

2003 GENERAL INFORMATION**Computer Relearn Procedures - General Motors****INTRODUCTION****BODY CONTROLS**

Vehicles equipped with body, air conditioning, anti-lock brake or memory computers may require a computer relearn procedure after components are replaced or the vehicle battery is disconnected. Vehicle computers memorize and store vehicle information and operation selections. When the vehicle battery is disconnected, vehicle computer memory may be lost, requiring relearning or resetting. Depending on the vehicle and how it is equipped, the following secondary memories may exist:

- Air conditioning. See appropriate AUTOMATIC A/C-HEATER SYSTEMS article in AIR CONDITIONING & HEATING.
- Clock.
- Power window operation. See appropriate POWER WINDOWS article in ACCESSORIES & EQUIPMENT.
- Power sliding door operation. See appropriate POWER SLIDING DOORS article in ACCESSORIES & EQUIPMENT.
- Radio presets.
- Remote keyless entry and/or keyless entry keypad custom features. See appropriate REMOTE KEYLESS ENTRY SYSTEMS article in ACCESSORIES & EQUIPMENT.
- Sun roof operation. See appropriate POWER SUN ROOF article in ACCESSORIES & EQUIPMENT.

These do not affect primary vehicle systems. For secondary vehicle systems, see appropriate article for relearn procedures. Other computer relearn procedures are required for primary vehicle system operation. These may include:

- Initial control unit programming.
- Traction control yaw sensor initializing.
- Multiplex communication.
- Anti-theft system or engine immobilizer system passwords.

ENGINE CONTROLS

Vehicles equipped with an engine control module, may require a computer relearn procedure after vehicle battery is disconnected. Vehicle computers memorize and store vehicle operation patterns for optimum driveability and performance. When the vehicle battery is disconnected,

this memory is lost, which may result in a driveability problem. Depending on the vehicle and how it is equipped, the following driveability problems may exist:

- Rough or unstable idle.
- Hesitation or stumble.
- Rich or lean running.
- Poor fuel mileage.
- Harsh or poor transmission/transaxle shift quality.

Default data is used until NEW data from each key start is stored. As the computer restores its memory from each new key start, driveability is restored.

Driveability problems may occur during the computer relearn stage. To accelerate computer relearn process after battery removal and installation, specified computer relearn procedures should be performed. See appropriate procedures for specified manufacturer.

CRANKSHAFT POSITION SENSOR SYSTEM VARIATION LEARN PROCEDURE

NOTE: Before performing Electronically Erasable Programmable Read Only Memory (EEPROM) programming procedure, check for any applicable Technical Service Bulletins (TSBs) that may apply to vehicle application. Body Control Module (BCM) must be programmed with proper Regular Production Option (RPO) configurations. Follow instructions on Techline Terminal and scan tool to program BCM.

ALERO, AURORA, BONNEVILLE, CAVALIER - 2.2L, CENTURY, GRAND AM, GRAND PRIX, PRIX, IMPALA, LESABRE, MALIBU, MONTE CARLO, PARK AVENUE, REGAL & SUNFI SUNFIRE - 2.2L, AZTEK, MONTANA, RENDEZVOUS, S10 PICKUP - 2.2L, SILHOUETTE, SONOMA - 2.2L & VENTURE

CAUTION: Before performing crankshaft position system variation learn procedure, always set parking brake and block drive wheels in order to prevent personal injury. Release throttle immediately when engine starts to decelerate in order to eliminate over-revving engine. Once learn procedure has been completed, control module will return engine control to operator and engine will respond to throttle position.

NOTE: Battery must be fully charged and in good condition. Scan tool connection at Data Link Connector (DLC) should be clean and

tight before starting crankshaft position system variation learn procedure.

1. Install scan tool. Close hood.
2. With a scan tool, monitor the powertrain control module for DTCs. If other DTCs are set, except DTC P1336, diagnose affected DTC(s). See appropriate SELF-DIAGNOSTICS article.
3. With a scan tool, select the Crankshaft Position (CKP) variation learn procedure.
4. Observe the fuel cut-off for the engine that you are performing the learn procedure on.
5. The scan tool instructs you to perform the following:
 - Block drive wheels.
 - Apply parking brakes.
 - Cycle ignition from OFF to ON.
 - Apply and hold brake pedal.
 - Start and idle engine.
 - Turn OFF A/C.
 - Place transmission in Park (A/T) or Neutral (M/T).
 - The scan tool monitors certain component signals to determine if all the conditions are met to continue with the procedure. The scan tool only displays the condition that inhibits the procedure. The scan tool monitors the following components:
 - A. CKP sensor activity. If there is a CKP sensor condition, refer to the applicable DTC that set. See appropriate SELF-DIAGNOSTICS article.
 - B. CMP sensor activity. If there is a CMP sensor condition, refer to the applicable DTC that set. See appropriate SELF-DIAGNOSTICS article.
 - C. If ECT is not warm enough, idle engine until engine coolant temperature reaches correct temperature.
6. With the scan tool, enable the CKP system variation learn procedure.

NOTE: While learn procedure is in progress, release throttle immediately when engine starts to decelerate. The engine control is returned to operator and engine responds to throttle position after the learn procedure is complete.

7. Slowly increase the engine speed to the RPM that you observed.
8. Immediately release the throttle when fuel cut-off is reached.
9. The scan tool displays Learn Status: Learned this ignition. If scan tool does NOT display this message and no additional DTCs set, diagnose for an engine mechanical problem. If a DTC set, diagnose affected DTC(s). See appropriate SELF-DIAGNOSTICS article.

10. Turn ignition off for 30 seconds after the learn procedure is completed successfully.

AVALANCHE, ASTRO BLAZER, BRAVADA, CAB & CHASSIS, CHEVY EXPRESS, CORVE CORVETTE, CUTAWAY, DEVILLE, ENVOY, ENVOY XL, ESCALADE, ESCALADE ESV, ESCALADE EXT, RV CUTAWAY, S10 PICKUP - 4.3L, SAFARI, SATURN - 2.2L, SAVANA, SAVANA CAMPER SPECIAL, SAVANA SPECIAL, SEVILLE, SIERRA, SILVERADO, SONOM SONOMA - 4.3L, SUBURBAN, TAHOE, TRAILBLAZER, VUE - 2.2L, YUKON & YUKON XL

1. Connect scan tool to DLC.
2. Monitor the Engine Control Module (ECM) for DTCs using scan tool. If other DTCs are set, except DTCs P0315, refer to DIAGNOSTIC TROUBLE CODE DEFINITIONS in appropriate SELF-DIAGNOSTICS article for the applicable DTC that set.
3. Select the crankshaft position variation learn procedure using the scan tool.
4. The scan tool instructs you to perform the following:
 - Accelerate to Wide Open Throttle (WOT).
 - Release when the fuel cut-off occurs.
 - Engine should not accelerate beyond calibrated RPM value.
 - Release throttle immediately if value is exceeded.
 - Block drive wheels.
 - Set parking brake.
 - DO NOT apply brake pedal.
 - Cycle the ignition switch from OFF to ON position.
 - Apply and hold the brake pedal.
 - Start and idle engine.
 - Turn A/C OFF.
 - Vehicle must remain in Park or Neutral.
 - The scan tool monitors certain component signals to determine if all the conditions are met to continue with the procedure. The scan tool only displays the condition that inhibits the procedure. The scan tool monitors the following components:
 - Crankshaft Position Sensors Activity** - If there is a CKP sensor condition, refer to the applicable DTC that set.
 - Camshaft Position Sensor Activity** - If there is a CMP sensor condition, refer to the applicable DTC that set.
 - Engine Coolant Temperature** - If the engine coolant temperature is not warm enough, idle the engine until the engine coolant temperature reaches the correct temperature.
5. Enable the crankshaft position system variation learn procedure using the scan tool.

