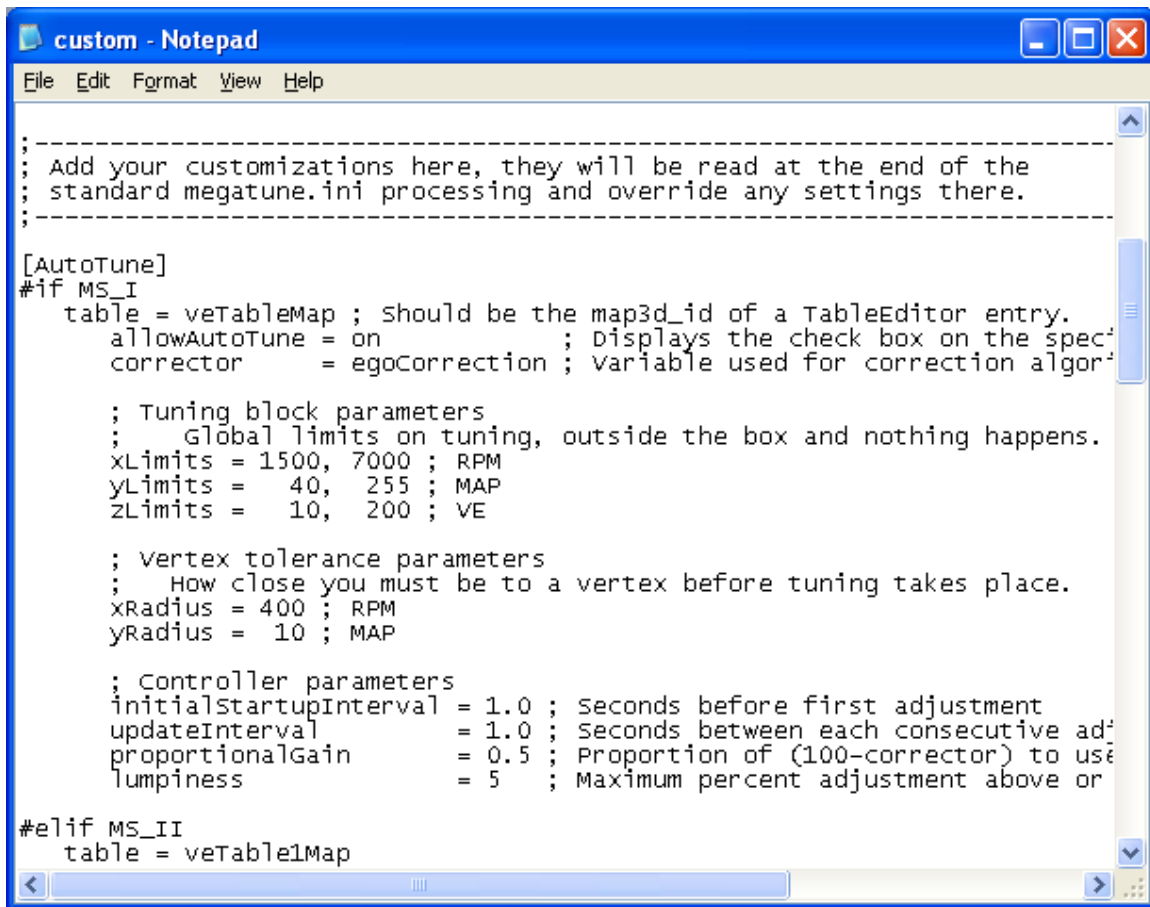
    ; Tuning block parameters
    ; Global limits on tuning, outside the box and nothing happens.
    xLimits = 1500, 4000 ; RPM
    yLimits = 60, 90 ; MAP
    zLimits = 10, 200 ; VE

    ; vertex tolerance parameters
    ; How close you must be to a vertex before tuning takes place.
    xRadius = 200 ; RPM
    yRadius = 7 ; MAP

    ; Controller parameters
    initialstartupinterval = 1.0 ; Seconds before first adjustment
    updateInterval = 1.0 ; Seconds between each consecutive ad
    proportionalGain = 0.5 ; Proportion of (100-corrector) to use
    lumpiness = 5 ; Maximum percent adjustment above or

#elif MS_II
    table = veTable1Map
```

To this:



```
-----  
; Add your customizations here, they will be read at the end of the  
; standard megatune.ini processing and override any settings there.  
