

GM Anti-Theft Systems

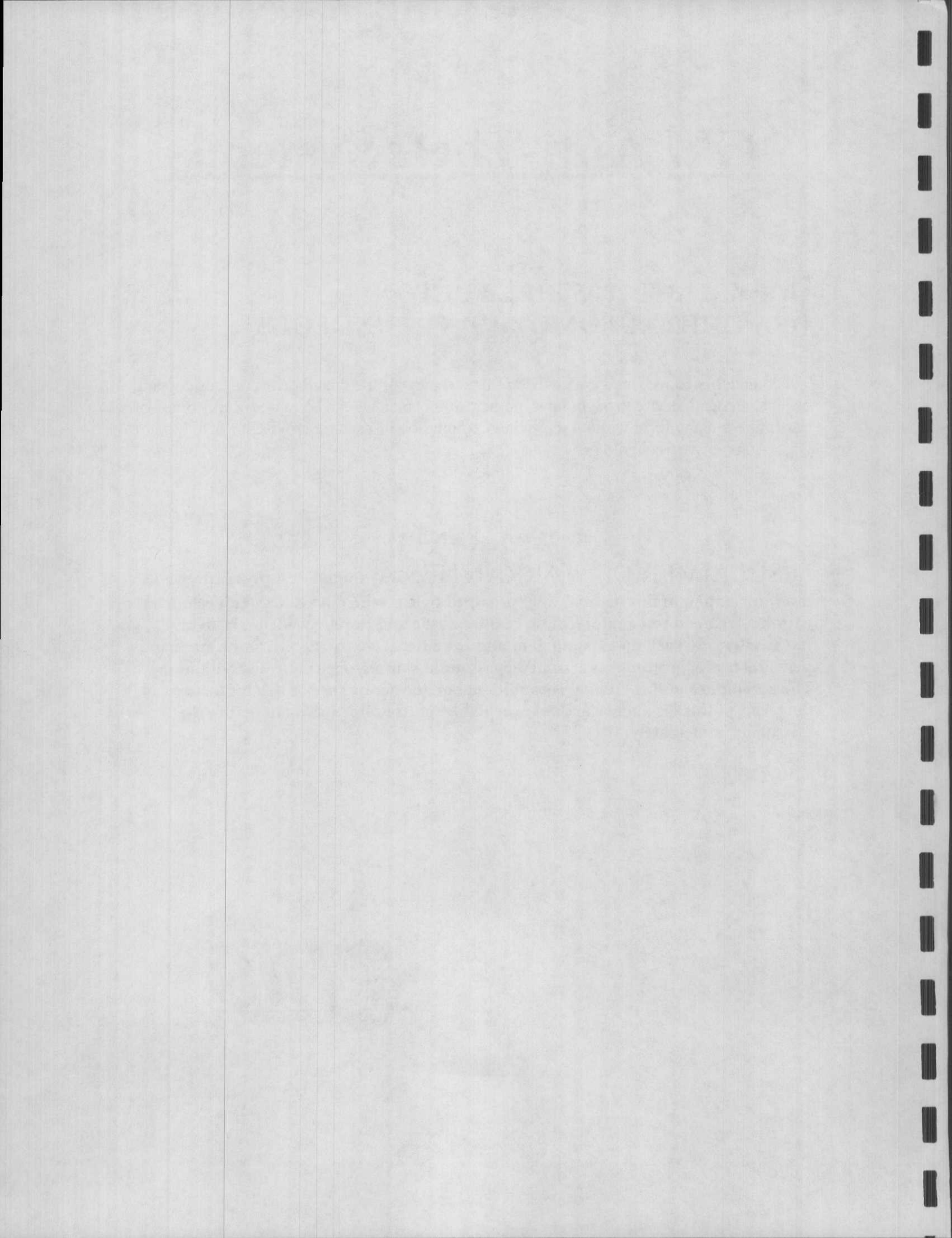
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GM Anti-Theft Systems



Notes:

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Introduction to GM Anti-Theft Systems



Notes:

GM Anti-Theft Symptoms

- **No Crank Condition?**
- **Start and Stall?**
- **Engine Cranks with No Injector Pulse?**
- **Security Light On?**



Notes:

Understanding GM's VTD Systems

- No GM Anti-Theft system will disable the Ignition System or the Fuel Pump.
- Some GM Anti-Theft systems will disable the starter and the injectors while other GM systems will only disable the injectors.



Notes:

Understanding GM's VTD Systems

- No GM Anti-Theft system will disable the _____ or the _____.
- Some GM Anti-Theft systems will disable the starter and the injectors while other GM systems will only disable the _____.



Notes:

Which GM Anti-Theft System?

- **Pass Key?**
- **Pass Lock?**
- **PK3 System?**



Notes:

VTD Fuel Disable?

VTD Fuel Disable
Inactive
Fuel Pump
On



Notes:

GM Anti-Theft systems will disable the starter, the injectors, or both.
No GM Anti-Theft systems disable the fuel pump or the ignition system.

Pass Key Systems



Notes:

Pass Key Applications

- Buick
- Cadillac
- Chevrolet
- Oldsmobile
- Pontiac



Notes:

BUICK: 1997-2003 CENTURY, 1992-1999 LeSABRE, 1991-1996 PARK AVENUE, 1990-1992 REATTA, 1994-1999 REGAL, 1990-1993 and 1995-2001 RIVIERA, 1994-1996 ROADMASTER.

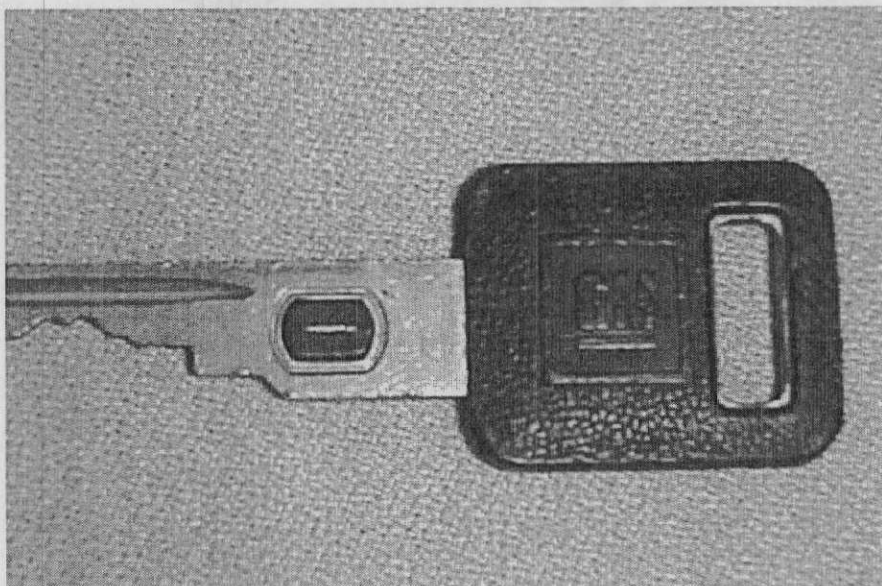
CADILLAC: 1989-1993 ALLANTE, 1992-1996 BROUGHAM, 1990-1999 DeVILLE, 1989-2002 ELDORADO, 1989-1997 SeVILLE.

CHEVROLET: 1994-2002 CAMARO, 1994-1996 CAPRICE AND IMPALA, 1986-2003 CORVETTE, 1995-2000 LUMINA, 1995-1999 MONTE CARLO.

OLDSMOBILE: 1994-1997 CUTLASS SUPREME, 1995-2000 AURORA, 1992-1999 EIGHTY EIGHT, 1991-1996 NINETY EIGHT, 1990-1993 TORONADO.

PONTIAC: 1992-1999 BONNEVILLE, 1989-2002 FIREBIRD, 1994-1996 GRAND PRIX.

GM Pass-Key



Notes:

Technicians can ohm out the resistor pellet to determine the resistive value of the key.

Pass Key Components

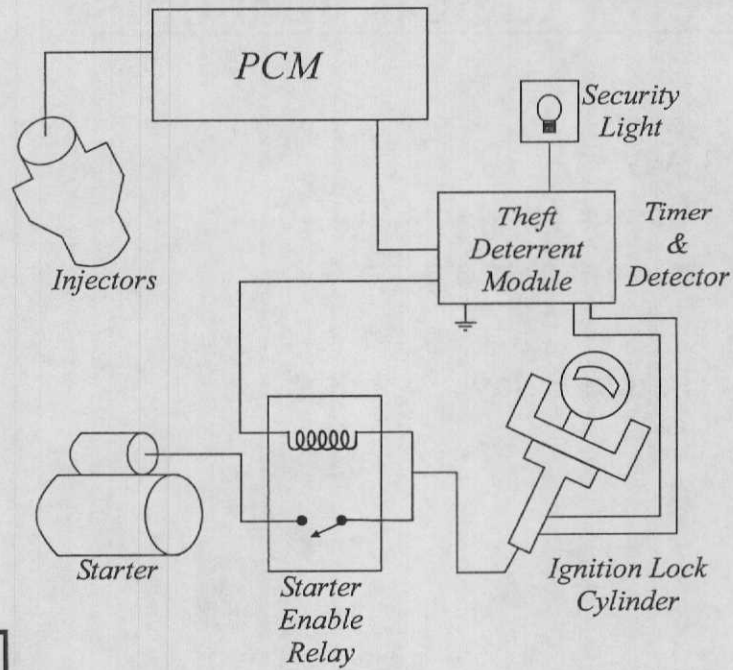
- Ignition Key
- Ignition Lock Cylinder
- Theft Deterrent Module
- Security Light
- Starter Enable Relay
- PCM



Notes:

