

2006 Chevrolet HHR LT

2006 ACCESSORIES & EQUIPMENT Computer/Integrating Systems - HHR

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Computer/Integrating Systems - HHR

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

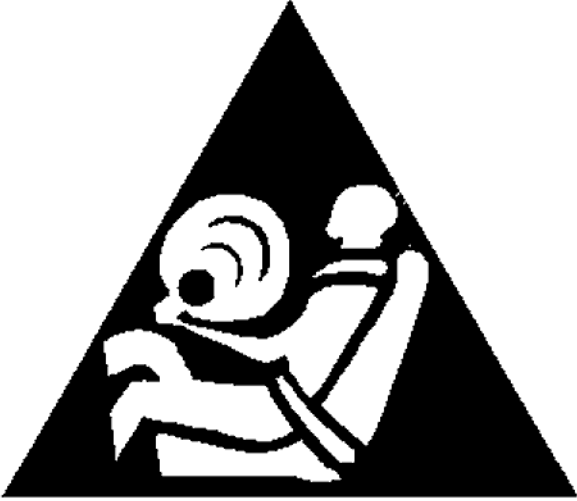
Fastener Tightening Specifications

Application	Specification	
	Metric	English
Body Control Module Screw	2 N.m	18 lb in
Data Link Connector Screw	2 N.m	18 lb in

SCHEMATIC AND ROUTING DIAGRAMS

COMPUTER/INTEGRATING SYSTEMS SCHEMATIC ICONS

Computer/Integrating Systems Schematic Icons

Icon	Icon Definition
	CAUTION: When performing service on or near the SIR components or the SIR wiring, the SIR system must be disabled. Refer to SIR Disabling and Enabling Zones. Failure to observe the correct procedure could cause deployment of the SIR components, personal injury, or unnecessary SIR system repairs.
	IMPORTANT: Twisted-pair wires provide an effective

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shield that helps protect sensitive electronic components from electrical interference.

In order to prevent electrical interference from degrading the performance of the connected components, you must maintain the proper specification when making any repairs to the twisted-pair wires shown :

- The wires must be twisted a minimum of 9 turns per 31 cm (12 in) as measured anywhere along the length of the wires.
- The outside diameter of the twisted wires must not exceed 6.0 mm (0.25 in).

BODY CONTROL SYSTEM SCHEMATICS

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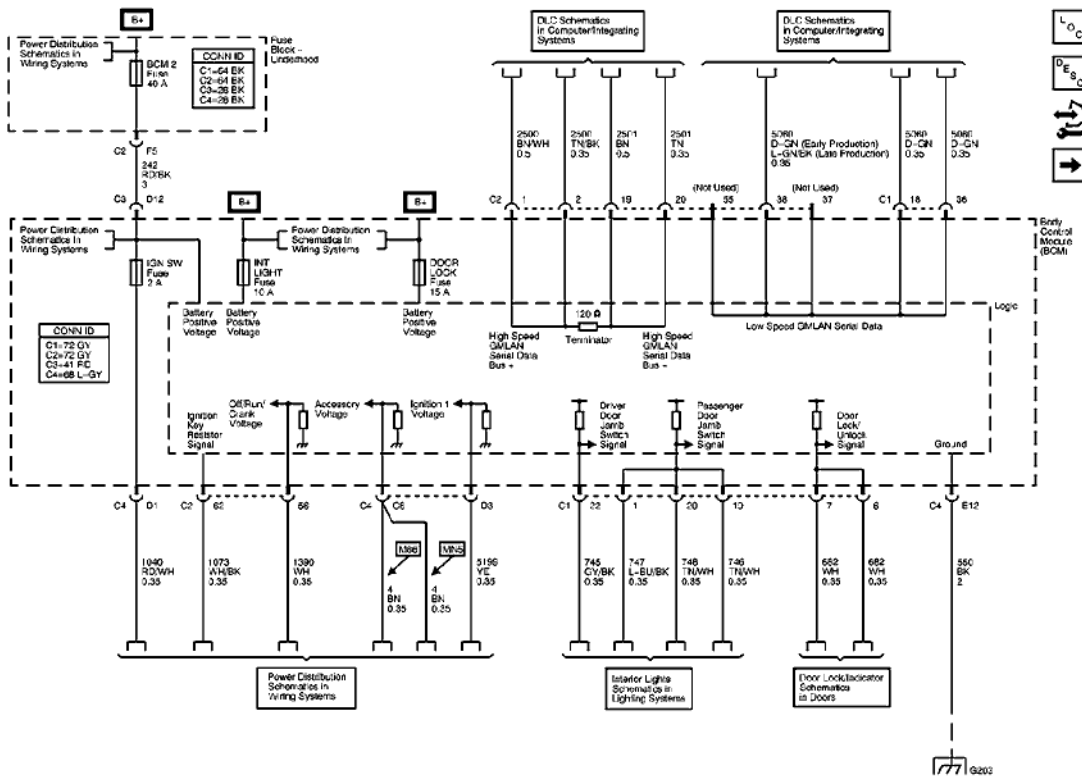
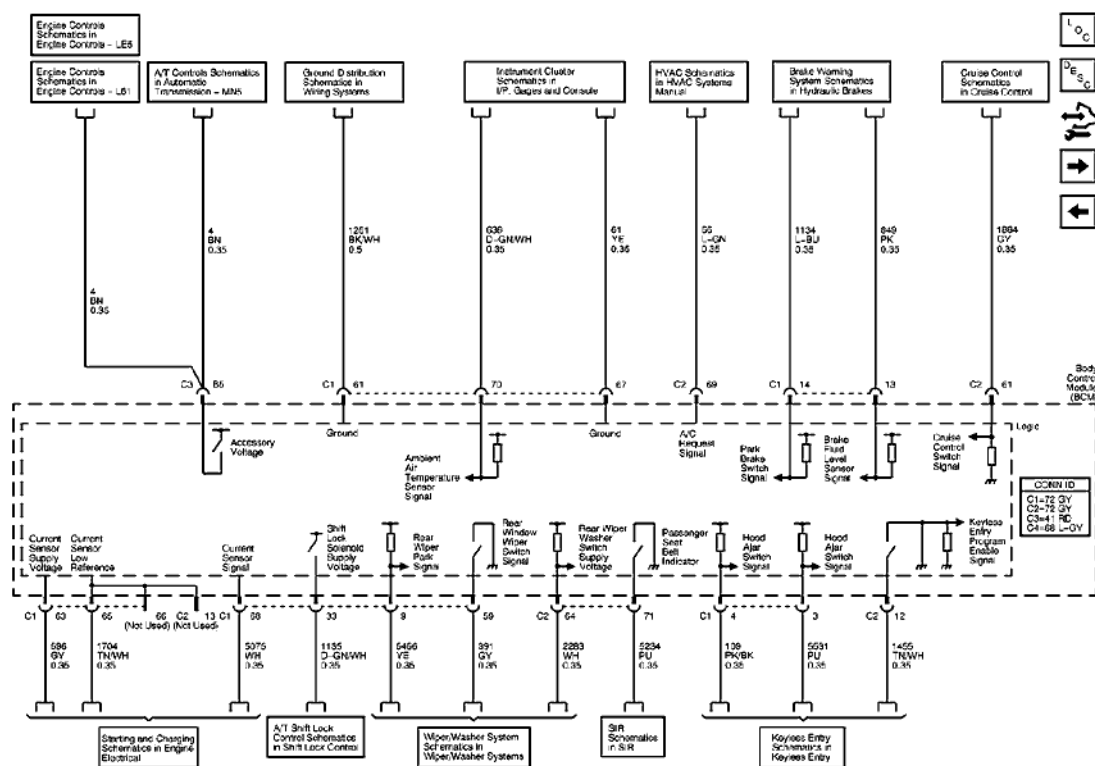


