The Electronic Fuel Injection
Enhancer (EFIE, pronounced
Ee-Fy) (t) is not a fuel saver, in and
of itself. Yet, it is likely the greatest
enhancement to be invented for fuel
savers in recent history. The EFIE
allows fuel savers like hydrogen to work on Fuel
Injected engines.

Most modern fuel systems use an oxygen sensor to tell th computer the air: fuel ratio of the engine.

Believe it or not, the design of oxygen Sensor feedback actually prevents Efficient combustion!

Increasing the combustion efficiency
Of an engine increases the exhaust
Oxygen percentage because:
The engine uses less fuel for the
Same volume of air;
More oxygen is free because the
Engine produces less carbon
Monoxide and;
Less oxides of nitrogen form.
The increased oxygen content in the
Exhaust is 'read' by the computer to
Be a (Lean mixture in the engine.
The computer then adds extra fuel to
Bring the fuel injection back to 'normal'.
Solving this problem requires the EFIEdevice, this electronic
circuit that can be
Completely built with parts from a
Neighborhood electronic parts store or internet electronics parts
store,.

The EFIE allows you to add a
'Floating (Voltage offset', in series
With the oxygen sensor, so the fuel
Computer thinks the mixture is richer
Than it really is. That way, you can
Compensate for increased exhaust
Oxygen caused by increased
Combustion efficiency.
Applying the EFIE, is like adding a
Little battery in-series with the oxygen
Sensor. This 'battery' is powered by
The vehicle. Therefore, it will never
Fade or go dead. It is completely
Adjustable to a few millivolts for
Optimal custom tuning.
The result: your vehicle's computer is
Entirely unaware that the oxygen
Content of the exhaust has increased.
The EFIE is designed to work with any o2 sensor with 4 wires or less, not the 5 wire type
The EFIE will not void any vehicle
warrantee.
It is against federal law for any
vehicle manufacturer to void the
warrantee simply because the
customer installed any kind of aftermarket
device.
Further, if the vehicle has problems
and the vehicle manufacturer (or
representative) wants to blame the
after-market device, the onus is on
the vehicle manufacturer to prove that
the after-market device caused the

problem in the first place
Of course, the vehicle manufacturer's warrantee does not cover the aftermarket device or the EFIE

Control the Computer By Knowing How It Thinks,

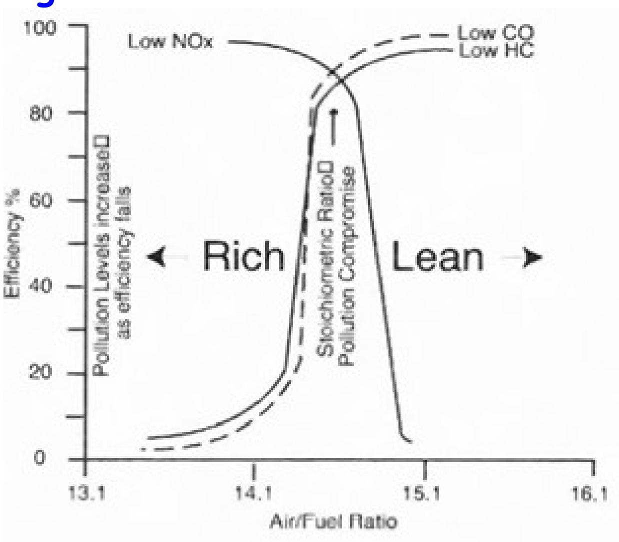
The computer is designed by the factory to assume that a certain readout of the oxygen sensor **(.5** volt or 500 millivolts) means the engine has a correct air: fuel mixture. The factory setting is correct, as long as the engine is totally OEM.
Oxygen sensors generate a voltage signal due to the difference of oxygen on the inside and outside of the exhaust pipe. We've seen oxygen sensors go up to 1.9VDC and as low as -2VDC. They are calibrated to suppose that O.5VDC is equal to the **14.7:l** air: fuel ratio.
The oxygen sensor does not tell the computer the actual air: fuel ratio. The computer infers the air: fuel ratio

based on it's set internal parameters and the oxygen sensor reading.
Burning the fuel more efficiently, causes the oxygen content in the exhaust to rise an average of 2%. This is the oxygen that didn't form carbon monoxide and oxides of nitrogen. The carbon dioxide goes up a bit and the hydrocarbons drop

