Wiring Your Megasquirt (MS):

1.6L:

Your ECU is located under the passenger foot rest. Remove the side sill with a Phillips head screw driver and pull the carpet back, the cover can be lifted off after removing 5 10mm nuts.

1.8L:

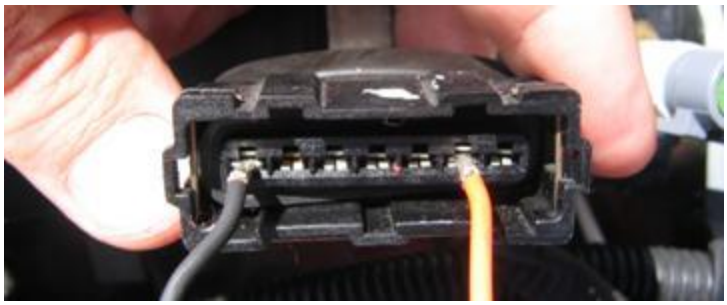
Your ECU is located behind the passenger seatt. Remove the side sill with a Phillips head screw driver and pull the carpet back, off the ECU. The ECU can be lifted off after removing 3 10mm nuts.

Remove the ECU, plug the OEM connectors into your new harness and attach the DB37 connector to your MS (be certain to screw in the connector).

AIT (air intake temp):

Wire your new GM AIT sensor 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:

Your Wbo2 input is the pink wire left dangling on the harness, labeled o2, or on the center connector plug, also labeled. Connect your 0-5v output from your WBo2 to this wire.

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

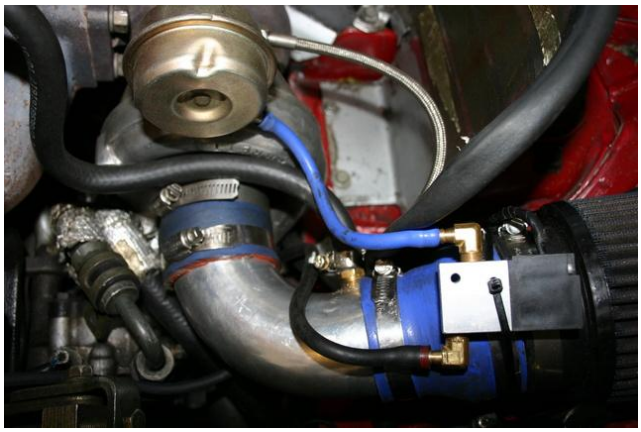
BOOST SOLENOID:

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. This should be labled.



MAP SENSOR:

Run a vacuum line from your intake manifold to the MAP sensor inside MS. The ideal spot is teeing off the FPR on the back of the manifold. If you use a different port the map signal tends to spike when it shouldn't due to turbulence.

There is a grommet on the firewall you can pass the vacuum line through. Pop it out, drill a hole to fit the vacuum line through, and start feeding it in. You'll need to reach up behind the insulation and glove box to find it.

TPS:

1.6L Standalone users need to unplug your TPS connector.

The stock TPS sensor is useless to begin and MS cannot do anything with the signal. I have prewired these harnesses to work in conjunction with the Wells TPS210 mod as outlined on miatatubo.net or automatic throttle body. Wiring it this way gives you an easy upgrade opportunity.

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

Software Setup:

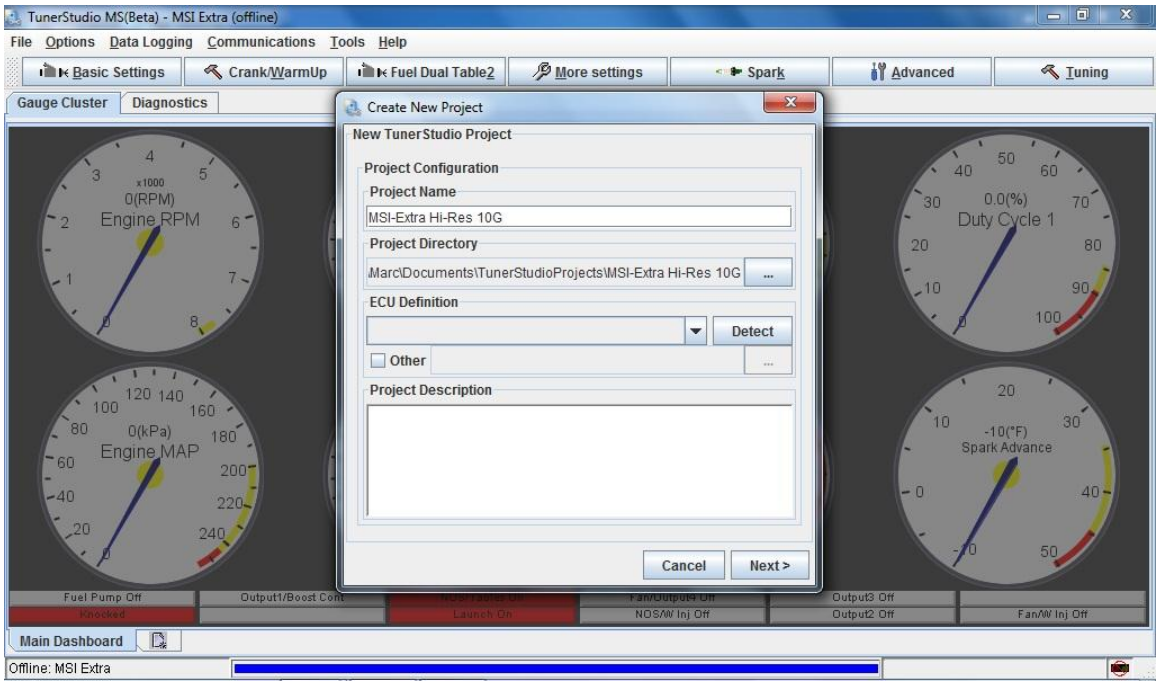
You need to start with a fresh install of Megatune and Tuner Studio.

