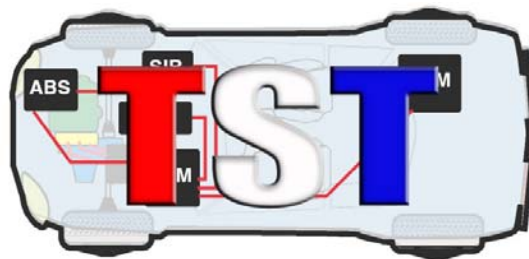


September 2015



Technicians Service Training

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Editor

"G" Jerry Truglia

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"Reprogramming With J2534"

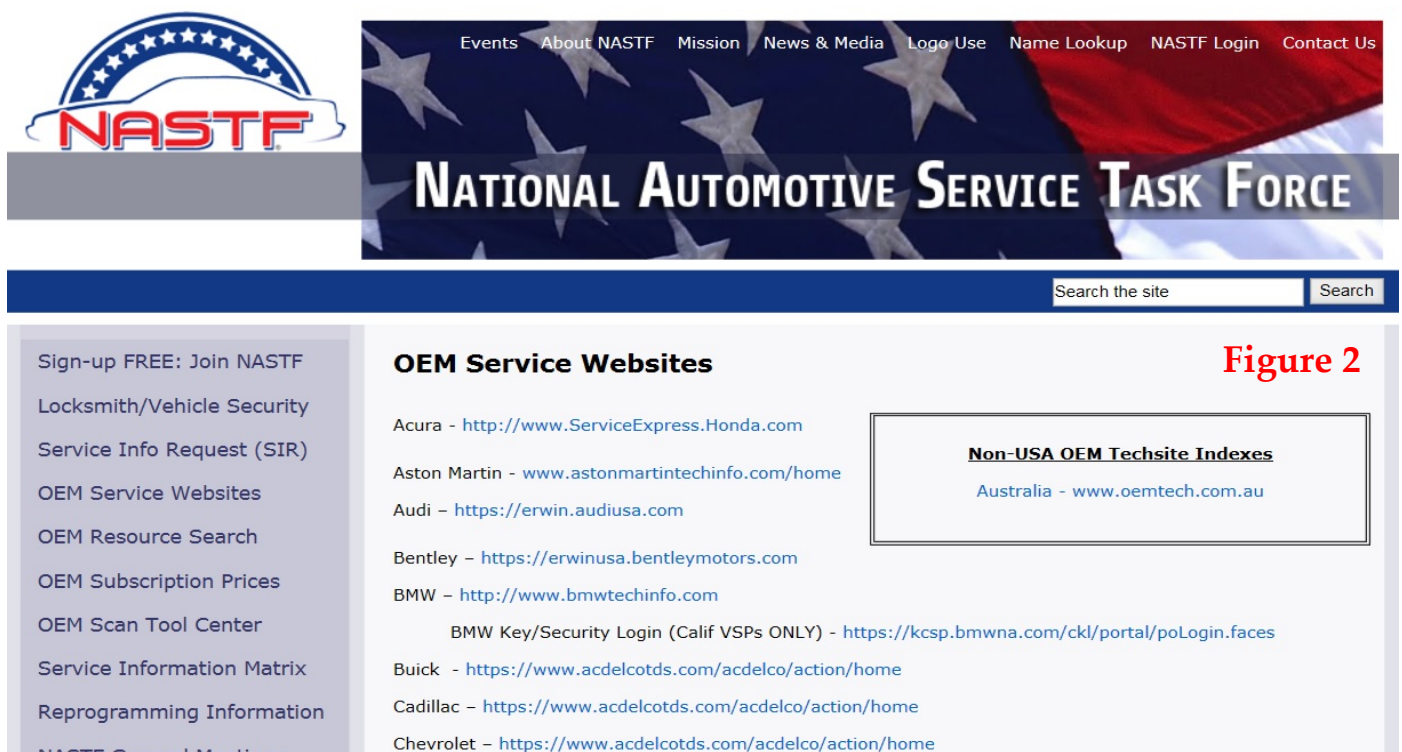
Believe it or not reprogramming is nothing new, in the 80's most likely you worked on GM vehicles and changed a MemCal/PROM (Fig 1) or two. The purpose of the Mem-Cal, PROM and today's reprogramming is to update the ECM/PCM with the most updated information. Since we are concerned with today's software reprogramming we will discuss the generic J2534 unit and how and why to use it. So let's get started. What is J2534? Well here you go, J2534 is the Regulated Standard for installing software in onboard light duty vehicle computers. It sometimes goes by the following names, ECU Reprogramming, Flash Programming, Pass-Thru Programming, Calibration Updating and Software Updates. J2534 was created for aftermarket shops as a means to repair vehicle emissions systems without purchasing the OE scan tools. Pass through reprogramming dumps software downloaded (or CD, old style) to a laptop from the internet to the J2534 tool. The J2534 tool is then connected to the vehicle diagnostic link and the data is transferred to the PCM. Some OEs such as Audi/VW, BMW/Mini, GM, Honda, Jaguar, Land Rover, Toyota, Volvo and VW