NOTE: While the learn procedure is in progress, release the throttle

immediately when the engine starts to decelerate. The engine control is returned to the operator and the engine responds to throttle position after the learn procedure is complete.

6. Accelerate to WOT.
7. Release when the fuel cut-off occurs.
8. The scan tool displays LEARN STATUS: LEARNED THIS IGNITION. If the scan tool indicates that DTC P1336 ran and passed, the CKP variation learn procedure is complete. If the scan tool indicates DTC P0315 failed or did not run, go to DIAGNOSTIC TROUBLE CODE DEFINITIONS in appropriate SELF-DIAGNOSTICS article for the applicable DTC that set.
9. Turn ignition switch to OFF position for 30 seconds after the learn procedure is completed successfully.
10. The CKP system variation learn procedure is also required when the following service procedures have been performed, regardless of whether DTC P0315 is set:
 - Engine replacement.
 - ECM replacement.
 - A harmonic balancer replacement.
 - Crankshaft replacement.
 - CKP sensor replacement.
 - Any engine repairs which disturb the crankshaft to CKP sensor relationship.

ENGINE CONTROL MODULE OR POWERTRAIN CONTROL MODULE

NOTE: DO NOT program an existing PCM with the identical software/calibration package. This procedure is not a short cut to correct a driveability condition. This is an ineffective repair. A PCM should only be programmed when a service procedure instructs you to replace the PCM. The service part PCM does not contain operating software or calibrations or General Motors Corporation releases an updated software/calibration package.

After replacing Powertrain Control Module (PCM) or if program needs to be updated, refer to latest Techline(R) information on PCM reprogramming. PCM can only be programmed using Tech 2 and Techline(R) terminal, or by using a personal computer equipped with the current service programming system software installed.

SERVICE PROGRAMMING SYSTEM

After replacing PCM or if program needs to be updated, refer to latest Techline information

on PCM reprogramming. Before programming a PCM, the following must be observed, or PCM damage may occur:

- The Tech 2 and the terminal must have the latest software.
- The vehicle battery must be fully charged. The battery voltage should be 12-14 volts.
- The Tech 2 and the terminal cable connections must be secure.
- A battery charger must NOT be connected to the battery when programming a PCM.

After reprogramming, program theft deterrent system components. See **THEFT DETERRENT SYSTEM COMPONENTS** .

Service Programming Methods

The 4 methods of programming a PCM and the proper tools for each method are as follows:

- Remote Programming. See **SERVICE PROGRAMMING SYSTEM REMOTE PROCEDURE** .
- Pass-Thru Programming. See **SERVICE PROGRAMMING SYSTEM PASS-THRU PROCEDURE** .
- Off-Board Remote Programming, vehicle NOT available. See **SERVICE PROGRAMMING SYSTEM OFF BOARD REMOTE PROCEDURE** .
- Off-Board Pass-Thru Programming. See **SERVICE PROGRAMMING SYSTEM OFF BOARD PASS-THRU PROCEDURE** .

All 4 methods may not be available for every vehicle.

SERVICE PROGRAMMING SYSTEM REMOTE PROCEDURE (EXCEPT CORVETTE)

The Remote Service Programming System (SPS) method is a 3-step process that involves the following procedures:

1. Connecting the Tech 2 to the vehicle and obtaining the information from the module.
2. Connecting the Tech 2 to the terminal and downloading a new calibration file from the terminal into the Tech 2 memory.
3. Reconnecting the Tech 2 to the vehicle and uploading the new calibration file into the module.

Remote Procedure

NOTE: **Ensure the PCM is installed in the vehicle and the battery is fully charged before programming.**

1. Connect the Tech 2 to the vehicle and obtain the module information using the following

procedure:

- Connect the Tech 2 to the vehicle Data Link Connector (DLC), with the engine and the Tech 2 OFF. See **Fig. 1** .
- Turn ON the Tech 2.
- Press Enter at the title screen.
- Turn ignition switch to RUN position, engine OFF.
- Select SERVICE PROGRAMMING SYSTEM at the Main Menu.

NOTE: **Select REQUEST INFO AGAIN if a vehicle identification number (VIN) was previously stored in the Tech 2.**

- Select REQUEST INFO.
 - Enter the vehicle description by following the on-screen instructions.
 - Turn all accessories OFF and select CONTINUE.
 - Select NO and write down the VIN if the VIN is incorrect. Verify that the correct VIN is entered on the Tech 2 and select YES.
2. Turn OFF the Tech 2.
 3. Disconnect the Tech 2 from the vehicle.
 4. Turn ignition switch to OFF position.
 5. Transfer the data from the terminal to the Tech 2 using the following procedure:
 - Connect the Tech 2 to the terminal. See **Fig. 2** .

NOTE: **The Techline Information System (TIS) supports service programming with the Tech 2 scan tool only.**

- Launch the TIS application at the terminal.
- Select the SERVICE PROGRAMMING SYSTEM at the main screen.
- Highlight the following information on the SELECT DIAGNOSTIC TOOL and PROGRAMMING PROCESS SCREEN:

Select Diagnostic Tool - Select Tech 2.

Select Programming Process - Identify whether an existing module is being reprogrammed or a module is being replaced with a new one.

Select ECU Location - Select vehicle.

- Select NEXT.
- Verify the connections and select NEXT.

NOTE: **You may receive a message stating that the PCM could be a service PCM if you selected NO to the VIN being**

correct. Click OK.

- Verify the VIN and select Next.
- Select the appropriate controller for the vehicle being serviced.

NOTE: When selecting the Vehicle Configuration Index (VCI) programming type, a valid VCI number for the vehicle must be entered. This number may be obtained from the Techline Customer Support.

- Select the type of programming to be performed from the following categories:
 - Normal** - Used for updating an existing calibration or programming a new controller.
 - Vehicle Configuration Index (VCI)** - Used for updating an existing controller or programming a new controller for newer vehicles whose VINs are not yet in the database.
 - Reconfigure** - Used to reconfigure a vehicle for changes in tire size and axle ratios.
- Select NEXT.

NOTE: Refer to Service bulletins before service programming is performed if the bulletins are listed along with the calibration files.