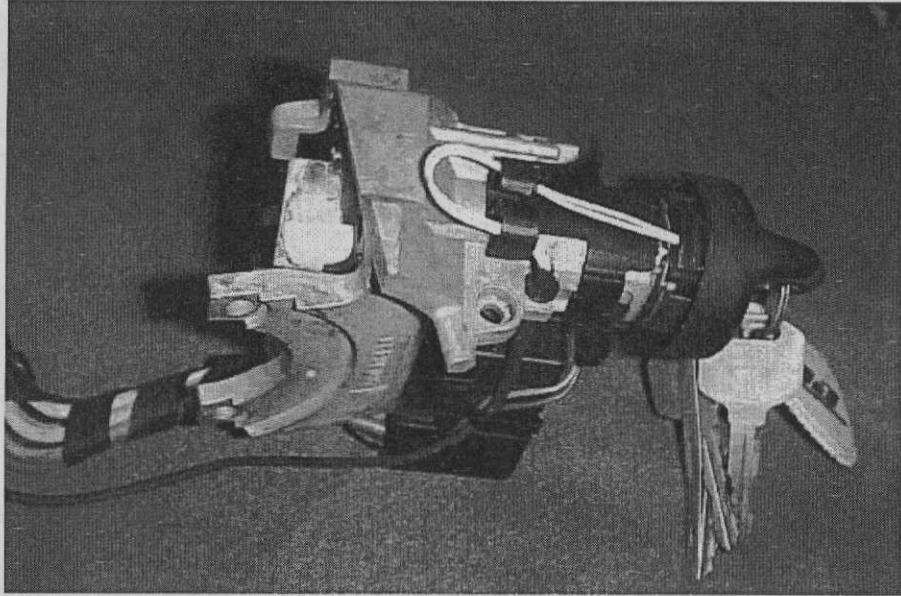
1. **THE IGNITION KEY-** The Ignition Key is a mechanically cut key with a specific resistor embedded into the shank end. There are a possible 15 different ohmic values these keys could have, found on the pass key systems.
2. **THE IGNITION LOCK CYLINDER-** The Ignition Lock Cylinder contains a set of contacts that bridge the circuit across the resistor pellet of the key when inserted into the lock cylinder. A two wire harness is attached to the ignition lock cylinder that connects to the theft deterrent module.
3. **THE THEFT DETERRENT MODULE-** The Theft Deterrent Module is the brains of the Pass Key System. The Theft Deterrent Module sends 5 volts to one side of the ignition lock cylinder contacts. With the key inserted into the lock cylinder, the embedded key pellet resistor will bridge the circuit across the key contacts. The resulting voltage drop will be looked at by the Theft Deterrent Module. If the voltage on the signal wire matches the learned value inside the Theft Deterrent Module, the module will send a fuel enable signal to the PCM. If the wrong value is read, the module disables starting and activates an internal timer that locks out starting for 3 to 5 minutes. Some GM systems such as Cadillac and Corvettes, use a Central Control Module or the IPC to fulfill the duties of the Module.
4. **THE SECURITY LIGHT-** The Security Light is ground side controlled by the Theft Deterrent Module to give specific diagnostic information.
5. **THE STARTER ENABLE RELAY-** The Starter Enable Relay energizes the starter solenoid during normal operation. If the Pass Key Module detects an incorrect voltage value at the ignition lock cylinder, the Starter Enable Relay will not be grounded by the module, resulting in an open circuit to the starter solenoid.
6. **THE PCM-** The Powertrain Control Module receives a pulse width modulated digital frequency signal from the Theft Deterrent Module if the proper voltage value is read across the key contacts. The PCM will then allow injector operation. If no signal is sent to the PCM from the Theft Deterrent Module the injectors will be disabled.

GM Pass Key System



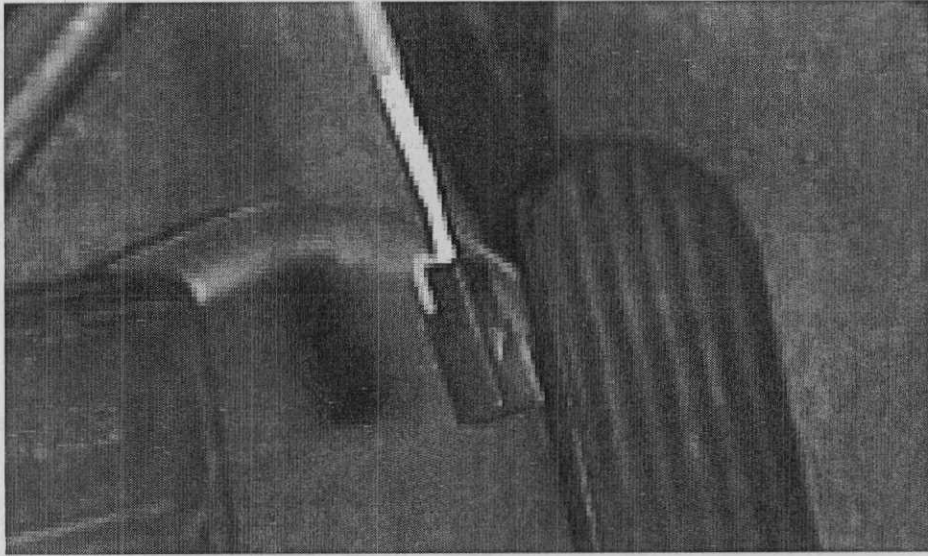
Notes:

Pass Key Ignition Switch



Notes:

GM Pass-Key Test Terminal



Notes:

The Pass-Key terminal is located behind the hush panel near the base of the steering column. This connector has two white wires that plug into the Pass-Key decoder module. If a Pass-Key failure exists, place an ohmmeter across these two terminals to read the key pellet ohmic values. The ohmmeter should read the same value in all key positions.

Pass Key Anti-Theft Module



Notes:

Pass Key Module Relearn Procedure

- **Module is not reprogrammable**
- **Programming a new Pass Key module**



Notes:

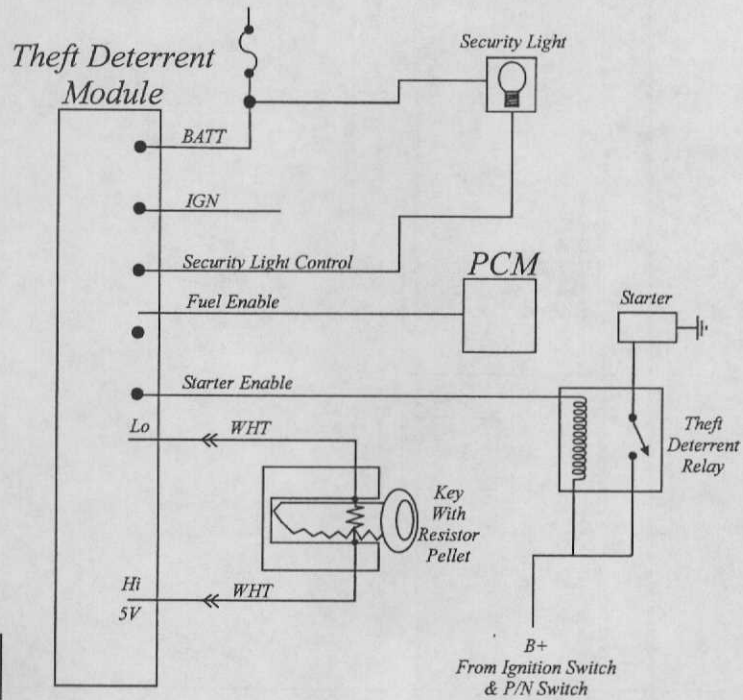
THE PASS KEY MODULE IS NOT REPROGRAMMABLE, LIKE MOST OTHER MODULES. WHENEVER THE MODULE NEEDS REPLACING OR THE IGNITION KEY AND TUMBLERS HAVE BEEN REPLACED, A NEW VIRGIN ANTI-THEFT MODULE WILL BE NEEDED. ONCE AN ANTI-THEFT PASS KEY MODULE HAS LEARNED A SPECIFIC IGNITION KEY VALUE IT CANNOT BE RE WRITTEN.

PROGRAMMING A NEW PASS KEY MODULE

A NEW PASS KEY MODULE IS ALREADY IN A STATE CALLED REGISTRATION MODE. WHEN YOU INSTALL THIS VIRGIN MODULE IT IS READY TO LEARN THE NEW KEY OHMIC VALUE.

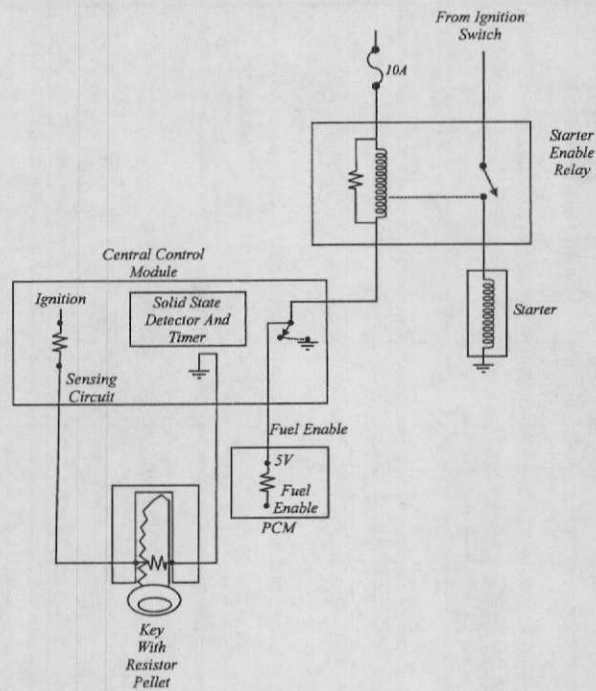
AFTER INSTALLING A NEW PASS KEY THEFT DETERRENT MODULE, TURN THE KEY BRIEFLY TO THE KOEO POSITION AND THEN PROCEED TO THE CRANK MODE. THE ENGINE SHOULD START. IF THE ENGINE DOES NOT CRANK, NOTE THE SECURITY LIGHT. IF THE SECURITY LIGHT COMES ON FOR 5 SECONDS AND THEN GOES OUT THE PASS KEY MODULE IS READING THE PROPER KEY VALUE. SUSPECT A BAD STARTER ENABLE RELAY OR A CONVENTIONAL STARTING CIRCUIT PROBLEM. IF THE SECURITY LIGHT STAYS ON A FAULT HAS BEEN DETECTED. RETRIEVE CODES WITH A SCAN TOOL.