(Con't on page 2)

“Reprogramming With J2534” (con’t from p. 1)

use the J2534 interface not only for reprogramming, but they can also be used as the full factory scan tool. As with any software you have to make sure that your laptop meets the requirements for the OE that you are working on. If an aftermarket shop wants to get into the reprogramming business they will need to have the following, a laptop or PC, internet connection, J2534 tool, a subscription to an OE website (or purchase a one or more day access subscription) and a vehicle that needs the update. Remember that not all OEs use the same requirements for software or hardware. Make sure you read their requirements before purchasing anything. A good rule of thumb is to purchase a laptop with Windows 7 Professional, Intel processor (NOT A Celeron), at least 4 GB of RAM, 32 BIT (some require 64 BIT) minimum 2 USB, and wireless connection. The laptop will need Windows Explorer, Acrobat Reader and Java with NO Virus protection. Next you will need access to the OE information, this can be accomplished by going to (Fig 2) www.NASTF.org. Once you’re on that web page select the OE websites tab that is on the left of the page and read the information on programming.



(Con't on page 4)

What is TST?

TST is a group of dedicated technicians and instructors committed to the continuing education of our fellow technicians. We provide training seminars to technicians at a reasonable price. TST brings our members nationally known instructors and state of the art training.

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The following are some of TST's regular instructors:

Bernie Thompson of ATS

John Thornton of Autotrain Inc.

Wayne Colonna of ATSG

Jorge Menchu the "Labscope Guru," AES Wave

John Anello of Auto Tech On Wheels

Mark Warren of World Pac / Motor Magazine

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“Reprogramming With J2534” (con’t from p. 2)

Your next step would be to login and provide all your information, including a password so you can continue to the page where you will select the programming information or scan tool access. After completing the setup you will be able to download the updated data from the OE website to the laptop. Make sure your laptop meets the hardware and software requirements for the manufacturer. This is followed by connecting your J2534 tool to the vehicle DLC (Diagnostic link Connector). Software tools such as Drew Techs Tool Box make sure that the J2534 box (Fig. 3) has the correct firmware and software installed. The Tool Box application also checks the laptop connection to the J2534 box and vehicle along with the ability to check DTCs and provide helpful information and videos. This application takes the guess work out of proper connection of the device and the device to vehicle.