-----  
[AutoTune]  
#if MS_I  
    table = veTableMap ; Should be the map3d_id of a TableEditor entry.  
    allowAutoTune = on ; Displays the check box on the spec  
    corrector = egoCorrection ; Variable used for correction algor  
  
    ; Tuning block parameters  
    ; Global limits on tuning, outside the box and nothing happens.  
    xLimits = 1500, 7000 ; RPM  
    yLimits = 40, 255 ; MAP  
    zLimits = 10, 200 ; VE  
  
    ; Vertex tolerance parameters  
    ; How close you must be to a vertex before tuning takes place.  
    xRadius = 400 ; RPM  
    yRadius = 10 ; MAP  
  
    ; Controller parameters  
    initialStartupInterval = 1.0 ; Seconds before first adjustment  
    updateInterval = 1.0 ; Seconds between each consecutive ad  
    proportionalGain = 0.5 ; Proportion of (100-corrector) to use  
    lumpiness = 5 ; Maximum percent adjustment above or  
  
#elif MS_II  
    table = veTable1Map
```

This will allow the autotune feature to work better. You can adjust it however you want.

NOTE: I do not use autotune anymore but Mega Log Viewer to help tune my fuel map.

Open Megatune again.

Turn the ignition to ON. Connect the cable. Go to Communications > Settings
Make sure your com port is correct and rate at 9600, hit test.

Start her up to make sure it works.

Configuring your tune:

The first thing you have to do it match the ignition timing!

MS has no idea what your timing is. But if you tell it is all good then it will believe you.

Idle the car and open up Spark > Spark Settings.

To adjust the timing you adjust the trigger angle, that's it.

Spark Settings

Trigger Angle = Setting + Additions
e.g. 77+45= 122

Trigger Angle (Deg)

Trigger Angle addition

Note: If req Trigger above 90
then select +22.5 Deg
if above 112.5 select +45

Cranking Timing

Cranking advance Angle (see F1) (Deg)

Hold Ignition

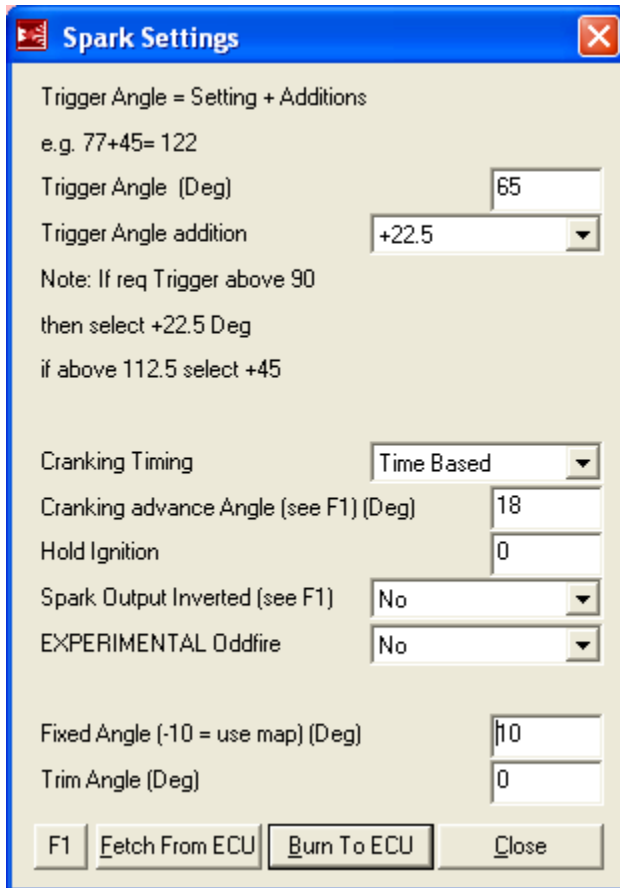
Spark Output Inverted (see F1)

EXPERIMENTAL Oddfire

Fixed Angle (-10 = use map) (Deg)

Trim Angle (Deg)

First change the -10 to a 10. This is the fixed angle. You're telling Megasquirt that you only want a static 10°. You never want it to give you any other timing.



The screenshot shows the 'Spark Settings' dialog box with the following fields and values:

- Trigger Angle = Setting + Additions
e.g. 77+45= 122
- Trigger Angle (Deg): 65
- Trigger Angle addition: +22.5
- Note: If req Trigger above 90 then select +22.5 Deg if above 112.5 select +45
- Cranking Timing: Time Based
- Cranking advance Angle (see F1) (Deg): 18
- Hold Ignition: 0
- Spark Output Inverted (see F1): No
- EXPERIMENTAL Oddfire: No
- Fixed Angle (-10 = use map) (Deg): 10
- Trim Angle (Deg): 0

Buttons at the bottom: F1, Fetch From ECU, Burn To ECU, Close.