http://diyautotune.com/downloads/tuning_software/diyautotune_software_win_081909.exe

This link provides you with all the latest firmware files you'll need. Run the installer and open Tuner Studio, this is the program you'll be using. If it asks to update, please do so now.

Go to the file menu, and select Project. Under the pull up menu in Projects, you will be given a few choices related to the project. Since you want to set up for your car, the first thing you want to do is SELECT NEW PROJECT.

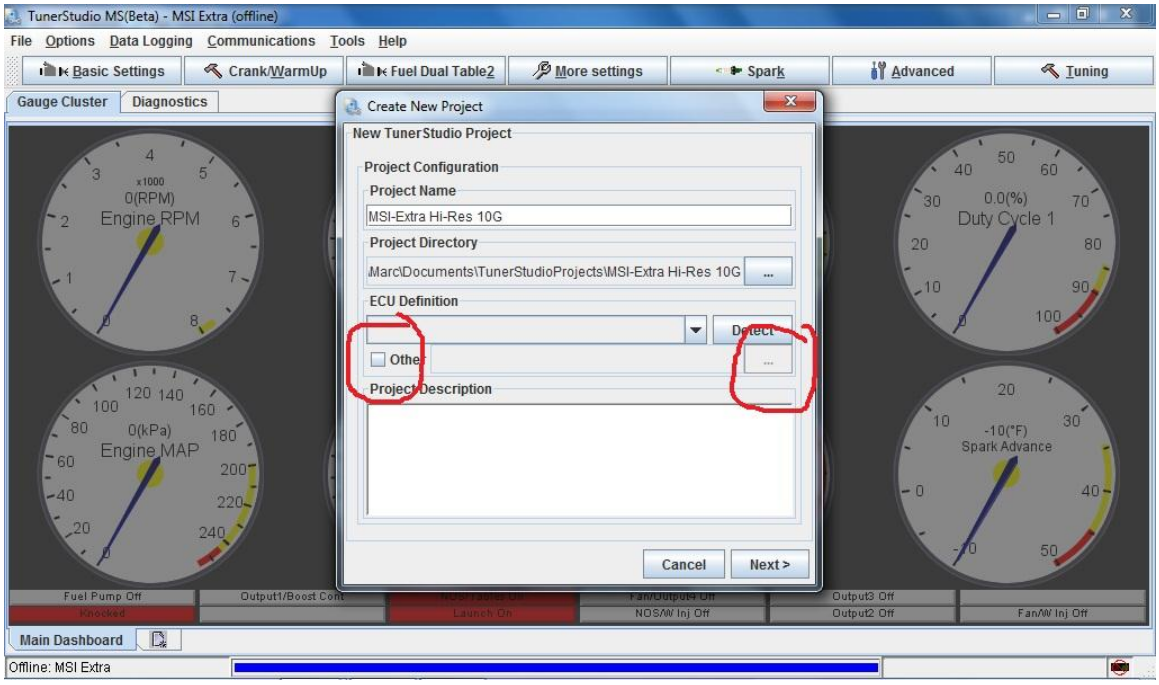
This screen should open up:



Name the project something that you can easily Identify, and make it specific. For example, MSI-Extra Hi-Res 10G. This would indicate you are running MS-I and firmware Hi-Res 10g. Or you can name it whatever you like, it doesn't really matter.

