

MegaSquirt PNP Gen2 Documentation

Model/Vehicle specific installation guide for model MSPNP2-EEC4B8 for a 1994-1995 Ford Mustang 5.0L.

Please read all documentation before installing your MegaSquirtPNP EMS and verify that you've followed all steps before starting your engine for the first time.

Physical Installation

All you'll need for a successful installation are some basic hand tools. No cutting or drilling of the original sheet metal or bracketry is required.

For a thorough and professional installation, you will need the following items:

- 10mm socket and ratchet
- 7/32" socket and ratchet
- 9/32" socket and ratchet
- Phillips screw driver
- Zip ties
- Timing light
- Laptop with TunerStudio installed

The stock ECU is located in the passenger's side footwell, just behind the kick panel in front of the door. To remove the kick panel, first pull out the plastic plug as depicted below. The plug is fairly tight, but pull evenly and it will pull out. Next, remove the lower door sill cover by grasping the end and firmly pull upward. Afterward, the kick panel simply pulls away.



The ECU is tucked away behind a bracket that secures three connectors. Disconnect all three connectors and remove the bracket by removing the two screws that secure it.



The ECU is held in place by a plastic bracket that is secured by a single screw. First, disconnect the main connector from the ECU by loosening the large bolt in the center of the connector. Note, that the bolt won't come out completely. Wiggle the connector loose from the ECU. Afterwards, remove the screw that secures the ECU bracket. Then with a bit of moving about, the ECU can be pulled free from the car.



Installation of the MSPNP is the reverse of the factory ECU removal. Simply install it into the place of the original ECU and secure it with the original plastic mounting strap and screw. Please note that the strap fitment will be somewhat tighter due to the location of the vacuum nipple next to the connector. Afterward, reconnect the main harness connector.

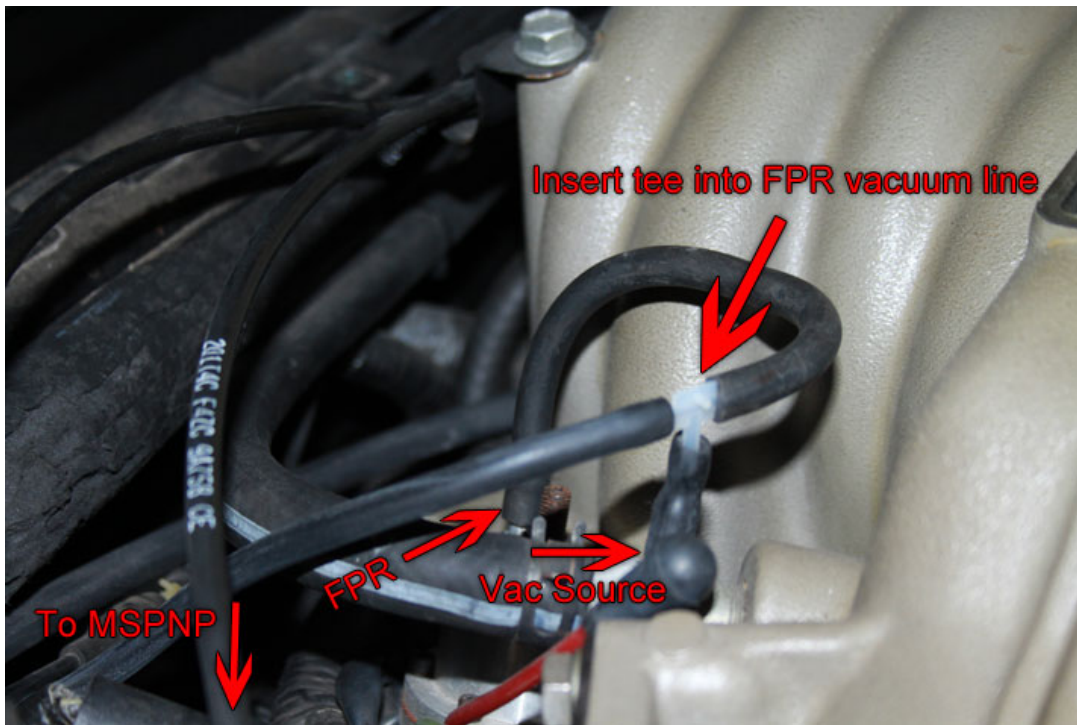


Without modification to the factory mounting cradle, the serial cable, knock headphones, and options connector cannot be connected while the MSPNP is installed in place. However, the MSPNP can still be connected to the main harness as well the serial cable outside of the mounting cradle to allow tuning and adjustments if you choose not to modify the cradle.