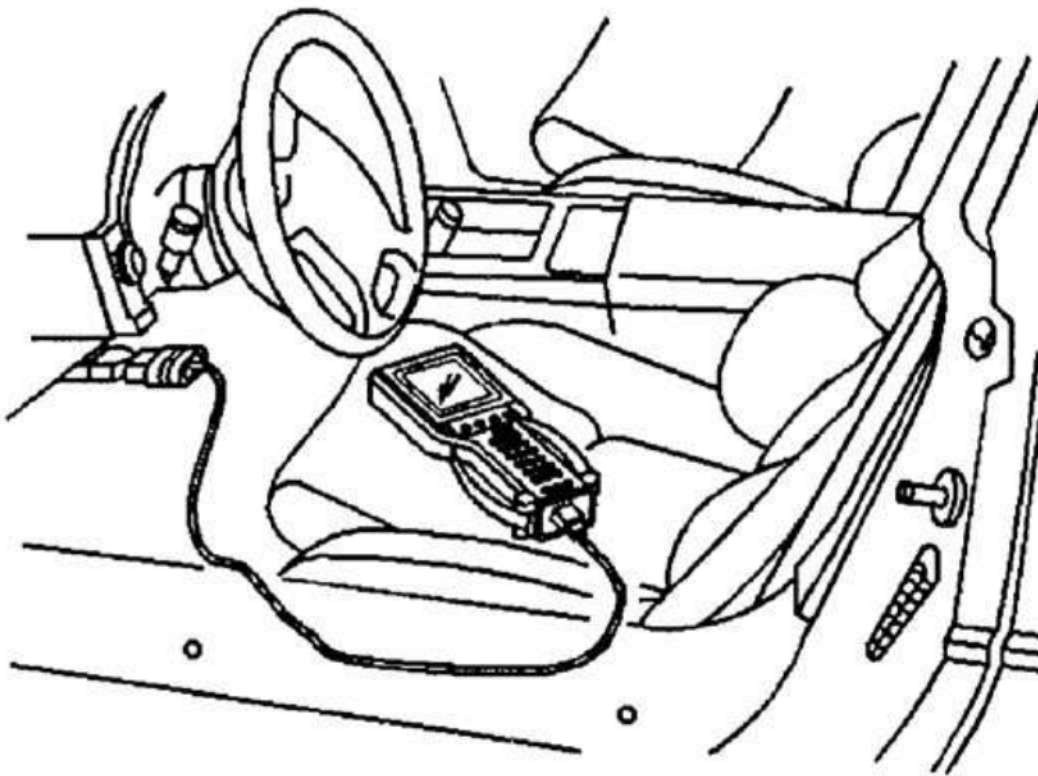
- Select the appropriate calibration file for the vehicle being serviced.
- Select NEXT.

NOTE: Select CANCEL if you receive a message stating that the calibration selected is already the current calibration in the PCM and reprogramming with the same download is not allowed.

- Verify your selection on the Summary screen.
- Select NEXT.

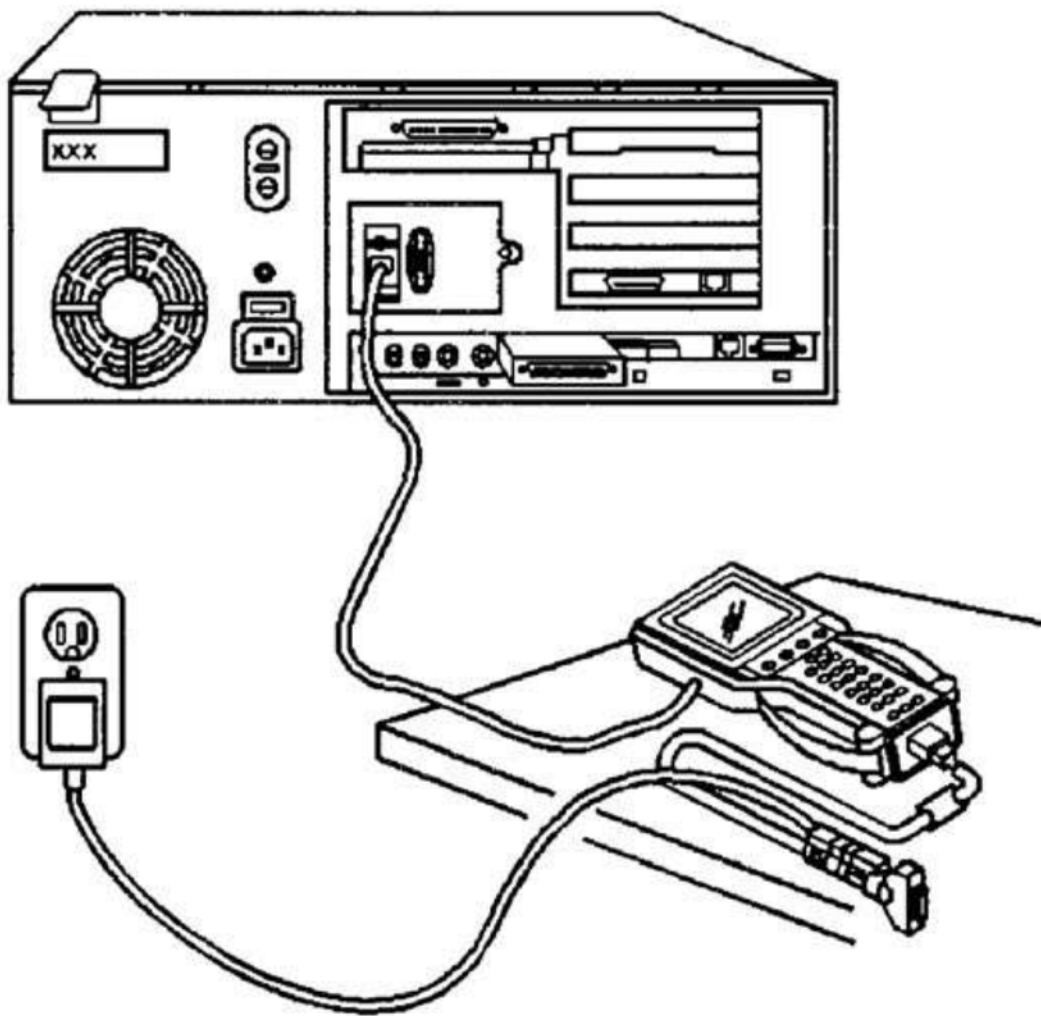
6. Perform the CRANKSHAFT POSITION VARIATION RELEARN PROCEDURE using the SPECIAL FUNCTIONS feature, if applicable. See **CRANKSHAFT POSITION SENSOR SYSTEM VARIATION LEARN PROCEDURE**.
7. Close the application and return to the TIS application Selection screen after the download is complete.
8. Turn OFF the Tech 2.

9. Disconnect the Tech 2 from the terminal.
10. Transfer the data from the Tech 2 to the PCM using the following procedure:
 - Turn OFF the ignition.
 - Turn OFF the Tech 2.
 - Disconnect the Tech 2 from the vehicle.



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Fig. 1: Connecting Scan Tool To DLC
Courtesy of GENERAL MOTORS CORP.



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Fig. 2: Connecting Scan Tool To Terminal For Data Transfer
Courtesy of GENERAL MOTORS CORP.

Verifying Reprogramming

Verify the PCM programming was successful using the following procedure:

1. Turn OFF the ignition for 30 seconds.
2. Start the engine.
3. Repeat the SPS procedure if the vehicle does not start or starts but runs rough.