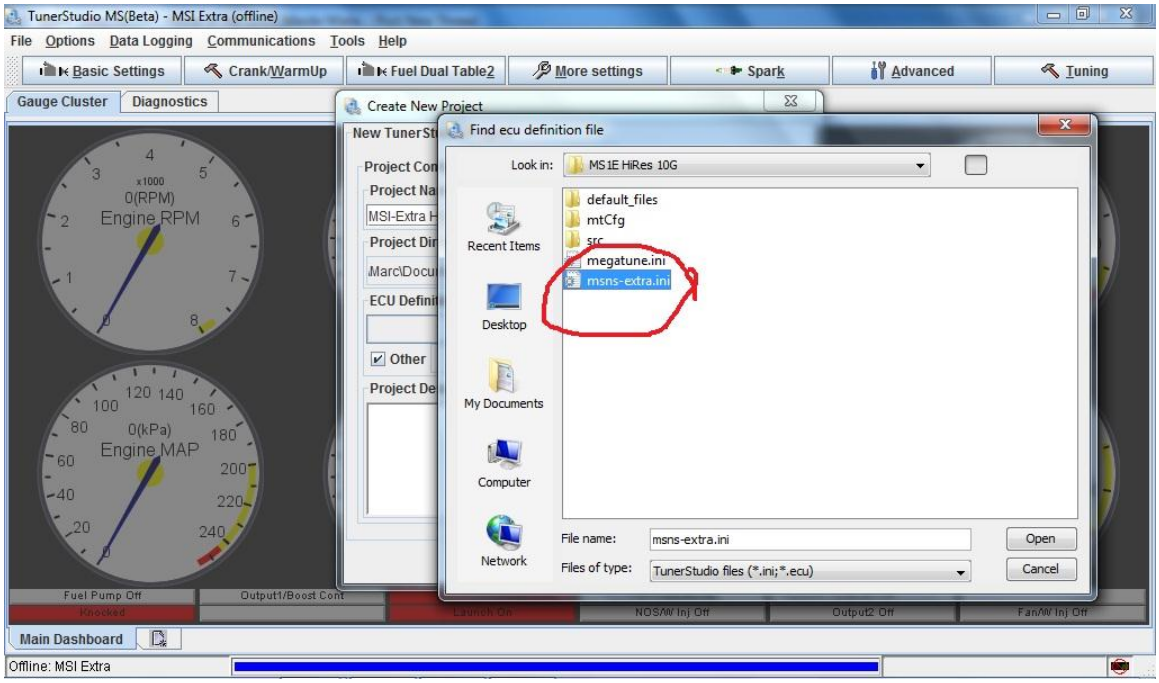
Make sure under "Project Directory," to save it to the Tuner Studio Projects Folder, which should default in your My Documents folder. Otherwise on some Vista and 7 machines, you may have issues saving files.

Next, you need to select the firmware you will be using.

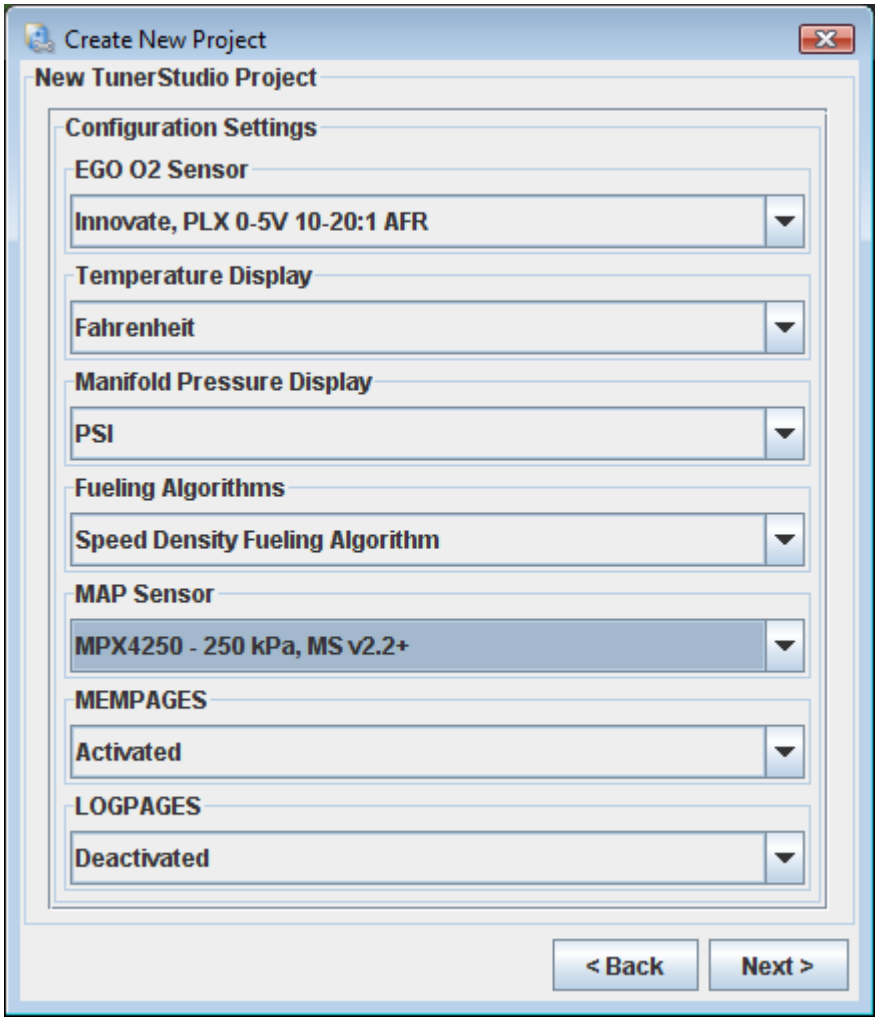


You should be able, if you installed from the file I provided in the beginning of this software section, to simply click the down arrow and find “MS/Extra Format Hr_10*******”. Use this unless running MS-II or otherwise instructed to by me.