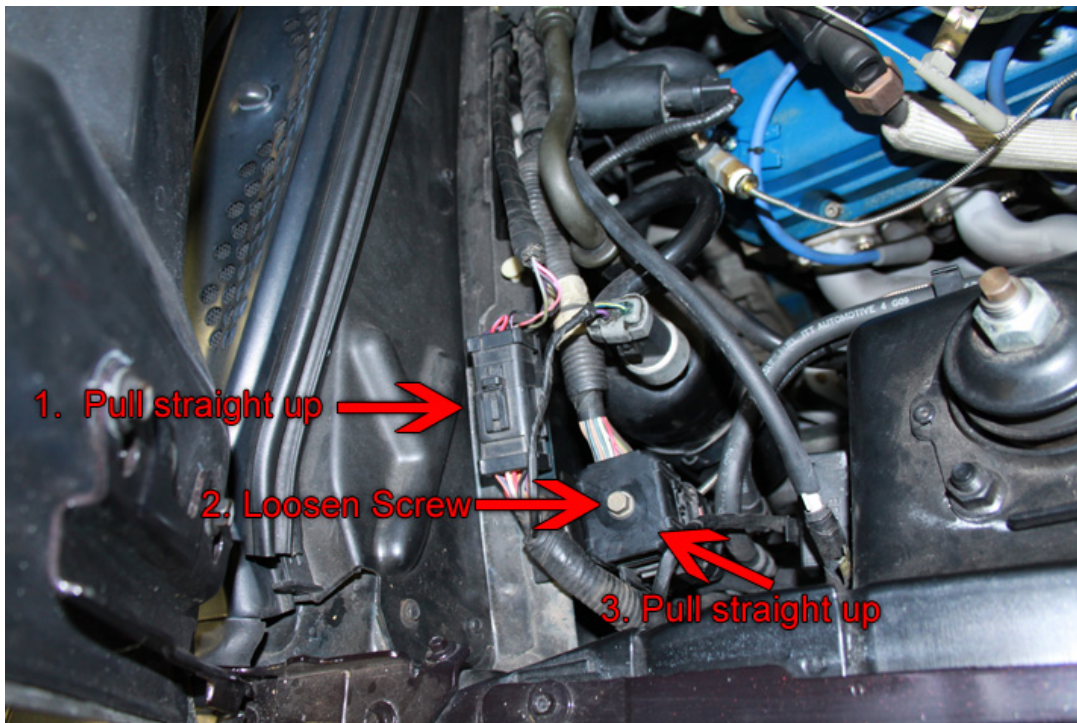


If you choose to use these connections, the cradle can be removed and trimmed to allow clearance. The cradle is secured by a second screw up and behind the blower motor. It's a very tight area and difficult to access, so be patient when removing the cradle for modification.

After the MSPNP is mounted, you must run a vacuum line from the engine, through the firewall, and to where the MSPNP resides. A nipple on the side of the intake manifold, just past the throttle body, provides the perfect source for a vacuum reference. A hose small hose connects the fuel pressure regulator to the manifold here. Cut this small hose and insert a tee as shown below. After the tee is installed, connect one end of the vacuum line for the MSPNP here and route it neatly through the engine bay and secure it with zip ties to prevent movement and entanglement.



There is a small rubber grommet in the firewall on the passenger's side corner of the engine bay through which the hose should pass. However, you'll need to remove a few electrical connectors first. The horizontal connector does not need to be disconnected, though it should be removed to allow access to the grommet. Grab the connector at both ends and pull straight up. Rocking back and forth will help in this process. Next, disconnect the large vertical connector by completely loosening the center bolt (the bolt won't come out completely) then pull up.