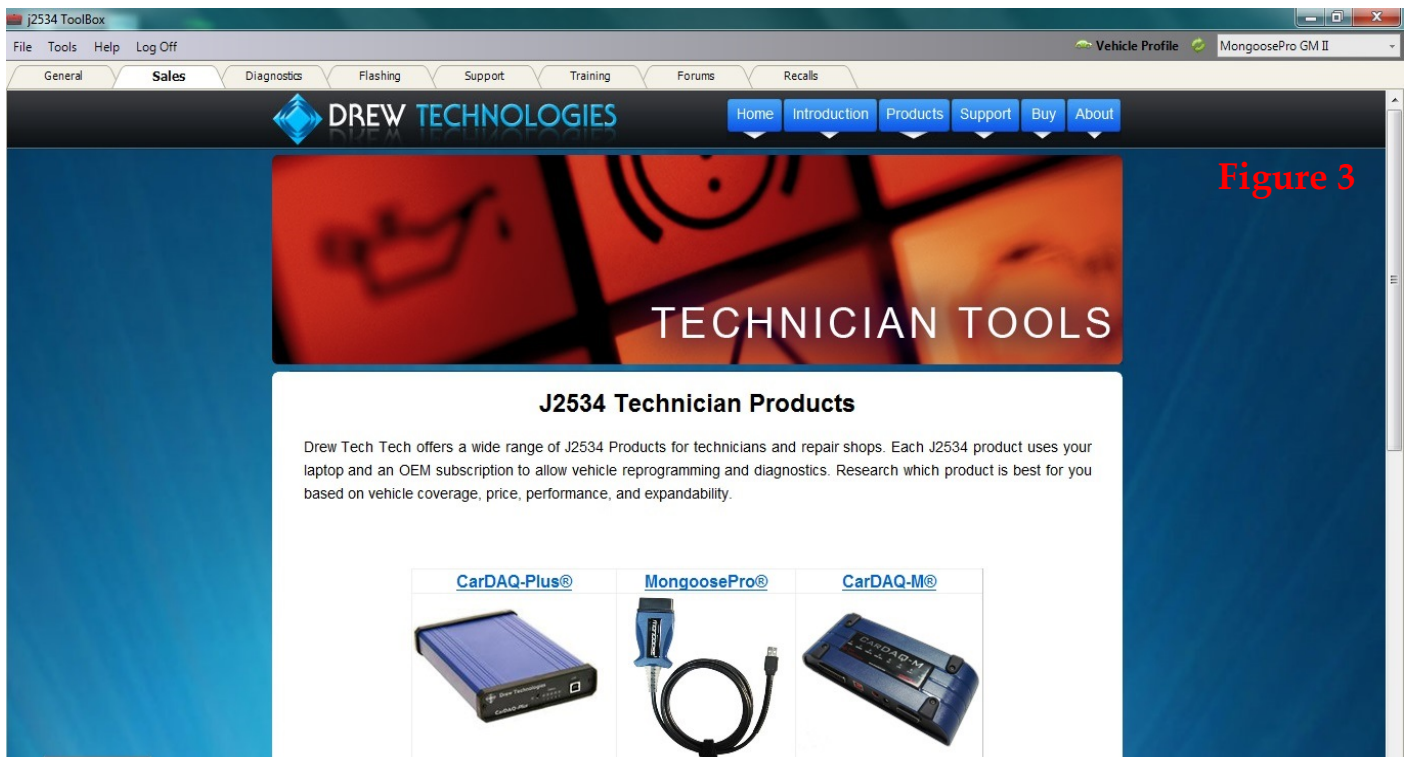


Figure 3

Logging On

The next step is making sure you select TIS2 Web Service Programming for J2534, filling out the form, paying a fee, than

(Con't on page 5)

"Reprogramming With J2534" (con't from p. 4)

downloading the program that will be installed into the vehicles computer(s). Make sure that the following are completed; laptop is plugged into a power source, all the connections to the DLC are tight, the J2534 box is attached to the laptop and a very important step is making sure a battery maintainer such as Fronius, Assocoated or Midtronics battery maintainers, is connected to the vehicle. All of these special chargers maintain battery voltage with very low AC voltage output that is important in order to prevent any problems during the reprogramming process. The battery maintainer is a very important tool to use when reprogramming, do NOT reprogram any vehicle without using one of these maintainers. Do not use a battery pack since it will not maintain the proper battery voltage level. Make sure that all vehicle accessories are turned off and that there are no interruptions during the procedure. Make sure that the vehicle doors are not opened during the process and if needed make sure that the recommended fuse (some Toyota vehicles) is removed so other modules will not be affected during the programming process. Another note of caution is placing the OBD II wire through the window, some vehicle's will operate the windows during programming that can unplug the cable. Make sure to read all of the information from the OE website along with everything in the Drew Tech Tool Box that is related to reprogramming of the vehicle.

Case Studies

A 2012 GMC Yukon 5.3L with an illuminated MIL came in with an idle problem along with a P2135 (Throttle Position Correlation) DTC. If you follow the GM recommended procedure for the DTC you will be instructed to check voltages, that in this case were all within specification. Following the GM trouble shooting chart will lead you to replacing the throttle body, only to find out you still have the same problem. We had a few other GM vehicles from other shops that had already replaced the throttle body with new GM units only to encounter the same problem. In cases where the throttle body is defective and needs to be replaced the unit must be re-

(Con't on page 7)

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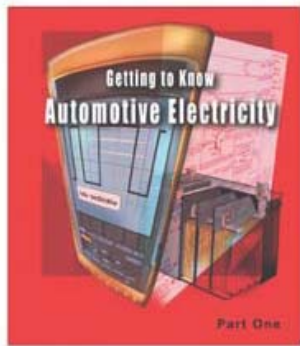
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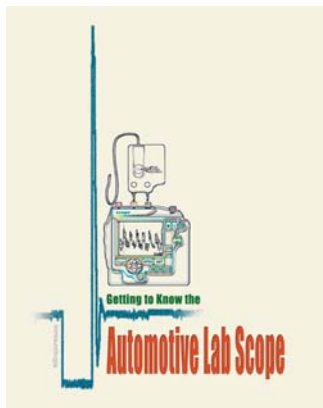
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"Reprogramming With J2534" (con't from p. 5)

the repair and prevent the P2135 from coming back. The fix for this vehicle was just to reprogram the PCM without changing the throttle body. It's not always replacement of parts that fixes the vehicle.

2012 Nissan Altima came in from another shop with a P0101 (Mass Air Flow Sensor) that to some may be a simple diagnosis. If you are thinking that the MAF sensor needs cleaning or replacing you would be dead wrong and the vehicle would still have the same problem. Selecting any Generic/Global scan tool along with the proper service information would be the right place to start. In fact doing the research was what led to the proper diagnosis. The shop that sent us the vehicle looked the correct information up on Identifix while we confirmed it with Alldata. The fix for this vehicle was not a cleaning or replacement of the MAF, but rather a reprogramming of the PCM. Reading the TSB (technical service bulletin) provide us will all the information we needed. Next we connected our Drew Tech CarDaq J2534 device to the vehicle along with using the Nissan NERS (Nissan ECU reprogramming software) and purchased the update software. Within an hour the vehicle was fixed without replacing any parts.