Use a timing light and verify the timing is correct. If it's not a match, change the *trigger angle* a few points and try again.

Spark Settings

Trigger Angle = Setting + Additions
e.g. 77+45= 122

Trigger Angle (Deg)

Trigger Angle addition

Note: If req Trigger above 90
then select +22.5 Deg
if above 112.5 select +45

Cranking Timing

Cranking advance Angle (see F1) (Deg)

Hold Ignition

Spark Output Inverted (see F1)

EXPERIMENTAL Oddfire

Fixed Angle (-10 = use map) (Deg)

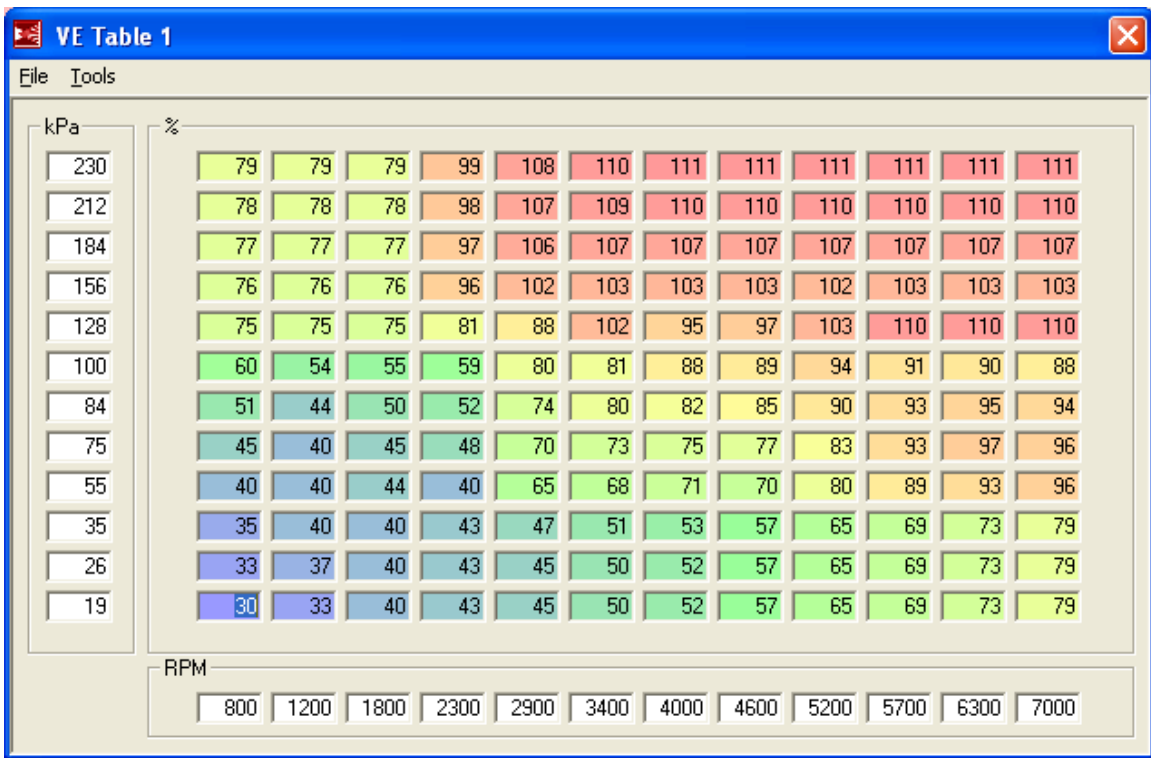
Trim Angle (Deg)

Once your timing light indicates 10°, change the 10 back to a -10. You are now telling Megasquirt to change the timing based on the preloaded map I gave you. If you go back out with a timing light you should see it changed to the 15-18° range.

That's it! You're now ready to tune this baby up.