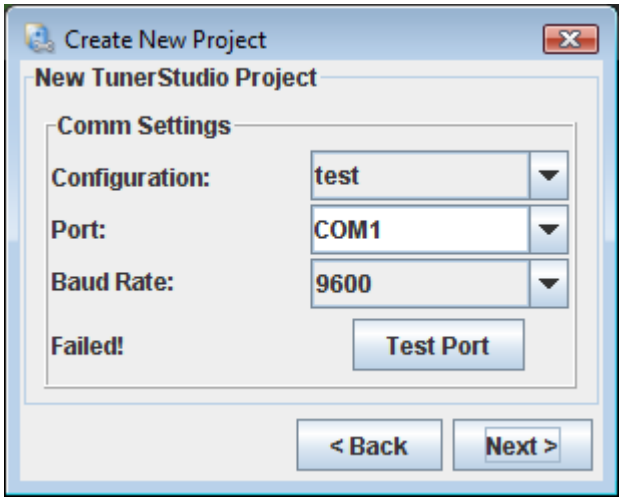
If that is not an option, click other, then the …, and navigate to the Medqtune directory and find the folder for MS-I Extra Hr_10G, then select the msns-extra.ini file.



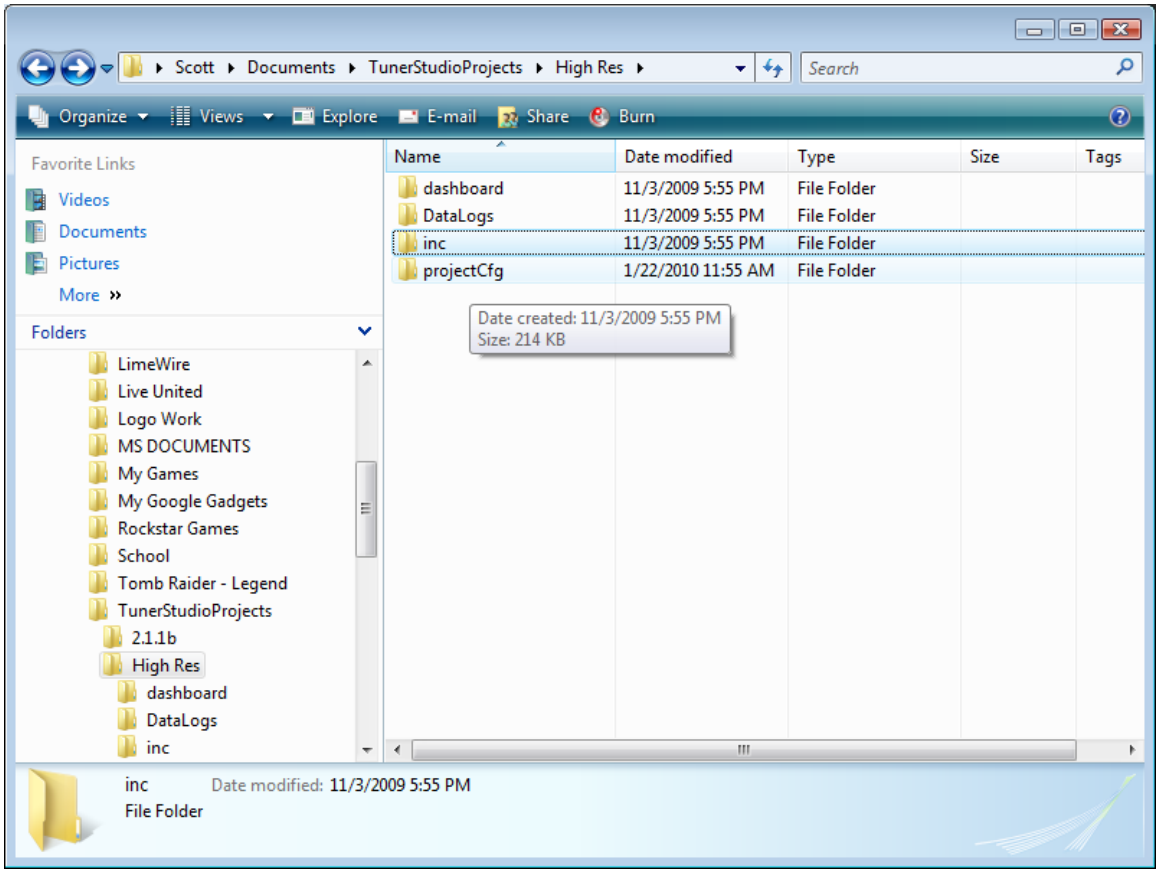
On the next page, choose your settings for however you need to set up your car. Choose your WB choice, Temperature settings, and the like. Most setups should look like the below options, only change the MAP sensor if you ordered the 4-bar.



