

INSIDE THIS ISSUE:

Chairman's Column

Florida Winter Regional

L98 Perf. Diagnosis

'72 TCS Diagnosis

Arizona Regional

Editor's Column

Ed Di Napoli, Chairman

Howard Welch, Vice Chairman

Rich Vaughan, Treasurer

Jim Rosenberger, Secretary

Bruce Crookham, Judging

Chairman

Bob Zimmerman, Newsletter

Editor

BUSINESS MEETINGS & TECH SESSIONS

Hightstown Elks Club 110 Hickory Tavern Road Hightstown, N.J.

3rd Monday of the month at 8:00 p.m.

GOOD THINGS ARE COMING

Chairman's Column

By: Ed DiNapoli

Well we got the two worse months of the winter behind us. Not that we have had a severe time of it, quite the opposite, if you picked the right day, you could have taken the Corvette for a drive and swore it was middle of spring. I know that I am still looking forward to spring and the local car activities to begin, so I can get the cars out, clean them up from their long winters nap, and see old friends.

The January retreat to the Florida Winter Regional in Kissimmee was, as usual, a great get away to sun, fun and Corvettes. Many of our chapter members took part in the judging and judging classes. I did not count the cars on the judging field, but from my memory [which is not always so good] there appeared to be more cars that 2011. The flea market is one of the best

at any NCRS event. Lots of everything you could want for any Corvette project. It you have not visited the Winter Regional, this is an event I think you will enjoy very much.

With all the winter travel, we still had lots of work to do with the chapter. Your board has been working diligently on scheduling 2012 events and updating the chapter web site. We have established September 16, 2012 for our chapter meet and we are presently looking for a site that will accommodate a field of 12 judged cars. I hope to have more information in the near future. We have a committee made up of our board members and the following volunteers:

Registration - Ralph Greer Parking – Ed Lepelis, Ken Vause

Food – Les Goldberg Site determination – Mark Rudnick

We are also working with Jim Loughlin for another road tour

on July 15, 2012 to his beautiful home in Mendham, N.J. Jim has again opened his wonderful piece of property to the chapter for a picnic and corvette event. This has been in the past and will be again a event you will enjoy and remember. We will offer more information as details develop.

We are also working on the possibility of a tour of two NJ lighthouses, and a trip to a road course racetrack. Again we will pass on information as these events mature.

I would like to thank John Kuhn for organizing a very entertaining and informative February technical meeting with Joe Danner, C4 race driver. Joe's presentation showed car preparation and his driving skills on some of the country's best road courses. We will be looking forward to more of John's presentations.

(Continued on Page 2)

FLORIDA WINTER REGIONAL 2012

By: Bob Zimmerman

Once again the Florida weather was spectacular after an early shower or two. For those of us fortunate enough to have attended we were reunited with our NCRS family

from all over this great country. From flight judging to swap meet, there was plenty to see and experience at Old Town. As part of the National C4 team I conducted a segment of Terry McManmon's Advanced Judging Seminar on Friday and then had the

pleasure of doing some of the first practice judging on the early C5 models. A hearty thanks to Roger Judski of Roger's Corvettes for loaning the team a beautiful low mileage '97 coupe for the exercise.

(Continued on page 2)

Chairman's Column

(Continued from Page 1)

There has been a major effort put forward to update our chapter web site. If you have not visited the site recently, you will find new photos and information. I want to thank Bob Zimmerman, our Newsletter Editor for his extraordinary efforts in researching and organizing our photo albums and working with the webmaster. I also need to thank Vinny Peters, our National Restorer Magazine Editor, for his help in supplying photos of CNJ Wildwood Regional. We are still trying to add photos to the web site and are looking for any photos of the reception and banquet dinner at the Wildwood Regional. We are also looking for any photos of the 2001 Woodbridge Regional. If you have photos of these events please contact Bob Zimmerman, topcopfh1@verizon.net so that we can maintain our chapter's history in pictures. I would also like to remind members that we are in the process of improving the chapter member photo site. The pictures that were posted in the past, were old and the quality of these photos was not the best. Bob has only received responses from a few members to date. We would like to encourage you to send photos of you car or cars with the pertinent information (motor, trans, colors, NCRS awards, etc.) to Bob so we can update this part of the web site.