F-Body Pass Key Circuit



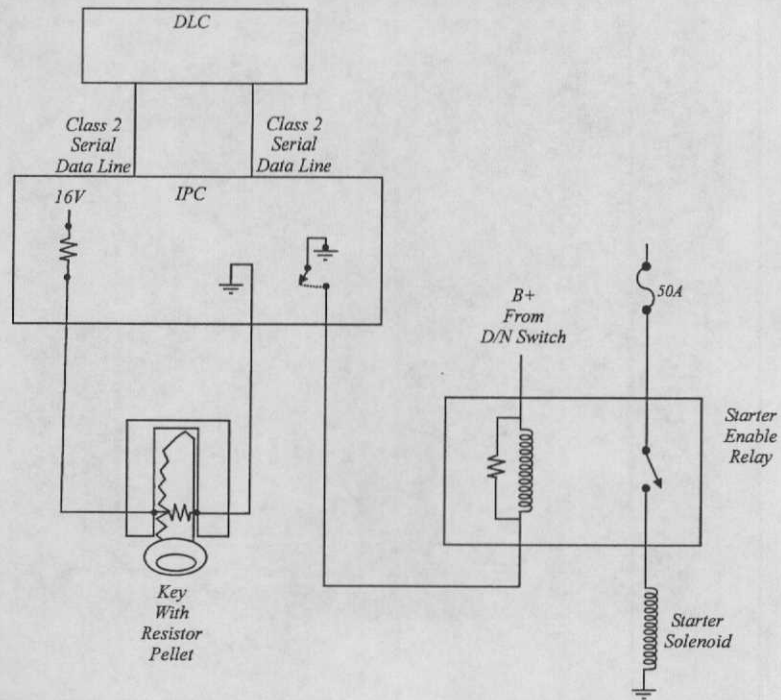
Notes:

Cadillac Pass Key Circuit (w/CCM)



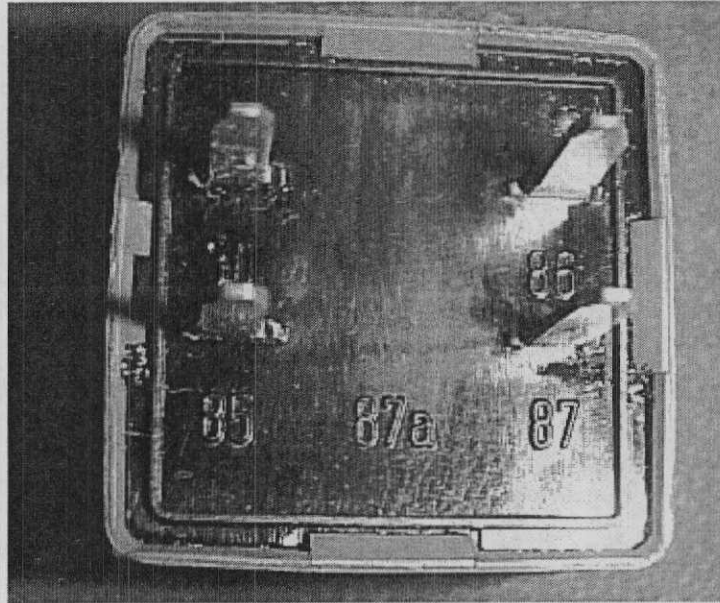
Notes:

Cadillac Pass Key Circuit (w/IPC)



Notes:

Starter Enable Relay



Notes:

Security Light Diagnostics on Pass Key Systems

- Bulb Check
- Key with Wrong Resistance Value
- Circuit Problem
- One Minute Detection
- Fault After a Successful Key Schedule
- Five Second Bulb Check, Light Out / No Crank, Suspect Starter Enable Relay



Notes:

1. THE SECURITY LIGHT WILL COME ON WHENEVER THE KEY IS PLACE IN THE RUN OR START POSITION FOR ABOUT 5 SECONDS FOR THE BULB CHECK.
2. IF THE WRONG KEY IS USED WITH AN IMPROPER RESISTANCE VALUE, THE SECURITY LIGHT WILL ILLUMINATE FOR 3 MINUTES. THIS IS THE LOCK OUT MODE. THE ENGINE STARTING WILL BE DISABLED FOR 3 MINUTES UNTIL THE LOCKOUT TIMER EXPIRES.
3. IF A CIRCUIT PROBLEM EXISTS SUCH AS BROKEN SENSING WIRES INSIDE THE STEERING COLUMN OR LOOSE OR DIRTY KEY CONTACTS, THE SECURITY LIGHT WILL FLASH AT ONCE PER SECOND AND STARTING WILL BE DISABLED.
4. IF THE SYSTEM DETECTS A PROBLEM IN THE LOCK CYLINDER CIRCUIT FOR ONE MINUTE, THE SECURITY LIGHT WILL REMAIN ON. WHEN THE FAULT HAS BEEN CORRECTED THE SECURITY LIGHT WILL REMAIN ON FOR ONE MINUTE AND THEN GO OUT.
5. IF A FAULT HAS BEEN DETECTED FOR WHILE THE ENGINE IS RUNNING AND THEN TURNED OFF, THE ENGINE CAN BE RESTARTED BUT WILL NOT BE UNDER THE PROTECTION OF THE PASS KEY SYSTEM. THIS IS CALLED FAIL ENABLE MODE. THE SECURITY LIGHT WILL REMAIN ON WITH THE KEY IN THE RUN POSITION. WHEN THE FAULT HAS BEEN CORRECTED, THE LAMP WILL GO OUT AFTER ONE MINUTE.
6. FIVE SECOND BULB CHECK, LIGHT OFF, NO CRANK?

Critical Points for Pass Key Systems

- Key Pellet
- Theft Deterrent Module, BCM, IPC, or CCM
- Broken Wires inside Steering Column
- Dirty or Lose Key Contacts
- Heavy Key Chains
- Modules Require Programming
- Possible Bad Starter Enable Relay
- Accessibility
- Fuel Enable Signal to PCM



Notes:

1. A BLACK RESISTOR PELLETT EMBEDDED IN THE KEY IDENTIFIES A PASS KEY SYSTEM.
2. ON SYSTEMS USING A CCM, BCM, OR THE IPC IN PLACE OF THE THEFT DETERRENT MODULE, SUCH AS CADILLACS AND CORVETTES, A NO START CONDITION MAY BE CAUSED BY A FAILED SERIAL DATA LINE, EITHER UART OR CLASS 2. FIX THE DATA LINE PROBLEM FIRST. SOME SYSTEMS USE A DEDICATED FUEL ENABLE LINE TO COMMUNICATE WITH THE PCM OR THE SERIAL DATA LINE.
3. BROKEN WIRES INSIDE THE STEERING COLUMN ARE THE MOST COMMON PROBLEMS WITH THIS SYSTEM. THIS CAN BE CHECKED BY USING AN OHMMETER AT THE 2 WIRE CONNECTOR BEHIND THE HUSH PANEL.
4. DIRTY OR LOOSE CONTACTS INSIDE THE LOCK CYLINDER ARE A COMMON CAUSE OF INTERMITTENT NO CRANK COMPLAINTS. USING AN OHMMETER CHECK FOR CONSISTENT RESISTANCE VALUES IN ALL KEY POSITIONS AT THE TWO WIRE CONNECTOR. A VARIATION OF 5 OR MORE OHMS IS CONSIDERED FAULTY.
5. HEAVY KEY CHAINS OR RINGS CAN CAUSE INTERMITTENT NO START CONDITIONS. THIS CAUSES LOOSE CONTACTS INSIDE THE LOCK CYLINDER.
6. NEW PASS KEY MODULES WILL REQUIRE PROGRAMMING.
7. INTERMITTENT NO CRANK COMPLAINTS CAN BE CAUSED BY BAD STARTER ENABLE RELAYS. YOU CAN SUBSTITUTE A JUMPER ACROSS THE RELAY CONTACTS TO BYPASS.
8. COMPONENT LOCATORS ARE A MUST! THE STARTER ENABLE RELAY AND THE THEFT DETERRENT MODULE ARE BURIED TO DISCOURAGE TAMPERING.
9. THE FUEL ENABLE SIGNAL IS A 5V/0V TOGGLE WITH A 50% DUTY CYCLE SIGNAL @ 30 to 50hz. THE 5 VOLTS IS SOURCED AT THE PCM AND TOGGLED BY THE THEFT DETERRENT MODULE.

Pass Key Intermittents

- Loose, Dirty, or Worn Key Contacts
- Ohmmeter Check
- Starter Enable Relay Contacts



Notes:

1. MOST INTERMITTENT PROBLEMS ON PASS KEY SYSTEMS CAN BE TRACED TO LOOSE, DIRTY OR WORN KEY CONTACTS INSIDE THE IGNITION SWITCH.
2. DISCONNECT THE THEFT DETERRENT MODULE AND INSERT THE PROPER RESISTOR PELLET KEY INTO THE LOCK CYLINDER. USING AN OHMMETER PROBE THE SIGNAL AND GROUND TERMINALS THAT CONNECT THE THEFT DETERRENT MODULE TO THE IGNITION SWITCH. YOU SHOULD READ WITHIN 5 OHMS OF THE RESISTANCE VALUE OF THE KEY PELLET. WITH THE OHMMETER IN THE MIN/MAX MODE ROTATE THE KEY THRU ALL THE KEY POSITIONS. THE OHMIC VALUE SHOULD NOT VARY MORE THAN 5 OHMS. A BEEPING OHMMETER FUNCTION WILL ALERT YOU TO AN INTERMITTENT CONNECTION PROBLEM AT THE KEY CONTACTS. IN ADDITION WIGGLE THE STEERING WHEEL FROM SIDE TO SIDE AND LISTEN FOR ANY OHMIC SHIFT FROM THE DVOM. WHILE STILL USING THE OHMMETER YOU SHOULD ALSO GENTLY WIGGLE THE WIRING HARNESS TO DETECT ANY POOR ELECTRICAL CONNECTORS.
3. INTERMITTENT BAD STARTER ENABLE RELAY CONTACTS – IF THE SECURITY LIGHT COMES ON FOR 5 SECONDS AND THEN GOES OFF FOLLOWED BY A NO CRANK CONDITION THE STARTER ENABLE RELAY SHOULD BE SUSPECT. IF SEVERAL KEY CYCLES ARE NEEDED FOR STARTER ENGAGEMENT THE STARTER ENABLE RELAY SHOULD ALSO BE SUSPECT.

Pass Lock Systems



Notes:

Pass Lock Applications

- Buick
- Chevrolet
- GMC
- Oldsmobile
- Pontiac



Notes:

BUICK: 1996-1998 SKYLARK

CHEVROLET: 1998-2004 ASTRO, BLAZER, C,K PICKUP,
EXPRESS VAN, G VAN,S-10, TAHOE, SUBURBAN, 2000-2005
CAPRICE/IMPALA, 1996-2005 CAVALIER, 2003 H-2, 1997-2005
MALIBU, 2000-2003 MONTE CARLO, 2002-2005 TRAIL BLAZER

GMC; 1998-2005 ENVOY, JIMMY, SAFARI, SAVANNA, SIERRA,
SONOMA, SUBURBAN, YUKON.