On the next page, please select the com port of your usb-serial cable. MS-I baud rate is 9600, MS-II is 115200. Test the connection with your MS attached and ignition turned to ON.



Once you select how you want your display to look, please close TS and open up your My Documents folder. You should now see “Tuner Studio Projects” find the folder you named your project and open the /Inc folder within.



Save the following there .inc files into this directory (unless otherwise given different files): http://www.boostedmiata.com/MS/msq/Therm%20Files/16L_standalone/

Open Tuner Studio again and turn your car to ON.

Under Tools > Calibrate TPS (1.6L users put in 255 for both on and off, unless equipped with a vTPS)

- Key in the on position, car should not be running.
- With your foot OFF the throttle, click 'GET CURRENT' for the Closed Throttle ADC Count
- Floor it and hold it there. Click 'GET CURRENT' for the Full Throttle ADC Count
- Click Close

Configuring your tune:

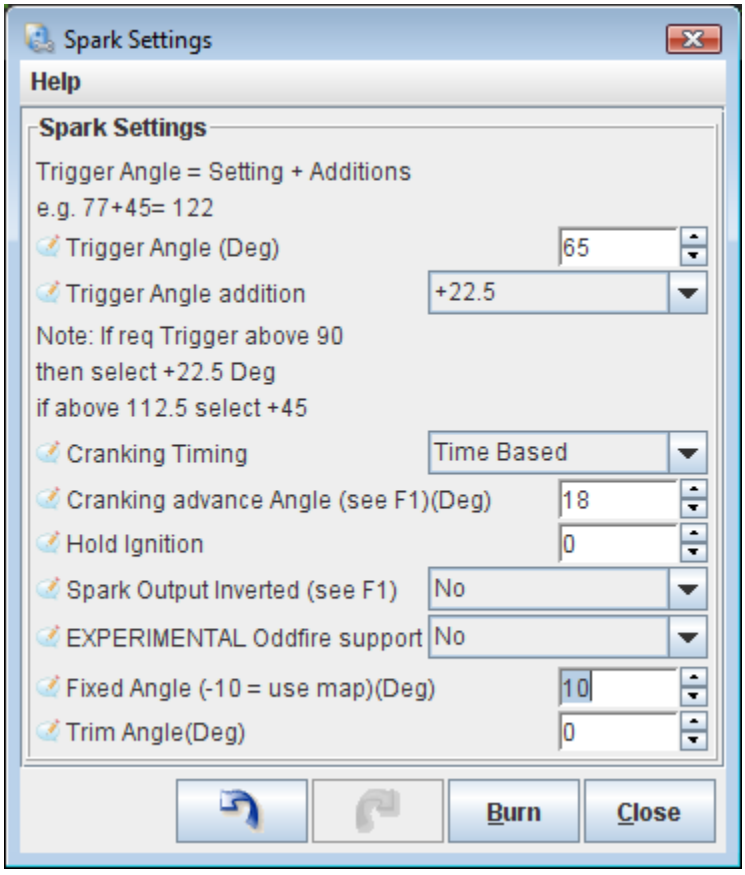
The first thing you have to do it match the ignition timing! MS has no idea what your timing is so driving on your new ECU without doing this is potential for serious failure.

Start and idle the car and allow it to warm-up and stabilize.

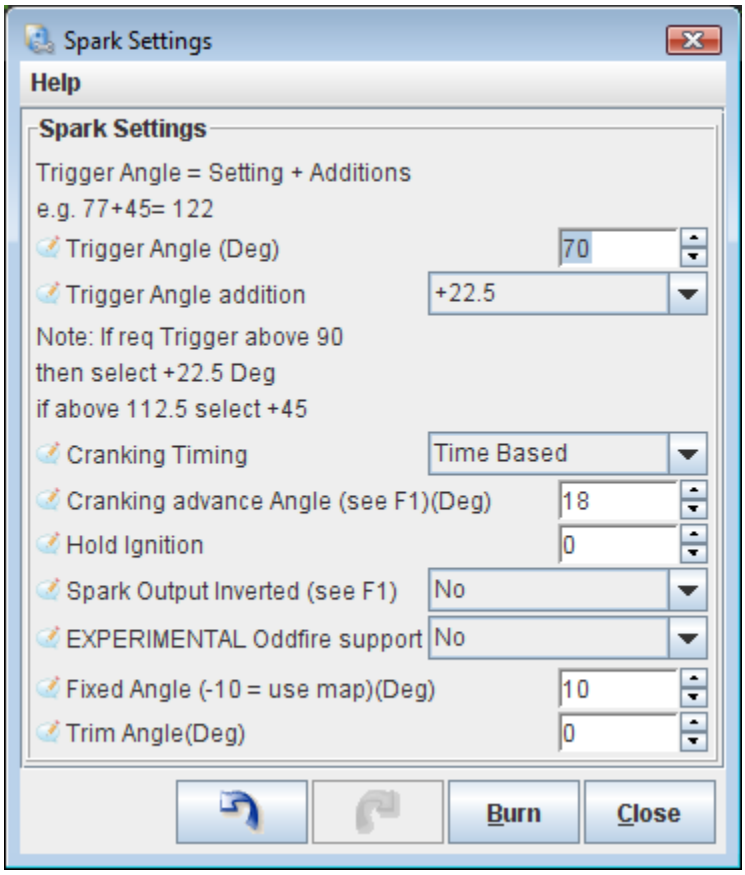
Open up Spark > Spark Settings.