I need to remind members that Rich Vaughan is collecting dues for 2012. If you have not paid your 2012 dues you can pay at our next meeting or send them to:

NCRS Central New Jersey Chapter c/o Richard Vaughan 3 Harter Road Morristown, NJ 07960

I would like to thank all the members that have signed up for 2012 and hope we can make your membership an enjoyable, worthwhile experience. However, year to date we are 10 members short of our 2011 enrollment. I am still standing by my goal of increasing the chapter membership by 10% this year. Rich has been working with Phil Barbaro to replace and supply new members with name tags. If you have requested a CNJ name tag Rich will be handing them out at our next meeting. Please wear your name tags to all events. Finally, your board has had a busy couple of months and we would like to see members get involved with our activities and join in the fun and camaraderie. Hope to see you at our March 19th business meeting. Best regards,

Ed



My wife and I and Jim and Dottie Loughlin rounded out the event by attending the Mecum Auction during the evening which was only a short distance away. In just a bit less than a week Mecum moved over 2,200 cars past the block and took on \$60,000,000.!







1989 – 1991 Corvette L98 Engine Operability Diagnosis Part I of II

By: Bob Zimmerman

Despite the ease with which most diagnoses can be accomplished on C4 operational problems, there can be some that will be more challenging to discover. My 90 Corvette began to run pretty poorly last spring after taking it out of storage. But it only did so after the engine reached full operating temperature, was shut down and allowed to heat soak for about 20 minutes. Upon restart I was unable to accelerate the engine much past 1500 r.p.m. without experiencing stumbling, backfiring through the intake plenum, rough idle and an occasional clunk from low in the engine that mimicked a rod knock. These are not the sounds and performance results you expect from a car with only 15k on the odometer. The most interesting observation was the lack of any malfunction indication from the Driver Information Center (DIC). A key on bulb check of the DIC revealed that all the malfunction indicator bulbs were operational telling me that the ECM saw nothing out of the normal ranges of engine management to trigger a code. I conferred with my good friend Dave Perry from California who suggested that I probably had a bad fuel pump. In-tank pumps can often slow down when they heat up and fail to deliver the proper fuel pressure. I was certain that the H.E.I. ignition module was breaking down when it got hot. Diagnosing the problem would not be as simple as just reading a malfunction code.

I decided to check the ignition system first since that would be the easiest part of the diagnosis. Tests and visual inspections showed that I had good plugs, plug wires, distributor cap and rotor. Just to be sure I replaced the ignition module inside the distributor fired it up, let it get good and warm then shut it down for ten minutes and restarted the engine. Nothing changed. The problem was still there. It was definitely time to check the fuel system. Unlike carbureted engines, the tuned port injection engines use a pressurized fuel system. The in-tank pump delivers pressurized fuel to a fuel rail and regulator valve on top of the intake manifold that supplies fuel to the injectors. At idle or low r.p.m. conditions the unused fuel is returned to the tank via a return fuel line. In order to test to see that you are getting sufficient fuel flow and pressure you must have a fuel pressure test gauge kit. I purchased an OTC brand Part # OTC5630 available from Advance Auto Parts for under \$40.00. The gauge will tell you if you have a plugged fuel filter or a weak fuel pump or defective fuel pressure regulator by following the test steps outlined in the Corvette Service Manual.



Photo#1

There is a shrader valve located on the rear portion of the passenger's side fuel rail for connection of the gauge (Photo 1). In order to connect the gauge to the shrader valve you will have to remove the MAP sensor from the intake plenum and the vacuum line connected to the bottom of it. Turning the ignition key to the run position will activate the in-tank fuel pump causing a reading on the gauge. The normal pressure range should be between 40 and 47 lbs. Although my symptoms were consistent with that of a bad fuel pump or plugged filter the gauge told the truth. I had 45 lbs. of fuel pressure to the filter, from the filter and at the regulator. I could then rule out a weak fuel pump, plugged fuel filter or defective fuel pressure regulator. The only link left in the fuel delivery system chain not checked was the fuel injectors.

