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Technicians Service Training

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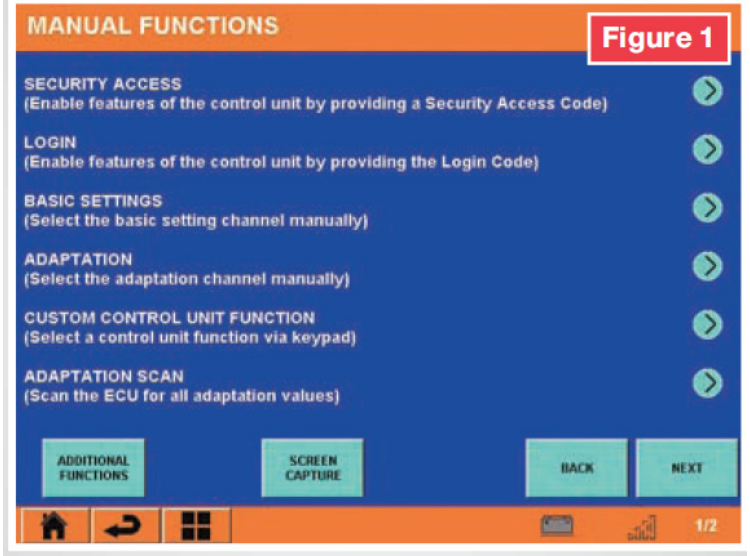
Editor
"G" Jerry Truglia

"European Programming"

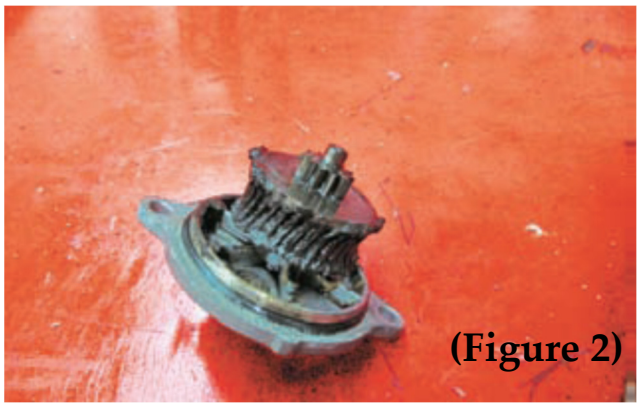
If you are working on European vehicles you know that one of the most common procedures you will need to perform after replacing a component is coding. Coding can be used to adapt a part or control unit to the vehicle right through many scan tools without going on the Internet. The coding information usually resides on the scan tool so there is no need to do anything other than carry out the function from the scan tool. As you can see from our example from an Autologic scan tool (Figure 1), there is a manual function that has been selected to code the control unit to the vehicle. Another common example that comes to mind is coding of the transmission transfer case motor on a BMW X drive vehicle. Many vehicle owners forget the golden rule of making sure they have all the same tread depth as well as tire style on all wheels of the vehicle. When a vehicle owner cheaps out by not installing four matching tires, they will damage their transfer case



(Con't on page 2)

"European Programming" (con't from p. 1)

servomotor and possibly damage the transfer case.



(Figure 2)

Look at (Figure 2) and see what happened on this 2007 BMW 328xi when this vehicle owner only replaced one tire while leaving three others that had different tread depths. After the vehicle was driven 5,000 miles or so he lost his "X" drive and had to go for an expensive repair along with four new tires. As you can see, the transfer case servomotor gear is completely stripped out. Our repair included draining and flushing the transfer case to remove debris before installing a new servomotor. The next step is very important and involves using a suitable scan tool that is capable of coding the servomotor to complete the job.

Now that we got the coding out of the way, it's time to look at programming and reprogramming and what's needed to be successful. These procedures can be as a simple as ignition key reprogramming or updating software of a computer module. There are a few different ways to program modules from OE to aftermarket scan tool interfaces. You're going to need the vehicle's battery voltage to remain stable by installing a clean low AC voltage output battery maintainer. When working on European vehicles you will need to invest in a battery maintainer that is suitable for the vehicle. Some vehicles, such as some newer BMWs, need a steady 14.6 volts with up to 90 amps depending on the model. Another precaution to follow is making sure you route the scan tool OBD II cable through the door without crushing the cable. This is usually done by leaving the door open after locking the latch lever on the door. If you route the cable through the open window, it may be crushed as the vehicle is being programmed due to the windows being activated during the programming procedure.

(Con't on page 6)

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.