To adjust the timing you adjust the trigger angle, that's it. No more rotating the CAS, this is same idea.

First change the "Fixed Angle" from -10 to a 10. By doing this, you're telling your Megasquirt to hold the ignition timing at 10°. This is essentially what you are doing when you would jump GND and TEN in the past. Since MS has control of your timing now, this is how you can lock the timing.



Use your timing light and verify the timing is correct. The timing mark should land on 10°. If it's not a match, change the *trigger angle* a few points and try again.

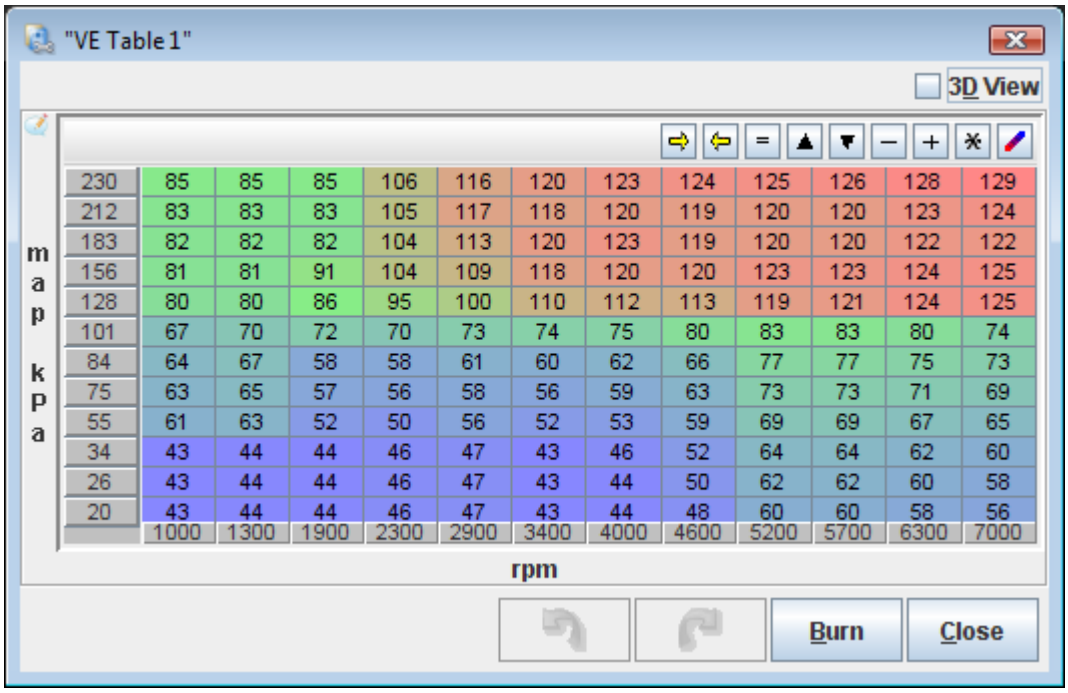


Once your timing light indicates 10° you have now synced the CAS position and the MS. **Change the "Fixed Angle" from 10 back to a -10.** You can see that setting -10 tells the MS to use map. If you fail to do this, your timing will remain at 10° regard of RPM or load, this will overheat your motor fast and run very sluggish. If you go back out with a timing light you should see you're probably idling in the15-18° range.