off by at least half.
The electronic feedback fuel injection computer can't imagine that a higher oxygen content is possible with complete combustion. It figures the fuel mixture is lean and signals the injectors to richen the mixture in order to bring the oxygen content back in range
Oxygen sensors are very accurate in a very limited range. They must also be heated to at least 600" F to read accurately. Temperatures under 700" F will cause the sensor to carbon up quickly.
Exhaust temperatures, at idle, tend to be lower than 600" F, so oxygen sensor readouts can't be trusted. You may have to shut down your hydrogen device at idle. Alternatively, you can buy a heated (three wire) oxygen sensor. We've had extremely good results with heated oxygen sensors.
The 14.7:l air: fuel ratio that is considered ideal is really a pollution compromise. Don't be fooled, it is not the most efficient burn ratio. It just hovers on flooding to prevent the mixture from heating up. Heat is very important here, because it is heat that creates the Oxides of Nitrogen (iNOx). Oxides of Nitrogen are created anytime you heat air over

2100" F. So if you control the heat, you reduce the oxides of nitrogen. 14.7:l is the best pollution compromise using liquid fuel technology.

Fig. 2



However, when you add a fuel saver, the combustion characteristics are changed, so you have to adjust the oxygen sensor output signal.
Vapor technology and water injection are superior options for reducing heat.
Water injection will help prevent carbon buildup in your engine and promote better combustion. But, because it also adds extra oxygen in the exhaust, water injection will fool an oxygen sensor into thinking that the fuel ratio is leaner than it actually is. You need to install an EFIE to correct for the extra oxygen when you

add water injection.
The chart shows the typical reasoning for the 14.7:l air1liquid:fuel ratio. When burning vapors, much leaner mixtures can be burned, with reduced NOx production for two reasons:

1. The burn time is much shorter, which limits the time that NOx has to form.
2. You can reduce the flame temperature by reducing the amount of fuel. If the combustion has barely enough fuel to burn, it will be cool.

Another way to reduce temperature is to add water injection. Conventional technology shows that fuel will easily burn in air: fuel ratios as lean as **26:l.**

The EFIE's function is to correct the oxygen sensor's output to match the corresponding increase in efficiency caused by the combustion improvement. With the EFIE, the computer won'tfisht the fuel saver by adding extra fuel.

Applying the EFIE ***by*** *itself is not recommended. The EFIE should always be applied in addition to a combustion enhancement device or method.*

Use of the EFIE without combustion enhancement could result it an

1 *overly lean mixture, increasing pollution and decreasing the life of the engine.*

GETTING PARTS >

All of the parts in the EFIE device are available in most electronic outlets. They will also carry the necessary circuit boards, box, wire connectors, chip sockets, solder, wire, etc. To acquire the parts, simply take the schematic (Fig. **3)** into your Radio Shack, for example, and purchase the components.

The only component not readily available at Radio Shack (in particular) is the 200K (Twenty-turn circuit-board-mounted trimmer potentiometer. These are available from nearly any electronics supplier *(see Re.sourrr.s),* usually for under $5.00. Radio Shack does sell twenty turn board mounted trimmers, but only to about 15K. You could set up a series of trimmers, to do the job. Knowledgeable people may wish to purchase 'component packs' of assorted transformers, capacitors and resistors. The range of values in these packs allows for experimentation of the circuit for Your vehicle's needs.

BEFORE YOU BUILD -'I

Purchase an experimenter's board to

pre-assemble and test your circuit before you Hard wire the components onto a circuit board. It is nearly impossible for your individual circuit to work correctly without some tuning. There are too many tiny variables in the circuit components. The modest expense of an experimenter's board saves hours of hassle and mess that de-soldering and re-soldering causes. Tune the circuit, then hard wire it to a circuit board.

After you've tuned your circuit on the experimenter's board, take extra special care in assembling it onto your circuit board. Remember, all the components have to fit into your circuit box. A neatly done circuit is more likely to work well.

Fasten the circuit into it's box using a hot glue gun. This allows for greater freedom of action during assembly and assures that the electronics will be secure.

BUILDING THE EFIE

Always tie a knot in the output wires, on the inside of the circuit box, to prevent any stress on the wires which could detach the wires from the circuit board.