SERVICE PROGRAMMING SYSTEM REMOTE PROCEDURE (CORVETTE)

NOTE: Do NOT program a control module unless you are directed by a

service procedure or you are directed by a General Motors Corporation service bulletin. Programming a control module at any other time will not permanently correct a customer's concern.

Before Programming A Control Module

1. Ensure there are no charging system concerns. All charging system concerns must be repaired before programming a control module.
2. Ensure battery voltage is greater than 12 volts but less than 16 volts. The battery must be fully charged before programming the control module.
3. Ensure a battery charger is NOT connected to the vehicles battery. Incorrect system voltage or voltage fluctuations from a battery charger may cause programming failure or control module damage.
4. Turn OFF or disable any system that may put a load on the vehicles battery. Turn OFF or disable systems such as:
 - Twilight Sentinel.
 - Interior lights.
 - Daytime Running Lights (DRL). Applying the parking brake, on most vehicles, disables the DRL system.
 - Heating, Ventilation, and Air Conditioning (HVAC) systems.
 - Engine cooling fans, etc.
5. The ignition switch is in the proper position. The scan tool prompts you to turn ON the ignition, with the engine OFF. Do not change the position of the ignition switch during the programming procedure unless instructed to do so.
6. All tool connections are secure:
 - The RS-232 cable.
 - The connection at the DLC.
 - The voltage supply circuits.
7. Do not disturb the tool harnesses while programming. If an interruption occurs during the programming procedure, programming failure or control module damage may occur.

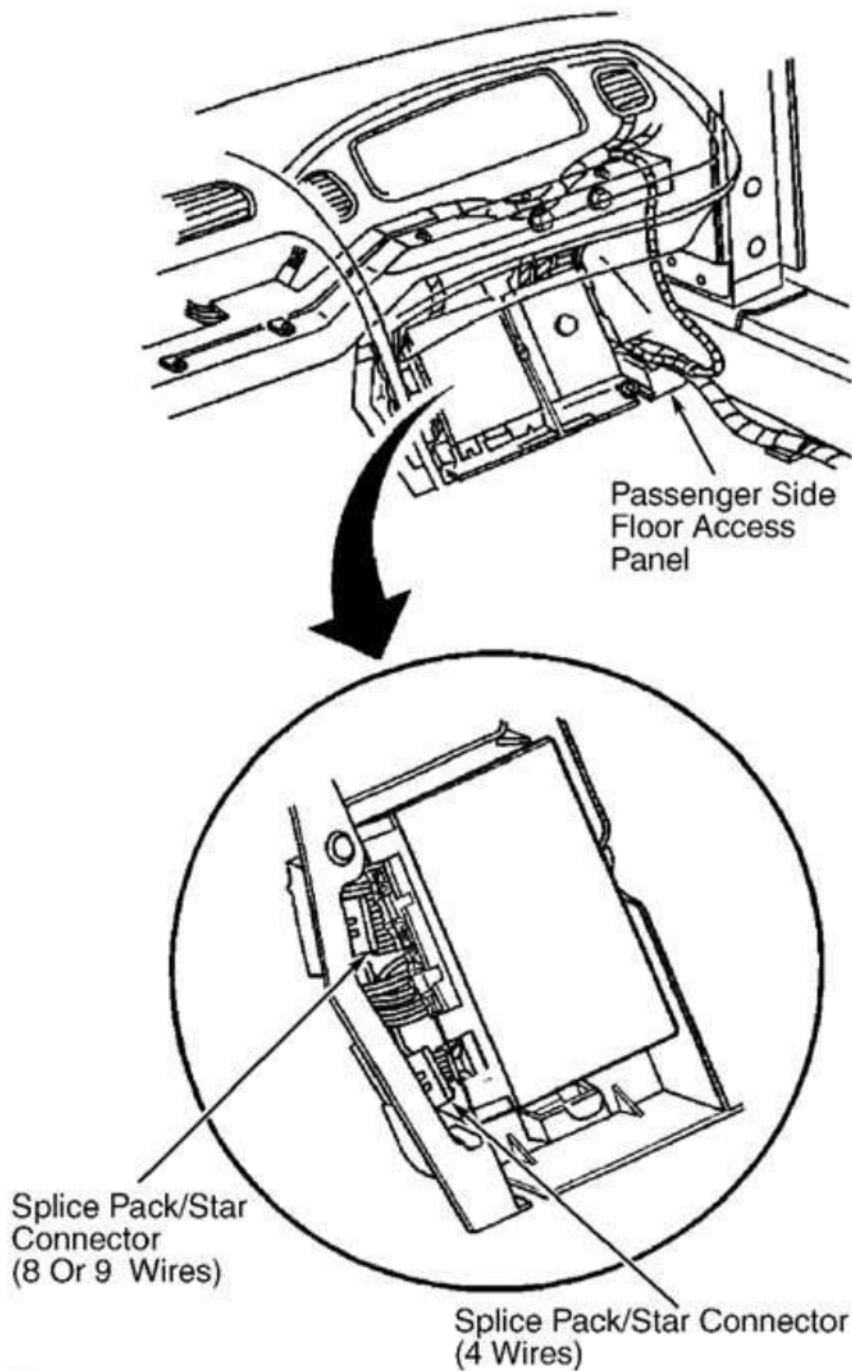
CAUTION: The PCM will be damaged if proper programming procedures are not followed.

NOTE: Tools Required: Serial Data Link Tester (J-42236).

PCM Programming Set Up With Special Tool

1. Ensure that the following conditions have been met:

- The battery is fully charged.
 - The scan tool cable connection at the Data Link Connector (DLC) is secure.
2. Turn OFF the ignition.
 3. Remove the passenger side floor access panel. See.
 4. Remove the splice pack/star connector shorting bars from both splice pack/star connectors. It may be necessary to remove splice pack/star connectors from the mounting positions.
 5. Install the star connector cable No. 1 from the Serial Data Link Tester to the 12-pin splice pack/star connector. This is the connector with 8 or 10 wires.
 6. Install the star connector cable No. 2 from the Serial Data Link Tester to the 12-pin splice pack/star connector. This is the connector with 4 wires.
 7. Select the star connector cable No. 1 on the Serial Data Link Tester toggle switch.
 8. Select position "B" on the Serial Data Link Tester.



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Fig. 3: Locating & Identifying Splice Pack/Star Connectors In Passenger Floor Access Panel

Courtesy of GENERAL MOTORS CORP.

Remote Programming

1. Turn ignition ON, with engine OFF.

2. Turn OFF all vehicle accessories.
3. With the Tech 2, select Service Programming.
4. Identify vehicle information as requested by the Tech 2.
5. Verify the displayed VIN with the vehicle VIN. If the displayed VIN does not match the actual VIN, write down the actual VIN and correct the VIN at the Techline terminal.
6. When complete, exit Service Programming.
7. Turn OFF the Tech 2 and disconnect the Tech 2 from the vehicle.
8. Turn ignition OFF.
9. Connect the Tech 2 to the Techline terminal.
10. Select Service Programming.
11. Select Tech 2 as the tool you are using.
12. Select the type of programming to be performed.
13. Verify the displayed VIN with the vehicle VIN. Correct the VIN as necessary.
14. Select the type of module you are programming.
15. Identify what type of programming that you are performing.