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

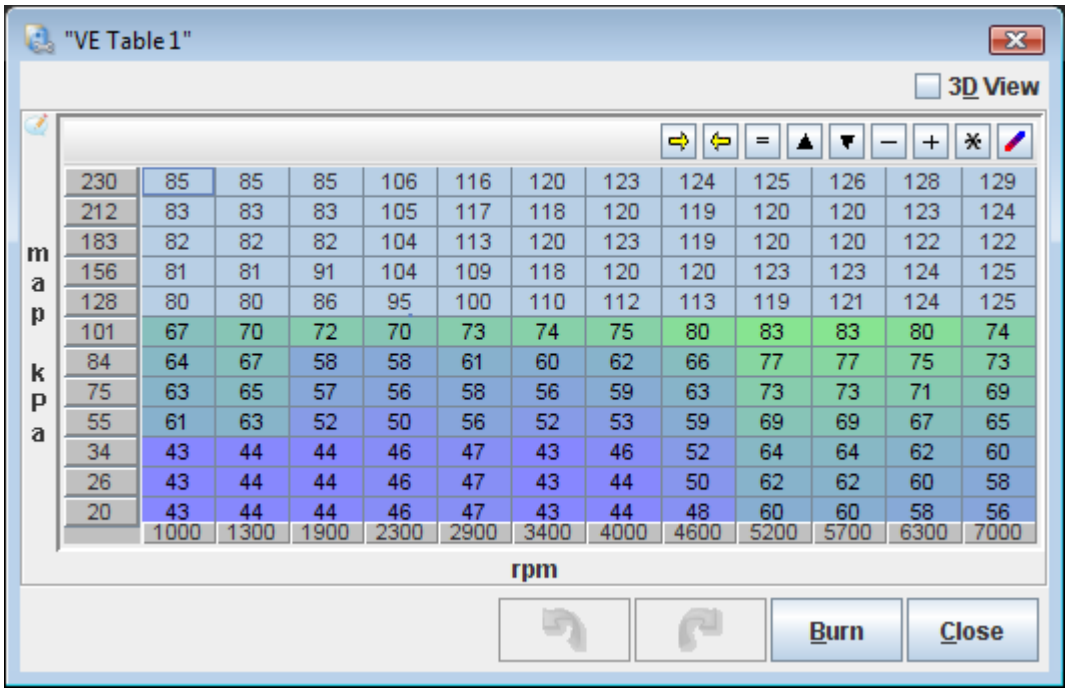
Your spark table should be good. So first focus on fuel.

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.

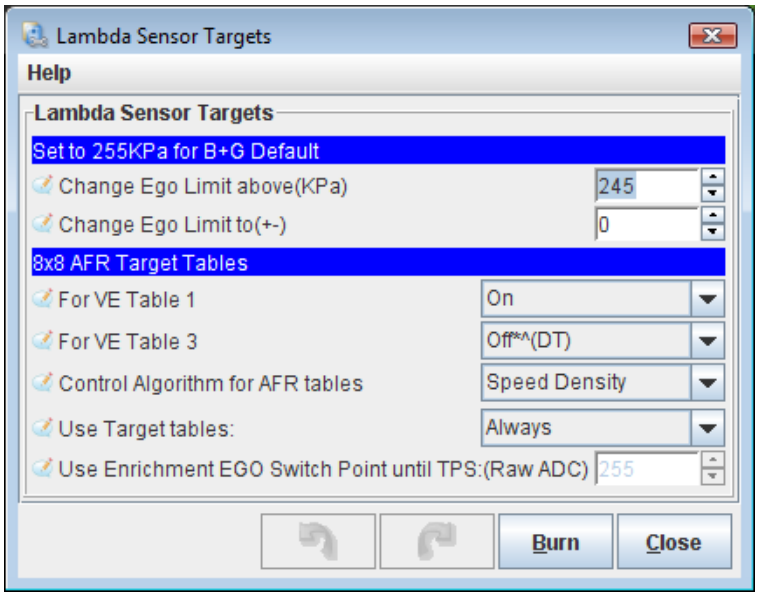


Tuning:

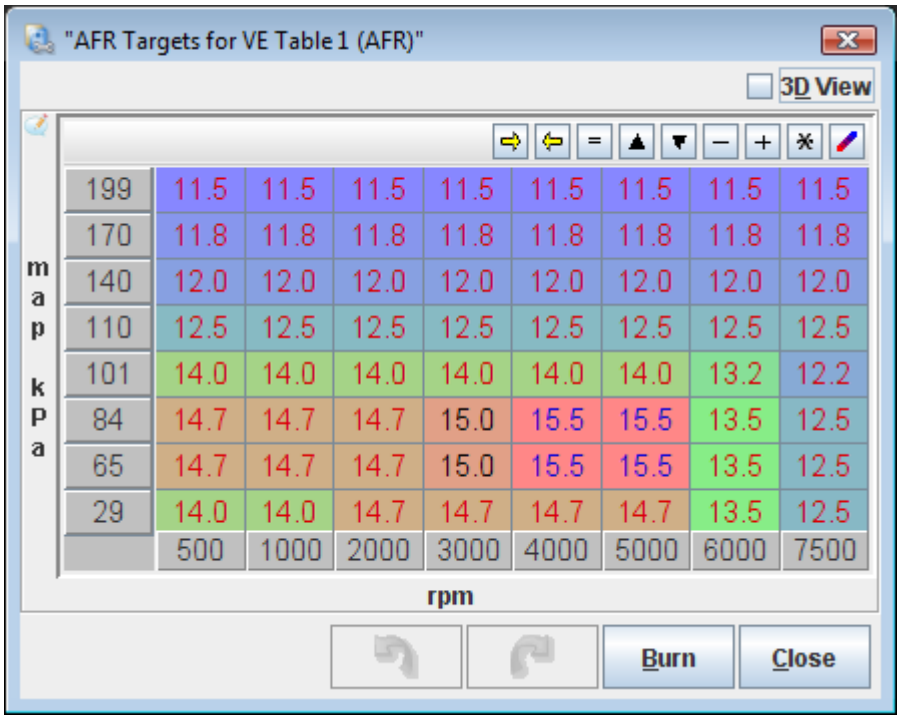
Setup your AFR target.