Remember before reprogramming any computer always check TSBs and the Calibration information to see if a new update will fix the problem. The example to the right is for a 2005 Chrysler 300C, 5.7L Hemi that had a problem with an emission issue.

This TSB and reflash is very important since it involves an emission related problem. Remember no matter how much experience and tools we have date.

DaimlerChrysler		AUTHORIZED MODIFICATIONS		THESE MODIFICATIONS HAVE BEEN APPROVED BY EPA AND CALIF.
THE FOLLOWING MODIFICATIONS HAVE BEEN MADE:				
Replace PCM and Install Correct Software Calibration				
CHANGE AUTHORITY	DEALER CODE	DATE		
RECALL D25	XXXXXX	XX/XX/XX		
04127086AB				

(Con't on page 8)

"Reprogramming With J2534" (con't from p. 7)

we cannot fix a vehicle if it needs an update. Reprogramming is something you have seen for year's right on your own Windows computers. How many times have you seen a new update for the version of Windows? I know too, many to count. Those updates fix sometime minor or major flaws just like the updates that you can perform on a vehicle. Additionally, reprogramming can change the onboard computer's default settings to compensate for wear and tear. It can even compensate for variations in fuel quality or severe operating conditions. Reprogramming is also taking the place of some hardware upgrades. For example, changing the way the computer interprets an improperly calibrated sensor input eliminates the need to install a new sensor. A similar "fix" can be used to modify the behavior of actuators. For example, injectors may be commanded ON longer during cranking to improve starting in engines with air intake deposits. Many of the Asian vehicle have problems setting a P0420 (catalyst inefficiency) DTC that can only be extinguished by reprograming the PCM as per the OE's TSB. Make sure to always check for updates on the vehicle you are working on.

2008 Ford E350 Van with a 5.4L came in with a rough running engine along with the MIL illuminated. As we were performing our diagnostic procedure we found the problem for the misfire. The number 2 cylinder had a DTC along with an injector circuit that was causing the misfire. When we connected the labscope to the number 2 injector the waveform was non existent. The next step was to check the ground side that is connected to the PCM. What my tech Bill found was that the circuit had 3 volts on the ground. This meant that there was a 3 volt voltage drop on the PCM ground circuit. The next step that needed to be performed was checking the actual voltage drop with the DVOM. The reading was confirmed, the PCM was not able to drop the 12 volts that the injector receives from the injector KOEO circuit. The best way to confirm that the circuit is computer related and not a wire related, is to disconnect the number 2 injector wire from the PCM and supply ground. With a separate ground pulsed on the injector ground wire the injector should fire normally while displaying a good waveform.

(Con't on page 9)

"Reprogramming With J2534" (con't from p. 8)

With the injector firing normally as the ground was pulsed (using the Power Probe) it was now time to make the call to replace the PCM. Usually replacing a Ford PCM is a piece of cake but that's not the way it was going to be with this vehicle. We ordered a used PCM from AutoECMs.com and install it in the vehicle. Unfortunately the PCM they sent had a broken PCM plug and may have been defective. Usually I use my Ford IDS to program the PCM followed by resetting or programming the PATS (anti-thief) system. This vehicle uses a PATS system that has a red indicator in the IC (instrument cluster) that can prevent the vehicle from cranking and grounding (firing) the injectors. After performing the PATS procedure the engine cranked but the injectors would not fire. The IDS security displayed the PCM and the IC as access denied. We tried the procedure about a dozen different times without any success. I looked at PCM data on the IDS and noticed that the data was scrambled, indicating that something was wrong. After confirming there was a problem with my IDS I decided to download the Ford J2534 reprograming file. With the file downloaded along with using the Drew Tech CarDaq M, I proceeded to program the PCM and reset the PATS. The vehicle still would not start either on the new or old PCM's because the PCM and IC were both locked out. We decided to order another PCM thinking that the new PCM maybe have been defective. After installing another replacement PCM the engine would still not start due to the same security issues. What's the chance of all three PCMs being defective? Remember that the vehicle ran with the original PCM and now it wasn't. At this point we started to question ourselves, we checked all powers, grounds and all the PCM connections. We tried again with the J2534 and 3 different aftermarket scan tools to erase the DTCs from the PCM in order to get the injectors to fire without any success. Having a suspicion that the J2534 Ford software was not working correctly I called Joey from AE Tools and ordered a new Ford IDS II system. When I connected the new Ford IDS all the DTCs were cleared allowing the PCM to be reprogrammed along with resetting the PATS. The results were the DTCs were gone and the IC and PCM were no longer locked down. Now that the engine was running normally there was a lesson learned. The Ford J2534 software does NOT work properly and only the IDS can get the engine running. I am going to email Ford about the problem and I have already informed