After the connectors are pushed away, CAREFULLY make a slit or hole large enough to pass the vacuum line through. If you use a knife, use extreme caution as there are many wires in this area that you certainly don't want to damage.



NOTE: Your car will not have the metallic line passing through the grommet as pictured above.

Once the vacuum line is routed to the proper location under the dashboard, press it on to the vacuum nipple next to the connector.

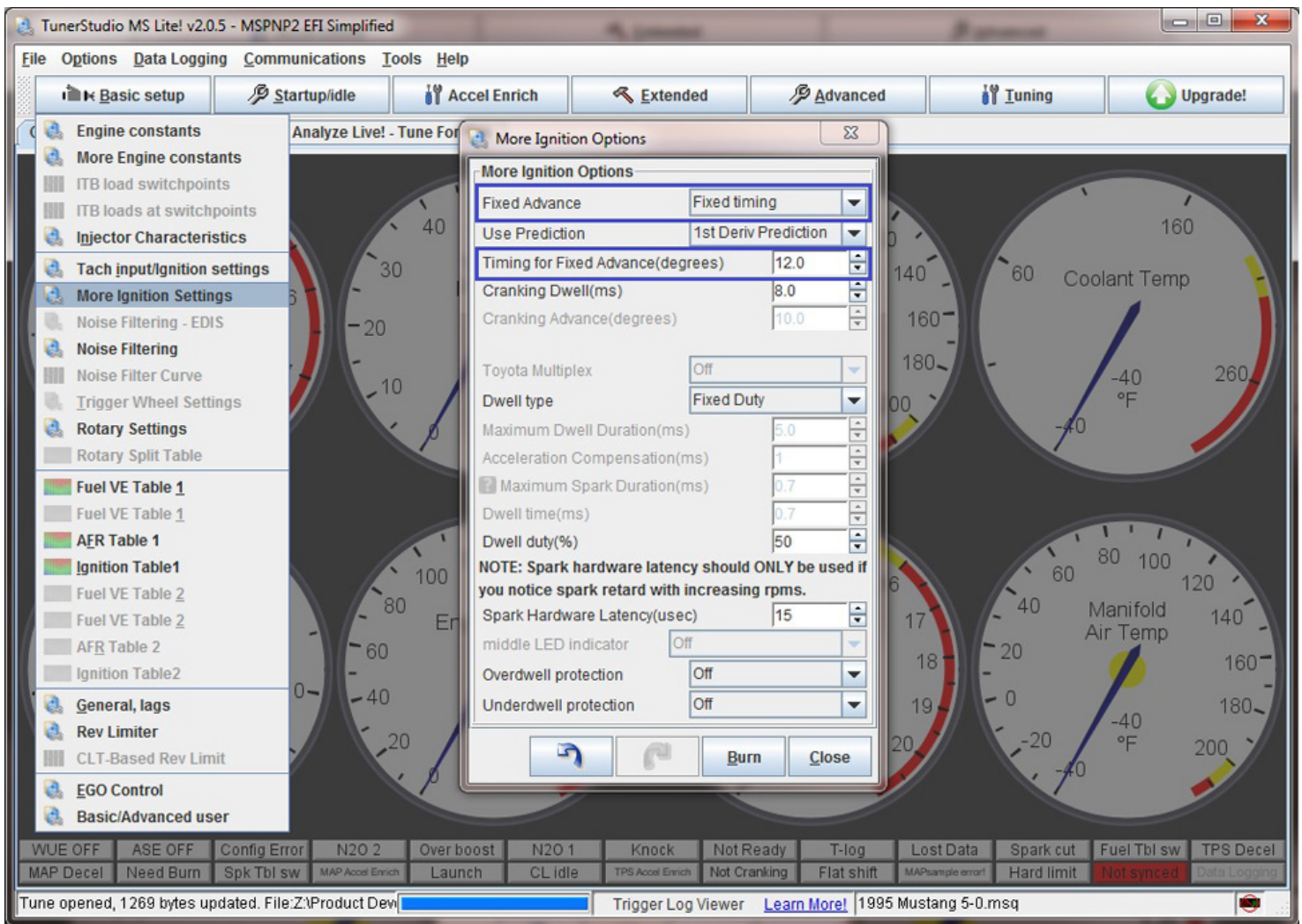


Verifying and Adjusting Base Timing

Because the factory ECU is no longer in control of ignition timing, it will be necessary to make checks to ensure the MSPNP is accurately delivering the proper timing. Improper ignition advance can cause engine damage if improperly set or is left unchecked.