- **Normal**

This type of programming is for updating an existing calibration or programming a new controller.

- **Vehicle Configuration Index (VCI)**

This selection is used if the vehicle VIN is unavailable or not recognized by the Techline terminal. You will need to contact the Techline Customer Support center to use this option.

- **Reconfigure**

This is to reconfigure a vehicle, such as tire size and axle ratio changes.

16. Select the appropriate calibration file.
17. Ensure all connections are secure.
18. Select Reprog to initiate the download of the new calibration to the Tech 2.
19. After the download is complete, turn OFF the Tech 2.
20. Disconnect the Tech 2 from the Techline terminal.
21. Install the Tech 2 to the data link connector (DLC).
22. Turn ON the Tech 2.
23. Turn ignition ON, with engine OFF.

24. Select Service Programming.

NOTE: Do not turn OFF the ignition if the programming procedure is interrupted or unsuccessful. Ensure that all the PCM and DLC connections are secure and the Techline operating software is up to date. Attempt to reprogram the control module. If the control module cannot be programmed, replace the control module. See POWERTRAIN CONTROL MODULE under COMPUTERIZED ENGINE CONTROLS in REMOVAL & INSTALLATION - CORVETTE article.

25. Select Program.

26. After the download is complete, EXIT Service Programming.

27. Turn OFF the ignition for 30 seconds.

28. Turn OFF the Tech 2.

29. If a control module is replaced the following service procedures must be performed:

CRANKSHAFT POSITION SENSOR SYSTEM VARIATION LEARN PROCEDURE and **THEFT DETERRENT SYSTEM COMPONENTS**.

Programming Verification

1. With a scan tool, clear the DTCs.
2. Attempt to start the engine.
3. Repeat the Service Programming procedure if the engine does not start or operates poorly. Perform the following procedures before programming the PCM:
 - Ensure the control module and DLC connections are okay.
 - Ensure the Techline operating software is up to date.
 - Ensure the calibration part number is correct for the vehicle.
4. Attempt to program the control module. If the control module still cannot be programmed properly, replace the control module. See **REMOVAL & INSTALLATION - CORVETTE** article. You must program the replacement control module.

SERVICE PROGRAMMING SYSTEM PASS-THRU PROCEDURE

NOTE: The Techline Information System (TIS) supports service programming with the Tech 2(tm) scan tool only.

Pass-Thru programming allows the scan tool to remain connected to the terminal and to the vehicle throughout the programming process. The vehicle must be in close proximity to the terminal while using Pass-Thru.

Performing The Pass-Thru Procedure

1. Launch the TIS application at the terminal.
2. Select the SERVICE PROGRAMMING SYSTEM.
3. Highlight the following information on the Select Diagnostic Tool Programming Process screen:

Select Diagnostic Tool - Select PASS-THRU.

Select Programming - Identify whether an existing module is being reprogrammed or a module is being replaced with a new one.

Select ECU Location - Select vehicle.

4. Select NEXT.
5. Complete all terminal-directed data on the PREPARING FOR COMMUNICATION/DETERMINE VEHICLE screen until NEXT is highlighted.

NOTE: To reduce the potential for signal loss, the RS-232 cable should not be more than 25 feet long.

6. Select NEXT.
7. Follow the instructions on the PREPARING FOR COMMUNICATION screen.
8. Select NEXT.

NOTE: The correct Vehicle Identification Number (VIN) must be entered if the VIN does not appear correctly.

9. Verify the VIN on the VALIDATE VEHICLE IDENTIFICATION NUMBER screen.
10. Select NEXT.

NOTE: When selecting the VCI programming type, a valid VCI number for the vehicle must be entered. This number may be obtained from the Techline Customer Support. The correct tire size and axle ratio must be highlighted and a valid VCI number entered if you select RECONFIGURE for your programming type.

11. If an option screen appears, verify the vehicle configuration and/or RPO information.
12. Select Next.
13. Highlight the appropriate PCM and programming type on the Supported Controllers screen.
14. Select Next.
15. Select the proper calibrations on the Calibration Selection screen.

16. Ensure all the folder tabs have a green check mark.
17. Select NEXT.
18. Verify the current calibrations with the selected calibrations.
19. Select NEXT.
20. The TRANSFER DATA screen will appear until the progress bar reaches 100 percent. This may take up to 30 minutes.
21. Complete all of the terminal-directed data on the Programming Complete screen.

NOTE: Some vehicles will require that Idle Learn, Theft Deterrent Relearn, or Crankshaft Variation Learn procedures be performed after programming. Consult the appropriate service information for these procedures. See CRANKSHAFT POSITION SENSOR SYSTEM VARIATION LEARN PROCEDURE and THEFT DETERRENT SYSTEM COMPONENTS .

22. Turn OFF the Tech 2.
23. Disconnect the Tech 2(tm) from the vehicle.

SERVICE PROGRAMMING SYSTEM OFF BOARD REMOTE PROCEDURE

NOTE: Ensure the Tech 2 and the terminal are both equipped with the latest software before performing SPS.

The Off-Board Programming Adapter Kit (J 41207-C) is required when a module must be programmed without having the vehicle present. The adapter allows the module to be turned ON and communicate with the scan tool.

Performing the Off Board Remote Procedure

1. Obtain the Vehicle Identification Number (VIN) of the vehicle for which the module is being programmed.

NOTE: The Techline Information System (TIS) supports service programming with the Tech 2 scan tool only.

2. Launch the TIS application at the terminal.
3. Select the SERVICE PROGRAMMING SYSTEM.
4. Highlight the following information on the Select Diagnostic Tool and Programming Process screen:

Select Diagnostic Tool - Select Tech 2.

Select Programming Process - Identify whether an existing module is being

reprogrammed or replaced with a new one.

Select ECU location - Select Off-Board Programming Adapter.

5. Select NEXT.

NOTE: **Ensure the correct connector for the PCM is used.**

6. Follow the directions on the Preparing for Communication screen for connecting the following components:
- The PCM.
 - The Off-Board Programming Adapter (OBPA). Refer to the TIS users guide for a listing of the OBPA.
 - The Tech 2.

See **Fig. 4**.

7. Select the SERVICE PROGRAMMING REQUEST INFORMATION function on the Tech 2.
8. Follow the Tech 2 instructions to obtain the module data and security information.
9. After the Tech 2 has received the data from the module, exit the REQUEST INFO mode.
10. Disconnect the Tech 2 from the OBPA.
11. Turn OFF the Tech 2.
12. Connect the Tech 2 to the terminal. See **Fig. 2**.
13. Turn ON the Tech 2.
14. Select Next at the terminal after the Tech 2 start-up screen appears.
15. Enter the VIN of the vehicle that will be receiving the NEW PCM.
16. Select NEXT.