(Con't on page 10)

“Reprogramming With J2534” (con’t from p. 9)

Drew Tech so they can pass the information on helping other technicians and shops. So if you have a Ford vehicle that uses a non electronic key you may encounter the same problem. The Ford software works well on electronic keys that I tried it on in classes. I believe that Ford vehicles using electronic keys have been tested and work well because its common on so many vehicles. There are only a small amount of their vehicles that use the non electronic key. Keep your eyes open and if you come across this problem find someone that has a Ford IDS to program the vehicle for you.

As you are working on today’s vehicles you won’t be able to fix many different vehicle problems unless you are able to reprogram the vehicle. Our case in point is a 2006 Ford Explorer with a 4.6L V8 (Figure 4) that came in the shop with an EVAP circuit and O2 heater circuit problem. The associated Diagnostic Trouble Codes (DTCs) were P0141 (O2 heater Circuit Bank 1 Sensor 2), P0161 (O2 heater Circuit Bank 2 Sensor 2) and P0443 (EVAP System Purge Control Valve Circuit). Other than these DTCs, the vehicle ran fine, but with the MIL illuminated the vehicle would not pass inspection.



The first place to go after the customer interview and a visual inspection is the service information. We decided to start our search with Identifix since they do a good job covering old problems and provide OE information. We found the same DTC information listed on Identifix suggesting a wiring issue or a defective PCM could cause the concerns. We decided to start our formal diagnosis by checking the P0443 EVAP circuit first since it would be easier. The DTC description stated that this DTC can set if the EVAP canister purge valve circuit output driver is out of range. The PCM test fails when the solenoid is outside of the minimum or maximum limits that are set for the commanded state.

(Con't on page 11)

“Reprogramming With J2534” (con’t from p. 10)

The possible causes for this code are VPWR (vehicle power circuit) circuit open, EVAP canister purge valve circuit shorted to ground, damaged EVAP canister purge valve, EVAP canister purge valve circuit open, EVAP canister purge valve circuit shorted to VPWR or a damaged PCM.

With all of those possibilities it is easier to check out the load first to see if there is power and ground along with checking if the solenoid works. Since the canister purge valve would be easy to test right at the load, we started there. We disconnected the wiring to the purge valve with the ignition key off and turned it back on to check the indexing of the two-wire connector to confirm which one of the two had power. Using the index information, we used a Power Probe to manipulate the solenoid. The Power Probe tip was connected to the B+ side of the solenoid and the ground wire to the other side along with a mini amp clamp that was placed around the ground wire. Now we could check the load, the EVAP solenoid, to see if it works and how much amperage the solenoid would draw. This test was one easy, complete way to diagnosis that circuit without following a long task list.

In the past I have seen many solenoids drawing excessive current that would burn the circuit open. The testing we performed confirmed that the solenoid did function as designed and did not cause a high current draw that would damage the PCM. The test concluded that the purge solenoid was drawing about 430 milliamps, assuring that the valve had the ability to function properly.

With the purge valve out of the way we now could move on to testing the O2 heaters. This part of the diagnosis was going to be a bear to check since this 4.6L V8 hardly had any room to get to the connectors, so we decided to test where it was easiest: at the PCM. Service information suggested checking power at fuse 42 or at the circuit breaker. Since this vehicle had a fuse and not a circuit breaker, we checked it for power before moving on to a more difficult test. Since the fuse was good, we had to check the PCM, which was

(Con’t on page 12)

“Reprogramming With J2534” (con’t from p. 11)

located on the right side of the passenger engine compartment making it easy to test for voltage and current draw. Now that all the easy tests were done we had to move on to test the O2 sensor heaters at the source.

We struggled to get the connectors apart, due to the tight space, but once we did, we installed jumper wires to the heater power and ground circuits. We once again used the Power Probe and connected the tip to the B+ side and the ground wire to the ground side of the circuit, along with an amp clamp attached. We proceeded to check for heater current as we depressed the power button on the Power Probe. There was normal current draw Bank 1 sensor 1 heater circuit. We moved on to the Bank 2 sensor 2 and found that also was drawing the correct current. With test results indicating that all the circuit components were good it was now time to condemn the PCM.

