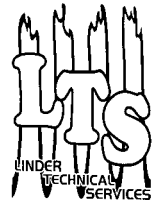


# Networking

Newsletter



## TECH TRAINING

Jim Linder  
The Injector "Guru"

### ARE THE COPS AFTER YOU?



This month's local D.A.T.A. groups were nothing short of exciting! The topic of discussion was Coil On Plug Ignition systems. (COP) I prefer to call them "discussions" in lieu of calling them classes because some of these guys have been attending my classes for almost 20 years. After that long, you end up discussing rather than teaching!

Mac Vandenbrink, the "ignition guru", agreed to come by and hang out for a couple days to help teach some of the classes and also do some research.

COP systems are being taken for granted as they have been very reliable in many cases. COP systems like the ones used on BMW have been around for many years with few problems.

One of the newest systems we discussed was the COP (Coil On Plug) Ion-Sensing system found in on a 1999 Volvo 570. (Yes, some of our students do drive expensive cars) This system uses a single coil per cylinder (5 cylinders) and utilizes the latest Ion-Sensing Interpretation Ignition system. This system uses only a single oxygen sensor (B1S1 behind the cat) for emission verification and uses the Ion gap system for individual *cylinder knock control, cam phase sensing, pre-ignition detection, and misfire/combustion quality/lean limit.*



*(more information on rear cover of this newsletter, and look for a class on this system sometime next year)*

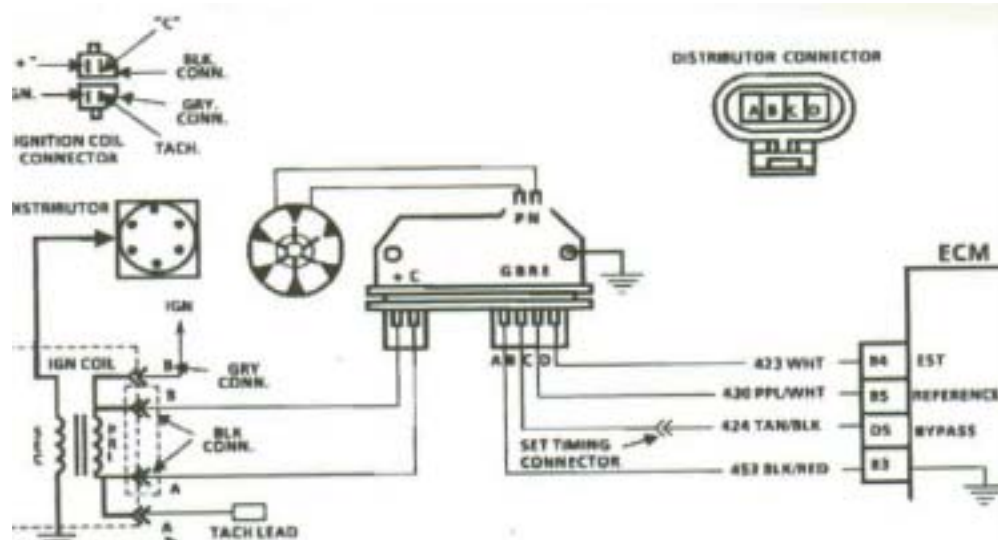
## Analysis from the “Sleuth”, Michele Winn



This month it was a struggle for me to pick a car to focus on and write about. I was lucky enough to have several “interesting” cars come through my bay this month and it’s hard to pick out only one.

1989 Chevy Camaro with a 2.8L engine. The customer’s complaint was the check engine light was on all the time. When the customer called for the appointment, he was quick to let me know that two other shops had already looked at the problem, but didn’t know what was wrong. It had a code 42 (EST by-pass circuit) and both shops had replaced the module and ECM with no luck. Don’t you just hate it when an ECM or a module won’t fix a code 42!

I’m sorry I didn’t take a picture of this car, but I’ll try to describe it to you as best I can. The check engine light came on as I pulled it into the bay. As a matter of habit, I rolled down the (power) window on the driver’s side before I got out. You guessed it, it went down about 3” and the front corner did a nose-dive. I’ll fix that later. Next, I popped the hood, but of course, it didn’t open. After much beating and banging,, I got it unlatched. I knew what would come next, so I grabbed a prop rod before I bothered to raise the hood. It was time to find a wiring diagram, flow chart and do a little homework on how the EST circuit functions. The picture below is a wiring diagram from Alldata.