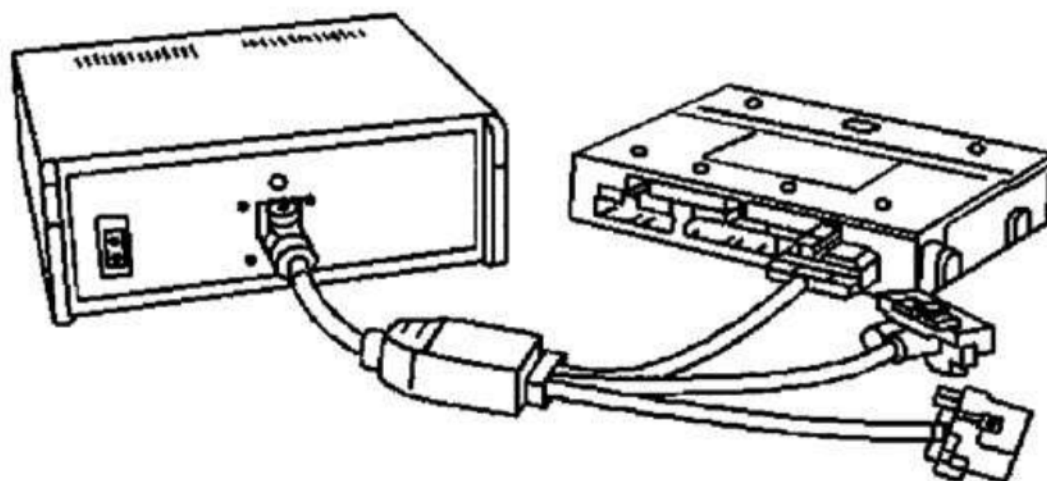
NOTE: **When selecting the Vehicle Configuration Index (VCI) programming type, a valid VCI number for the vehicle must be entered. This number may be obtained from Techline Customer Support.**

17. Select the type of programming to be performed from the following categories:
- Normal** - Used for updating an existing calibration or programming a new controller.
- Vehicle Configuration Index** - Used for updating an existing controller or programming a new controller for newer vehicles whose VINs are not yet in the database.
- Reconfigure** - Used to reconfigure a vehicle for changes in tire size and axle ratios.
18. Select NEXT.

19. Select a calibration on the CALIBRATION SELECTION screen, if necessary.
20. Ensure all the desired folder tabs have a Green check mark.
21. Select NEXT.
22. Verify the current and the selected calibration of the PCM on the summary screen.
23. Select NEXT.

NOTE: **Select CANCEL if you receive a message stating that the calibration selected is already the current calibration in the PCM and reprogramming with the same download is not allowed.**

24. Select OK.
25. On model year 1996 and newer controllers, a Crankshaft Position (CKP) relearn procedure box may appear. Select OK. See **CRANKSHAFT POSITION SENSOR SYSTEM VARIATION LEARN PROCEDURE** .
26. Follow the on-screen instructions, if any, when the PROGRAM CONTROLLER/PROGRAMMING COMPLETE screen appears.
27. Select CLOSE.
28. Turn OFF the Tech 2.
29. Disconnect the Tech 2 from the terminal.
30. Connect the Tech 2 to the OBPA.
31. Turn ON the Tech 2.
32. Select ENTER at the title screen.
33. Select the SERVICE PROGRAMMING SYSTEM at the Main Menu.
34. Select the Program ECU function.
35. Select CONTINUE.
36. Follow the on-screen instructions.
37. Select CONTINUE.
38. Select Exit when the programming is complete.
39. Turn OFF the OBPA.
40. Turn OFF the Tech 2. Wait 30 seconds after the OBPA is turned OFF before disconnecting the PCM.
41. Disconnect the OBPA from the Tech 2 and the PCM.



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Fig. 4: Connecting Off-Board Programming Adapter
Courtesy of GENERAL MOTORS CORP.

SERVICE PROGRAMMING SYSTEM OFF BOARD PASS-THRU PROCEDURE

NOTE: The Techline Information System (TIS) supports service programming with the Tech 2 scan tool only.

NOTE: Ensure the Tech 2 and the terminal are both equipped with the latest software before performing SPS.

The Off-Board Programming Adapter Kit (J 41207-C) is required when a module must be programmed without having the vehicle present. The adapter allows the module to be turned ON and communicate with the Tech 2.

Performing The Off Board Pass-Thru Procedure

1. Launch the Techline Information System (TIS) application in the terminal.
2. Select the SERVICE PROGRAMMING SYSTEM.
3. Highlight the following information on the Select Diagnostic Tool and Programming Process Screen:

Select Diagnostic Tool - Select PASS-THRU.

Select Programming Process - Identify whether an existing module is being reprogrammed, or a module is being replaced with a new one.

Select ECU location - Select Off-Board Programming Adapter.

4. Select NEXT.

NOTE: To reduce the potential for signal loss, the RS-232 cable should NOT be more than 25 feet long.

5. Complete all terminal-directed data at the PREPARING FOR COMMUNICATION/DETERMINE VEHICLE screen until NEXT is highlighted. See **Fig. 4**.
6. Select NEXT.
7. Follow the on-screen instructions for connecting the following components:
 - The PCM.
 - The Off-Board Programming Adapter (OBPA). Refer to the TIS Users Guide for a listing of OBPA.
 - The Tech 2.
8. Select NEXT.
9. Pass-Thru displays the VIN stored in the PCM. If a new PCM is being programmed, enter the correct VIN of the vehicle.
10. Select NEXT.
11. Select the appropriate options if the OPTIONS screen appears.
12. Select NEXT.

NOTE: When selecting the Vehicle Configuration Index (VCI) programming type, a valid VCI number for the vehicle must be entered. This number may be obtained from Techline Customer Support.

13. Select the type of programming to be performed from the following categories:
 - Normal** - Used for updating an existing calibration or programming a new controller.
 - Vehicle Configuration Index** - Used for updating an existing controller or programming a new controller for newer vehicles whose VINs are not yet in the database.
 - Reconfigure** - Used to reconfigure a vehicle for changes in tire size and axle ratios.
14. Select NEXT.
15. Select a calibration selection on the Calibration Selection screen, if necessary.
16. Ensure all the desired calibration folder tabs have a green check mark.
17. Select NEXT.
18. Verify the current and selected calibration of the PCM on the Summary screen.
19. Select NEXT.

NOTE: Select CANCEL if you receive a message stating that the calibration selected is already the current calibration in the PCM and reprogramming with the same download is not allowed.

20. Select OK.

NOTE: On model year 1996 and newer controllers, a Crankshaft Position (CKP) relearn procedure box may appear. See CRANKSHAFT POSITION SENSOR SYSTEM VARIATION LEARN PROCEDURE .

21. Select OK.

22. When programming is complete, a PROGRAM CONTROLLER/PROGRAMMING COMPLETE screen appears. Follow the on-screen instructions, if any.

23. Select CLOSE.

24. Turn OFF the OBPA.

25. Turn OFF the scan tool.

NOTE: Wait 30 seconds after the OBPA is shut OFF before disconnecting the PCM.

26. Disconnect the OBPA from the Tech 2 and the PCM.

IDLE AIR CONTROL VALVE LEARN PROCEDURE

DEVILLE & SEVILLE

1. Start and idle the engine for 15 seconds.
2. Turn the ignition switch to the LOCK/OFF position.
3. Wait 15 seconds.
4. Restart the engine, and check for proper idle operation.