OLDSMOBILE: 1996-1998 ACHIEVA, 1998-2004 BRAVADA,
INTRIGUE, 1997-2001 CUTLASS

PONTIAC: 1996-2005 GRAND AM, 1996-2005 SUNFIRE

Pass Lock System Components

- IGNITION LOCK CYLINDER
- IGNITION SWITCH
- PASS LOCK SENSOR
- BCM
- SECURITY LIGHT
- PCM OR VCM



Notes:

IGNITION LOCK CYLINDER

IGNITION SWITCH

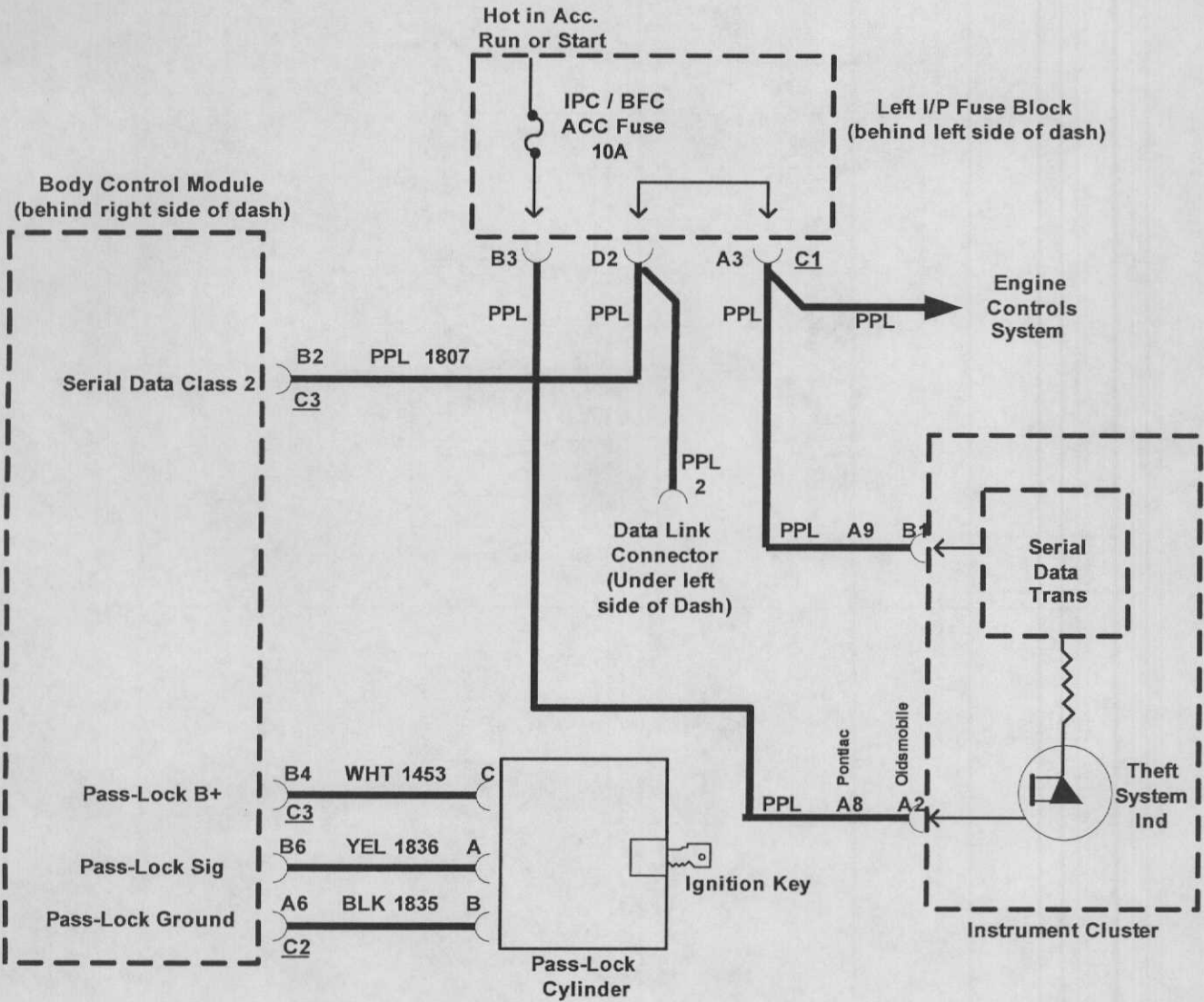
PASS LOCK SENSOR - INTEGRATED WITH LOCK CYLINDER ON DASH MOUNTED SWITCHES. INSIDE THE STEERING COLUMN ON COLUMN MOUNTED IGNITION SWITCHES. SEPARATE FROM LOCK CYLINDER.

BCM

SECURITY LIGHT

PCM OR VCM

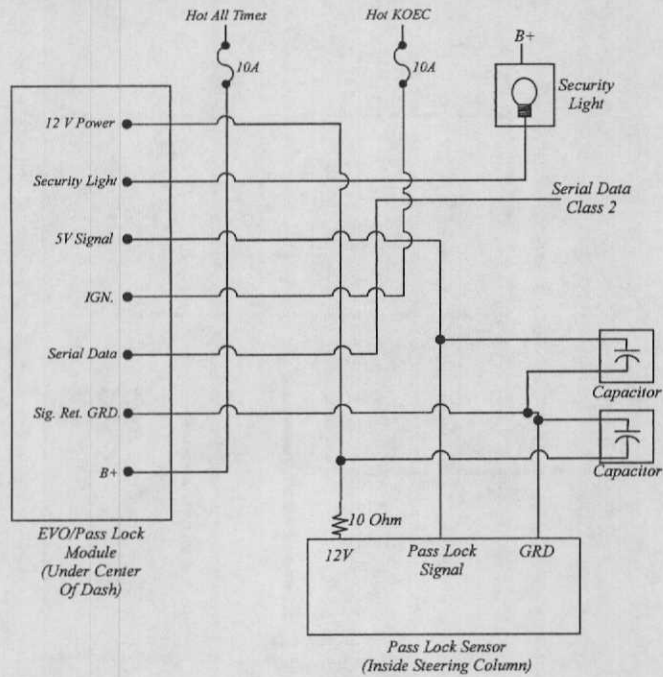
Typical GM Pass-Lock System



Notes:

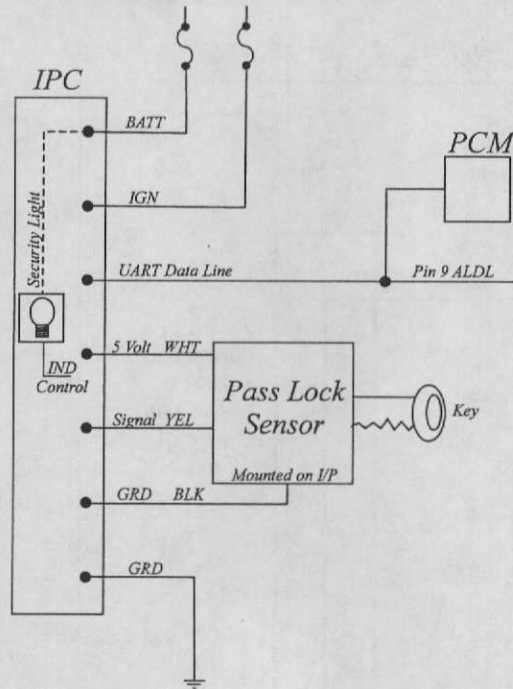
When performing pin out testing with a DVOM or DSO, leave the circuit in tact to create a loading effect.

GM Pass Lock Sensor (C/K Pickup)



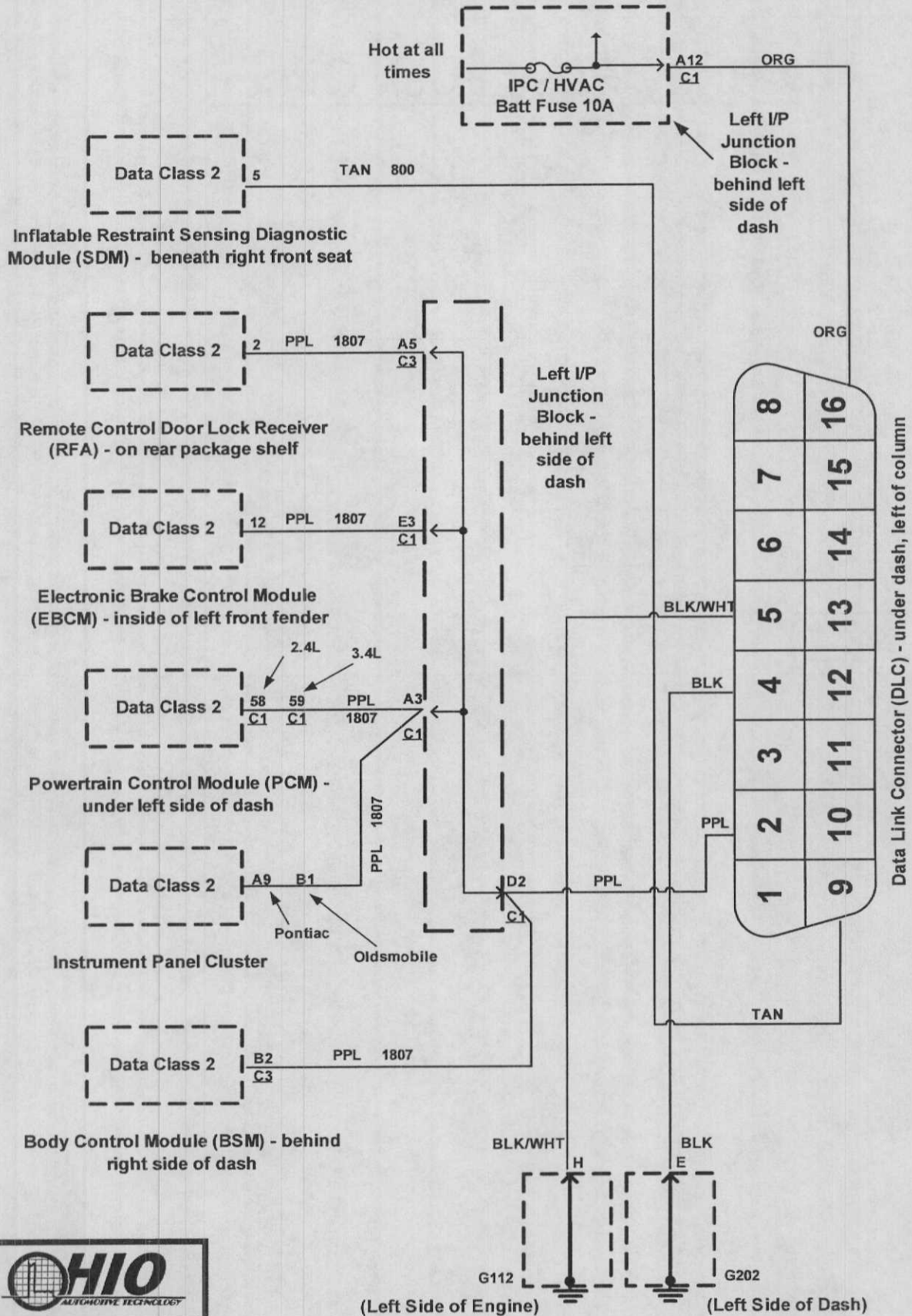
Notes:

N-Body Pass Lock Circuit

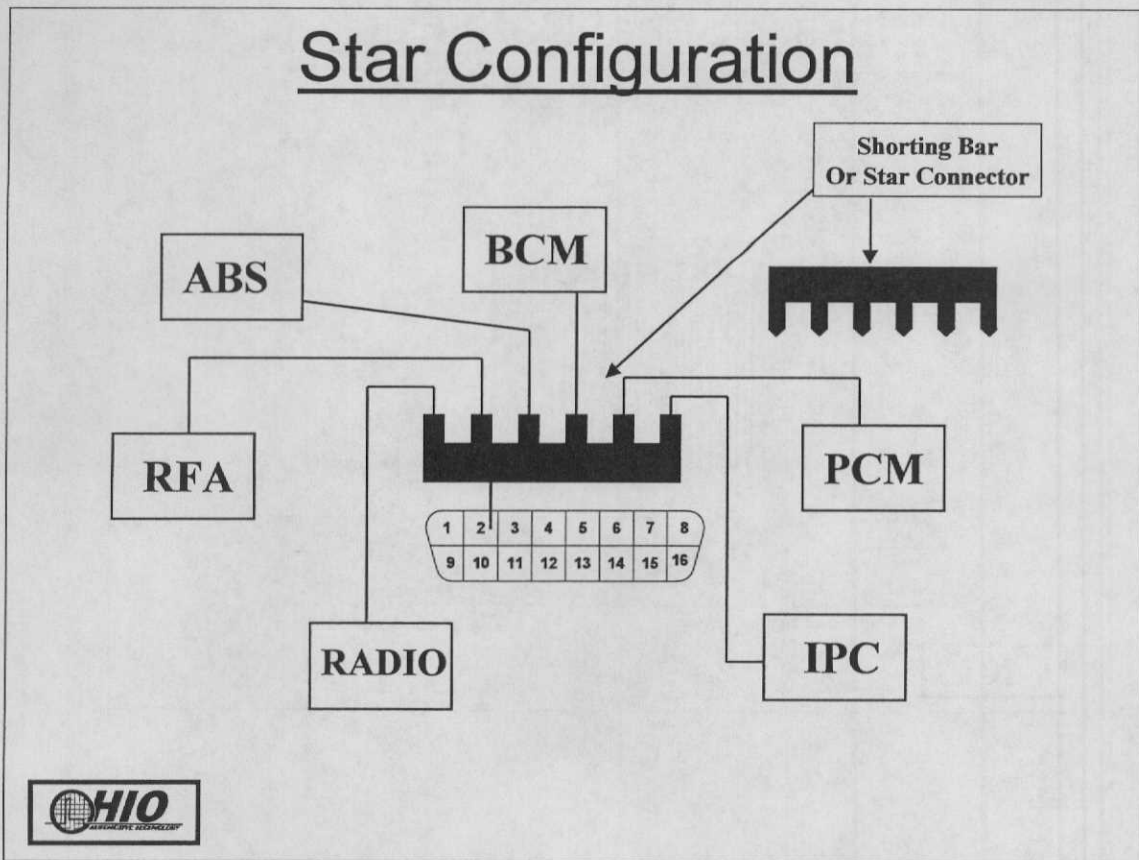


Notes:

GM Computer Data Lines



Star Configuration

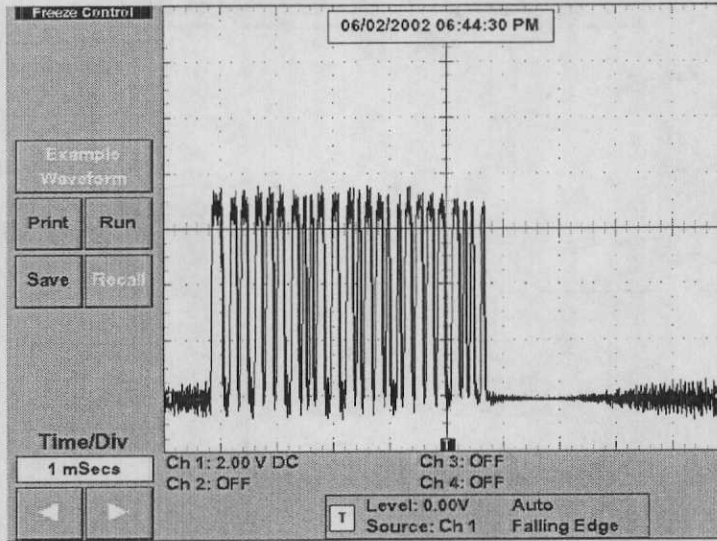


Notes:

- This is an example of a GM Class 2 serial data bus (star configuration) with 6 modules.

On a class 2 system, each module contains its own bias voltage. An open on 1 leg will only affect the module with the open condition. A short-to-ground or a short-to-power will shut down the whole bus.

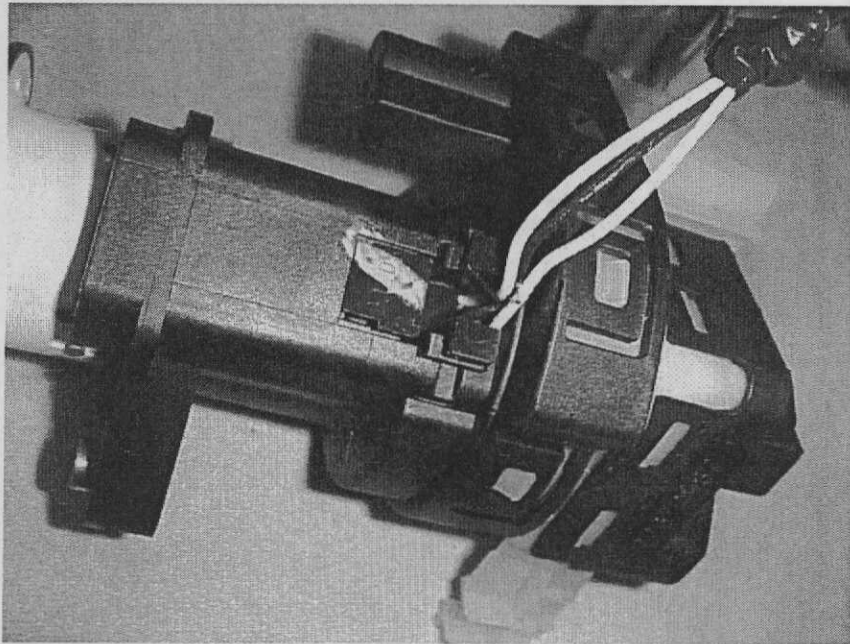
Class 2 Serial Data Packet



Notes:

In this example, a DSO is used to probe pin-2 on a GM OBD II connector during KOEO. The waveform indicates a 7-0 volt toggle confirming that a module or a node is communicating on the bus.

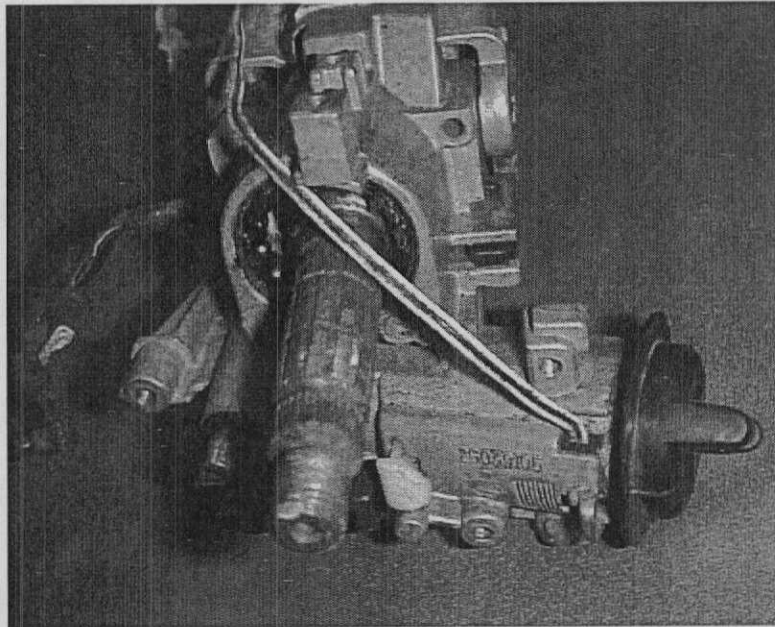
GM Pass-Lock



Notes:

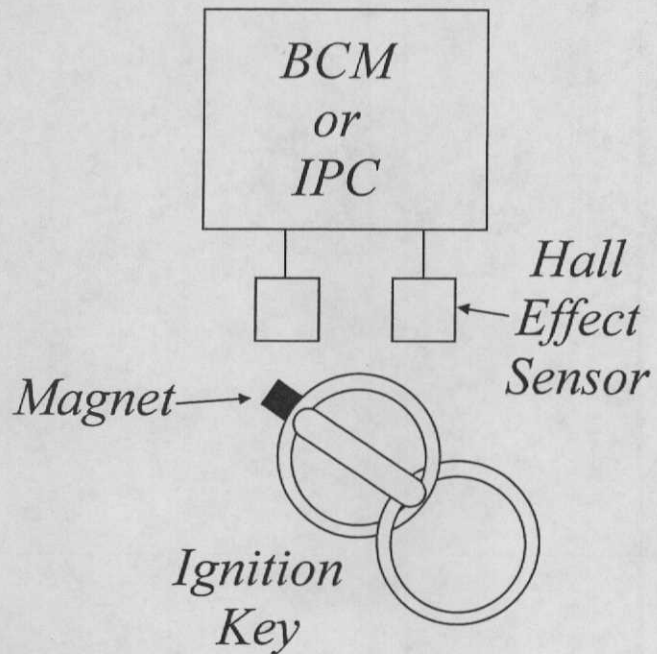
The GM Pass-Lock ignition switch contains two hall-effect sensors (located at the 3-wire connector) and a rotating magnet. The BCM (on most applications) or the IPC (a few applications) will send out a 5-volt reference voltage to this sensor. The hall-effect sensor creates an analog signal that is then processed by the BCM. When the BCM recognizes this "R" code voltage, it sends a class 2 password to the PCM to allow starter and injector operations.