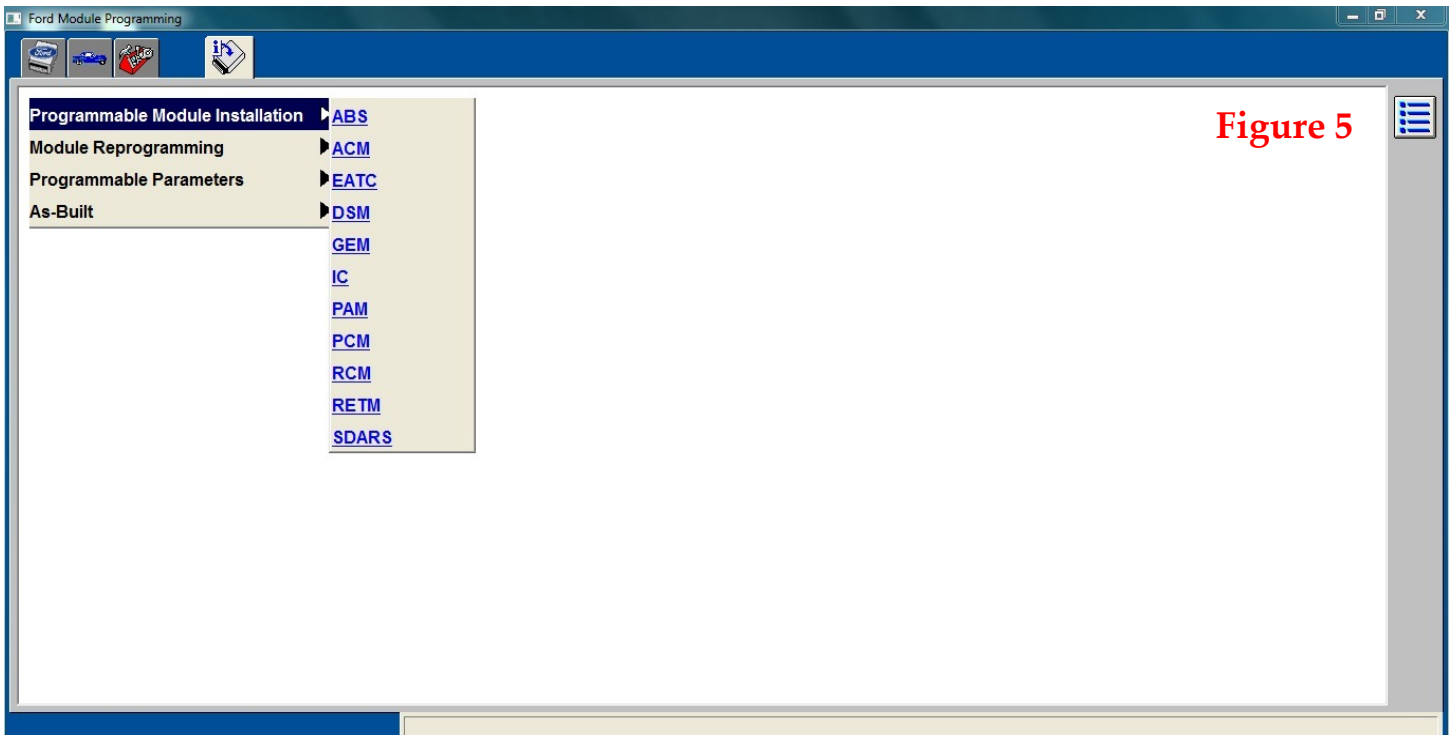
Remember before replacing the PCM, the most expensive fuse on the vehicle, always check for excessive current draw from components that will damage a computer. Since all the solenoids on the affected circuits did not test for excessive current it left only the PCM. We called around to aftermarket part stores trying to locate the PCM that was not available.

We then called the two different Ford dealers that told us they did not have it, but they can special order. The price of a new PCM was more than \$800, making the repair more difficult for the vehicle owner to swallow. The vehicle, as I stated earlier, ran well, the only problem was the MIL was illuminated and it would not pass an inspection. The owner asked if there was a possibility in getting a junkyard PCM that can just be plugged in and fix the problem. I explained to them that it may be possible in locating a used unit but that the engine would not start without reprogramming the PCM. This is also true if the unit was purchased from Ford; nothing works without programming it. I also explained that I would need all the vehicle keys and key fobs so I could program them in to the PCM. After calling salvage yards for over an hour I came up empty handed.