Our Goal & Mission Statement

- ***Keep our fellow technicians up to date with the latest technology.***
- ***Provide training seminars for a reasonable price.***
- ***Deliver information that the technician can use now.***
- ***Keep technicians informed of information affecting our industry.***
- ***Increase consumer awareness of what a good technician is.***

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TST membership includes special pricing on weekday night seminars and the occasional full Saturday seminar. With a **$75.00 yearly individual or shop $250.00 membership, the seminars are only $50.00. TST seminars are NOT sales or product seminars.** The instructors that TST brings in are all "hands-on" industry experts with up to date, cutting edge knowledge that you can use in your shop the next day. That's 75 dollars for a seminar in which you are able to learn something useful, for fixing those tough jobs that we all see on a regular basis. Our instructors are masters at making the complex understandable. Membership also includes a newsletter full of real world technical articles, diagnostic case studies, and solutions to the kinds of problems you see in your bays each week.

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
Bob Pattengale of Bosch
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Information contained in this newsletter is intended for use by professional auto repair technicians familiar with approved vehicle repair procedures. The authors are not responsible for physical injury or property damage resulting from the incorrect application of information or procedures outlined in this volume.

Currently there are TST chapters in Connecticut, Massachusetts, New Jersey, New York and membership continues to grow. For more information you can call TST headquarters at:

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"European Programming" (con't from p. 2)

Also on the list is making sure all accessories are off and insuring nothing is disturbed during the process. Remember, in many cases the procedure can take hours. If anything is interrupted during the programming process there is a good chance the unit being programmed will be damaged and will not be recoverable. A damaged controller on a European vehicle will be a very expensive mistake.

Now let's take a look at an easy task, key reprogramming that you are most likely to encounter since keys and fobs are either broken or lost. Our example vehicle is an Audi/VW key reprogramming procedure, which can either be very easy or not. The procedure can range from using an existing key that has already been linked to the vehicle's security system, to programming a new replacement key. If the key and fob have been previously linked to the vehicle, the following procedure will work on many Audi/ VW vehicles. The procedure for previously programmed keys and fobs areas follows:

1. Make sure the batteries in the key fob are good.
2. Press and hold the unlock button on the remote.
3. While continuing to hold down the unlock button, insert the key into the ignition.
4. Turn the ignition to the "On" position, making sure the unlock button is still depressed for two seconds.
5. After two seconds have elapsed, turn the ignition off and release the button.

Check the key fob for all functions of lock, unlock and starting the vehicle. Make sure when you go to start the vehicle that the engine runs for more than a minute to confirm the key is linked.

Now if you are adding a new key, the procedure requires a scan tool capable of programming the key and requires a bit more time. You will need to insert a working key in the ignition that starts, runs and locks and unlocks doors before you proceed. Turn the working key until the dash lights are illuminated followed by rolling down the driver's side window to prevent any lock out problems.

(Con't on page 7)

"European Programming" *(con't from p. 6)*

The next steps are:
1. Exit the car and shut the door with the window down.
2. Use the new key and lock the door by turning the key in a clockwise direction.
3. Take the new remote and press the unlock button. The lights should flash once.
4. Wait 10 seconds then press the unlock button making sure the doors unlock.

If this procedure does not work and you tried it a few times you will have to use a scan tool such as the dealer ODIS or an aftermarket tool that is capable of programming the keys to the vehicle.

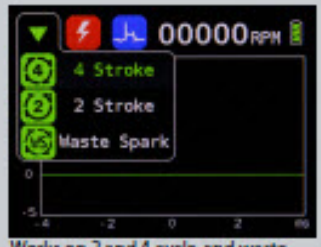
In many cases, programming is not a plug and play process; care must be taken before reprogramming or programming a vehicle's computer. Before you begin, be sure you review all of your service information resources for any known issues, including TSBs and OE calibration lists.

If you're using a laptop to program or reflash a vehicle, look up the OE requirements for the vehicle that you are working on before attempting to perform the function. These are some common requirements: a laptop with Windows 7 Professional with Service Pack 3 (SP3), minimum 2 USB ports, 9 male pin RS232 for older GM and some other vehicles, 4 GB of memory, 32 or 64 bit as per OE, and software Java (check the version the OE requires and do not install the latest version for most OEs). Disable automatic downloading and deleting of old versions for Java, Acrobat Reader, Internet Explorer (IE) (could be 9, 10, 11 or other) rather than check the version required and make sure there is no virus protection software on the laptop. You may think this is a bunch of mumbo jumbo, but it is important information with specifications that must be followed to be successful in programming or reprogramming vehicle computers.