Fuel injectors are a combination of mechanical parts and an electric coil. The mechanical tests are not possible on the car but the coils can be tested very easily by measuring their electrical resistance. This is done with an ordinary multi tester that contains an ohm meter. Shorted coils are the primary reason injectors fail. Coil testing is accomplished by removing the electrical connector on top of the injector and probing the terminals and measuring the resistance See (Photo2). A normal resistance reading should be 12.8 ohms.



(Photo2)

Readings that fall below that range indicate a weak or inoperative coil. Corvette L98 engines were equipped with first design Multech injectors at the factory beginning in 1989. They operate with a wet coil which means that the fuel flows over the coil to cool it. After completing the ohm tests on my car I indeed had a bad injector coil with a reading of only 3 ohms and a few that were on the verge of failing with readings at 7 ohms. Why would the coils begin to fail on a car with so few miles? The answer is ethanol. It's added to gasoline refined in the United States. Ethanol is alcohol and it is caustic when compared to gasoline. The coils inside the injectors are covered with a coating which acts as an insulator. The coating was designed to withstand exposure to gasoline not alcohol. Once the federal government mandated ethanol as a supplemental additive to gasoline, injector manufacturers had to develop a different type of insulation for the wet coils since they realized that the ethanol alcohol would dissolve the older coatings. In time the insulation will slowly dissolve and eventually the coil will short out. With my testing and diagnosis complete the next step was to find a new set of injectors. It is important to note that it is recommended that you replace all of the injectors at the same time. There are several reasons for this the least of which is the expected eventual failure of the remaining good ones but more importantly because they should all be flow tested and matched accordingly for proper engine operability.

The aftermarket has all sorts of new injectors available for your Corvette, some that are ethanol safe and some that are not. Most are made by companies who specialize in fuel injectors but only offer them in neon colors or configurations alien to the originals. If you're planning on having your car flight judged you'll want to avoid all of them. I spent days on the web and was finally able to locate a company in Cumming, Georgia that manufactures new ethanol compatible injectors that resemble the Multechs with only slight differences. They are advertised as "E85" compliant meaning injectors designed to operate properly with fuels that are comprised of only 85% gasoline and 15% ethanol. As far as I know most states are selling a mix which is 90% gasoline and 10% ethanol. If the feds boost it to 15% the injector coils will still operate properly. Other than a slight variation of the gray color that could cost you a few points, they are virtually indistinguishable from the original equipment examples and are all flow matched. I contacted the company's owner Jon Banner and he was most obliging and informative and spent a considerable amount of time with me answering my questions. You can contact Jon Banner on the web at www.corvetteinjectors.com or call 770-888-1662. His mailing address is Corvette Injectors 5485 Bethelview Rd. Cumming, GA 30040.

Part II of this Tech Article will appear in the next newsletter and detail the removal and replacement of the fuel injectors.

Meet the Members

By: Jack Brown

In this issue of the Newsletter, our featured chapter personality for "Meet the Members" is our chapter's newly appointed Secretary, Jim Rosenberger. Jim's first recollection of Corvettes was when he was about 8 or 9 years old. He lived in Staten Island at the time and a neighbor down the street had a black '58; this was about 1963 or 64. It wasn't until about seven years later that Jim got his first ride in a Corvette. He remembers it well. A 17 yr old friend got a '61 red convertible and gave him a ride. It was after this ride that Jim set a goal for himself to own a Corvette some day. While he didn't have the money at this early stage in his life, he was constantly reminded of his goal. Every day when he walked his dog in the Marlboro neighborhood where he then lived, he would see his neighbor's '67 roadster and think about his goal.

Jim has been a member of NCRS for about 5 years and a member of Central New Jersey Chapter for the same amount of time. He also has belonged to Corvette Express for many years, crediting Richie Saida with having really gotten him interested in the hobby. Although Jim has been a Corvette enthusiast for over 40 years, he has pledged all his love to a single Corvette.