(Con't on page 13)

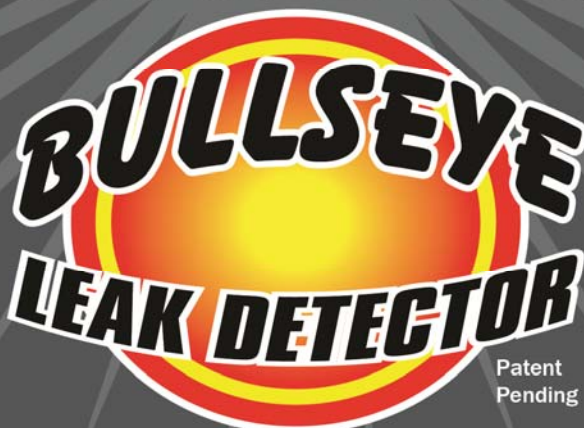
“Reprogramming With J2534” (con’t from p. 12)

Then I remembered the company I told you about a few pages back, AutoE-CMs.com. The company will ship you a unit to try and if it doesn't work or you don't want it, you can return the unit for the fee and shipping. Since I was confident the PCM was defective I purchased the unit and installed it. With the used unit installed, I knew the vehicle would not start without reprogramming it. I had connected my IDS to program the unit, but as luck would have it my laptop that the Ford IDS was on was having a Microsoft problem. I did not want to take the chance in destroying the PCM so I decided to program the unit using my Drew Tech J2534 device that's on a different laptop. As you can see the software (Figure 5) looks just like the IDS and works similar with the exception that I had to access the file and pay for it. I proceeded with the first programming screen that provided the vehicle specification that needed to be confirmed. The second screen had the mileage and the VIN information that needed to be corrected since this was a used PCM and did not match the vehicle's VIN.



(Con't on page 15)

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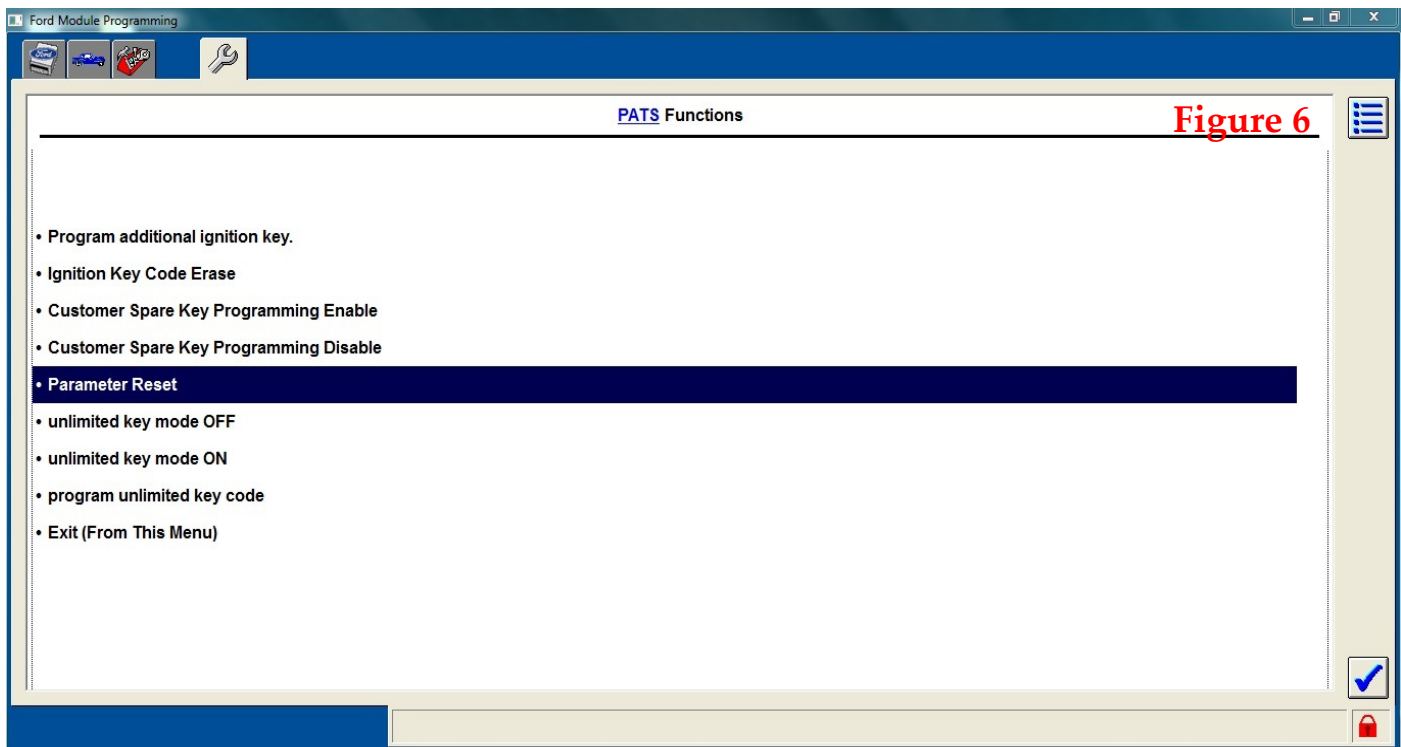
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"Reprogramming With J2534" (con't from p. 13)

