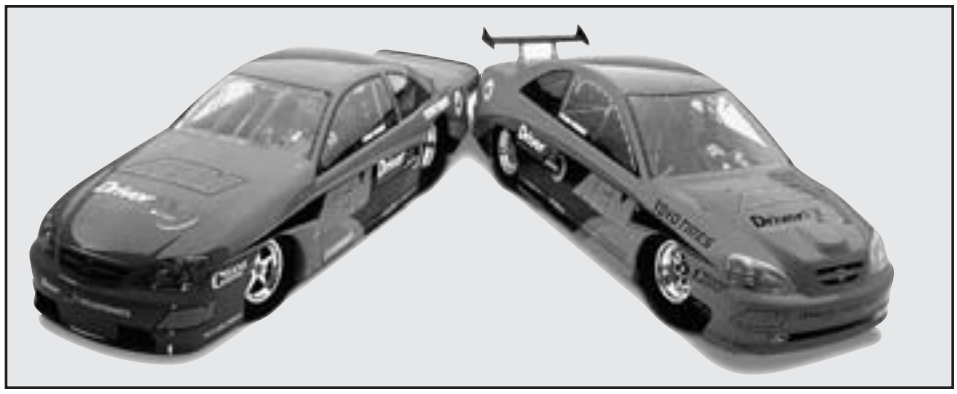
AEM PLUG & PLAY

AEM Plug & Play

COST: Approximately $2,000

FEATURES: This system can use all factory sensors and actuators, and it can be converted to use aftermarket functions like nitrous or boost control.

EASE OF INSTALLATION AND TUNING: Installation is very easy, but the tuning software can be somewhat complex for new users.



AEM has made a huge splash in the import racing and high-performance community with their offerings of engine management systems for specific vehicles that are "plug and play," meaning the system can plug into the factory wiring with no modifications. AEM is a noted sponsor of import/sport-compact drag racing.

Advanced Engine Management, or AEM, as they are known in the automotive aftermarket industry, has long been a leader in product development and testing for the import performance market.

John Concialdi, the company's president, has been working on high-performance vehicles for most of his life, and has built an amazing variety of different racing and performance engines in his long and illustrious career.

John started AEM as a small one-man shop in Gardena, California, and worked his way up the ladder of recognition through countless hours of hard work and dedication. He used his in-house dynamometer and his small but adequate fabrication room to build and test all sorts of parts for import vehicles. His company's name began to grow very rapidly with the introduction of the AEM cold-air induction kits for numerous makes and models of high-performance street cars.

Before long, John realized that he had found something special in AEM that could serve a very wide marketplace across the world. He then made the decision to team up with some business-savvy partners and formed AEM, Inc. The team picked up shop and moved to their current super-sized facility in Hawthorne, California, with the intention of being a world leader in high-performance technology for the import and sport-compact marketplace.

In order to obtain the most potential from their parts and high-performance add-on kits, AEM began to rely on several aftermarket engine-management systems to allow them complete control over any engine they chose to develop. At that point they realized that however effective these systems might be, they tend to require a much more complex installation than most performance enthusiasts were willing or able to undertake. Systems such as these usually required a fair amount of wiring, soldering, crimping, and bracket fabrication in order to make them correctly operate a given engine.

AEM came up with a concept that

Tire Size and Gear Ratios on the Dyno

Many people often ask me if they should wait to put their car on a chassis dyno until after they have the same size wheel and tire combination on the car that it will normally run.

The answer, quite simply, is no. The size of the tire that is on the car will have little effect on the recorded power output of the car at the wheels.

Other than a very slight difference in parasitic losses, the diameter of the tire will not affect the power output. This can be easily measured by trying several different tire sizes on the same day.

The reason this holds true is because the rolling diameter of the tire acts as another gear ratio for the power that the engine makes to be transferred through. When we measure power on a chassis dyno, we measure the power the engine makes when all of the gearing is calculated out of it. So, if we test in third gear, or fourth gear, we will get the same readings from the dyno.

