



## Computer Tunes – Are They Worth It?

*At Mid America Motorworks, we know that Corvette owners are passionate about the drive. You want to keep your Corvette performing at the same level – or better – than the day you brought it home. With so many options available to add performance and power, how do you know which is best? This newsletter takes a look at the tuning side of performance upgrades.*

### Corvette Computers

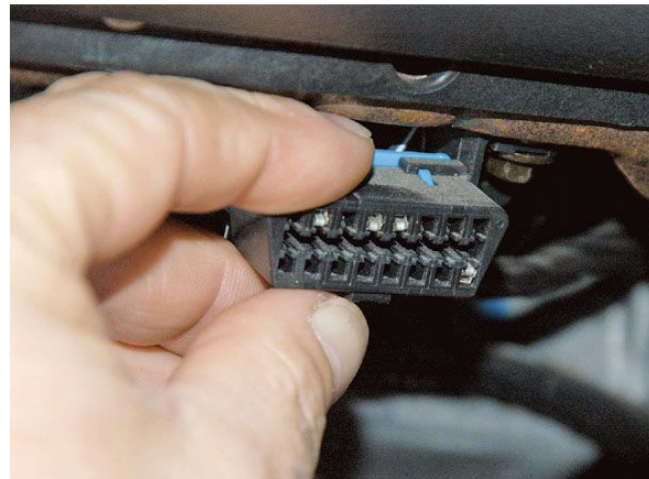
In the later model Corvettes, different computers have different roles. The Body Control Module controls your windows, HVAC, interior lights and other functions of your Corvette's body. The ABS Module controls the traction control and brake system.

For tuning, we focus on the Engine Control Module, which controls the various functions of the engine. The engine control module houses the computer programming that tells your Corvette engine what to do and when. The only way to change this program is to access the computer system through the OBD (on board diagnostic) Connector.

### OBD Connectors

When auto manufactures began implementing computers for engine management, they integrated a diagnostic link so the manufacturer could check the computer systems before the vehicle left the factory. Auto mechanics began using this link to diagnose problems. The problem was, each auto manufacture used their own style of computer and connector to read codes.

In 1988 the Society of Automotive Engineers suggested that all auto manufacturers use a universal form of connector to diagnose vehicles. All of these Connectors are referred to as OBD1 Connectors, because of their location on the vehicle. In 1996, all cars sold in the United States were mandated to use an OBD2 Connector. This OBD2 Connector is a standardized connector that has higher capabilities to relay information to the scan tool.





As a result of the 1996 mandate, OBD1 tuning software is outdated and the little bit of programming that could have been done to an OBD1 car is now attainable. Aftermarket tune companies no longer supporting the older computers.

## Good, Better, Best of Tuning

### Scan Tools

Handheld scan tools are used to look at information from data the computer has collected. They plug into the onboard diagnostic port of your vehicle and provide feedback on engine function, emissions, fuel usage and warning lights. This is what dealerships and auto shops use to diagnose problems. While handheld scan tools are easy to use and readily accessible, they only provide diagnostic information and do not have the ability to adjust any of your Corvette's functions.

### Programmers

Programmers are designed to hook a computer up to the OBD2 Connector and download the computer files from your Corvette. The software then analyzes the data in real time. A Programmer has the ability to adjust settings for improved performance, but only at pre-determined intervals.

### Software Tuners

Professional tuners have access to proprietary software that connects a computer to the OBD2 to download your Corvette's computer data. Then the tuner takes the known data and manipulates and tunes it to perfection. A new program is then uploaded into the car, allowing the car perform at the most optimum levels.



Tuning is highly recommended whenever any engine performance changes are made to your car, such as installing new exhaust or a new cold air intake. When changes are made to your Corvette, the specific tuning for that attribute (exhaust, intake, etc.) also needs to be changed.