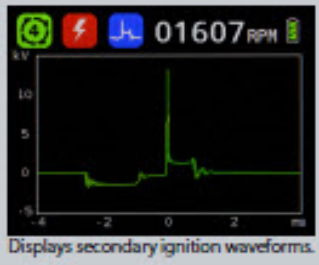
(Con't on page 10)

GTC505
Engine Ignition Analyzer

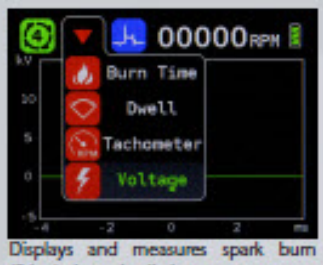
Complete ignition system diagnostic:



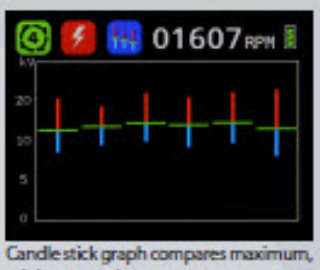
Works on 2 and 4 cycle, and waste spark ignition systems engines.



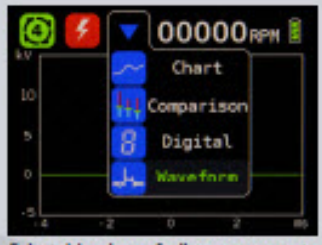
Displays secondary ignition waveforms.



Displays and measures spark burn (firing) time, dwell time, current ramp time, RPM, and spark plug peak voltage.



Candle stick graph compares maximum, minimum and average measurements of several cylinders.



Selectable view of all measurements modes as chart, compare graph, analog gauge / digital readout and waveforms.

Analog gauge and digital readout with maximum and minimum.

Quick, powerful and easy to use

- Plug the appropiate sensor pick-up into the flexible probe
- Select the engine's cycle (4-stoke, 2-stroke, or waste spark)
- Select the measurement type and display format
- Place the pick-up on top of the ignition module, or over the spark plug wire
- The GTC505 will automatically detect and adjust all parameters to provide accurate measurements and clear graphs

Useful for troubleshooting:

- Non-starts
- Misfires
- Intermittent problems
- Primary and secondary coil circuits faults
- Fouled or damaged spark plugs
- Damaged spark plug wires


Specially designed pick-ups for coil on plug ignition modules (left) and spark plug wires (right).

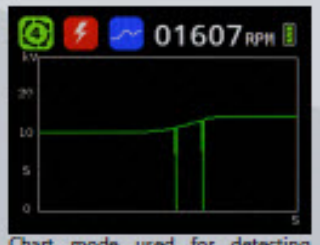


Chart mode used for detecting intermittent or infrequent failures and misfires.

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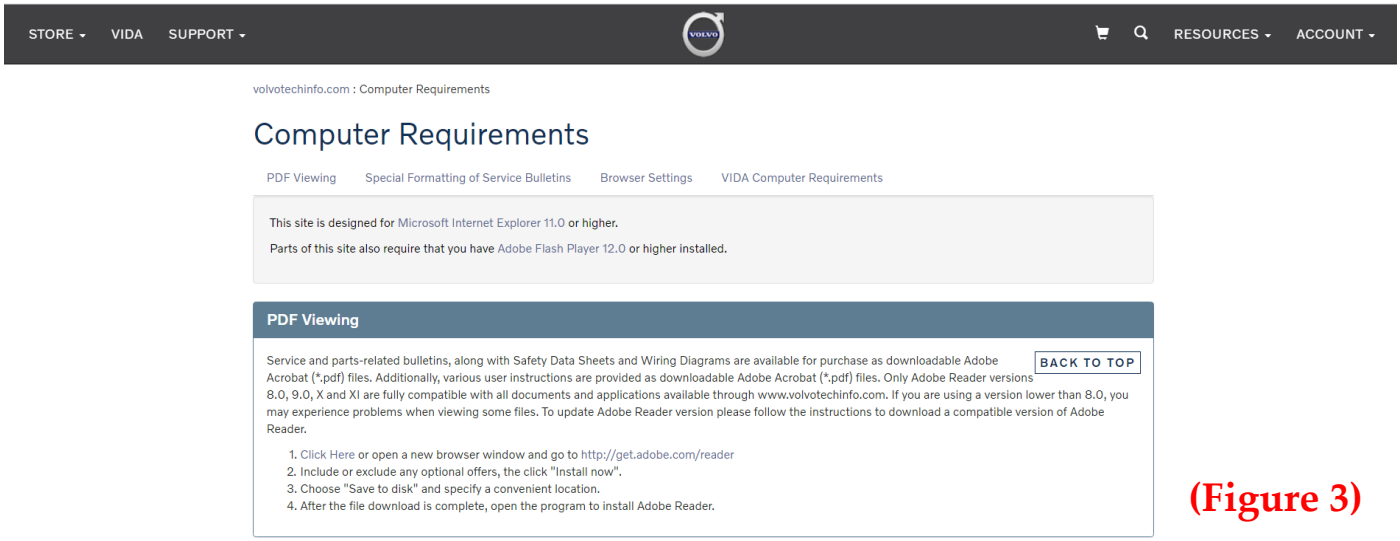
"European Programming" *(con't from p. 7)*