The MSPNP will have a base ignition map loaded and ready to use. However, it is necessary to ensure that the timing advance being commanded by the MegaSquirt is in sync with what the engine is actually receiving. These steps will require the use of a timing light and a laptop with a copy of TunerStudio running.

1. Connect a timing light on the cylinder #1 spark plug wire. Use all due caution here, as secondary ignition voltage can be as high as 100,000 volts or more. Also ensure that the timing light's cords can not get tangled in moving engine parts or burned on hot components.
2. Make sure your tuning laptop is connected to your MSPNP and start your vehicle. If you have not already done so, start TunerStudio MS or TunerStudio Lite. Make sure that your laptop connects to the MSPNP and you are online.
3. Navigate to the **Ignition Settings -> Ignition Options/Decoder Wheel** (For v1.2 MSPNP2s, go to **Basic Setup -> More Ignition Settings**). If "Fixed Advance" is set to "Use Table", set it to "Fixed timing". This will tell the MSPNP to ignore the ignition table and hold a fixed advance angle. Set this value to 12.0 degrees. Burn these changes and close this menu. (Ignore the sections not highlighted in blue rectangles.)



4. Use a timing light to confirm that you have 12 degrees of timing at the crank pulley -- If you have more timing, decrease the "Trigger Angle" value under the "Basic Setup -> Ignition Options" dialog box. If you have less, increase this value.



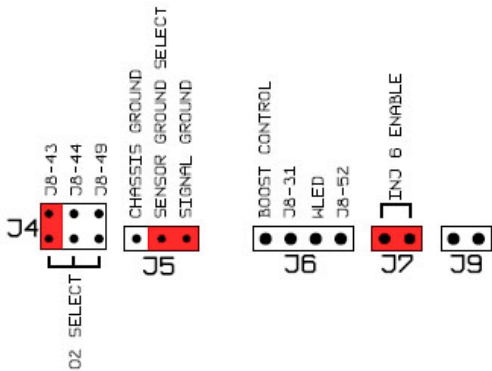
5. Close the "Ignition Options" dialog and go back to the "More Ignition Settings" menu under the "Basic Setup" tab. Set "Fixed Advance" back to "Use Table". Burn and close this menu. Cycle power to the MSPNP (turn the car off and back on). The MSPNP is now commanding timing advance based on the ignition table.

Removing the Mass Air Flow Meter

Since the MSPNP calculates engine load using a MAP sensor, the air flow meter is no longer needed. While not necessary, it is recommended to remove the AFM for a small performance increase. At the very least, the air meter should be unplugged and the connector neatly tied away.

Optional Configurations

Several jumpers are located on the lower, black circuit board inside the MSPNP. These are accessible by removing the top cover and are indicated as depicted below. However, these dictate the platform with which the MSPNP is design for. The only jumper that should be changed, if desired, is J6.



Default settings indicated in red.

- J4: Oxygen Sensor Selection**
Place a jumper between "O2 Sensor" and "J8-43" to connect the left bank OE O2 sensor the MSPNP. Likewise, connect the jumper between "O2 Sensor" and "J8-44" to connect the right bank OE O2 sensor.
- J5: Sensor Ground Selection**
In almost all cases, the jumper should be left installed between the center pin and "Signal Ground". However, the option is given to allow the engine sensors to be grounded directly to the chassis.

- J6: Not used in this application**
Leave this unjumped.
- J7: Injector 6 Enable**
Leave this jumper in place as it is necessary for this application
- J9: Not used in this application**
Leave this unjumped.