## Tuning Questions

**Q: *What is the difference between buying a computer programmer and getting a custom tune by a professional tuner?***

A: Computer programmers found at automotive stores are a quick and convenient way to change your Corvette's programming for better performance. These tuners are pre-loaded with new computer programs that will enhance your engine performance and efficiency. The downside to getting a programmer and the upside to paying someone to custom tune your car is the programmer you buy off the shelf has pre-determined values, while a professional tuner is building a computer program 100% custom to YOUR car. Not just a "cookie" cutter style program.

**Q: *Will a professional tune void my warranty?***

A: Ultimately the decision to void your warranty due of modifications is up to your dealership. Old computer programmers used to erase data called the "checksum." By erasing this data, the dealership could tell that a computer system had been modified. For instance a car might show as having 50K miles but only show that it has been started 5 times. New software saves the checksum data and reloads it onto the new files so that the data looks undisturbed. Someone operating a scan tool or flashing the memory would not be able to see that the computer program has been altered.

**Q: *Will computer updates I get from my dealership alter my new custom tune?***

A: Most likely not. Usually updates affect emissions and non-performance related computer data.





**Q: What Changes are made during a custom tune?**

A: Fuel Trim – typically fuel trim has an 8-10% margin on variance of the correct fuel-to-air ratio. After the tune is done you should experience a 2% variance.

**Torque Management** – When the your computer program is designed, it factors in that you want a nice, easy and comfortable take off when you accelerate. Changing this tells the computer to go ahead and deliver all of the torque that we desire through the throttle and we don't need a computer holding it back for us.

**Drive by Wire** – Since there is no physical cable from the foot pedal to open the throttle like the old days, we rely on the sensor from the foot pedal to tell the computer how much throttle is desired. During a tune, the delay can be decreased so that there is no lag time between the foot pedal and the computer telling the throttle to open.

**INOP Tune** - Programs can be written for specific situations. For instance the tuner can shut off a sensor, such as a mass air flow sensor, and then write a computer program that will allow the car to run the best it can if the mass air flow sensor is inoperative. If this ever happens, the computer will default to this program and allow you to limp home. This may not help you on the performance end, but it may save you from walking in case of sensor failure.

**Q: How much power will I gain?**

A: Approximately 15 horsepower, give or take a few, depending on what modifications you have done to your car before the tune. However, you will gain about 18-20 ft lbs of torque that will make it feel like you have gained way more than 15 hp.

**Q: Will this affect my Fuel mileage?**

A: That's a tricky question. Your fuel mileage should improve if you drive the car exactly how you drove it before the tune. Added horsepower is gained by making the engine run more efficiently, therefore giving you more MPG. However, if your foot becomes heavier, the tune won't save you from fuel mileage loss.

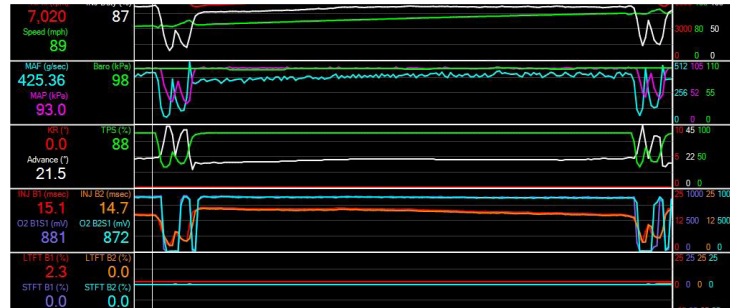
**Q: How can I get the best tune possible?**

A: Dyno tunes are the best you can get. This allows the tuner to run your car in real world situations and then keep tweaking your tune until it is absolutely perfect. The downside is, thanks to the added cost of the dyno, these are usually more expensive.

**Q: Can a tune affect other aspects of my car?**

A: The computer program changes take place in the ECM and do not affect anything in the body control module, ABS control module or other areas of your Corvette.

**TORQUE MANAGEMENT**



**DRIVE BY WIRE**