SATURN (ION)

1. Turn ON the ignition, with the engine OFF.
2. Turn OFF the ignition for 10 seconds.
3. Start the engine and check for proper idle operation.

SATURN (L200 & LW200)

1. Turn the ignition ON with the engine OFF for 10 seconds, then turn the ignition OFF for 10 seconds.
2. Start the engine and let the engine idle for 30 seconds.
3. Accelerate the engine slowly between idle and 3500 RPM five times.
4. Let the engine return to idle. The IAC valve position should be relearned.

THEFT DETERRENT SYSTEM COMPONENTS

10-MINUTE LEARN PROCEDURE (ALERO, GRAND AM & MALIBU)

NOTE: Due to component variability, the Vehicle Theft Deterrent (VTD) system must have the learn procedure performed regardless if vehicle starts on the first ignition cycle after a VTD repair. All codes in the theft deterrent module must be cleared for a relearn.

The Body Control Module (BCM) must be programmed with the proper RPO configurations before performing learn procedures. See PROGRAMMING in appropriate BODY CONTROL MODULES article in ACCESSORIES & EQUIPMENT.

If replacing the BCM with a GM Service Parts Operations (SPO) replacement part, the module will learn Passlock(tm) sensor data code immediately. The existing PCM however, must learn the new fuel continue password when the BCM is replaced.

If replacing a PCM with a GM Service Parts Operations (SPO) replacement part, after programming, these modules will learn the incoming fuel continue password immediately upon receipt of a password message. Once a password message is received, and a password is learned, a learn procedure must be performed to change this password again. A PCM which has been previously installed in another vehicle will have learned the other vehicle's fuel continue password and will require a learn procedure after programming to learn the current vehicle's password.

Use this procedure after replacing:

- Passlock(tm) Sensor
- BCM
- PCM

1. Turn on the ignition, with the engine off.
2. Attempt to start the engine, then release the key to on (vehicle will not start).
3. Observe the SECURITY telltale, after approximately 10 minutes the telltale will turn off.
4. Turn off the ignition, and wait 5 seconds.

5. The vehicle is now ready to relearn the Passlock(tm) Sensor Data Code and/or passwords on the next ignition switch transition from OFF to CRANK.

NOTE: **The vehicle learns the Passlock(tm) Sensor Data Code and/or password on the next ignition switch transition from OFF to CRANK. You must turn the ignition OFF before attempting to start the vehicle.**

6. Start the engine. The vehicle has now learned the Passlock(tm) Sensor Data Code and/or password.
7. With a scan tool, clear any DTCs if needed. History DTCs will self clear after 100 ignition cycles.

10-MINUTE LEARN PROCEDURE (CAVALIER, CENTURY, CORVETTE, IMPALA, MONTE MONTE CARLO, REGAL & SUNFIRE, & ALL TRUCKS EXCEPT AZTEK, MONTANA, RENDEZVOUS, SILHOUETTE & VENTURE)

NOTE: **Due to component variability, the Vehicle Theft Deterrent (VTD) system must have the learn procedure performed regardless if vehicle starts on the first ignition cycle after a VTD repair. All codes in the theft deterrent module must be cleared for a relearn.**

The Body Control Module (BCM) must be programmed with the proper RPO configurations before performing learn procedures. See PROGRAMMING in appropriate BODY CONTROL MODULES article in ACCESSORIES & EQUIPMENT.

If replacing the BCM with a GM Service Parts Operations (SPO) replacement part, the module will learn Passlock(tm) sensor data code immediately. The existing PCM however, must learn the new fuel continue password when the BCM is replaced.

If replacing a PCM with a GM Service Parts Operations (SPO) replacement part, after programming, these modules will learn the incoming fuel continue password immediately upon receipt of a password message. Once a password message is received, and a password is learned, a learn procedure must be performed to change this password again. A PCM which has been previously installed in another vehicle will have learned the other vehicle's fuel continue password and will require a learn procedure after programming to learn the current vehicle's password.

Use this procedure after replacing:

- Passlock(tm) Sensor
- BCM
- PCM

NOTE: This procedure requires a Tech 2 scan tool and a Techline terminal with current SPS (Service Programming System) software.

1. Connect Tech 2 to vehicle.
2. Select Request Information under Service Programming.
3. Disconnect Tech 2 from vehicle and connect it to a Techline terminal.
4. On the Techline terminal, select Theft Module Re-Learn under Service Programming.
5. Disconnect Tech 2 from Techline terminal and connect it to vehicle.
6. Turn ignition on, with engine off.
7. Select VTD Re-Learn under Service Programming.
8. Attempt to start engine, then release key to ON (vehicle will not start).
9. Observe the SECURITY telltale, after approximately 10 minutes the telltale will turn OFF (the vehicle is now ready to relearn the Passlock(tm) Sensor Data Code and/or password on the next ignition switch transition from OFF to CRANK).
10. Turn ignition off, and wait 5 seconds.
11. Start engine (vehicle has now learned the password).
12. With Tech 2 scan tool, clear any DTCs.

30-MINUTE LEARN PROCEDURE (CAVALIER, CENTURY, CORVETTE, IMPALA, MONTE MONTE CARLO, REGAL & SUNFIRE, & ALL TRUCKS EXCEPT AZTEK, MONTANA, RENDEZVOUS, SILHOUETTE & VENTURE)

NOTE: Due to component variability, the Vehicle Theft Deterrent (VTD) system must have the learn procedure performed regardless if vehicle starts on the first ignition cycle after a VTD repair. All codes in the theft deterrent module must be cleared for a relearn.

The Body Control Module (BCM) must be programmed with the proper RPO configurations before performing learn procedures. See PROGRAMMING in appropriate BODY CONTROL MODULES article in ACCESSORIES & EQUIPMENT.

If replacing the BCM with a GM Service Parts Operations (SPO) replacement part, the module will learn Passlock(tm) sensor data code immediately. The existing PCM however, must learn the new fuel continue password when the BCM is replaced.

If replacing a PCM with a GM Service Parts Operations (SPO) replacement part, after programming, these modules will learn the incoming fuel continue password immediately upon receipt of a password message. Once a password message is received, and a password is learned, a learn procedure must be performed to change this password again. A PCM which has been previously installed in another vehicle will have learned the other vehicle's fuel

continue password and will require a learn procedure after programming to learn the current vehicle's password.

Use this procedure after replacing:

- Passlock(tm) Sensor
 - BCM
 - PCM
1. Turn ignition on, with engine off.
 2. Attempt to start engine, then release key to ON (vehicle will not start).
 3. Observe the SECURITY telltale, after about 10 minutes, the telltale will turn OFF.
 4. Turn ignition off, and wait 5 seconds.
 5. Repeat steps 1 -4 two more times for a total of 3 cycles/30 minutes (the vehicle is now ready to relearn the Passlock(tm) Sensor Data Code and/or passwords on the next ignition switch transition from OFF to CRANK).

NOTE: The vehicle learns the Passlock(tm) Sensor Data Code and/or password on the next ignition switch transition from OFF to CRANK. You must turn the ignition OFF before attempting to start vehicle.