Use a chip socket when soldering a

circuit together. This assures that the chip doesn't overheat and makes for quick replacement of faulty chips.
The challenges involved in building an O2 sensor-corrector (EFIE) are tricky ones. You need to be able to vary voltage in such a way that you can ad-just it by millivolts. Yet, you have to work within the capabilities of the vehicle electrical system and the characteristics of O2 sensors. Further, the device ***must not*** be able to harm any vehicle computer.
In particular, tuning your transformer (T1 - Fig. 3) is the most critical design parameter.
In all three transformer options, the actual circuit remains identical. To tune the transformer you will vary only C1, R4, and R5. Therefore, you can assume that all the other components are as described and are wired as per the circuit diagram

Choose one of the following transformer options.

Option 1: Manufactured Transformer

Consider buying a transformer from Rhombus Industries Inc.

We used a T50110 Cfor TI). This is a circuit-board-mounted, general purpose, low cost 1:I transformer.

We tuned this transformer with
CI=8.7 *dnF; R4 = 7.9 K ohm;*
R5 = 100 Kohm.

Option 2: Build Your Own T1

Simply wind two 30-gauge varnish coated magnet wires together and onto a plastic sewing bobbin, to make your own 1 : 1 transformer. Be sure to bum and scrape the insulation off the wire ends before soldering them.

Varnish-coated magnet wire can be bought new or salvaged from a solenoid coil.

We stretched out two 30 foot lengths on the floor and wound them together on the plastic sewing bobbin. This coil came to 3.6 Ohm and .46 (LmH for both primary and secondary.

Vary values of CI , R4 and R5 'ti1 you get 500 **dmV** across BR.

We tuned Option 2 transformer with
CI= 0.61 nF; R4 = 107 K ohm;
R5 = 382 K ohm.

Option 3: Tuning Any Transformer

We tuned Option 3 transformer with
CI= *0.61 nF; R4 = 118 K ohm;*
R5 = 1 K ohm.

Chances are you won't be able to obtain the exact transformer used in Option 3. Your coil can be nearly anything. Adjust the circuit capacitors and resistances to get the result you desire. The Option 3 example TI is a very small I: I transformer (from a salvage catalog) with 40 ohms resistance and .3 1 Henrys inductive reactance on the primary and 34.7 ohms resistance and .33 Henrys inductive reactance on the secondary.

When you are connecting your transformer, it does matter which secondary wires are used to run your bridge rectifier. Change the secondary leads around, on your test board, to get the highest voltage across C3.

We used a 'floating' capacitor (C3) to add 1-olmge in series with the o2 *sensor signal.*

As you increase the resistance of R6, the voltage across C3 rises (by millivolts and the C3 voltage is added to the voltage of the o2 sensor, as read by the computer.

This is a true 'voltage ofset'and will remain exact regardless of the oxygen sensor voltage. Exnnzple EFIE offset at 200 milli~~olwtsil l cause an o.rygen sensor readout of 500 millivolts to read 700 millivolts to the computer uncl an oxygen sensor readout of 100 r millivolts to read 300 r millivolts to the computer.