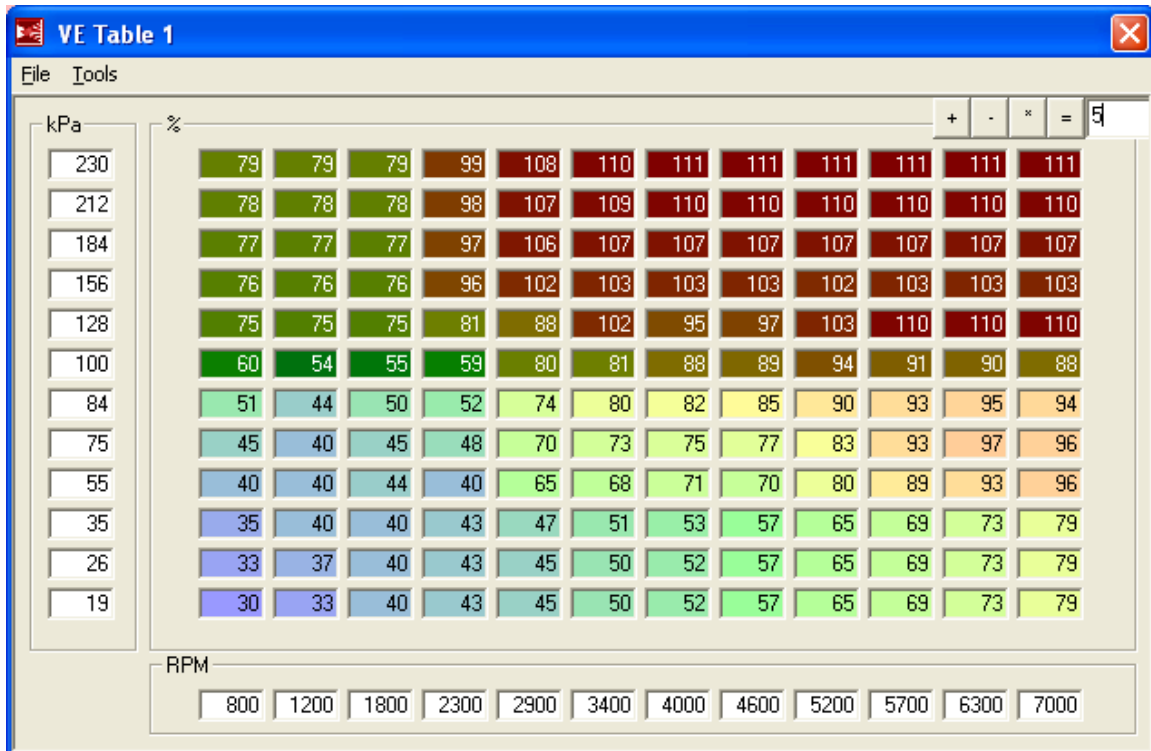
Your spark table should be good (It's the map I run personally). So focus on fuel.

Go to basic setting > VE Fuel table



That's the fuel map, when idling you can see where it's reading the map at. When you drive you can see your AFR gauge react to whatever situation your map is in. Adjust as needed. It should be close...you might have to increase the table by 5-10 point throughout to idle good.