Jim's pride and joy is a 1971 Mille Miglia Red convertible with a white top, black interior, 350/270, 4 speed. The car was technically a 2 owner car from the Toms River area which he purchased in 2005,

with 78 thousand miles. The original owner sold the car to provide the funding for a business start-up. The second owner only put about 1600 miles on the car but decided to make a few changes during his ownership, like the radio and the carburetor. Jim was driving down the road one day and saw the car in the driveway. He stopped, looked at the car and knew he had to have it. He paid \$ 27,500 for the car but it required virtually nothing to be done to it. He decided to replace the exhaust but that was all. Jim said there are several thing he could do to improve the car but the cost of doing so would not materially add to its appearance or its value and will probably not invest any more money in the car. He has had the car top flighted at a CNJ Chapter meet as well as our Regional in Wildwood and was pleased with the way the car scored. He has been considering taking it to an NCRS National but hasn't made up his mind.

Jim currently stores the car locally and drives it to and participates in several local Corvette shows. He is a retired Captain from the NYC Fire Department (25 yrs) and his current interests include real estate for investment and as a landlord. He also has a small construction business for making home improvements as well as an exterminating business. How's that for keeping busy in retirement? Jim and wife Madaline live in a retirement community in Jackson, NJ. They have two daughters but none of Jim's ladies share his love for his '71 Corvette.

Natural Mouse Trap

The next time you complain about mice getting inside your Corvette, just do what the McNay's do.......



All kidding aside, the C5 pictured here belongs to Mason McNay of California. When you live in the woodlands of northern California, these rattle snakes will seek warmth in the cooler weather. It apparently coiled up on the engine and after a brief ride to the gas station decided the engine was getting too hot and moved as far away from the heat as it could. Upon stopping and opening the door to fill the tank, Mr. Rattle Snake was right there in the lower door hinge opening to greet the driver. He was eventually prodded out of the car and was last seen slithering through the gas station. Thanks to Art & Glorie McNay of the Northern California Chapter for sharing the photo.



1972 Small Block V8 Transmission Controlled Spark (TCS) System

By: Erich Meyer

PURPOSE

The purpose of this article is to describe how vacuum advance is controlled in 1972 Corvette small block engines with a manual transmission and describe the techniques I used to troubleshoot my system. The motivation for this article was that I would receive a deduct on TCS Operations Flight Judging because the engine speed would not increase 20-30 seconds after the transmission was put into 4th gear. The 1972 small block vacuum advance control is unique in that vacuum advance is only supplied 20-30 seconds after 4th gear with the engine at normal operating temperatures. '71 manual transmission Corvettes received vacuum advance in 3rd and 4th gears after a time delay and for 15 seconds after the ignition is turned on. '72 Corvettes do not receive vacuum advance after engine start unless the engine operating temperature is below 82°F or above 232° F. '72 TCS systems do not have the Reversing Relay used on '71 CEC systems. The Time Delay Relay used in 1971 is located on the driver's side firewall whereas in 1972 it is located on the lower windshield frame behind the center gage cluster.

SYSTEM COMPONENTS

Vacuum advance on '72 small block Corvettes is controlled by four components:

1. Vacuum Advance Solenoid

The vacuum advance solenoid is located on the right side of the intake manifold (PHOTO 1). It has two vacuum hose connection nipples — One port connects the solenoid to a vacuum source from the carburetor with a rubber vacuum hose. A second vacuum hose connects the other solenoid port to the distributor vacuum advance canister. The solenoid either routes the carburetor vacuum to the distributor or blocks the vacuum from reaching the distributor. When vacuum is blocked from reaching the distributor, the distributor vacuum advance canister is vented to atmosphere through a foam filter on the vacuum advance solenoid.



2. Transmission Switch

This switch is threaded into a boss on the driver's side of the transmission (PHOTO 2).



Photo 2

It is normally open meaning that unless the transmission is in fourth gear, there is an open circuit between the transmission switch terminal and ground. When the transmission is put into fourth gear, there is a closed circuit between the transmission switch terminal and the transmission case. The black wire in PHOTO 2 connected to the transmission switch terminal runs to one of the terminals on the Time Delay Relay.

3. Engine Temperature Switch

This switch is located in the right cylinder head (PHOTO 3). PHOTO 3 shows the location with the right side spark plug shielding in place. The switch has two terminals. It is dedicated to the TCS control system and is separate from the water temperature sender located on the driver's side head. The Engine Temperature Switch has three states; COLD, NORMAL, AND HOT. In the HOT and COLD states this switch is closed to ground. In the NORMAL mode it is an open circuit to ground.