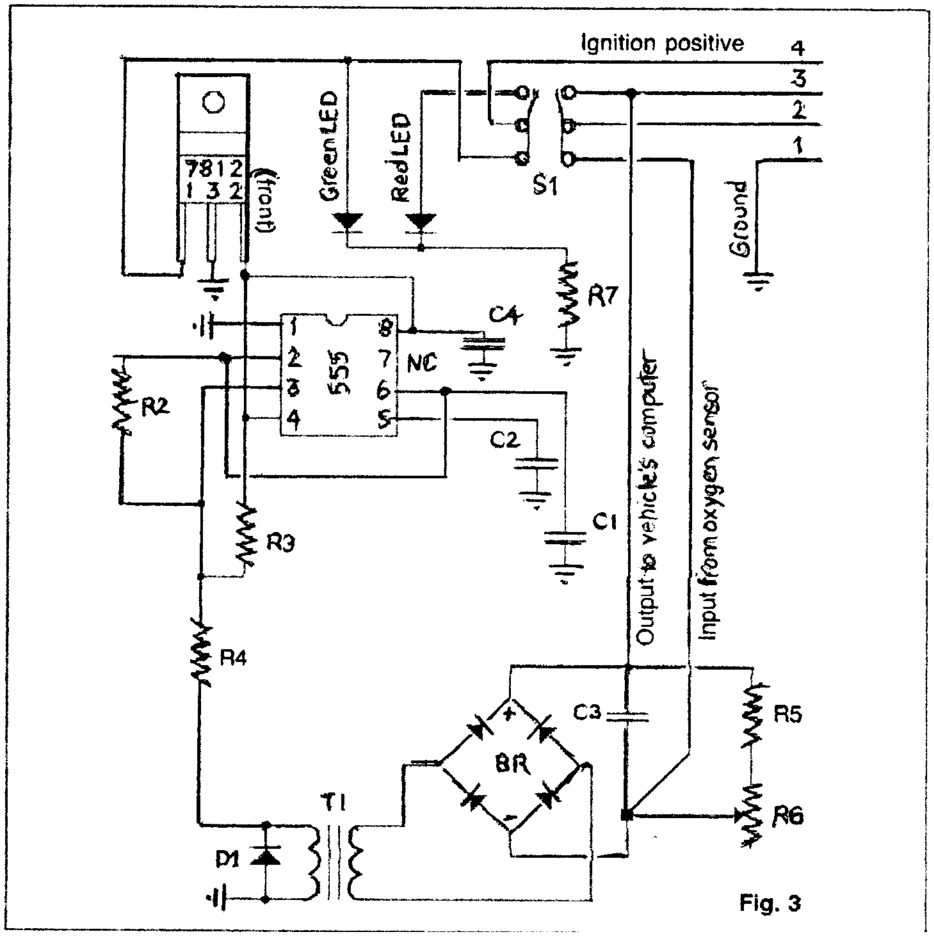
Variable Design Components:

(depending on transformer option)
C1, R4, R5
Option 1
C1 = 8.7 nF
R4 = 7.9 K ohm
R5 = 100 K ohm
Option 2
C1 = 0.61 nF
R4 = 107 Kohm
R5 = 382 K ohm
Option 3
C1 = 0.61 nF
R4 = 118 K ohm
R5=1 Kohm
Fixed Design Components:
(all transformer options)
BR = 1 amp @ 200 volts
C2 = 8.8 nF
C3 = 200 - 500 ~ u@F 35 VDC
C4 = 0.047 UF to 20 UF
Dl = 1 amp @ 200 volt diode
R2 = 15 Kohm
R3 = 1 K ohm
R6 = 20 turn 200 K pot.
R7 = 500 ohm resistor

We use simple inexpensive circuit board-mounted potentiometers for R6. *These require **a small** screwdriver for adjustment.* Once set, you won't have people spinning the knob. Going past the twenty turns on this potentiometer (pot.) will

simply cause the adjustment screw to slip. As far as we are aware, no damage will be caused.
Connect the leads to R6 in such a way that when the pot. is turned all the way to the left (counterclockwise), the pot. is 0 ohms
between the center pin and the pin that you connect to R5. *Circuit*
and be sure the circuit is grounded (to wire **1).**
Frequency control is very important to tune TI. You may need a higher or lower frequency to tune your 555 to your transformer. You will know when your 555 is best tuned to your transformer by monitoring secondary output of the TI with a volt-meter. The highest voltage indicates the best tuned. Be careful not to push the high frequency limits of your 555. Some of them don't like to go above 500 KHz.
Sizing C1 upward (more capacitance)
. Increasing the resistance of R2 decreases the frequency of the 555.

The R4 controls both the amperage output of the 555 and how much that
. amperage affects TI. By having a



voltage drop across R4, there is less voltage to apply to T 1 and the inductive reactance is less. R4 limits the current from the **555** to a value that allows the **555** to activate T 1 without any other electronic components. You'll need to adjust R4 to get optimum performance. Try to keep the value of R4 high, to minimize current flow. This keeps the **555** chip cool. *If your TI has a high resistance and/or inductive reactance, you may not need as high a value for R4.*

Adjust R4 by experimenting with various sized resistors or by installing a variable resistor, 'ti1 you get the highest readout (millivolts) across the **C3**. If the millivolts is too low (< **350** millivolts), then size R4 to less resistance. If the millivolts is too high (> **500** millivolts), then size R4 for more resistance. Once you've adjusted R4 for adequate voltage across **C3**, your internal circuit board adjustments are finished. *Use a fixed resistor.for R4 in the finished EFIE. Unless you have a faulty oxygen sensor, you should not require more than 500 millivolts output of the EFIE. This is the limit of the oxygen sensor's input to the fuel computer. The fuel computer can't adjust any more - .*