Column Mounted Pass Lock Sensor



Notes:

GM Pass Lock Sensor



Notes:

KOEO Pass-Lock Voltage

5.14_v



Notes:

The 5.14 volts was obtained by probing the BCM at the yellow wire that comes from the ISLC. On most systems, access to the BCM is much easier than access to the ISLC.

Key On-Engine Cranking Pass-Lock
Voltage

1.15_v



Notes:

In the start mode of the ignition switch, the Pass-Lock voltage is now 1.15 volts. This is known as the proper "R" code voltage. On intermittent start or stall complaints, you may want to monitor this voltage for consistency.

Pass Lock Security Light Diagnostics

- **KOEO Bulb Check**
- **Flashing Security Light**
- **Security Light on Steady**



Notes:

1. KOEO BULB CHECK- INITIAL KEY ON THE SECURITY LIGHT WILL ILLUMINATE BRIEFLY AND THE GO OUT.
2. FLASHING SECURITY LIGHT- MEANS THE SYSTEM IS IN THE FUEL DISABLE MODE BECAUSE THE BCM DID NOT SEE THE CORRECT PASS LOCK VOLTAGE DURING CRANKING.
3. SECURITY LIGHT ON STEADY- MEANS THE SYSTEM IS IN THE FAIL ENABLE MODE. THE BCM DETECTED A FALSE PASS LOCK VOLTAGE AFTER A SUCCESSFUL START UP. THE ENGINE WILL CONTINUE TO START BUT THE VEHICLE WILL NOT BE UNDER THE PROTECTION OF THE PASS LOCK SYSTEM.

Pass Lock System Status

- Fuel Continue
- Fuel Disable
- Fuel Lock-Out
- Fuel Enable



Notes:

FUEL CONTINUE- This is the normal Pass Lock operation in which the BCM has seen the correct voltage from the Pass Lock sensor during the KOEO to KOE Cranking cycle. The BCM sends the PCM the correct message on the Class 2 bus circuit for Fuel Enable. On some systems this may occur on the UART bus circuit.

FUEL DISABLE- This mode means that the PCM did not see the correct Pass Lock voltage from the Pass Lock sensor during the start attempt. The engine will initially start but the PCM will cut off the injectors within 2 seconds of engine running. The IPC will be commanded to flash the security light. The Scan Tool will indicate the Fuel Enable as being off.

FUEL LOCKOUT- If a tamper has been detected by the BCM during a startup attempt, the BCM will not send a Fuel Enable signal to the PCM. The PCM will lock out the injectors for a 10 minute period. At this time the IPC will be commanded to flash the Security Light. Before another key cycle you must wait for the 10 minute timer to run out and the Security Light to stop flashing.

FUEL ENABLE- status occurs when the BCM detects an incorrect Pass Lock voltage value after a successful key cycle and startup. In these cases the Security Light will remain on. The engine will continue to start but the vehicle will not be under the theft protection of the Pass Lock system. The Security Light will remain on with a stored DTC.

Pass Lock Fuel Lockout Modes

- **Short Tamper Mode**
- **Long Tamper Mode**



Notes:

- **SHORT TAMPER MODE-** THE SHORT TAMPER MODE OCCURS WHEN THE BCM, IPC OR THE PASS LOCK MODULE DETECTS A FALSE PASS LOCK VOLTAGE VALUE. THE SECURITY LIGHT WILL FLASH FOR 4 SECONDS. NO PASS WORD FOR FUEL ENABLE WILL BE SENT TO THE PCM. BECAUSE OF THIS THE PCM WILL NOT PULSE THE INJECTORS.
- **LONG TAMPER MODE-** THE LONG TAMPER MODE OCCURS WHEN THE THEFT MODULE DETECTS A FAILURE OR A TAMPER IN THE PASS LOCK SENSOR. THIS WILL OCCUR IF NO VOLTAGE VALUE IS READ BY THE PASS LOCK MODULE. THE SECURITY LIGHT WILL FLASH FOR THE FULL 10 MINUTES. A START UP ATTEMPT WILL NOT BE JUDGED BY THE THEFT MODULE FOR A FULL 10 MINUTES.

Critical Points for Pass Lock Systems

- **Voltage Spikes**
- **Checking for DTCs**
- **Serial Data Lines**
- **Bad Ignition Switches**
- **BCM, IPC, or BFC**
- **Pass Lock Sensor Location**



Notes:

1. Many intermittent start and stall problems can be solved by doing a relearn procedure. Voltage spikes from jump starting are a common cause for intermittent loss of Pass Lock learned voltages.
2. Initially, when a Pass Lock failure is suspected, check for DTCs in the BCM, IPC or the PCM.
3. Some GM Pass Lock systems communicate on the Class 2 bus line while some use the UART bus line. Check the specific schematic and fix a bus problem first.
4. Intermittent problems can be caused by bad ignition switches that power up the IPC or BCM.
5. Not all systems use a BCM for Pass Lock functions. J and N Bodies use the IPC as the Pass Lock module. S/T trucks use the BCM, while L/N bodies use a BFC.
6. GM Pass Lock systems that have the ignition switch mounted on the dash have the Pass Lock sensor integrated into the ignition switch. GM Pass Lock systems that have the ignition switch mounted on the steering column have the Pass Lock sensor inside the steering column separate from the ignition switch.

Changing Pass Lock Components

- Pass Lock Sensor
- BCM
- PCM / VCM



Notes:

CHANGING THESE COMPONENTS WILL FORCE THE PASS LOCK SYSTEM INTO THE TAMPER MODE, RESULTING IN A START AND STALL CONDITION:

1. PASS LOCK SENSOR
2. BODY CONTROL MODULE (BCM)
3. POWER TRAIN CONTROL MODULE (PCM OR VCM)

IF YOU REPLACE ANY OF THESE PARTS A RELEARN PROCEDURE IS NEEDED. IF A RELEARN PROCEDURE IS NOT DONE A START AND STALL WILL OCCUR FOR 10 MINUTES.

DURING THIS TIME, THE SECURITY LIGHT WILL FLASH FOR THE FULL 10 MINUTES AND A DTC B3031 WILL BE SET IN THE BCM.

Pass Lock Relearn Procedure

- 1. Momentarily Cycle Key to Crank Position and Release (note Security Light).**
- 2. 10-Minute Time Out Period.**
- 3. Repeat Steps 1 and 2.**
- 4. Turn Key to Crank Position (BCM learns lock cylinder).**



Notes:

NEEDED IF BCM OR PASS LOCK SENSOR HAS BEEN REPLACED

NOTE: THIS IS A 30 MINUTE PROCEDURE! APPLY THE PARKING BRAKE SO THAT THE DAY TIME RUNNING LIGHTS WILL BE TURNED OFF. YOU MAY ALSO WANT TO HOOK A SMALL 10 AMP CHARGER ON THE BATTERY.

1. WITH KOEO USE A SCAN TOOL TO CLEAR ALL DTCs.
2. MOMENTARILY ROTATE THE KEY TO THE CRANK POSITION AND RELEASE TO THE RUN POSITION. (DO NOT ATTEMPT TO START). THE SECURITY LIGHT SHOULD BEGIN TO FLASH. IT MAY FLASH FOR A FEW SECONDS AND THEN STAY ON STEADY OR CONTINUE TO FLASH. THIS WILL LAST FOR ABOUT 10 MINUTES. AFTER THIS PERIOD OF TIME THE SECURITY LIGHT WILL GO OFF.
3. TURN THE KEY TO THE OFF POSITION FOR 10 SECONDS. THIS IS THE FIRST STAGE OF COMMUNICATION RELEARN.
4. ROTATE KEY BACK TO THE RUN POSITION. NOTE THE SECURITY LIGHT. IT MAY FLASH FOR A FEW SECONDS AND THEN REMAIN ON SOLID. AFTER ABOUT 10 MINUTES THE LIGHT SHOULD GO OUT. THIS IS STAGE 2.
5. TURN KEY OFF FOR 10 SECONDS. TURN KEY BACK TO THE RUN POSITION AND NOTE SECURITY LIGHT. IT MAY FLASH FOR A FEW SECONDS AND THEN REMAIN ON SOLID. AFTER ABOUT 10 MINUTES THE SECURITY LIGHT WILL GO OUT. THIS IS STAGE 3.
6. TURN KEY OFF FOR 30 SECONDS. NOW ROTATE KEY TO RUN POSITION AND MOMENTARILY PAUSE BEFORE GOING TO CRANK POSITION. ENGINE SHOULD START. IF ENGINE STARTS AND STALLS WITH THE SECURITY LAMP ON CHECK FOR PCM, IPC OR BCM CODES.

NOTE: IF THE PASS LOCK SENSOR WAS REPLACED, THE SECURITY LIGHT WILL FLASH FOR 10 MINUTES AND THEN GO OUT. IF THE PASS LOCK MODULE (BCM, IPC or EVO MODULE) WAS REPLACED, THE SECURITY LIGHT WILL FLASH FOR A FEW SECONDS AND THEN REMAIN ON FOR 10 MINUTES.