If you highlight cell you can plug numbers in on the top. If you want to increase by 5 points, highlight the cells you want, insert a 5 and hit the plus sign.

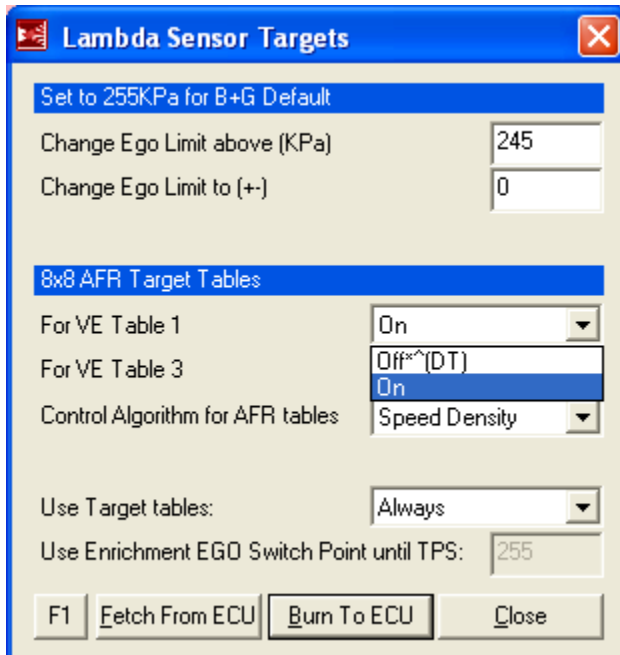


Tuning:

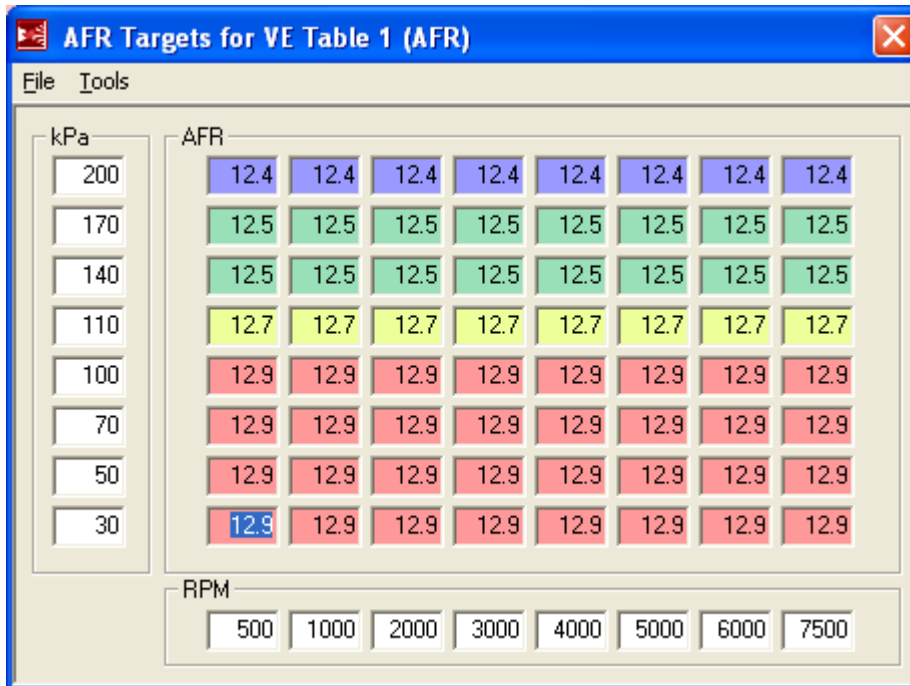
Setup your AFR target.

More settings > lambda AFR settings

Turn VE table 1 on.

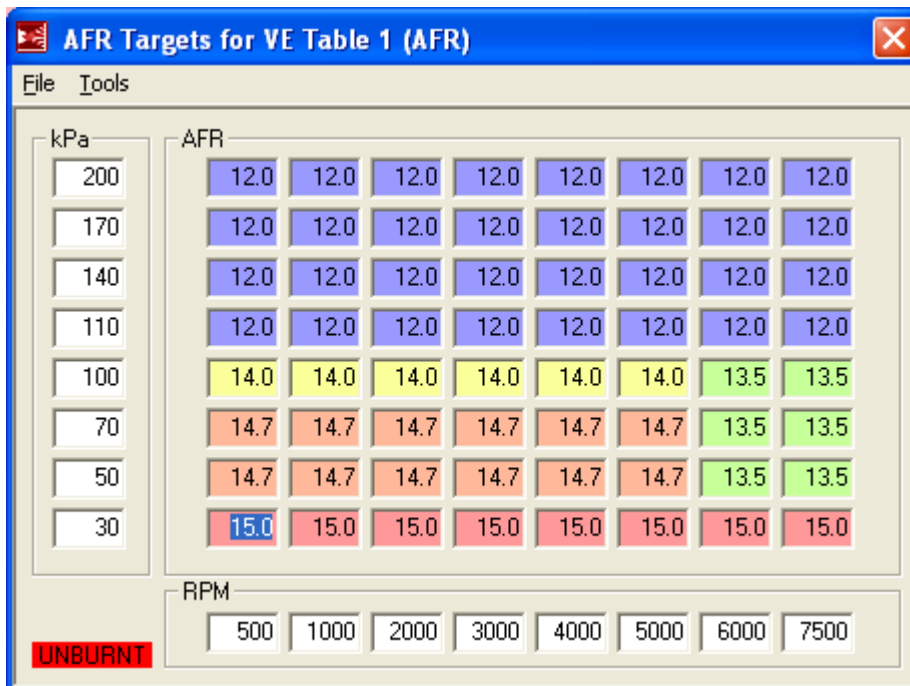


Then go to More settings > AFR targets for VE table 1



These are the targets you tell MS you want to hit. This only works in autotune and if you have EGO correction turned on.