6. Start the engine (the vehicle has now learned the Passlock(tm) Sensor Data Code and/or password).
7. With a scan tool, clear any DTCs if needed (history DTCs will self clear after 100 ignition cycles).

SET UP A NEW THEFT DETERRENT CONTROL MODULE (AURORA, BONNEVILLE, CTS, DEVILLE, GRAND PRIX, LESABRE, PARK AVENUE & SEVILLE, & ALL TRUCKS EXCEPT AZTEK, MONTANA, RENDEZVOUS, SILHOUETTE & VENTURE)

NOTE: When replacing a theft deterrent control module with an GM Service Parts Operation (SPO) replacement part, set up the control module prior to the 10-minute relearn procedure or the 30-minute relearn procedure. See SET UP A NEW THEFT DETERRENT CONTROL MODULE.

NOTE: Use this procedure only if replacing the theft deterrent control module with an GM SPO Replacement Part.

1. Connect scan tool to vehicle.

2. Turn ignition on, with engine off.
3. Using scan tool, select Setup New VTD Module in the Vehicle Theft Deterrent, Special Functions data list.
4. Follow scan tool on-screen instructions.

NOTE: When replacing a theft deterrent control module with an GM SPO Replacement Part, the module will learn the keys immediately. The existing PCM must learn the new fuel continue password when you replace the theft deterrent control module.

NOTE: When replacing a PCM with a GM SPO Replacement Part, the new PCM will learn the incoming fuel continue password immediately after programming and upon receipt of a password message. Once a password message is received and a password is learned, perform the learn procedure to change this password again. A PCM which had been installed in another vehicle will have learned the fuel continue password of the other vehicle's theft deterrent control module. Perform either the 10-minute relearn procedure or 30-minute relearn procedure after programming to learn the fuel continue password of the current vehicle's theft deterrent control modules.

NOTE: When performing either relearn procedure, all previously learned keys will be erased from the theft deterrent control module's memory.

NOTE: Additional keys may be learned immediately after the first relearn procedure by inserting the additional key and turning the ignition to RUN within 10 seconds of removing the previously learned key.

NOTE: Use only a master key when performing the first relearn procedure. If you use a valet key first, the theft deterrent control module will not allow additional keys to be learned.

10-MINUTE LEARN PROCEDURE (AURORA, BONNEVILLE, CTS, DEVILLE, GRAND PRIX, PRIX, LESABRE, PARK AVENUE & SEVILLE, & ALL TRUCKS EXCEPT AZTEK, MONTA MONTANA, RENDEZVOUS, SILHOUETTE & VENTURE)

NOTE: This procedure requires a Tech 2(tm) scan tool and a Techline(tm) terminal with current SPS (Service Programming System) software.

NOTE: Use this procedure after replacing the Passkey(R) III (PK3) keys, theft deterrent control module or PCM.

NOTE: If replacing a theft deterrent control module with a GM SPO Replacement Part, perform the procedure to setup a new theft deterrent control module prior to the 10-minute relearn procedure.

1. Connect scan tool to vehicle.
2. Turn ignition on, with engine off.
3. Ensure that all power consuming devices are turned OFF on vehicle.
4. With scan tool, select Request Info. under Service Programming System and follow scan tool on-screen instructions.
5. Disconnect scan tool from vehicle and connect scan tool to a Techline(tm) terminal with the current Service Programming System (SPS) software.
6. On the Techline terminal, select Service Programming System and follow Techline terminal on-screen instructions.
7. Disconnect scan tool from Techline(tm) terminal and reconnect scan tool to vehicle.
8. With a master Passkey(R) III key, turn ON the ignition, with engine OFF.
9. With scan tool, select Program ECU under Service Programming System.
10. At this point the scan tool must remain connected for the duration of the 10-minute relearn procedure.

NOTE: On some vehicles, the SECURITY telltale maybe illuminated on steady for the duration of the 10-minute relearn procedure.

11. Observe scan tool, after about 10 minutes, scan tool will display "Programming Successful, Turn OFF Ignition". The vehicle is now ready to relearn the key information and/or the passwords on the next ignition switch transition from OFF to ON.
12. Turn OFF ignition and wait 5 seconds.
13. With master Passkey(R) III key, start engine. The theft deterrent control module has now learned the key transponder information and PCM has now learned the fuel continue password.

NOTE: Perform this step ONLY on vehicles with EXPORT configured theft deterrent control modules.

14. Turn OFF the ignition and wait 15 seconds minimum.

NOTE: Perform this step **ONLY** on vehicles with **EXPORT** configured theft deterrent control modules.

15. With a second master Passkey(R) III key, start engine. The theft deterrent control module has now learned the second master Passkey(R) III key transponder information.
16. Using scan tool, clear any DTCs.

30-MINUTE LEARN PROCEDURE (AURORA, AZTEK, BONNEVILLE, DEVILLE, GRAND PRIX, LESABRE, MONTANA, PARK AVENUE, RENDEZVOUS, SEVILLE, SILHOUETTE & VENTURE)

NOTE: Use this procedure after replacing the Passkey(R) III (PK3) keys, theft deterrent control module or PCM.

NOTE: This procedure is not available on vehicles equipped with option code Z49 or BAE.

NOTE: If replacing a theft deterrent control module with an GM SPO replacement part, perform the procedure to setup a new theft deterrent control module prior to the 30-minute relearn procedure.

1. With a master Passkey(R) III key (Black), turn ignition on, with engine off.
2. Observe the SECURITY telltale. After about 10 minutes, the telltale will turn off.
3. Turn OFF ignition, and wait 5 seconds.
4. Repeat steps 1 -3 for 2 more times for a total of 3 cycles or 30 minutes.

NOTE: The vehicle learns the key transponder information and/or passwords on ignition switch transition from OFF to CRANK. You must turn the ignition OFF before attempting to start the engine.

5. With a master Passkey(R) III key, start engine. The vehicle has now learned the key transponder information and PCM has now learned the fuel continue password.
6. Using scan tool, clear any DTCs.

THROTTLE BODY RELEARN PROCEDURE

SATURN - 3.0L

The engine control learns the idle position of the throttle body for correct operation. When the throttle body or ECM is replaced, this procedure must be performed to ensure correct idle

operation. The engine idle may be unstable or a DTC may set if the idle position has not been learned.

Perform the following procedure in order to allow the ECM to learn the idle position:

1. Ensure that the following conditions are met:
 - The vehicle speed is 0 mph.
 - Accelerator pedal angle is less than 14.9 degrees.
 - Battery voltage is more than 10 volts.
 - ECT is 41-212°F (5-100°C).
 - IAT is more than 41°F (5°C).
2. Turn OFF the ignition for 30 seconds.
3. Turn ON the ignition, with the engine OFF for 60 seconds.
4. Turn OFF the ignition.

THROTTLE POSITION SENSOR LEARN PROCEDURE

DEVILLE & SEVILLE

1. Turn the ignition to the RUN/ON position.
2. Wait 1 minute.
3. Turn the ignition to the LOCK/OFF position.
4. Wait 15 seconds.

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