You also need a good, stable high speed wired or wireless Internet connection along with the application software from the OE website. Turn off all accessories, make sure there are no DTCs in the vehicle's computers, use a battery maintainer that has less than 1 volt AC ripple and make sure the maintainer can output the required voltage and amperage required by the manufacturer.

NOTE: you cannot use your shop's battery charger for this and if you try, you'll be buying a lot of new control modules!

Take a look at the Volvo website (Figure 3) that has information on using their factory scan tool called VIDA. Take a look at what they have printed in bold about using the correct Internet browser. It states that VIDA and their download software will not work using anything lower than Internet Explorer (IE) 11. Also look at some of their announcements that refer to using Windows XP, programming instructions and laptop issues with the Panasonic semi rugged Toughbook 53. This screen shot is an example from one OE. Others will have different information and requirements that you need to follow. Purchasing subscriptions for programming/ reflashing of a Euro vehicle can range from approximately $50 to $1,400. Check NASTF.org for more information.



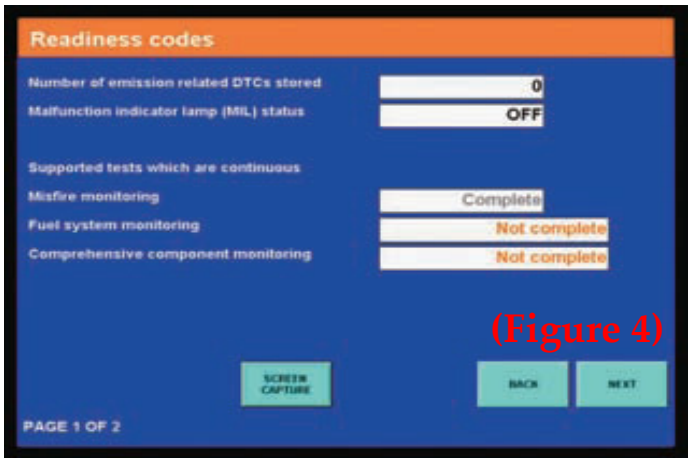
(Figure 3)

(Con't on page 11)

"European Programming" *(con't from p. 10)*

Now let's move on to programming a vehicle to see that it's not that difficult. If it's your first time programming or reflashing a control unit, take the time to make sure you have everything you need before you proceed. Make sure the laptop is plugged in and has a good battery in case of a power interruption. It's important to make sure you concentrate on the task at hand without being interrupted during the process. These steps are very important because computers can become "bricked" (not reusable) if you don't follow the proper procedure that the OE has outlined. So, once again, make sure to be prepared and read all the information they recommend prior.

A real-world problem vehicle that my friend John was working on is a great example of a vehicle that needs to be programmed. The vehicle was a 2003 BMW Z4 with 124,000 on the odometer that failed state inspection for monitor problems. The vehicle had two Continuous Monitors (Figure 4) that were not Ready. There are three Continuous Monitors —Comprehensive Component, Fuel and Misfire — that are always displayed as Ready/Complete on all OBD II vehicles. This Z4 only displayed the Misfire Monitor as Complete and the other two as Not Complete, while all the Non Continuous Monitors were Complete. A check of TSBs found that there was a software update available. John understood that there was no drive cycle or enabling criteria that he could perform to change the vehicle's Non Complete/Ready status. The option he had available was to tell the shop that the unit could (Figure 4) be reprogrammed with no guarantee it would work or purchase another ECU/PCM that would need programming as well. The shop owner opted to go with the programming of the PCM because it was the cheaper of the two choices available.