Marking R (rich) and L (lean) indications on the EFIE box are handy for adjustment of R6. The indications should show the direction to adjust R6 so that the EFIE voltage lowers (richer mixture) and rises (leaner mixture) respectively. *We use clockwise toward lean.*

S 1 (Switch I , (LDPDT), Green and Red (LLED diodes and R7 **(500** ohm resistor) are optional. R7 is needed if using either LED; R7 is ***not*** needed if

you choose not to have any LEDs.
S **1** allows you to shut off the EFIE, without losing your R6 adjustment setting

Wire Color Code

#I = Black,

#2 = Green,

#3 = White,

#4 = Red.

The 7812 voltage regulator, in a TO-220 AB case, is included to keep the voltage to the **555** chip steady. Vehicle operating voltage usually fluctuates a bit. If the voltage fluctuates to the **555,** the voltage on ***C3*** will change. You want ***C3*** to have a steady (within **5** millivolts of the set-point) voltage.
The 8 pin **555** timer chip is set up as a high frequency (Lastable multivibrator with a **50%** duty cycle. The high frequency allows very stable voltage control to ***C3,*** by applying the voltage in very quick pulses to the primary coil of TI.

(**INSTALLING THE EFIE**)

The EFIE is spliced into the wire leading from the oxygen sensor to the vehicle :s computer. This allows the EFIE to modify the voltage signal coming from the oxygen sensor, *before the signal reaches the computer*

Step **#1**

Connect the **Black** (wire #1) from the EFIE to vehicle ground (negative). Make sure to ground the EFIE to the vehicle very well.

Step **#2**

Use an ignition-switched power source for the positive input to the EFIE (Wire #4, Red), so that the EFIE will shut off when you shut off the key. *The fuse box normally has spare terminals for this sort of thing. Or you can tap into power relay power wire that shiits off when the key shuts off, such as the radio power*

Step 3

Connect wire number 3 (white) from Efie To the wire leading to the vehicles computer.

Step **#4**

Connect Wire #2 (Green) from the EFIE to the wire leading from the oxygen sensor.

*Wires #2 and **#3** are routed to the oxygen sensor output wire, down near the oxygen sensor itself. There is usually a plug connector in the wire near the oxygen sensor.* If the oxygen sensor has just one wire, you can splice the EFIE wires into the plug connector. If the oxygen sensor has more that one wire, cut the appropriate wire on the vehicle side of the connector. The wires coming from the oxygen sensor are special high - temperature wires that are difficult to solder. *Assure yourself of a water-tight connection. Keep wires away from the exhaust pipe's heat. Some oqgen sensors have more than one wire. Extra wires could be exhaust ground or oxygen sensor heating wires. Your vehicle dealership should he able to tell YOU which wire is the correct one. You can always tell the oxygen sensor output wire because it will have no electrical continuity to the vehicles ,Ground, power (positive) or the exhaust pipe. In other words, testing with an ohm-meter will show infinite resistance when connected between the oxygen sensor outpiit and the metal body of the oxygen sensor and any other wire on the oqgen sensor*

Installation lips

Install the EFIE box under the dash in an assessable place. That way you can flip the switch and fine tune the adjustments as you drive. Dash mounting (or under dash) allows the EFIE electronics to be warm and dry. If mounting the EFIE under the hood, make sure to weather-proof it well. Connect the EFIE wires to the car with a plug connector so that the unit can then be easily removed for repair or reinstallation in another vehicle. Attach the EFIE box to your chosen surface with Velcro. Attach the Velcro with contact cement or glue. Alternatively, you can attach the EFIE to your vehicle with wire ties. Don't use crimp connections. Solder the connectors to the wires to prevent loose or corroded connections. Seal with shrink-wrap or silicone.

More than one ***O2*** sensor: adjust them all to the same voltage at first - then experiment with changing individual voltages.

Vehicles with more than one oxygen sensor need an EFIE on each oxygen sensor.

Operating Characteristics of the EFIE Circuit

Due to the large capacitance installed in the EFIE (C3). it takes five to ten minutes for the unit to stabilize at any new setting. This occurs every time the EFIE is turned on or adjusted.