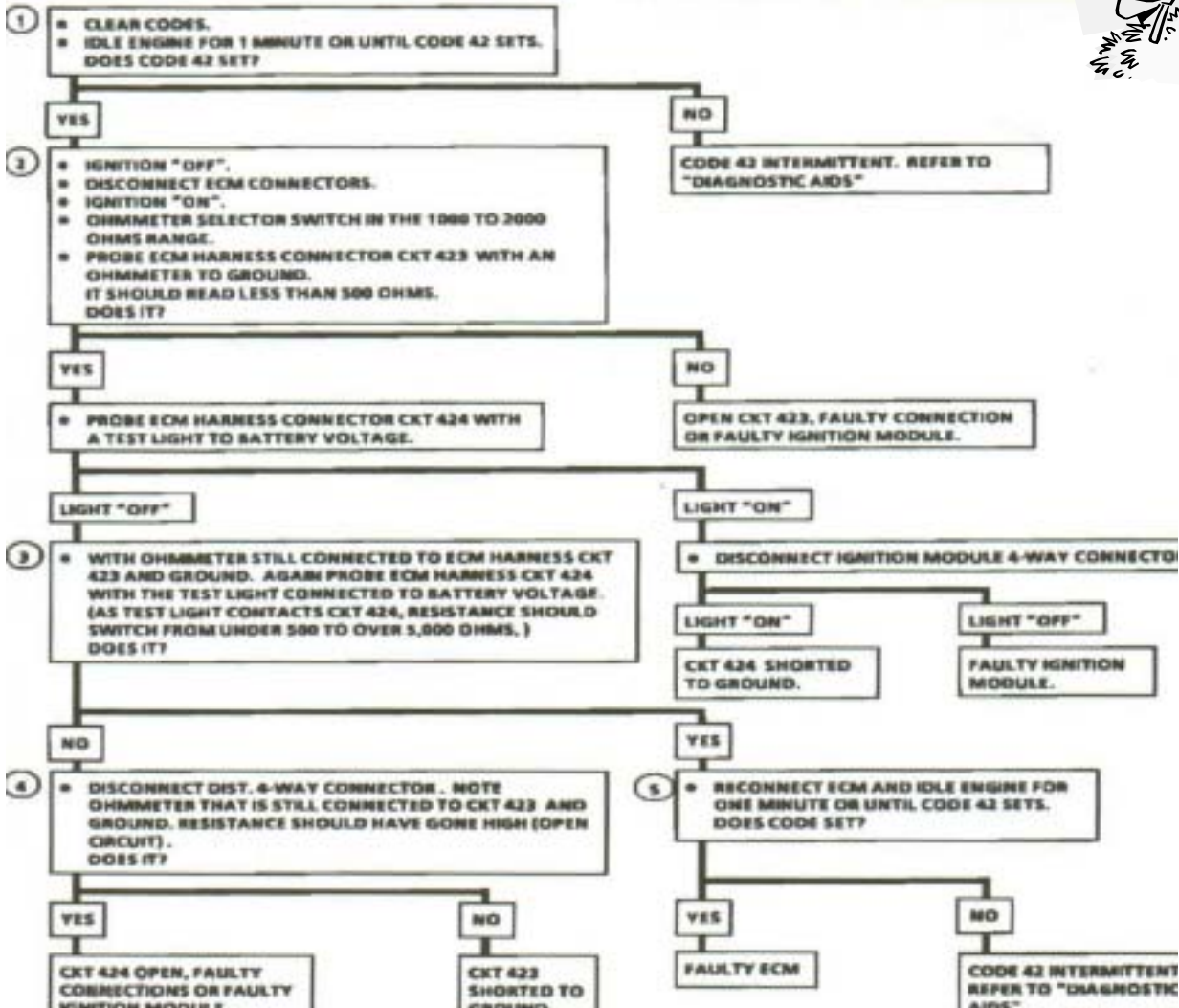


I’d be lying if I said that I found the problem using only the wiring diagram. I also printed out the Code 42 flow chart and started from the beginning. I’ll be the first to admit that sometimes flow charts can get you into trouble, but if you study the chart and try to understand exactly what each step is testing for, I think you will learn a lot about the system and probably even fix the car (in spite of the flow chart). A copy of the flow chart is found on the next page. Let’s take a look and see if we can fix this car.

Step 1 says to clear codes and see if it re-sets. It does.

Step 2 wants us to disconnect the ECM connectors and check the white wire (ckt.423) for a ground path thru the ignition module. The ohmmeter read just over 500 ohms, so no problems there.

# Analysis from the “Sleuth”, (cont.)



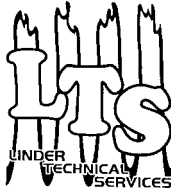
Now, we’re instructed to check the tan/black wire (ckt.424) to make sure it isn’t shorted to ground. It says to check the circuit by using a test light hooked to battery positive. I chose, instead, to use an DVOM with one lead on positive terminal and the other lead probing ckt.424 at the ECM connector. The meter read 1.87 volts, or if I had used a test light, the “light” would have been on. This means that ckt.424 is grounded, either by a defective module or a wire shorted to ground. So, it asks me to disconnect the ignition module 4-way connector and see if the light is still on (or my DVOM still reads battery voltage). Yes, I am still reading close to battery voltage. This eliminates the module as the source of the problem and narrows it down to the tan/black wire being shorted to ground somewhere.

Instead of trying to pinpoint the exact place where the wire was grounded, I simply ran a new wire. I am fairly confident that the problem was somewhere around the place where the passenger’s side front wheel well and door were caved in about 12”. Like I said, I wish I had a picture :)

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## ION-GAP SENSING SPARK CONTROLS

The spark plug can, using signal interpretation, function as sensor for several parameters. Knock intensity and misfire are already implemented in production cars as a basis for virtual engine-doctors. Lambda-sensing and peak pressure position estimation can be used in virtual engine fine tuners. Variations in engine speed together with crank shaft models can be used to conclude misfire by for example lacking torque pulse or to estimate cylinder pressure from derived torque fluctuations. Usage of the spark plug as an integrated actuator and sensor leading to ionization current interpretation is the path taken here.