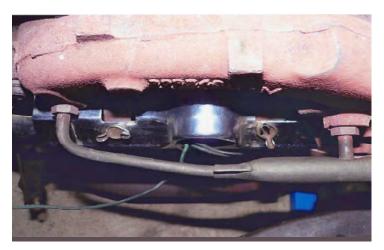


Photo 3

4. Time Delay Relay

This relay is normally open and closes approximately 20-30 seconds after shifting into 4th gear (PHOTO 4).



Photo 4

It receives 12 Volt power when the transmission is shifted into fourth gear. The internals of this relay are solid state devices (PHOTO 5).

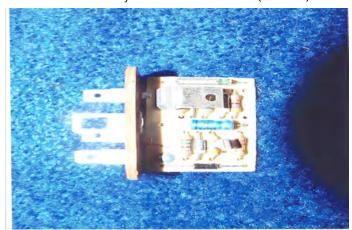


Photo 5

OPERATION

The Vacuum Advance Solenoid controls whether or not vacuum advance is supplied to the distributor. When the solenoid has 12 volts supplied to its terminals, vacuum advance is supplied to the distributor. In the non energized state the solenoid vents the distributor to atmosphere. Voltage is controlled to the Vacuum Advance Solenoid by the Transmission Switch, Engine Temperature Switch, and the Time Delay Relay.

There are six operating states for the TCS system:

State 1 - Engine Off

The schematic for this condition is shown in Figure 1. The ignition switch is off and battery power is not supplied to the solenoid. The distributor vacuum advance canister is vented to atmosphere.

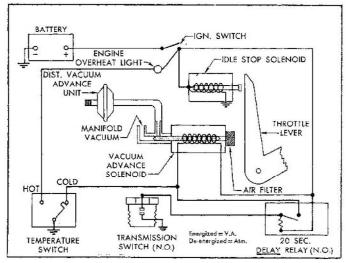


Figure 1 - Engine Off

State 2 - Ignition Switch On, Engine Cold

The schematic for this condition is shown in Figure 2. With the ignition switch closed the Vacuum Advance Solenoid receives power through the grounded Engine Temperature Switch. The transmission in this schematic is in any gear except 4th so that the transmission switch is open to ground. This is the cold start operating state where vacuum advance is supplied to the distributor in any gear.

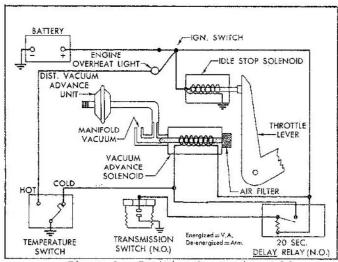


Figure 2 - Ignition On, Engine Cold

State 3 - Ignition Switch On, Neutral, $1^{\text{st}},\,2^{\text{nd}},\,3^{\text{rd}}$, or Reverse Gear, Normal

Engine Operating Temperature

The schematic for this condition is shown in Figure 3. The Transmission Switch and Engine Temperature Switch are open circuits and prevent powering of the Vacuum Advance Solenoid. Vacuum advance is denied to the distributor.

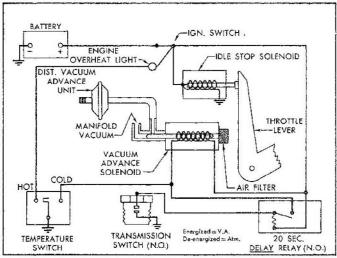


Figure 3 - Low Gear, Engine Temp Normal

State 4 & 5 - Ignition Switch On, 4th Gear, Engine Temperature Normal

The schematic for this condition is shown in Figure 4 and 5. Upon shifting into 4th Gear (State4), the Transmission Switch closes the circuit to power the Time Delay Relay as shown in Figure 4. The relay contact to energize the Vacuum Advance Solenoid is open for the first 20-30 seconds after shifting into 4th gear. A cross section of the Transmission Switch is shown in Figure 6. When the transmission is in Reverse, Neutral, 1st, 2nd, or 3rd gear, the transmission switch plunger is depressed breaking the contact between the cup and switch housing and thus creating on open circuit to ground. The spring loaded plunger extends when in 4th gear closing the circuit to ground. 20-30 seconds after powering the Time Delay Relay, a contact in it closes supplying 12 volts to the Vacuum Advance Solenoid (State 5) and vacuum advance to the distributor

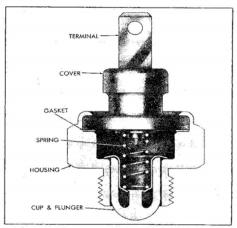


Figure 6 - Transmission Switch

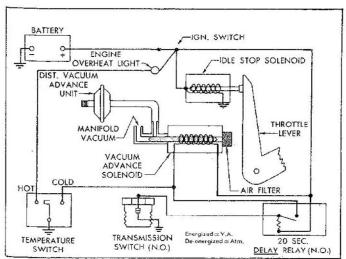


Figure 4 - TCS High Gear, Delay Relay Open

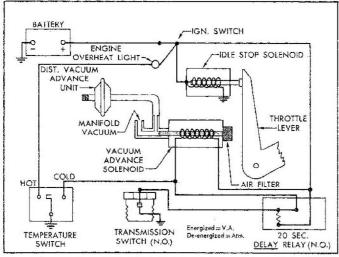


Figure 5 - TCS High Gear, Delay Relay Closed

State 6 - Ignition Switch On, Engine Hot (overheating)

The schematic for this condition is shown in Figure 7. With the

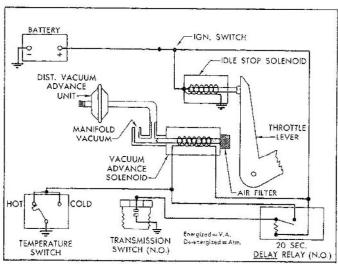


Figure 7 - TCS Hot Overide

ignition switch closed the Vacuum Advance Solenoid receives power through the grounded Engine Temperature Switch. The transmission in this schematic is in any gear except fourth so that the transmission switch is open to ground. In this Hot operating state vacuum advance is supplied to the distributor in all gears.

TROUBLESHOOTING

I purchased my Corvette new in September of 1971 when many did not understand how the TCS system worked. I believe that my TCS system did not function properly since the day it left the factory. Mine is an early car and I suspect that some confusion existed at the factory also since the system was changed in the '72 model year from that used in '71 Corvettes. In fact factory emissions system documentation problems existed on '71 Corvettes as described in a excellent article by Jack Humphrey in the Spring 2009 edition of the Restorer. It was not until I started Flight Judging my car that I learned one way to test the functionality of the TCS system was to put the car into 4th gear while idling and wait for the rpm to increase. As stated before, my rpm did not increase during this test so something was wrong.

The most beneficial fact that simplifies the troubleshooting process is that **the engine does not need to be started.** All that is necessary is for the ignition switch to be turned on to supply electrical power to the system. This eliminates having to deal with hot engine components while working on the system. I want to thank my friend and fellow NCRS member Tim Raisner from the Delaware Valley Chapter for pointing this out to me.In order to determine why my TCS system was not operating properly under normal engine operating temperatures, I decided to methodically simulate the operating states 1 through 5 described above and test if the distributor was receiving vacuum advance or being vented to atmosphere. But I needed a method to determine if the Vacuum Advance Solenoid was providing vacuum advance to the distributor without running the engine. **All test procedures described below were done with a cold engine without starting the motor**.

Static Vacuum Advance Test

The method used to determine if vacuum advance was being supplied by the Vacuum Advance Solenoid is shown in PHOTO 6.



Photo 6

I disconnected the vacuum hoses from the carburetor and distributor at the Vacuum Advance Solenoid and attached a longer hose at each port for better test access. Alternately you can also disconnect the hose at the distributor and carburetor vacuum source.

Vacuum advance is denied to the distributor if you cannot blow air freely through the hose normally connected to the carburetor. In this case you should be able to blow air freely through the hose normally connected to the distributor and have it exit through the Vacuum Advance Solenoid foam filter.

Vacuum advance is supplied to the distributor if you can blow through the hose normally connected to the carburetor and the air exits through the hose normally connected to the distributor in a unrestricted manner.

Engine Off Test - State 1

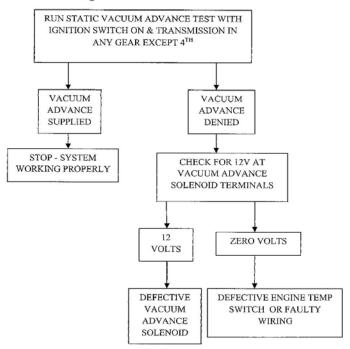
In this state the Vacuum Advance Solenoid should not have 12 volts at its terminals and the Static Vacuum Advance test should indicate that vacuum advance is denied. See Figure 8 for the test sequence. In my case the TCS system operated as designed. This test indicated that my

Vacuum Advance Solenoid was working properly.

Cold Start Test - State 2

See Figure 9 for this test sequence. Turn the ignition switch on but do not start the engine. The transmission should be in any gear except 4th. In this state the Vacuum Advance Solenoid should have 12 volts at its terminals through a grounded Engine Temperature Switch and the Static Vacuum Advance test should indicate that vacuum advance is being supplied. In my case the results of this test indicated that I was getting vacuum advance during cold start. Based on my test results from the Cold Start and Engine Off tests I concluded that I had a good Vacuum Advance Solenoid and Engine Temperature Switch.

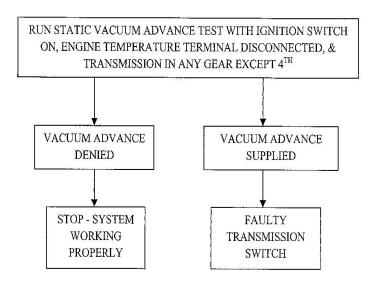
Figure 9 - Cold Start Test



Low Gear Test, Normal Engine Operating Temperature - State 3

In order to simulate normal engine operating temperature, disconnect the terminal from the Engine Temperature Switch. This prevents this switch from grounding. The transmission can be in any gear except 4th. In this state the TCS system is designed to deny vacuum advance to the distributor and the Static Vacuum Advance test should indicate this. See Figure 10 for this test sequence.

Figure 10 - Low Gear Test

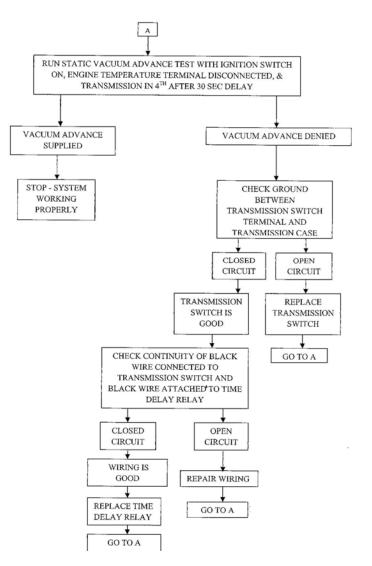


The only way the Vacuum Advance Solenoid can be energized in this test sequence is through the Transmission Switch. If vacuum advance is being supplied then this is due to a faulty Transmission Switch. The Transmission Switch grounds when the plunger is fully extended. The plunger is depressed by the transmission linkage in all gears except 4th. Original Transmission Switch plunger material is plastic and wears. If the plunger wears significantly then contact with the transmission linkage will be lost resulting in vacuum advance being supplied in low gears.

High Gear Test - State 4 & 5

This test requires that the transmission be in 4th gear and the Engine Temperature Sensor be disconnected. Turn the ignition on and wait approximately 30 seconds. The Static Vacuum Advance test should indicate the Vacuum Advance Solenoid has supplied vacuum advance. See Figure 11 for the test sequence

Figure 11 - High Gear Test



Since I was not getting any vacuum advance in high gear and determined that my Vacuum Advance Solenoid was operating properly, my problems had to be related to a faulty Transmission Switch, faulty Time Delay Relay, or wiring problems. To start the test I performed a continuity test between the Transmission Switch terminal and the transmission case while in 4th gear. This test indicated a properly functioning switch with a closed circuit between the two test points. To double check, the transmission was put in neutral and a continuity check indicated an open circuit as it should be. So my Transmission Switch was functioning properly. This left only two possibilities for my TCS System malfunction; either faulty wiring between the Transmission Switch terminal and the Time Delay Relay, or a defective Time Delay Relay. The Time Delay Relay is located just to the right of the driver's side dash panel behind the center instrument cluster (PHOTO 7).



Photo 7

This photograph shows the original TCS relay installed in my car as it left the factory. This was the first time the center gauge cluster had ever been removed from my car. Note how the factory bent the Time Delay Relay bracket making it difficult to remove the attaching bolt at the window frame. This bracket should have a 90° bend as shown in PHOTO 4 with the relay terminals facing toward the floor of the car. Following the test sequence in Figure 11, I used a long length of test wire to extend the end of the black wire at the transmission into the car's interior to check the continuity between it and the black wire entering the Time Delay Relay. You have to disconnect the wiring connector from the Time Delay relay to gain access to the terminal at the end of the black wire. A closed circuit between the end of the black wire at the transmission and the end terminal of the black wire at the Time Delay Relay indicated no wiring problems.

Replacement of the Time Delay relay solved my problem. The motor speed now increases approximately 400 rpm 30 seconds after shifting into 4th gear.

CONCLUSION

I hope that this article will assist in restoring the operation of '72 small block TCS systems to factory design specifications. I suspected back in 2000 that the reason my system wasn't working was a defective Time Delay Relay, but I did not have a logical way of determining this much less even know where this relay was located. The methodical method described here allowed me to verify which components in the system were working properly and identify defective components. With the exception of an overheating situation, the diagnostics covered herein test of all of the operating characteristics of the TCS system. The overheating operating mode is not covered in order to reduce the length of this article and because this was not my primary problem.

Arizona Regional Meet

Once again it was nice to see so many CNJ Chapter members at the Arizona Regional in Tucson in early March. Gracing the list of Garden State faces was Bruce Crookham, Kevin Goodman, Dan Young, Jack Brown, Jim Loughlin and yours truly. It was a well planned and well executed regional that was a pleasure to attend. One of the highlights of activities there was the Bone Yard Tour. The Bone Yard is a section of Davis-Monthan A.F.B. located in Tucson where surplus Air Force, Army, Navy, Marine and Coast Guard aircraft are stored because of the favorable southern Arizona climate. Most of the planes can be readied for re-entry into military service if needed while others are there for disassembly and cannibalization of the parts that are no longer available from their original manufacturer. Congratulations to Tom Barr, Arizona Chapter Chairman and his staff for staging a very memorable regional.





From the Driver's Seat

Editor's Column

By: Bob Zimmerman

Thanks to the dozen or so members who have submitted photos of their Corvettes. By the time you read this we will be ready to post the first batch to our website. Just as a reminder, when you submit your photo(s) be sure to send them to me as a jpeg. The size won't matter as I will re-size them. Don't forget to include your member name, the year and color of your Corvette and the engine/transmission combination. Finally include any NCRS award the car has earned.

I don't know about you but I'm loving this balmy weather. This year is probably the earliest I've had my Vettes on the road and as far as I'm concerned that's a good thing. We don't even have to be concerned about a lot of residual salt on the highway that's usually present throughout the month of March.

Lastly, if any members are selling parts or their Corvettes, we will post your information and also your wanted items. Most folks who check out our website do so through the NCRS national website, so that means a lot of national exposure.

PARTS FOR SALE/WANTED

Turbo 400 removed from 20K mile C2 in 1974. Comes with matching converter, flywheel, cooling & vacuum lines, gear selector.

63-64 black non a/c dash (minus speaker grill and radio bezel and hardware) Very good original pads. Some vinyl cracking at Hinge pillar.

Set of 63 dash bezels radio and heater.

63 hood alignment blocks

4 15 x 6 Motor Wheel Company "Spyder" wheels. Mag center chrome rims. Center bullet some dings. No original lugs,

C3 conv top frame.

Will trade a C1 conv top frame for C2 top frame.

Contact member $\underline{\text{John.Wesley@MolinaHealthCare.com}}$ will forward pics and info.

