A Simple MAF/MAP Enhancer

For some time now, we have been asked by our customers to produce a MAP/MAF enhancer. I have promised to do so, and at some point we will. But it has always been a low priority here for us because its so easy and so cheap for a person to produce their own. And don't think that it won't be "good enough". This little design, while quite simple, will do the job nicely. Please note that there is another design for a MAF/MAP enhancer in the article "Tuning For Mileage", also found on my Documents page. That is a different design, so don't be confused. They both work. This one is simpler.

The first sensors that need to be addressed are the oxygen sensors. The oxygen sensor(s) are the primary sensors that the computer uses to determine the air/fuel mixture. If you're unfamiliar with the theory of how increases in fuel combustion efficiency relate to the need to do sensor modifications.

This circuit will work with any MAF (Mass Air Flow) sensor or MAP (Manifold Absolute Pressure) sensor that signals the computer with a voltage. This includes almost all vehicles today. Most vehicles have a MAF ***or*** a MAP sensor, but not both. In these cases you will treat the sensor you have. Some vehicles have both a MAP and a MAF sensor. In these cases you are best off treating the MAF sensor alone. You ***can*** treat both, but you will likely reach your goal by just treating the MAF. Also note, that some vehicles that have both types of sensor respond better treating the MAP, so if your vehicle has both sensor types, this may require a bit of trial and error.

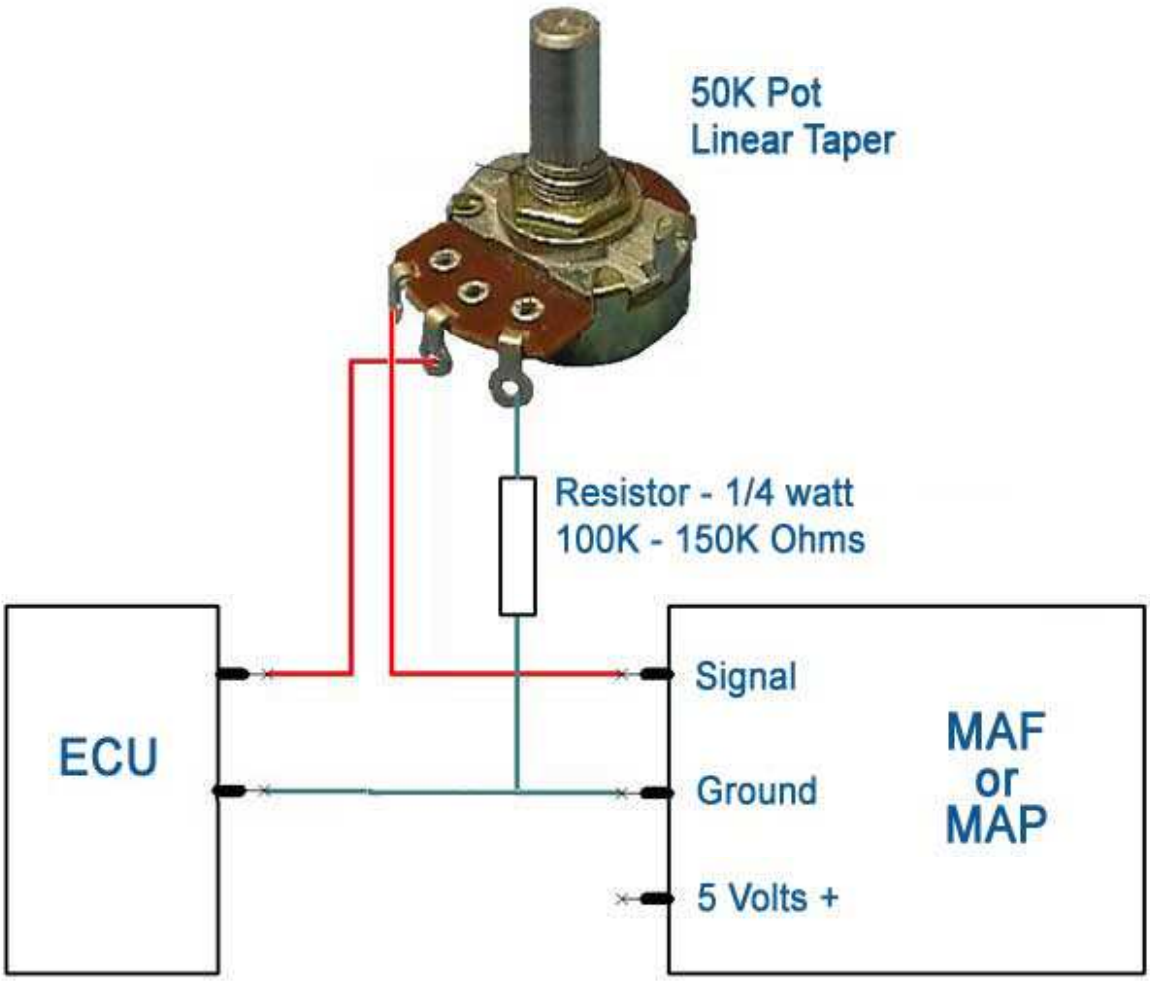
Note: Many Fords (and others) use a MAP sensor that signals the computer using a varying frequency signal, rather than a simple voltage. Other manufacturers use frequency based MAF sensors. This circuit will not work with a frequency based signal. However, most Fords that have a frequency type MAP sensor also have a MAF sensor, and the MAF sensors are usually voltage based. So in this case, just treat the MAF sensor and leave the MAP alone. We are currently prototyping a frequency based MAP/MAF enhancer and will soon have it for you in our store. But most of the time, you should be able to use this circuit to treat your MAF or MAP.