The following screen had a dropdown menu that allowed me to select Programmable Module Installation. That opened another drop down menu, allowing me to select the PCM module that needed to be programmed. I selected the PCM and followed the screen prompts that instructed me to turn the key on and off until I reached the screen that requested the VIN information. Once on the VIN screen I typed in the correct VIN. That moved me into the PATS (Passive Anti-Theft System) screen. Now I needed at least two Ford ignition keys along with any key fobs. I selected the (Figure 6) Parameter Reset that walked me through the programming screens for the keys and fobs. The procedure went through without a problem, allowing the engine to start so I could test drive the vehicle. With all the Monitors "Ready," I was confident that I had repaired the DTCs of the EVAP system and the O2 heaters. The customer's car passed inspection without further incident.



*All Articles in this newsletter by
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*Analysis of 2008 California Smog Check data.

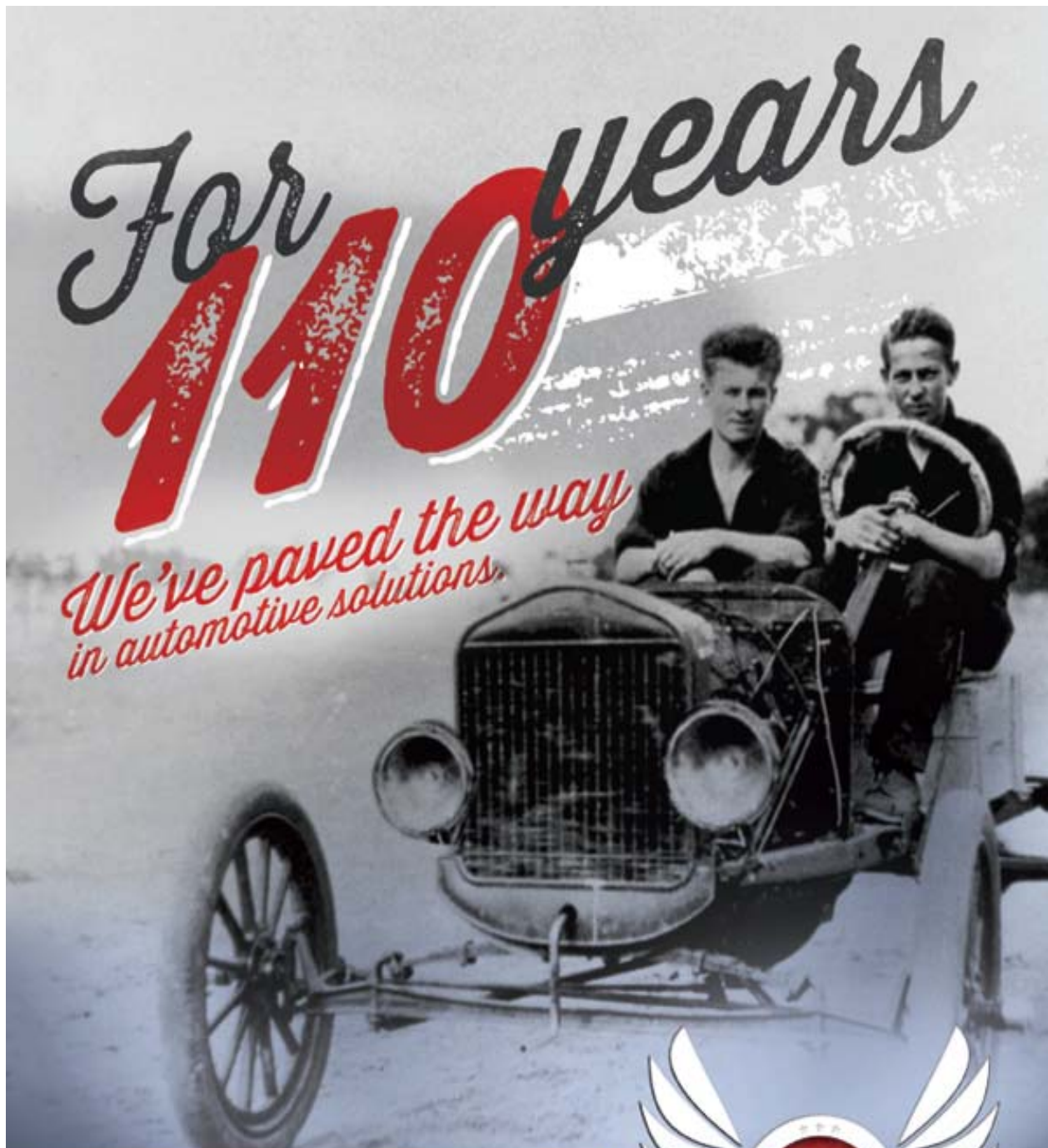
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