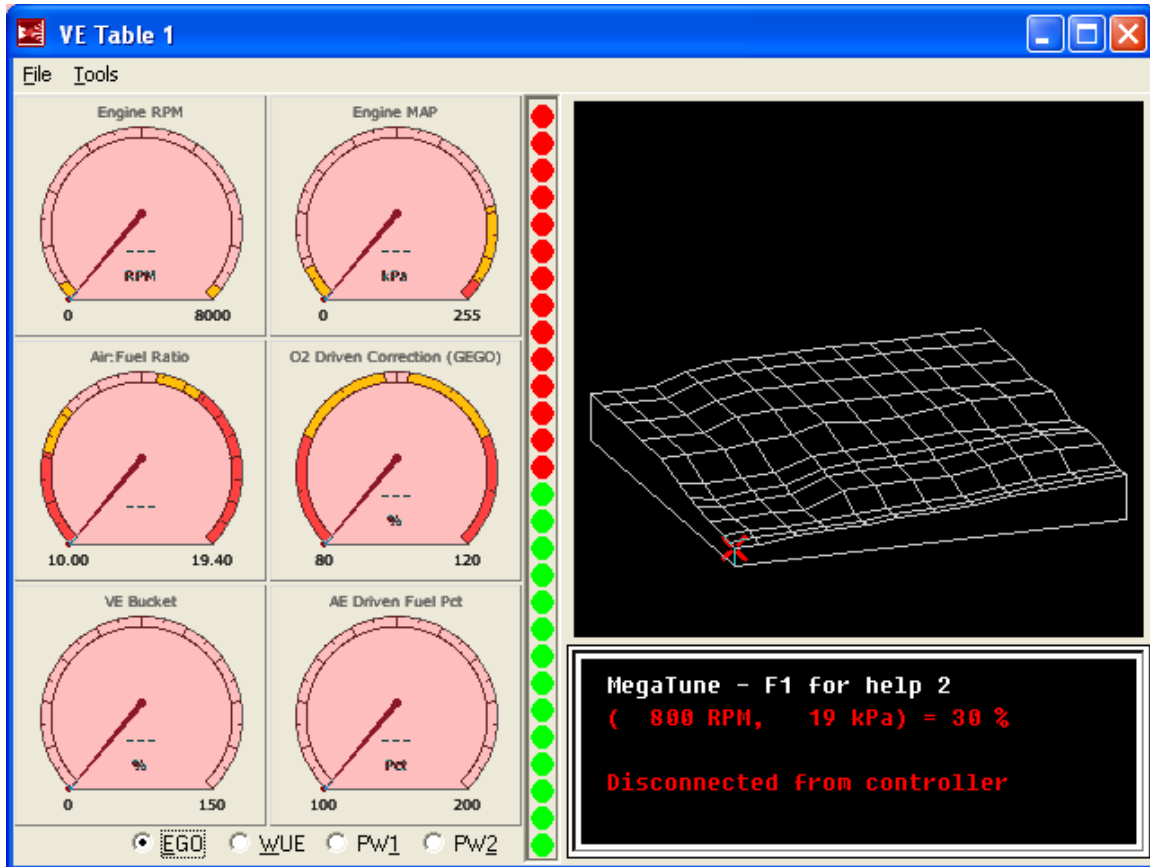
I like to use the below:



AUTOTUNE:

Go to tuning > ve table 1

Select tools and turn autotune on.



Autotune will now try to tune your car based on your AFR targets you set up.

Remember to burn the results once done. This does it in real time, so it's best to go out for a long cruise.

It's not always perfect so you can try Megalogviewer.

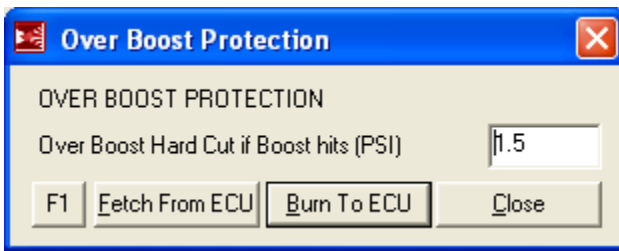
To record logs go to file > record new log.

Go out for a cruise once you get the fuel relatively close. And record the session.

Open that log in megalogviewer. Open the msq file once the log is loaded.

Tell it to analyze your fuel and match you AFR targets table....should then tune you map to get you closer. Save that, go back out see how it reacts....go out again, 10-15mins. Record and do it again....there you go...that should get your started.

Your over boost protection might kick in if you hit boost higher than the threshold, so you might need to change that as well.



Go to megasquirtnp.com and read through their articles on tuning and installation for better help.

Msefi.com

miataturbo.net megasquirt forum.