Many MAF sensors today also include an Intake Air Temperature sensor in the same housing. In this case you'll have 5 or 6 wires going to the sensor. But it's OK, it's easy to find the correct wires you need. The easiest way, of course is to have a wiring diagram for your vehicle. You can often find these in a Haynes manual. Also, you can sometimes get your wiring diagram at AutoZone. See this post for details.

However, if you have to test for the correct wire, it's easy to do. You are looking for 2 wires that you need to attach your circuit to: the signal wire and ground. Ground is found by finding the wire that has a few ohms or less resistance between the wire and the negative battery terminal. If you are unable to find the sensor's ground, then you may use any good ground that you can find, even the vehicle's body. To find the signal wire, the engine must be running. Then rev the engine while testing the voltage of each wire. The signal wire will change noticeably in voltage when you rev the engine.

Tip: You can steal a straight pin from your wife's sewing box and push it through the insulation of the wire you want to test. Make sure you get into the conductor (wire) inside. This will be much easier than scraping away the insulation to test the wire.
If you find your signal wire using a diagram, you should still test it before proceeding. You must make sure that you see a voltage increase when you rev the engine, and that the voltage drops back down when the engine slows back down again. If you see this phenomena, you can proceed to install this circuit. If you don't see this phenomena, then you have the wrong wire, or an incompatible sensor type. Do not try to use this circuit unless you find a signal wire that matches this phenomena. Note that sometimes the wiring diagrams are wrong, and you need to test the wires yourself to find the right wire. There's only 2 parts. Here's some Radio Shack part numbers that you can use:

Pot: 50K Linear Taper Potentiometer, Radio Shack #271-1716
Resistor: 100K Ohm Resistor, Radio Shack #271-1347 or #271-1131
Note: On some vehicles, this combination of pot and resistor can be too sensitive, such that very tiny movements on the pot make large changes in air/fuel ratio. You can make the pot less sensitive by using a 200K resistor or even a 400K resistor. The 400K resistor will make the pot 1/4 as sensitive. You may also find that you can only find a 100K pot. Regardless of the pot value you use, use a resistor of about twice that value with it. And if it's too sensitive use a larger resistor. Or lets say you can find a 10K pot. Well use that with a 20K resistor. And if that's too sensitive, double it to make the pot half as sensitive. The resistor values don't have to be exact either. If you can't find 100K resistor, use a 120K or 90K. These values aren't particularly special. I wouldn't use less than about 5K on the pot, and the resistor should be 2X to 4X the value of the pot.



Note: The MAF is often combined with an Intake Air Temperature sensor so may have more wires than shown here. The 5 Volt wire is not shown in the diagram because we don't do anything with it. But it is left in place. Do not cut it. Find the signal wire by revving the engine and finding the terminal that changes voltage.

Cut the signal wire and connect the sensor side of the cut to one of the outside pot terminals. Connect the pot's center terminal to the computer side of the cut. See the diagram.

Note: If you have a preference for which way the pot turns when you are leaning the

air/fuel mix, then you'll need to select which outside terminal to use by doing the following: Turn the pot all the way (until it stops) in the direction you want to be the **least** effect. In other words, if you want to turn the pot clockwise to make the mix leaner, then turn the pot counter-clockwise all the way. Now measure the resistance between the center terminal and the 2 outside terminals one at a time. One of these outside terminals will show no resistance to the center terminal. That will be the terminal you want to use on the signal wire.

The other outside terminal connects to ground, via the resistor. I recommend you use the ground that the sensor is using as per the diagram. You don't cut the ground wire. It must stay connected to the ECU. Instead, you'll tap into that circuit, as per the diagram. That's all there is to it. To set the pot, first turn the pot all way towards least effect. There will be almost no resistance between the ECU and the sensor on the signal wire. This is the stock setting, with no change in the sensor's signal. Then start your car. You can now gradually turn the pot and you will eventually notice that the idle runs slower and eventually rougher. Back off on the pot until the engine is running smooth again. Also test the car on the road and make sure you're not losing power. If you are, then you need to back off the pot some more until these symptoms disappear.

Note: You'll probably want a way to turn off your new MAP enhancer. You can just use a simple switch or a relay that short circuits the pot on the signal wire. In other words to turn this enhancer off, you just need to make a direct connection between the signal wire and the computer. In this way, you can rig up a relay to only turn on your MAP/MAF enhancer when your HHO system is running.