More settings > lamda AFR settings

Turn VE table 1 on.

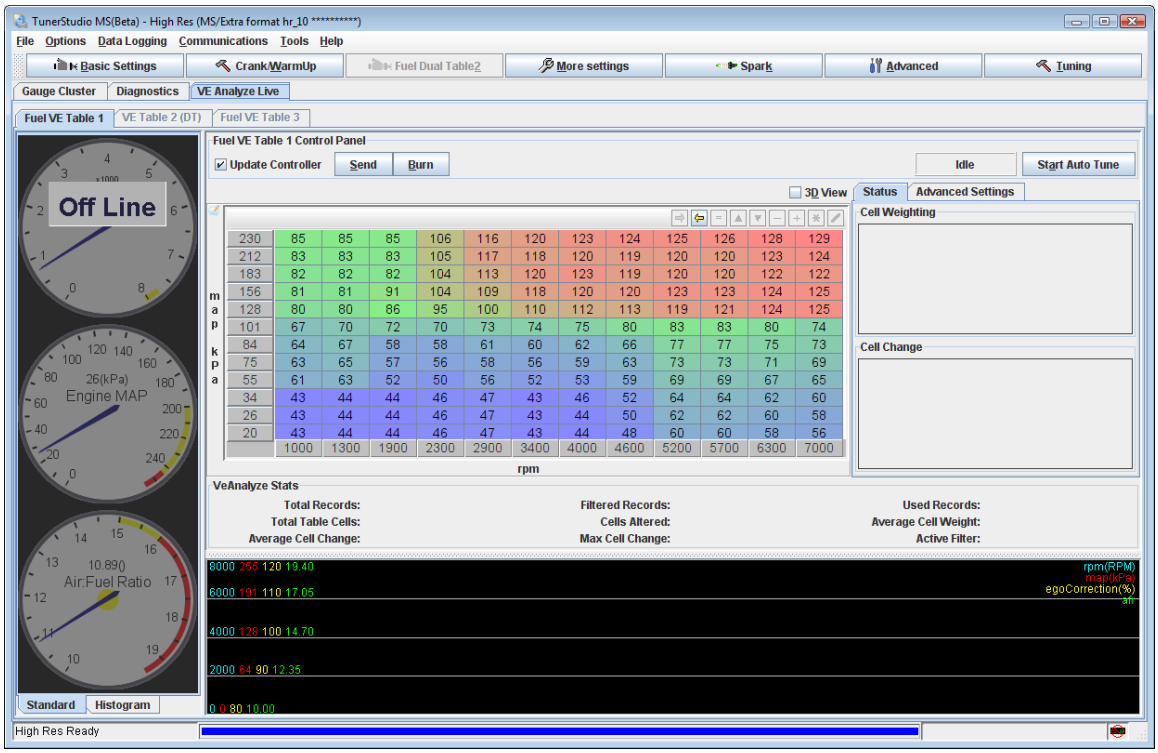


Then go to More settings > AFR tagets for VE table 1



These are the AFR targets you're telling the MS you want to hit.

If you click the VE Analyze Live tab, TS software can autotune your fuel map based off your AFR targets while you drive, this will be the quickest way to get your map tuned to your setup.

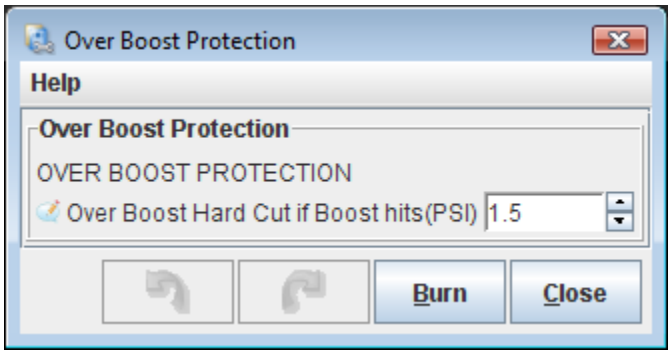


Please visit: http://www.miataturbo.net/forum/t42925/?highlight=tunerstudio for more discussion on tuning with VE Analyze Live.

To record logs go to Datalogging > Start Logging.

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

Final note: your over boost protection might kick in if you hit boost lower than the threshold, so you might need to change that as well. I have it set low just in case.



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

Msextra.com is a great forum for MS specific questions.

And of course the miataturbo.net megasquirt forum.