The EFTE capacitor (C3) quickly drains while the EFIE is turned off and will require a few minutes to come back to full voltage when the EFIE is turned back on. This soft start feature allows the vehicle's computer to adjust slowly to the increasing voltage signal.
TI secondary allows C3 to float. in relation to the vehicle's ground

reference, because of the isolation effect of transformers.
TI allows C3 to act as an adjustable voltage 'battery' in series with the **O2** sensor. By adjusting R6, we adjust the discharge rate of C3. This adjusts the voltage because the input electricity to C3 is fixed. The voltage is usually controlled to plus or minus two millivolt (0.002 volt).
+ Be sure to apply DI across the TI primary as shown, or the coil inductive kickback will reach > 100 volts. It could burn out the electronics. This diode wheels the coil's inductive kickback into the coil.
Zero ohms on R6 will not cause the voltage of C3 to go to zero because of the series resistance of R5.
Voltage of C3 is the actual voltage offset. A **fixed** amount of energy is

added to C3 by the EFIE circuit.
This makes it simple to control the actual voltage of C3 by 'draining' the current through R5 and R6.
If you drain the current from C3 faster than the current is brought in from the EFIE, the voltage of C3 will drop. Decreasing resistance of R6 will cause C3 to stabilize at a lower voltage.
R6 and R5 control how fast the current drains. Using a twenty turn pot for R6 allows fine tuning of the EFIE output by accurately controlling how fast C3 will drain.
Because the vehicle's ignition voltage is higher when the engine is running, all EFIE adjustments should be made while the engine is running.
alternatly, you can bench test it with a DC power supply set at 13.5 volts and < 14.5 volts. The alternator voltage is greater than the battery voltage.

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And due to the voltage drop across the voltage regulator, the EFIE is somewhat voltage sensitive.
If the ERE is shut off, by switching off **S1,** then the vehicle's oxygen sensor system operates normally.
Remember that use of a volt-meter between the oxygen sensor input (green wire # 2) and the output to the

computer (white wire #3) will cause a variance in the actual output. Output will rise by a few millivolts when the volt-meter is removed, because the volt-meter is actual load, taking a bit of power to operate.

A lower voltage on C3 causes the vehicle's cornputer to richen toward normal and a higher voltage on C3 will cause the velzicle's computer to lean.

Remember, you ore not really leaning the air vapor mixture if you are using combustion enhancement devices.

Your are simply putting in less fuel to get the same exhaust vapors.

If you monitor the o2s sensor voltage and your C3 voltage, you will note that the cornputer will try to keep the total voltage at 500 millivolts (when the vehicle is warm and not idling).

If you get too high an exhaust temperature or your vehicle **S** *performance drops, richen the mixture by reducing C3 voltage.*

Use a volt-meter across wires #2 and #3 to get an idea of what voltage offset you are applying. Connecting the volt-meter from wire #2 to ground (wire #1) will show actual **o2** sensor output. And connecting the volt-meter from wire **#3** to ground (wire # I) will show the combined voltages of the **o2** sensor and the EFIE

Operating the EFIE While Driving

Switching the EFIE off (red light), instantly disconnects the ignition power from the EFIE circuit and instantly connects the oxygen sensor output directly to the vehicle's fuel control computer. There is no delay time, the computer is instantly getting direct true oxygen sensor input. This feature has been added in case you want to switch the EFIE off for tweaking or because you want to test vehicle response on vehicle-computer-tester and pollution machines.

The EFIE is designed to be fully automatic. Once it has been adjusted no further tweaking is needed, unless something changes. Changes include but are not limited to: engine tune-up, adding-or subtracting combustion enhancement devices, etc.

The ONLY thing turned on when the EFIE is **off** is the red light, which simply indicates the switch position at a glance. If neither the green or red light is on, then the ignition power to the EFIE has been disconnected; there is a malfiinction in the EFTE unit; or you have a miswire.

Switching the EFIE on (green light), connects the ignition power to the EFIE circuit and runs the oxygen sensor output through the EFIE for voltage enhancement.