PK-3 Systems



Notes:

PK-3 Application Chart

- Buick
- Cadillac
- Chevrolet
- Oldsmobile
- Pontiac



Notes:

BUICK: 2000-2004 LeSABRE, 1997-2004 PARK AVENUE

CADILLAC: 2000-2004 DeVILLE, 1998-2004 SeVILLE

CHEVROLET: 1999-2004 VENTURE VAN

OLDSMOBILE: 2000-2004 AURORA, 1999-2004 SILHOUETTE

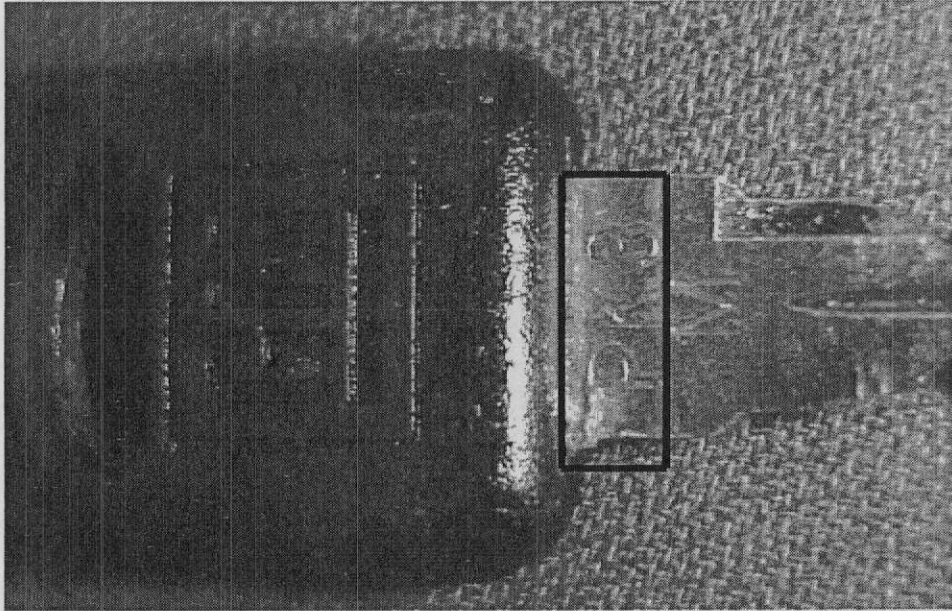
PONTIAC: 2001-2004 AZTEK, 2000-2004 BONNEVILLE, GRAND PRIX, 1999-2004 MONTANA

PK-3+ SYSTEMS:

CADILLAC: 2003-2004 CTS

CHEVROLET: 2002-2003 C/K, TAHOE EXPORT, TRAILBLAZER EXPORT

PK-3 Transponder Key



Notes:

PK-3 Systems

1. PCM
2. Theft Deterrent Module
3. Disables injector operation and/or starter operation



Notes:

- THE PCM VERIFIES THAT THE PASSWORD SENT FROM THE THEFT DETERRENT MODULE ON THE CLASS 2 SERIAL DATA CIRCUIT IS CORRECT. THE PCM CAN LEARN ONLY ONE FUEL ENABLE PASSWORD. IF THE FUEL ENABLE PASSWORD IS CORRECT , THE PCM ENABLES STARTER AND INJECTOR OPERATION.
- THE PCM DISABLES THE STARTING AND INJECTOR OPERATION IF THE FOLLOWING CONDITIONS EXIST:
 1. THE THEFT DETERRENT MODULE SENDS AN INCORRECT PASSWORD TO THE PCM.
 2. THE THEFT DETERRENT MODULE SENDS A DISABLE PASSWORD TO THE PCM.
 3. NO PASSWORDS ARE RECEIVED BY THE PCM FROM THE THEFT DETERRENT MODULE.
- NOTE- ON SOME VEHICLES, IF THE PCM IS UNABLE TO COMMUNICATE WITH THEFT DETERRENT MODULE AFTER THE VEHICLE HAS BEEN SUCCESSFULLY STARTED, THE PCM WILL ENTER THE FUEL ENABLE STATE AND COMMAND THE SECURITY LIGHT ON. THIS WILL NOT CAUSE THE CAR TO STOP RUNNING OR STALL. THE PCM WILL REMAIN IN THE FUEL ENABLE STATE UNTIL COMMUNICATIONS WITH THE THEFT DETERRENT MODULE HAS BEEN RESTORED.WHEN THE PCM IS IN THIS STATE THE THEFT DETERRENT SYSTEM IS NOT ACTIVE AND THE VEHICLE WILL START. THIS FEATURE IS NOT AVAILABLE ON ALL GM PK-3 SYSTEMS.

PK-3 System Components

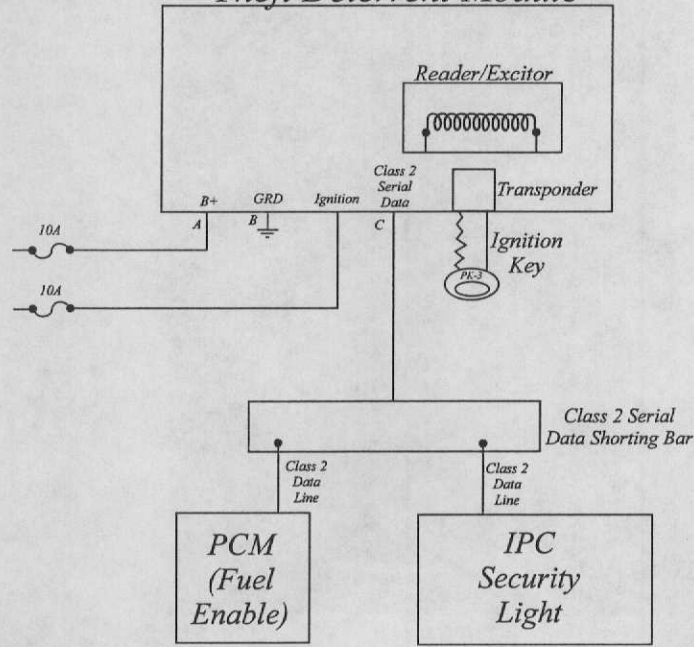
1. THEFT DETERRENT MODULE
2. PCM/VCM
3. IGNITION KEY WITH TRANSPONDER EMBEDDED
4. IGNITION LOCK CYLINDER
5. MASTER KEYS
6. VALET KEYS



Notes:

GM PK3 System

Theft Deterrent Module



Notes:

PK-3 Reader/Excitor Assembly



Notes:

PK-3 System Security Light Diagnostics

1. Bulb Check
2. Security light on, engine starts
3. Security light on, engine no start
4. Security light flashed, engine no start



Notes:

1. THE THEFT DETERRENT MODULE CAN COMMAND THE IPC TO ILLUMINATE THE SECURITY LIGHT ONLY WITH THE KEY ON. DURING AN INITIAL KEY CYCLE THE IPC WILL ILLUMINATE THE SECURITY LIGHT BRIEFLY FOR A BULB CHECK. THE SECURITY LIGHT CAN INDICATE BOTH A FAILURE IN THE SYSTEM AND A TAMPER OF THE SYSTEM. A FLASHING SECURITY LIGHT INDICATES TAMPER OR UNAUTHORIZED OPERATION. A STEADY SECURITY LIGHT INDICATES A MALFUNCTION IN THE SYSTEM. THE SECURITY LIGHT MAY BE ILLUMINATED UNDER THE FOLLOWING CONDITIONS.
2. **SECURITY LIGHT REMAINS ON AND ENGINE STARTS**, THE THEFT DETERRENT MODULE WAS UNABLE TO READ A TRANSPONDER VALUE OR THE PCM LOST COMMUNICATION WITH THE THEFT DETERRENT MODULE WHILE THE ENGINE WAS LAST RUNNING, THE SECURITY LIGHT WILL REMAIN ON. THE VEHICLE IS IN FAIL ENABLED AND WILL START.
3. **SECURITY LIGHT IS ON AND ENGINE DOES NOT START**, THE THEFT DETERRENT MODULE OR THE PCM HAS DETECTED A PROBLEM WITH THE ANTITHEFT SYSTEM. THE THEFT DETERRENT MODULE WAS UNABLE TO MEASURE THE IGNITION KEY TRANSPONDER VALUE. THE SYSTEM IS IN LEARN MODE.
4. **SECURITY LIGHT FLASHES AND ENGINE DOES NOT START**, THE THEFT DETERRENT MODULE HAS MEASURED AN INCORRECT TRANSPONDER VALUE OR THE TRANSPONDER HAS NOT BEEN LEARNED BY THE THEFT DETERRENT MODULE.

The Ignition Key (Transponder)

- **Type of Keys**
- **Ignition Lock Cylinder**



Notes:

- THE IGNITION KEY FOUND ON THE PASS LOCK (PK-3) SYSTEMS HAVE A TRANSPONDER INTEGRATED INTO THE KEY UNDER THE PLASTIC BOOT END OF THE KEY. THE THEFT DETERRENT MODULE USES THE TRANSPONDER VALUE TO DETERMINE IF A VALID IGNITION KEY IS BEING USED TO START THE VEHICLE. THE TRANSPONDER VALUE IS FIXED AND CANNOT BE CHANGED. THE KEYS ARE IDENTIFIED BY A STAMPED PK3 LETTERS ON THE STEEL SHANK OF THE KEY. YOU MAY ALSO IDENTIFY A PK3 SYSTEM FROM THE APPLICATION CHART IN THIS MANUAL.

TYPES OF KEYS:

MASTER KEYS- HAVE A BLACK PLASTIC END AND CAN BE USED TO START THE VEHICLE, UNLOCK AND LOCK ALL DOORS AND UNLOCK AND LOCK ALL STORAGE COMPARTMENTS.

VALET KEYS- HAVE A GRAY PLASTIC END AND ARE NOT OEM ON GM VEHICLES. VALET KEYS WILL UNLOCK, LOCK ALL DOORS AND START THE VEHICLE. VALET KEYS WILL NOT UNLOCK ANY STORAGE COMPARTMENT.

IGNITION LOCK CYLINDER- MAY BE LOCATED ON THE STEERING COLUMN OR ON THE DASH. THE IGNITION LOCK CYLINDER IS SURROUNDED BY THE EXCITOR COILS, IN A LOCATION VERY CLOSE TO THE HEAD OF THE KEY, SO THAT THE KEY TRANSPONDER AND THE EXCITOR COILS WILL COMMUNICATE WITH EACH OTHER.