(Figure 4)

Looking for an explanation on what the software update

(Con't on page 14)

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"European Programming" *(con't from p. 11)*

would fix was another story. In researching TSBs for this vehicle I found one that is related to an emission problem that deals with sensors not reporting the correct information to the PCM. This TSB is important but most likely will not resolve the problem at hand. Looking at it another way, it's good information to use when speaking to the vehicle owner and suggesting reprogramming the vehicle. Since there is an update to show the vehicle owner, it makes it easier to suggest that the vehicle be reprogrammed with the latest software first. The procedure started by connecting a battery maintainer to the vehicle, turning off all accessories, and starting the program to update the software.

Once the program was complete, the vehicle's Continuous Monitor was now set to Complete. The vehicle now needed to be driven to complete the Non Continuous Monitors that were cleared due to the programming of the PCM. Any time a vehicle battery is disconnected, DTCs are cleared or the PCM is programmed, all the Non Continuous Monitors will be Not Complete while the Continuous Monitors are always Complete and ready to run looking for emission problems. The vehicle was repaired with reprogramming of the PCM to the latest software version.

Our next programming example is a 2006 Land Rover LR3SE with a 4.4L motor that was plagued with a bunch of problems that were reported on a system scan. Many of the problems reported just did not make sense, especially after checking all the basics along with powers and grounds to the PCM. The faults in the report were everything from low battery voltage to misfires along with suspension, transfer case, control unit calibration issues, CAN Bus problems and so on. There was an overwhelming amount of problems that did not make sense. The vehicle owner was told after spending over $3,500 at the dealer that there was at least another $4,500 or more that this vehicle needed before it was going to be repaired. I questioned the vehicle owner on what problems he was experiencing with the vehicle. He told me the vehicle was not performing like it used to and that the check engine light was on. He showed me the repair order from the Land Rover dealer that had crank sensor to spark plugs beside a

(Con't on page 20)

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WHAT MAKES OUR LAPTOPS SO SPECIAL?

"European Programming" (con't from p. 14)

three-hour minimum of diagnostics fees. After reviewing the invoice and speaking to the vehicle owner, I still had no clue what the problem was. I checked everything I could get my hands on from TSBs, to Identifix, Alldata, ProDemand, Google and YouTube. Since this is a European vehicle, I decided to check the computer areas for signs of water leaks, which are a common problem. The areas where the computers were located and the computers themselves were all dry, so I ruled out that possibility. Since I had no other direction to go, I decided to perform a battery disconnect by removing both battery cables and connecting a 1 ohm – 10 watt resistor that will bring the capacitors down and reset the computers. I drove the vehicle around for a few days before performing a full system scan test again, only to come up with the same results. Now I decided to connect my Autologic to the Internet server and downloaded all the program files needed to update the controllers. I followed the normal procedure of clearing all DTCs in every computer, installing a battery maintainer, and making sure all accessories on the vehicle were off. I started with programming the PCM first since it seemed the most logical place to start. After programming the vehicle, I rescanned the system to check for any DTCs and found none. I called the vehicle owner to inform him where I was with the repair and suggested he leave it with me for a few more days. After driving the vehicle approximately the same amount, if not more miles than I did on the previous test drive, I rescanned the vehicle and found no problems in any of the controllers. The new program files (update) were just what this vehicle needed to be fixed. If I did not have the ability and tooling to reprogram this vehicle it would have not have been repaired.

Speaking of water problems, the 2003 BMW Z4 had the airbag module go for a swim. This vehicle had a problem with the convertible top that was no longer sealing water out. The seal to the convertible top on the driver's side of the vehicle had been displaced and disfigured due to leaf and twig debris that had made its way between the seal of the convertible top and the vehicle's body. After time, this became the path for water to find its way into the vehicle. The airbag module had water inside of it as well

(Con't on page 21)

"European Programming" *(con't from p. 20)*

as the vehicle being totally wet on the floor pan. We had to remove the seats and rug to get this vehicle down to the metal so we could dry everything up and install the new module.

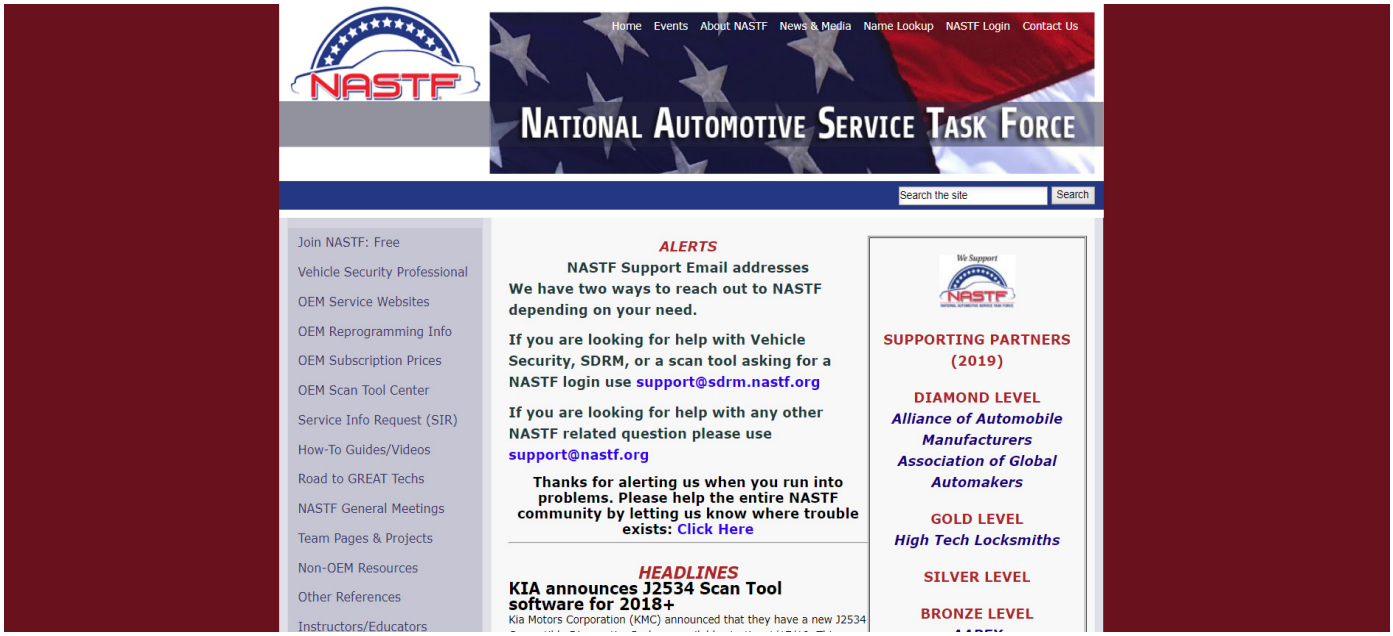
Once the new airbag module was installed, we followed the BMW recommended procedure. BMW states that when a control module in the safety system is replaced, the coding programming process must be performed so the system time can be started. If system time has not automatically started after the coding programming process was completed, a fault will be displayed as "System Time Error" in the control module. If the message appears, the system will need to be started manually by using the service function. Lucky for us, the coding programming process on the Z4 airbag module went without a hitch. After the process was completed we checked the module for codes and then ran a complete system scan that provided a DTC and BUS problem-free vehicle.

Remember that programming, reprogramming and coding are functions on European vehicles that are a common task. Getting yourself started in European programming entails research on what tools you need to purchase whether OE or aftermarket. There are two very capable scan tools I use for programming Euro vehicles. The first one I use most often is the Autologic, which also has a great tech support line that is willing to help you through any problem. The other is Autoland Scientech i Scan II and now i Scan 3 wt, which is good for module coding along with some programming capabilities for some vehicles. If you want the OE tools, there is a great option to download the OE software for Audi/ VW, BMW, Ranger Rover, Jaguar and Volvo for full factory capability using the Drew Tech CarDAQ- Plus 3 or CarDAQ-M as the J2534 link between the laptop and the vehicle. One last and important tool I mentioned before is a good battery maintainer, such as Associated, Midtronics or the Fronius, that is adjustable and capable of handling all European vehicle lines.

(Con't on page 24)

"European Programming" *(con't from p. 21)*

Since vehicle systems are getting more security features it is important that you go to www.NASTF.org and register for your LSID / VSP license. In the upper left hand corner in the Search box type in LSID and follow the direction to download the paperwork that you need to fill out. After you complete that process you will need to go to the Audi/VW website and follow the di-



rections to apply for their license that is separate. Once you are approved you can program the vehicle along with keys for Audi /VW vehicles.

Hopefully I've provided you with some insight on what you need and can do to program European vehicles.

Article By "G" Truglia TST Founder and President

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