For adjustment of R6 (voltage offset), start with R6 in the rich position, which is the lowest voltage offset. Warm up the engine and drive. Slowly adjust R6 to get your best economy with the least pollution. Adjustments are best done while driving but for safety's sake, use a friend to actually do the adjustments or pull over to make each change. Fine tuning adjustment of R6 should be carried out over days of vehicle service. Many vehicle computers equipped with O2 sensors 'learn' as they go. So you have to allow the computer to get used to your adjustment before you know what the actual effect has been. We can't tell you what the best voltage offset will be in your application. This is success by trial on your part. However, we can give you some ball-park figures to work with: With effective combustion enhancement devices, you should be able to offset at least 300 millivolts and you'll likely be somewhere

between 450 and 500 millivolts.
If your 'check engine' light comes on, then you've applied too much voltage offset and the computer can't adjust the fuel injector output any more.

It is easy to determine your air: fuel ratio while traveling
5 down the road by using an oxygen sensor and a (high impedance) voltmeter. Put the positive lead of the voltmeter to the oxygen sensor signal and ground the negative. Read the millivolts and

Use the EFIE only after some sort of combustion enhancement device or method has been added to the vehicle.
Vehicles with more than one oxygen sensor need an EFIE on each oxygen sensor.
Your actual mileage gains will depend on the capability hydrogen generators that you apply to your vehicle(s).

PARTS LIST

I x #555 8-pin timer chip #276- 17 18
I x 8-pin chip socket (for a #555) #276- 1995
1 x 78 12 voltage regulator in a TO-220 AB

case (Future Electronics)
1 x 20-turn (200k ohm) potentiometer
1 amp diode. #276- 1 103
4 pin connector, #274-8002
Box, #270- 180 10 (for EFIE circuit)
Bridge Rectifier, #276- 1 16 1 or #276- 1 152
- I amp at 200 volts
CI Capacitor, (for C3), 470 mfd @ 35V,
#272- 10 18
Capacitor Pak, #272-80 1
Circuit board,# 276- 159
Glue Sticks (glue gun)
1 green LED, #276-022
1 red LED, #276-04 1
Resistor Pak
roll of solder
Switch 1 , DPDT, #275-663
Wire, #278-50X (circuit assembly)
Wire, #278- 1304 (ERE leads)
T Options
These conzponents are bused on tran.~fornlar options.
T50110 (Option I , Rhombus Industries)
CI Magnet wire, #278- 1345 (for making a transformer - Option 2)
Plastic Sewing Bobbin (Option 2)
Induction Pak, #273- 160 1 (Option 3)

GLOSSARY
Words that are preceded by (L *are defined here.*
02 = oxygen
astable = repeats itself
CET = Combustion Enhancement Technology

DPDT = double pole, double throw switch
hard wire = solder
IC = integrated chip
lean (er) (est) = less fuel or too little fuel
LED = light emitting diode
mH = mill Henry
mV = millivolts
nF = nano-farad
NOx = Oxides of Nitrogen (NOx). Oxides of Nitrogen are created anytime you heat air (which is a mixture of oxygen and nitrogen) over 2 100 degrees F.
OEM = original equipment manufacturer
pin-out = pin numbering system on chip
rich **(en)** (er) = more fuel or too much fuel
ten turn = 10 full revolutions
twenty turn = 20 full revolutions *(greater refinement than a ten turn)*
uF = micro-farad
voltage offset = voltage added to oxygen sensor signal

Tools needed

drill (Dremmel preferred)
Drill Bits 118" and 1/16"
experimenter's board, #276- 175
glue gun
hemostat
high impedance multimeter #22- 174 - measuring at least 0-20 volts DC and 40,000 Ohms - *the ability to read capacitance & inductance is a great asset*

set of small screwdrivers
side cutter
soldering iron
soldering iron stand
wire stripper

Fuel saving is not an exact science. It is an evolving art, requiring time, patience and a commitment to lowering fuel costs.

While every effort is made to ensure clean, efficient, cost-effective methods and reliable information, You the experimenter, must always remember: Countless variables, which we cannot determine, affect any combustion enhancement device or method.

To reap optimum results, from any enhancement, your vehicle must have been maintained in 'good' working order. It is not only unrealistic, but entirely unfair, to expect a mileage enhancer to make up for poorly maintained engines.

Before applying any combustion enhancement method or device, your vehicle must receive a standard tune-up, .including:

ignition system
fuel system
filters

fluids and lubrication
fan belts
brakes . alternator
Get it done at least twice a year.
Only then can you expect mileage gains. Not reaping a fuel efficiency gain is highly unlikely with a reputable fuel saving device or method,