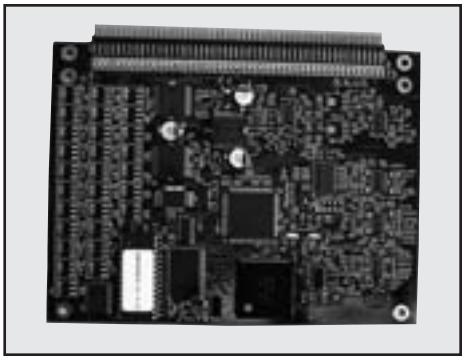
Since torque is the amount of work we can do, and power is the amount of work we can do in a period of time, it makes sense that gear ratios will cancel out any effects of power changes to the wheels because as we change the amount of torque multiplication to the tires, we also change the tire speed by the same amount.

For example, if we can produce 100 ft-lbs of torque in one rotation of the engine, and we have a 4:1 gear ratio, then the tire would have turned 1/4 of a turn and produced 400 ft-lbs.

Now if we have the same scenario but with a 3:1 gear ratio we would have only generated 300 ft-lbs at the wheel, but the tires would have traveled 1/3 of a rotation. So if we had a tire with a 100-inch circumference we would have traveled 25 inches with the first tire, but more than 33 inches with the second.

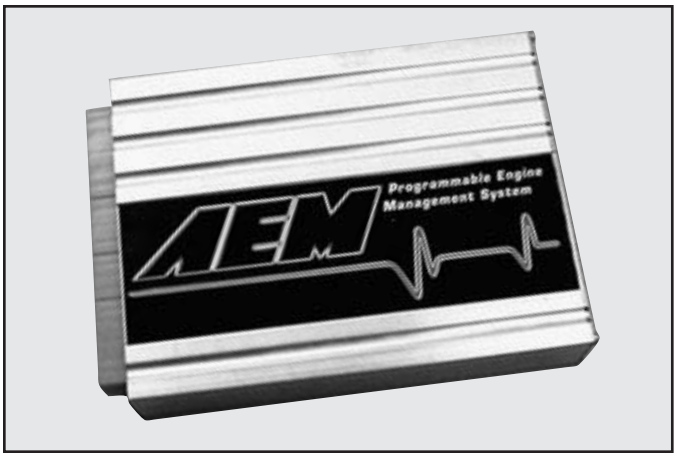
In each case, the amount of force available from the engine was the same, so over the period of time we have (1 revolution) the same amount of actual work was done. A taller tire will take more effort to move, but will move farther in one revolution than the same effort applied to a smaller tire. Thus the tire size acts as another gear ratio.

The bottom line is this: Tire sizes and gear ratios will not affect horsepower readings at the wheels.



All AEM computers share the same basic design, using a motherboard like the one shown here. It's the adapter boards that make each unit suited for a particular application. Lots of engineering goes into making sure that all of the factory sensors and actuators work properly with the motherboard.

has turned the aftermarket engine management community on its ear. The idea was to produce a totally user-programmable fuel-injection computer that could handle all of the extra power demands of high-performance engines, such as larger injectors, turbochargers, nitrous systems, etc., yet still be able to control all the factory accessories, emission controls, and involve almost no modification to the existing wiring harness or components. Thus, the first Plug & Play engine management system was born!



AEM produced the first ever truly plug-and-play engine management systems. These units use all of the factory wiring and sensors, but have all of the same features that most aftermarket systems offer.

In order to manage costs and maintain cutting-edge technology, AEM opted not to begin development of their system from scratch, but instead turned to General Engine Management Systems, or GEMS, in England. GEMS, Inc. has been a leader in European performance building and manufacturing racing and high-performance fuel-injection systems for many years. Once a deal was struck between the two companies to allow AEM the licensing rights to GEMSs system, the task of converting the universal units from GEMS into something that would be useful in a plug-and-play environment could begin.

The task begins with finding a suitable make and model of automobile to be covered by a single application, such as model years 1988 though 1995 of Ford Mustangs that use the V-8 engine. They want to figure out just how many models a particular ECU will work for. Once the target model is set, the next task is for the engineers at AEM to completely dissect and decipher the factory wire harness and control strategy. It was important for all of the factory equipment function as normal, and all emissions equipment be left intact and operational. This meant that