PK-3 Theft Deterrent Control Module

- **Operation of transponder, excitor ring, and theft deterrent module.**



Notes:

- WHEN THE IGNITION KEY IS INSERTED INTO THE LOCK CYLINDER, THE TRANSPONDER IS ENERGIZED BY THE EXCITOR COILS SURROUNDING THE IGNITION LOCK CYLINDER. THE ENERGIZED TRANSPONDER TRANSMITS A SIGNAL THAT CONTAINS ITS VALUE TO THE THEFT DETERRENT MODULE. THERE IS NO DEDICATED WIRING FROM THE KEY TRANSDUCER TO THE THEFT DETERRENT MODULE. THE THEFT DETERRENT THEN COMPARES THIS VALUE TO A VALUE STORED IN ITS MEMORY.
 1. IF THE TRANSPONDER VALUE IS CORRECT, THE THEFT DETERRENT MODULE WILL SEND A ENABLE PASSWORD ON THE CLASS 2 SERIAL DATA CIRCUIT TO THE PCM.
 2. IF THE TRANSPONDER VALUE IS INCORRECT, THE THEFT DETERRENT MODULE WILL SEND A CLASS 2 MESSAGE CONTAINING A FUEL DISABLE PASSWORD TO THE PCM.
 3. IF THE THEFT DETERRENT MODULE IS UNABLE TO READ A TRANSDUCER VALUE FOR 1 SECOND, IT SENDS A FUEL DISABLE PASSWORD TO THE PCM.

NOTE: LEAVING THE KEY IN THE IGNITION SWITCH FOR PROLONGED PERIODS OF TIME AS IN OVERNIGHT AND OR DAYS, CAN AND WILL DISCHARGE THE BATTERY SINCE THE EXCITOR COILS ARE ENERGIZED TO CHARGE THE TRANSPONDER CAPACITOR AS SOON AS THE KEY IS INSERTED INTO THE SWITCH. .

PK-3+ Control Module Operation

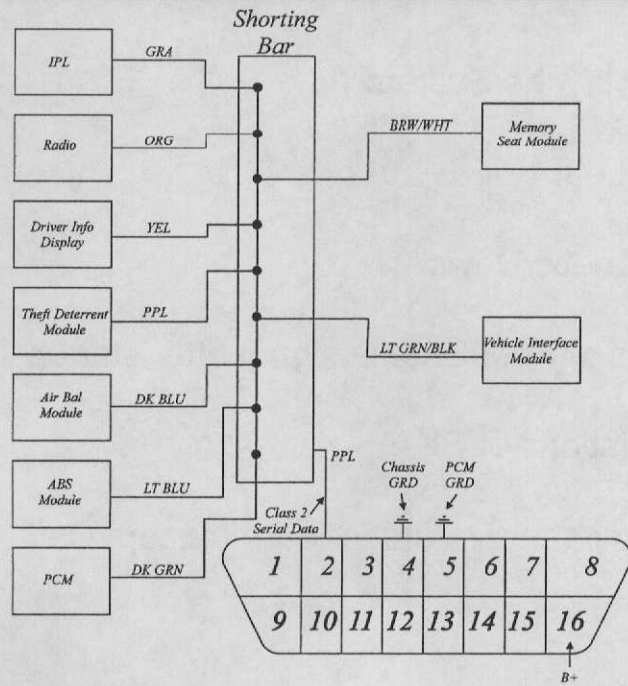
- **Charging the transponder capacitor**



Notes:

- ON THE PK3+ SYSTEMS, THE KEY TRANSPONDER CAPACITOR IS NOT CHARGED BY THE EXCITOR COILS UNTIL THE KEY IS TURNED ON. THE TRANSPONDER TRANSMITS A SIGNAL THAT CONTAINS ITS UNIQUE VALUE AND IS READ BY THE THEFT DETERRENT MODULE. THE THEFT DETERRENT MODULE THEN COMPARES THIS VALUE TO A LEARNED TO A LEARNED KEY CODE STORED IN MEMORY.

GM Class 2 Bus Circuit



Notes:

Critical Points on PK3 Systems

1. Identify the System
2. Re-Learn
3. Magnetic Devices
4. Loss of Fuel-Enable signal after startup
5. Variations of PK-3
6. 30-minute manual re-learn (except Cad. Caterra)



Notes:

1. MAKE SURE YOU CORRECTLY IDENTIFY THE SYSTEM FIRST. PASS KEY 3 SYSTEMS HAVE A PK3 STAMPED ON THE SHAFT KEY.
2. IF YOU REPLACE A KEY, THE PCM, THE THEFT DETERRENT MODULE OR THE EXCITOR, YOU WILL HAVE TO DO A RELEARN.
3. MAGNETIC DEVICES SUCH AS MOBIL CREDIT CARD DEVICE SHOULD NOT BE HUNG ON THE KEY RING.
4. AS WITH PREVIOUS SYSTEMS, LOSS OF THE FUEL ENABLE SIGNAL AFTER A SUCCESSFUL STARTUP WILL NOT CAUSE AN ENGINE SHUT DOWN. THIS WILL HOWEVER SET A DTC AND TURN ON THE SECURITY LIGHT.
5. PK3 SYSTEMS HAVE A LOT OF VARIETY- CADILLAC SEVILLE DISABLES THE STARTER AND INJECTORS. ALL SYSTEMS SEND THE FUEL ENABLE SIGNAL FROM THE THEFT DETERRENT MODULE TO THE PCM THRU SERIAL DATA LINES, EXCEPT THE U VANS- THEY HAVE A DEDICATED FUEL ENABLE SIGNAL WIRE FROM THE READER/EXCITOR TO THE PCM.
6. CADILLAC CATERAS REQUIRE A SCAN TOOL FOR THEFT RELEARN OPERATION. A 30 MINUTE MANUAL MODE WITHOUT A SCAN TOOL CAN BE USED ON ALL OTHER PK3 SYSTEMS. A 10 MINUTE RELEARN PROCEDURE USING A SCAN TOOL IS ALSO AVAILABLE

PK-3 30-Minute Relearn Procedure

- You must do a re-learn after replacing these components:

1. PK-3 Keys
2. Theft Deterrent Module
3. PCM



Notes:

YOU MUST DO A RELEARN AFTER REPLACING THESE COMPONENTS:

1. THE PASS KEY III KEYS (TRANSPONDERS EMBEDDED IN)
2. THE THEFT DETERRENT MODULE
3. THE PCM

30 MINUTE RELEARN PROCEDURE:

1. WITH THE MASTER KEY (BLACK BOOT), TURN KEY TO KOEO POSITION
2. WATCH THE SECURITY LIGHT, AFTER 10 MINUTES THE LIGHT SHOULD TURN OFF
3. TURN KEY OFF AND WAIT 5 SECONDS
4. REPEAT STEPS 1 THRU 3 TWO MORE TIMES FOR A TOTAL OF 30 MINUTES OF 3 CYCLES.
5. TURN KEY TO FULL OFF POSITION FOR 5 SECONDS AND THEN GO TO THE CRANK POSITION. THE LEARN PROCESS ACTUALLY OCCURS IN THE CRANKING POSITION. THE VEHICLE SHOULD START. IF IT DOESN'T CHECK AGAIN FOR DTCs. THERE HAVE BEEN MANY DOCUMENTED CASES WHERE THE MANUAL RELEARN PROCEDURE DID NOT WORK THE FIRST TIME. YOU MAY WANT TO REPEAT THE PROCEDURE OR USE THE SCAN TOOL PROCEDURE.
6. WITH SCAN TOOL CLEAR ANY DTCs.

10-Minute Scan Tool Relearn Procedure on PK-3 Systems

- **Component Replacement**
 1. **Ignition Key**
 2. **PCM**
 3. **Theft Deterrent Module**



Notes:

NEEDED IF ANY OF THESE COMPONENTS HAVE BEEN REPLACED:

1. PASS KEY III KEY
2. THEFT DETERRENT MODULE
3. PCM

Procedure:

1. CONNECT SCAN TOOL
2. TURN KEY TO KEY ON ENGINE OFF POSITION
3. MAKE CERTAIN THAT ALL ACCESSORIES ARE OFF
4. SELECT REQUEST INFO ON THE SCAN TOOL UNDER GMSERVICE PROGRAMMING SYSTEM (SPS)
5. FOLLOW THE SCAN TOOL INSTRUCTIONS
6. WITH SCAN TOOL SELECT PROGRAM ECU UNDER SERVICE PROGRAMMING SYSTEM
7. THIS TAKES ABOUT 10 MINUTES. THE SCAN TOOL WILL SAY PROGRAMMING SUCCESSFUL
8. TURN OFF IGNITION AND WAIT 5 SECONDS
9. CRANK ENGINE AND START ENGINE. THE THEFT DETERRENT MODULE LEARNS THE KEY TRANSDUCER VALUE AND THE PCM HAS NOW LEARNED THE FUEL ENABLE PASSWORD

PK-3 Ignition Key Relearn Procedures

- Learning new key transponders



Notes:

1. INSERT BLACK BOOT MASTER KEY IN IGNITION AND TURN TO KOEO. DO NOT CRANK. WAIT 10 SECONDS.
2. WITH NEW KEY READY TURN IGNITION OFF AND REMOVE MASTER KEY.
3. INSERT NEW KEY WITHIN 10 SECONDS. TURN KEY TO KOEO POSITION. THE SECURITY LIGHT WILL FLICKER VERY QUICKLY AND BRIEFLY. WHEN SECURITY LIGHT TURNS OFF RELEARN IS COMPLETE.
4. A TOTAL OF 10 KEYS CAN BE RELEARNED.

GM Anti-Theft Systems Summary



Notes:

Pass Lock, Pass Key, and PK3 Comparison

<u>Components</u>	<u>Pass Lock</u>	<u>Pass Key</u>	<u>PK3</u>
Special Lock Cylinder			
Special Key Pellet			
System Module			
Security Light			



Notes:

Pass Lock, Pass Key, and PK3 Comparison

<u>Components</u>	<u>Pass Lock</u>	<u>Pass Key</u>	<u>PK3</u>
Special Lock Cylinder	Yes w/ Sensor	Yes, w/Contacts	Yes w/ Excitor Ring
Special Key Pellet	No	Yes w/ Resistor	Yes w/ Transducer
System Module	No	Yes	Yes
Security Light	Yes	Yes	Yes



Notes:

Pass Lock, Pass Key, and PK3 Comparison

<u>Operation</u>	<u>Pass Lock</u>	<u>Pass Key</u>	<u>PK3</u>
Disables Starter			
Shuts Off Injectors			
Diagnostic Codes			



Notes:

Pass Lock, Pass Key, and PK3 Comparison

<u>Operation</u>	<u>Pass Lock</u>	<u>Pass Key</u>	<u>PK3</u>
Disables Starter	Yes on late model systems	Yes	Some Systems
Shuts Off Injectors	Yes, after startup	Yes, before cranking	Yes, before cranking
Diagnostic Codes	PCM, BCM, IPC, Codes	PCM Codes	PCM, BCM Codes



Notes: