



# TECH TIPS

**SPECIAL  
EDITION**

**SERVICE TIPS FOR THE AUTOMOTIVE TECHNICIAN**

In this special edition of Tech Tips, we will address some of the questions that technicians ask most frequently regarding computer relearn procedures when they install our remanufactured computers. We have also included a section addressing questions regarding the BDM scan tool and Iflash software

## GENERAL MOTORS VEHICLE COMPUTER RELEARN PROCEDURES

Performing any of the following repairs may require you to initiate a computer relearn procedure in order to restore proper vehicle operation.

- Powertrain Control Computer replacement with a non-transferable PROM
- Powertrain Control Computer reprogramming
- Body Control Computer
- Instrument Cluster replacement
- Engine replacement
- Crankshaft replacement
- Crankshaft harmonic balancer replacement
- Crankshaft position sensor replacement
- Diesel Engine controller
- Diesel engine PCM with or without injection pump replacement
- Diesel engine front cover replacement

Here are some helpful tips to perform the system relearn, depending upon the particular repair that you have performed.

### Powertrain Control Computer Replacement with a non-transferable PROM

All computers being replaced must be reprogrammed or "reflashed". This is so the replacement computer has the most up-to-date information for that particular vehicle. This information is specific for the vehicle based on the vehicle identification number, and cannot be used on another vehicle, even though they may appear to be similar. Relearn procedures involve: Crankshaft Variation (CASE Learn), Engine Idle speed, Theft Deterrent password, and Transmission adaptive shift points.

### Powertrain Control Computer Reprogramming

If diagnostics reveal that a reprogram or re-flash of the computer is necessary, relearn procedures involve: Crankshaft Variation (CASE Learn), Engine Idle speed, Theft Deterrent password, and Transmission adaptive shift points.

### Body Control Computer &/or Instrument Cluster replacement

Theft deterrent password relearn is necessary.

### Engine, crankshaft, harmonic balancer, and crankshaft position sensor

If any of the above items are replaced, then a Crankshaft Variation relearn is necessary.

## RELEARN PROCEDURES

**IMPORTANT:** Please note that the Theft Deterrent Password Relearn must be performed first, otherwise the vehicle may not start.

## THEFT DETERRENT PASSWORD RELEARN

General Motors uses three different types of vehicle theft deterrent systems in their cars and trucks manufactured from 1986. They are:

1. Pass-key or Passkey 2 (PK2)
2. Passlock
3. Passkey 3 (PK3) or Passkey 3+

Instead of listing all of the vehicles and the systems that they use, we will simplify the identification process by taking a look at the vehicle ignition key (Refer to page 8 for key identification). There is one other system, referred to as VATS (Vehicle Anti-theft System) that is used by GM. This system is similar to Passkey, but since a relearn is not necessary, we will not elaborate on this system in this article. By referring to the chart and matching the correct key, you can safely identify the system that the vehicle uses, and, in turn, determine the correct relearn procedure. *Just remember, that this article pertains only to those vehicles with a re-programmable or "re-flashable" PCM.*

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## PASSKEY & PASSKEY 2

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This system consists of: the Powertrain Control Module (ECM or PCM), Body Control Module (BCM) or Passkey theft deterrent module, and the ignition lock and key. In most cases, the theft deterrent duties are handled by a Passkey module. In those vehicles, if you are replacing a key, all you must do is match the resistance of the existing key that is in use. If you replace the theft deterrent module, then the module will learn the existing key resistance with the first start up sequence. At that point, the resistance is permanently memorized by the module, and can no longer be changed. No relearn is necessary. In this situation, the vehicle will start and run with no problem. If the vehicle won't start, check your scan tool for a VTD (Vehicle Theft Deterrent) Fail-Enable Mode trouble code, or if the security light on the dash is illuminated. If you have this code, then the vehicle probably is equipped with a BCM, and you must perform a relearn.

The next section applies only to those vehicles that use a BCM. For those vehicles that use a BCM, the BCM can learn the resistance value of the existing key by using the relearn process.

In order for the vehicle to start, the BCM (as well as the Passkey module in other vehicles) must identify the resistor pellet in the key, then the BCM sends a password to the PCM. If this password matches the password stored in the PCM, the system enables fuel delivery. So you can see that if either the BCM or PCM are replaced, a relearn procedure is necessary. This same relearn procedure can be used if an ignition key with a different resistance value is used to replace the existing key.

Before beginning the relearn, make sure there is a fully charged

battery in the vehicle, and both the BCM and PCM are properly powered up and in communication with each other. Now you're ready to initiate the relearn procedure.

- 1. First, insert the ignition key and turn the ignition switch to the "On" position (Do not start the engine). Leave the switch on for 11 minutes. The security light may flash or be on steady during this 11 minute period. Make sure the light is no longer on or flashing before proceeding to #2 .**
- 2. Turn the ignition switch off for 30 seconds.**
- 3. Turn the ignition switch to the "On" position (as in step #1) for 11 minutes again.**
- 4. Turn the ignition switch off for another 30 seconds.**
- 5. Turn the ignition switch to the "On" position for 11 minutes a third time.**
- 6. Turn the ignition switch off for 30 seconds one final time.**
- 7. Turn the ignition switch to the "On" position one final time and wait 30 seconds.**
- 8. Attempt to start the engine. If the engine starts and runs normally, the relearn is complete.**

If the engine does not start, check for trouble codes and address them before attempting the relearn procedure again.

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## PASSLOCK

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The Passlock system is designed to prevent vehicle operation if the key is not used to start the vehicle. The key, which does not contain a resistor will turn the Passlock lock cylinder. The Passlock lock cylinder will relay a resistance code to the instrument panel cluster (IPC). It does this by rotating a magnet past a stationary hall effect sensor, creating a resistance code. At this point the IPC will determine if the resistance

code is correct and within an acceptable time frame. If the code is correct, the IPC will send a coded password to the powertrain control module (PCM). If the PCM receives the correct password, it will allow the fuel injectors to operate normally and the vehicle will start and run normally.

If the correct resistance code from the lock cylinder is not received within the acceptable time frame, the vehicle will go into a **short tamper mode** during which the theft deterrent system will not allow the vehicle to operate for approximately 4 seconds. When this occurs, the **security** indicator will flash. After three consecutive failed tries, the system will enter into a **long tamper mode**. In this mode, the fuel injectors will be disabled for approximately 10 minutes, and the security indicator will be flashing. Please note that in any of the tamper modes, the vehicle may start, but it will quickly stall.

The Passlock system is designed to prevent vehicle theft even if any of the theft deterrent parts are replaced. Passlock eliminates the need for the key mounted resistor.

Parts that can no longer be replaced without the possibility of the system going into a tamper mode and prevent starting are: the lock cylinder, the instrument panel cluster (IPC), and the powertrain control module (PCM).

In order to initiate the relearn:

1. Hook up your scan tool to erase any of the passlock/vehicle theft deterrent trouble codes. If there are any other codes, note them before you erase them, so you may address them after the relearn has been completed.

2. With the ignition key in the "On" position from the code-clearing step, attempt to start the vehicle. At this point, if the vehicle starts, and the security light has not illuminated, a relearn is not necessary, and you're done. If the vehicle starts and stalls,

leave the key in the "Run" position and wait for the "Security" light to turn off. This will take approximately 10 minutes. At any time during this relearn, the light may flash or be on steady. If the ignition switch is turned off at any time during this relearn cycle that the security light is illuminated, the entire cycle must be restarted from the beginning.

*For most cars, one cycle will be sufficient for the relearn. If the vehicle will not start after the first cycle, then continue the process from step #3 to the end.*

*Most trucks will require that you continue from step #3 to the end.*

3. When the light turns off, turn the ignition switch to the "Off" position for approximately ten seconds.

4. Next, repeat steps 2 and 3 two more times for a total of three cycles. After the third time, the new code will be relearned on the next start attempt when the ignition switch is rotated from the "Off" position.

5. From the "Off" position, start the vehicle, observing the security light. If the vehicle starts and runs normally, and the security light is off, the relearn is complete. If the vehicle does not start, check for trouble codes before proceeding further.

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## PASSKEY 3 AND PASSKEY 3+

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In this system, the vehicle theft deterrent functions are provided by the theft deterrent control module. There is a transponder embedded in the head of the key that becomes energized by the exciter coils in the ignition lock cylinder when the ignition switch is turned on. The energized transponder now transmits a signal containing a unique value to the theft deterrent control module. If the module accepts this value, then there is an additional communication that takes place between the module and the key. If the module and the

key agree, then the module sends the fuel enable password to the PCM. If the PCM recognizes the password, then the vehicle starts and runs normally.

If any of the communication between the module and the key is incorrect or the PCM does not recognize the password, then the fuel injectors are disabled.

The ignition key is a normal looking key with no visible contacts as in the Passkey or VATS systems. The transponder is located in the key head. The transponder value is fixed and cannot be changed. These keys are usually identified by the letters PK3, or PK3+ stamped into the steel body. A relearn will be necessary if any of the following have been replaced: any key, the theft deterrent control module or the powertrain control module (PCM).

When the theft control module is being replaced, the module will learn the existing keys immediately. However, the PCM must learn the new fuel enable password from the new module. If you are replacing a PCM with a PCM that has been used in another vehicle or has been remanufactured, then a relearn must be performed in order for the PCM to learn the fuel enable password. Keep in mind that when you perform a relearn on this system, all previously learned keys will be erased from the theft deterrent control module's memory. Any additional keys may be relearned immediately after the first relearn has been performed by inserting the additional key and turning the ignition switch to the "On" position within ten seconds of removing the previously learned key.

In order to initiate the relearn process:

1. Insert a master key (black head) into the ignition switch.

2. Turn to the "On" position without starting the engine. The security light should illuminate and stay on.

3. Wait approximately 10 minutes or until the security light turns off.

4. Turn off the ignition switch and wait 5 seconds.

5. Repeat steps 2 through 4 two more times with the same key.

6. Turn the ignition off. The vehicle will now learn the key transponder information on the next start cycle.

7. Start the vehicle. If vehicle starts and runs normally, and security light is off, the relearn is complete.

**If additional keys are to be relearned:**

8. Turn the vehicle off.

9. Insert the next key to be learned and turn the ignition switch to the "On" position within 10 seconds of removing the previously used key.

10. Wait for the security light to turn off. It should happen quickly. You may not even notice the light come on, because it will learn the key transponder immediately.

11. Repeat steps 8 through 10 for any additional keys.

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## CRANKSHAFT VARIATION RELEARN (CASE Learn)

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"CASE" means: crankshaft angle sensor error.

A crankshaft variation relearn **must** be performed if:

*A diagnostic trouble code of P1336 is present.*

*The computer has been replaced or re-programmed.*

*The crankshaft position sensor has been replaced.*

*The engine, harmonic balancer, clutch, or flywheel have been: disassembled, removed, or replaced.*

The crankshaft position variation learning feature enables the computer to compensate for part manufacturing tolerances. This

allows the computer to accurately detect an engine misfire throughout the engine RPM range. The learning process is stored in the computer's memory and does not have to be repeated unless one or more of the above conditions are present.

To perform the relearn, proceed as follows: Connect a scan tool to make sure there are no trouble codes stored in the computer's memory. If there is any power train trouble code other than P1336 (Crankshaft Position Variation not learned), the computer will disable the relearn function until the problem that caused the code has been eliminated. Also, make sure that the engine coolant (check it when the engine is cold) and oil levels are at an acceptable level.

1. Set the parking brake and block the drive wheels. Make sure that the hood is closed.
2. Start the engine and make sure that the engine coolant temperature is at least 158 degrees F. (70 degrees C.)
3. Turn the engine off for at least 10 seconds.
4. Select the crankshaft position variation learn procedure (CASE Learn) on your scan tool.
5. Make sure that the transmission is in Park. Start the engine.
6. Apply the brakes and hold the pedal firmly.
7. Follow the scan tool instructions.

**Remember:** That you are going to increase the engine speed to approximately 3000 RPM, 4000 RPM, or 5150 RPM. That's the variation learn fuel cutoff RPM (depending upon the engine), and that it's important to release the throttle when the engine RPM starts to decrease as a result of the fuel cutoff going into effect. Failure to do such will result in over revving of the engine, causing possible engine damage.

8. Once the engine has returned to idle, check the status of Diagnostic trouble code **P1336**. If the scan tool

indicates that the CASE has been learned, the relearn procedure is now complete. If CASE has not been learned, check for the presence of other power train codes. If any exist, correct the problem, then repeat this procedure.

**NOTE: If the Crankshaft Variation Relearn is not accessible through your scan tool (some truck applications 1998 & later), perform the relearn in the following manner:**

1. Turn off all of the accessories. With the Air temperature sensor and Coolant temperature within 5 degrees (Centigrade) of each other, start the engine and let it idle in Park or Neutral for two minutes.
2. Accelerate the vehicle to 55 mph at part throttle. Cruise at 55 mph for 8-10 minutes until the engine reaches operating temperature.
3. Cruise at 55 mph for another 5-6 minutes.
4. Decelerate to 45 mph without using the brakes, and maintain 45 mph for 1 minute.
5. Perform 4 deceleration cycles, without using the brakes, of 25 seconds each where no specific speed is necessary. Returning to 45 mph for 15 seconds in between deceleration cycles.
6. Accelerate to 55 mph and cruise for 2 minutes.
7. Stop the vehicle and idle for 2 minutes with the brake applied and the transmission in Drive (automatic trans.) or Neutral (manual trans.) with the clutch depressed. Refer to diagram A on page 8.

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## BASE IDLE RELEARN

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The Computer will reset the idle air control valve whenever the ignition switch is turned to the "On" position, then to the "Off" position.

However, before you return the

car to the customer, it is best to bring the engine up to operating temperature in Park with the air conditioning off. Then, turn the air conditioning on. Next, turn the air conditioning off. Next, place the transmission selector in drive. Finally, with the car in Drive, turn the air conditioning on. That's it!

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## DIESEL ENGINE TDC OFFSET RELEARN PROCEDURES

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This procedure should only be performed when one or more of the following has occurred:

1. A diagnostic trouble code of P1214 (TDC offset not established) is present.
2. The engine has been replaced.
3. The front engine cover has been replaced.
4. The PCM with or without the injection pump has been replaced.
5. The crankshaft position sensor has been replaced.

*NOTE: Replacement of the only the injection pump does not require this procedure.*

In order to initiate the relearn:

1. Hook up your scan tool.
2. Start the engine and idle engine until coolant temperature is at least 170 degrees F.
3. Clear any diagnostic trouble codes, if any. Then turn the engine off.
4. Turn the ignition switch to the "On" position. Do not start the engine.
5. Prepare the PCM to activate the offset relearn by placing and holding the accelerator pedal in the fully open position for no less than 45 seconds. Then release the pedal.
6. Turn the ignition switch to the "Off" position for 30 seconds. To confirm that the PCM has powered down, you should get a "No communication with vehicle" message on your scan tool.

7. Now start the engine and make sure that the coolant temperature is 170 degrees F or higher.
8. As soon as the engine coolant has reached 170 degrees F. and the engine speed is below 1500 RPM, the PCM will automatically learn the new TDC offset. A slight stumble in engine RPM is indicative that the new TDC has been activated.
9. Verify the TDC offset reading on your scan tool. The TDC offset should be between -0.25 and -0.75 degrees. If the TDC offset is within the specification, the relearn is completed. If the offset is out of specification then the injection pump must be adjusted. If the injection pump has not been replaced or adjusted and the TDC offset is very high on the positive side, then check for damage on the camshaft driven gear or key-way. If the TDC offset is very high on the negative side, check the crankshaft sensor for proper installation.

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## TRANSMISSION RELEARN

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There is no relearn procedure other than to drive the vehicle. It is best to road test the vehicle, as the PCM will relearn the adaptive pressure shift points for proper transmission operation. The transmission may not shift as usual until the shift points have been learned. It is recommended that the first shift sequence be performed manually. Shift the transmission from low (first) gear to overdrive, one gear at a time, under moderate acceleration. If you turn the vehicle over to the customer without a road test, you may want to call this to their attention.

**Joe Dantuono-Top Gun Technician**  
**Nick Rinaldi- Tech Manager**

Here is a list of the most frequently asked questions and their answers regarding the BDM scan tool and the *Iflash software*.

### 1. When can I expect my TIS2000 Data updates?

Data updates are released from GM at infrequent intervals. Most often 1 or 2 updates per quarter.

### 2. How can I tell if a GM vehicle requires an update to its calibration?

Using an enhanced scantool like the BDM, read the CAL ID of the vehicles ECM and compare with the GM website <http://calid.gm.com/>. If the CAL ID number is different the vehicle requires an update.

### 3. Where can I find detail on the different calibrations available for a GM vehicle?

Enter the VIN at the GM website <http://calid.gm.com/>.

### 4. Can I program a remanufactured AC Delco ECM?

Yes you can, but only with General Motors TIS 2000 software version 2.4 or higher. However, in order to successfully reprogram an AC Delco ECM with TIS 2000 version 2.4, you must select "Replace and Program ECU" on the programming process selection on the first selection screen.

### 5. What happens if I lose power during programming?

The units are usually recoverable by starting the programming sequence once power is restored.

### 6. There is more than one calibration to choose from. Which do I select?

The normal selection is "initial system calibration". However, in some instances, you may be faced with a selection for a specific vehicle

platform: example - choose G Van or C/K Pick up. Your customer supplies this information. There may also be a bulletin selection for a specific problem: example - Telecommunications Interference. Choose at customers request.

### 7. Can we program GEO and Isuzu products?

No. These units are not supported by existing software.

### 8. Can I enhance the performance of my car through flash programming?

The performance improvements include fuel economy, emissions, diagnostics among others. The iflash will not drastically impact horsepower or acceleration.

### 9. What are "post programming instructions" and "controller specific instructions" that appear once programming is complete?

"Post programming instructions" are given at the end of the programming event. These instructions are necessary for the operator to perform prior to disconnecting the ECM "Controller specific instructions" are instructions that must be carried out by the technician installing the ECM.

### 10. What is CASE learn?

CASE learn stands for "crank angle sensor error" learn. Some vehicles require this procedure to be performed when installing a new ECM into a vehicle or if a code P1336 is present. The BDM can perform this function.

### 11. Where can I find the serial # of by BDM tool?

The BDM Serial # can be found on the bottom of the scantool beside the threaded brass mount. Simply pull back the yellow rubber housing and read the 7 digit # (ie 99B0001)

**12. Can I program Body modules with the TIS2000 software?**

No, as of July'03 TIS2000 software can only be used to program GM Engine Control Module calibrations. The ability to update GM Body and Chassis modules may be available from GM soon.

**13. How often is the TIS2000 application updated?**

The TIS application is the PC program application. It connects with the data to compile the calibration for the specific vehicle. This application is occasionally updated on no set schedule.

**14. What does off-board programming mean?**

Off-Board simple refers to the ECM being reprogrammed off the vehicle.

**15. Can I program on car?**

Yes. The iflash equipment can program on the car as well. See the iflash "User Guide" for more details.

**16. How do I select the correct harness?**

The harness number will be indicated beside PCM number on the cross-reference chart ST8873-1. Any PCM number not on the chart is currently not supported.

**17. What is Chrysler VIN programming?**

Chrysler PCMs are updated to the latest calibration by Blue Streak at the time of remanufacture. The customers VIN needs to be inserted in the PCM for proper function in the vehicles network.

**18. What is the latest version for my "Flash" cartridge?**

It is important to always keep your "Flash" cartridge updated. As of July'03 the latest version is 3.01. Refer to [www.bsecorp.com](http://www.bsecorp.com) for the latest version.

**19. What are the PC requirements for flash programming?**

CPU:166 Mhz , Hard Drive:2.5 GB, RAM:32 MB,Video RAM:1 MB,LS Cache:256 KB,CD-ROM:16X speed,OS:Win 95b/98/ME/2000/XP, ISA/PCI Bus 1 Parallel and 1 serial RS232 port.

Here is a description of the possible iflash codes and how to remedy them.

**GM SPS Programming Error Codes**

ERROR	DESCRIPTION	SOLUTION
E665	Communication could not be established w/the Diagnostic Tool! Ensure proper connection	1 BDM / BDM Pro FLASH software is the latest version. 2 BDM / BDM Pro is on main menu and double click iFlash icon 3 The RS-232 connection from PC to BDM / BDM Pro is proper.
E666	Access to database denied.	1 Disconnect and reconnect security dongle and restart computer. Repeat if necessary.
E1162	Access to service programming server was denied. No hardware key was found.	1 Ensure the <b>security Dongle key</b> is properly installed; Select " <b>Configuration</b> " in the TIS menu bar on the top of the screen; Choose " <b>I/O Management</b> " selection under the <b>Configuration</b> pull down menu and the <b>I/O Management</b> screen pop up; Click " <b>Properties</b> " button while making sure " <b>Dongle</b> " is highlighted and the " <b>Properties</b> " screen will pop up; Pull down the Port selection and select " <b>LPT1</b> "; Then click " <b>OK</b> " button; Exit TIS2000 and <b>iflash</b> software; Restart <b>iflash</b> for SPS programming.
M676	The ECU could be a service ECU!!!	1 This is just a message. It indicates the PCM / VCM does not contain a VIN and calibration. Usually seen on DELCO PCMs / VCMs. Continue as usual.

**Note: All Errors could be a result of the RS232 cable. Make sure that the modular end of the cable (BDM Side) is secure and no strain is placed on the cable.**

ERROR	DESCRIPTION	SOLUTION																																							
E2387	<p>Important: The calibration selected is already the current calibration of the control module. Reprogramming with the same download file is not allowed.</p>	<p>1 This indicates that the PCM / VCM to be programmed already contains the calibration in which you are trying to program.</p> <p>2 If this is a BSE remanufactured PCM / VCM, follow the procedure below.</p> <p>a) Select Replace and Reprogram instead of Reprogram only.</p> <p>b) Select 2001 Light Duty Truck w/Gasoline fuel in the preparing for communication screen.</p> <p>c) Select NEXT when asked to turn ignition off and change module.</p> <p>d) Enter the VIN of the customer's vehicle to be programmed.</p> <p>e) Select the calibration, and program the ECM.</p>																																							
E835	No selection is made in one or more modules... select a VALID part from each module.	1 In the calibration selection screen, make sure that tabs have GREEN checkmarks. If not select the tab and check a calibration.																																							
E837	No selection made to one of the option ...	1 Select Reprogrammable - without RPO K29 and proceed as usual.																																							
E2858	The communication could not be established with the vehicle / controller.	<p>1 Is the ECM a BSE ECM? We cannot guarantee to program other remanufactured or used ECMs</p> <p>2 Make sure that both LEDs are lit on the interface box (RED &amp; GREEN)</p> <p>3 Make sure that the ignition switch is in the on position.</p> <p>4 Make sure the correct harness is used and correct cross for ECM is made.</p>																																							
E842 / E671	VIN not found / The VIN validation failed, please check the entry in the edit box and try again!!!	<p>1 The VIN entered is not found / valid. Note that VIN numbers are 17 digits and do not contain the letter 'I' or 'O'.</p> <table border="1" data-bbox="846 877 1529 1325"> <thead> <tr> <th data-bbox="846 877 954 940">VIN Digit</th> <th data-bbox="954 877 1268 940">Light Duty Trucks / MPV / Incomplete</th> <th data-bbox="1268 877 1529 940">Passenger Car</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Number</td> <td>Number or Letter</td> </tr> <tr> <td>2</td> <td>Letter</td> <td>Letter</td> </tr> <tr> <td>3</td> <td>Number or Letter</td> <td>Number</td> </tr> <tr> <td>4</td> <td>Letter</td> <td>Letter (Carline)</td> </tr> <tr> <td>5</td> <td>Letter (Line)</td> <td>Letter (Series)</td> </tr> <tr> <td>6</td> <td>Number (Series)</td> <td>Number</td> </tr> <tr> <td>7</td> <td>Number</td> <td>Number</td> </tr> <tr> <td>8</td> <td>Number or Letter (Eng)</td> <td>Number or Letter (Eng)</td> </tr> <tr> <td>9</td> <td>Number</td> <td>Number</td> </tr> <tr> <td>10</td> <td>Number or Letter (Year)</td> <td>Number or Letter (Year)</td> </tr> <tr> <td>11</td> <td>Number or Letter</td> <td>Number or Letter</td> </tr> <tr> <td>12-17</td> <td>Number</td> <td>Number</td> </tr> </tbody> </table>	VIN Digit	Light Duty Trucks / MPV / Incomplete	Passenger Car	1	Number	Number or Letter	2	Letter	Letter	3	Number or Letter	Number	4	Letter	Letter (Carline)	5	Letter (Line)	Letter (Series)	6	Number (Series)	Number	7	Number	Number	8	Number or Letter (Eng)	Number or Letter (Eng)	9	Number	Number	10	Number or Letter (Year)	Number or Letter (Year)	11	Number or Letter	Number or Letter	12-17	Number	Number
VIN Digit	Light Duty Trucks / MPV / Incomplete	Passenger Car																																							
1	Number	Number or Letter																																							
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10	Number or Letter (Year)	Number or Letter (Year)																																							
11	Number or Letter	Number or Letter																																							
12-17	Number	Number																																							
E2906	Calibration marked with an asterisk [*] are not recognized by this TIS2000 release ...	1 Using Application Version 2.4 or newer select Replace and Reprogram ECU on the Programming Process selection. On the Preparing for Communication screen, select Chevrolet 2001 LD Truck (C/K) with gasoline engine. Without turning ignition switch off, continue as usual.																																							
E1212 / Exxx	<p>Reprogramming Error! / (Specific transfer data error varies by interruption type.)</p> <p>Check all connections and re-boot handheld device if it is not at the logo screen. Check all connections and re-boot handheld device if it is not at the logo screen.</p>	<p>1 If a pre OBDII Saturn ECM, it is normal to stop at 50%. It is programmed successfully. After the third attempt, click cancel.</p> <p>2 1996 and newer ECMs: After the third attempt cancel out of software, reboot: PC, scan tool and the ignition switch.</p> <p>3 1995 and earlier: (DO NOT TURN IGNITION SWITCH OFF) after third attempt, cancel and back out to preparing for communication application selection screen, click on reset and proceed as usual. If this fails cancel and reboot PC and BDM (DO NOT TURN OFF IGNITION) and retry. These units may become unusable and need to be returned to BSE / BSA as defective.</p> <p>4 Is the ECM a BSE ECM? We cannot guarantee to program other remanufactured or used ECMs.</p> <p>5 Make sure that both LEDs are lit on the interface box (RED &amp; GREEN)</p> <p>6 Make sure that the ignition switch is in the on position.</p> <p>7 Make sure the correct harness is used and correct cross for ECM is made.</p>																																							

**Note: All Errors could be a result of the RS232 cable. Make sure that the modular end of the cable (BDM Side) is secure and no strain is placed on the cable.**

## GM DRIVE CYCLE

**IDLE PERIOD** - Two minutes with all accessories OFF in Park or Neutral. Cold start with ECT & IAT within 5 degrees C of one another.

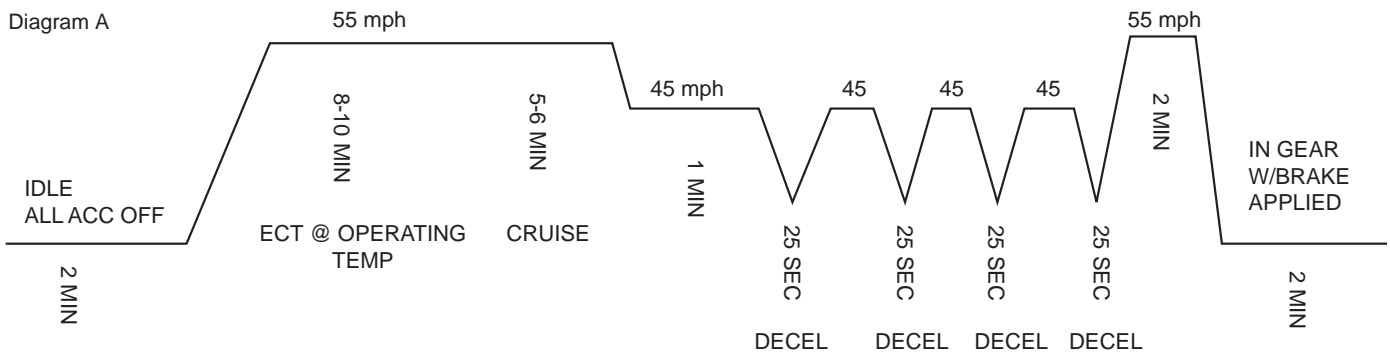
**ACCELERATION** - Accelerate to 55 MPH at part throttle and cruise at 55 until engine reaches operating temperature (Approx. 8-10 minutes.)

**CRUISE** - Cruise at 55 MPH for 5-6 minutes.

**DECELERATION** - Decel to 45 MPH with no brake and maintain 45 for 1 minute. Perform 4 decels of 25 seconds each returning to 45 MPH for 15 seconds between decels.

**ACCELERATION** - Accelerate to 55 MPH for 2 minutes. Cruise.

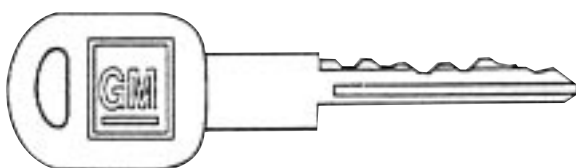
**IDLE** - Idle for two minutes with brake applied and automatic transmission in Drive or manual transmission in Neutral with clutch depressed.



Passkey, Passkey II (PK2)



Passkey III (PK3), III+ (PK3+)



Passlock



Passkey III (PK3), III+ (PK3+)