Fig. 1: Power, Ground, Data Link, and Engine References
Courtesy of GENERAL MOTORS CORP.

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Fig. 3: SIR, Shift Lock Control, ABS, Brake Warning, Cruise Control, Keyless Entry, Wiper/Washer, Engine Controls, Engine Cooling References, Starting/Charging
Courtesy of GENERAL MOTORS CORP.

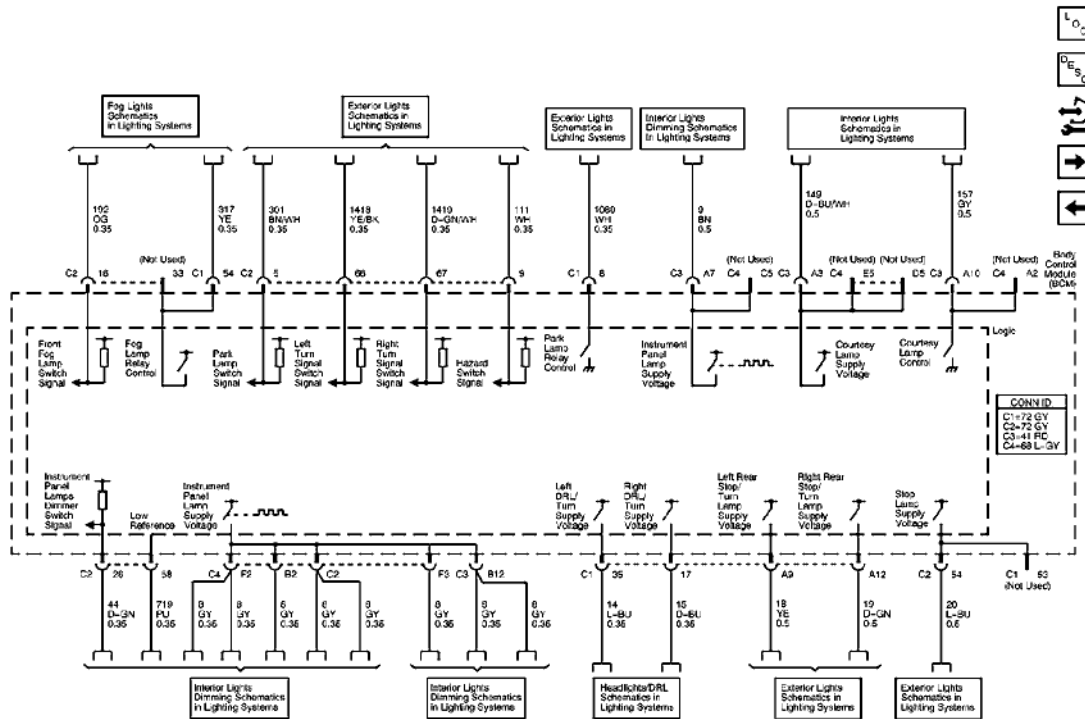


Fig. 4: Lighting System References
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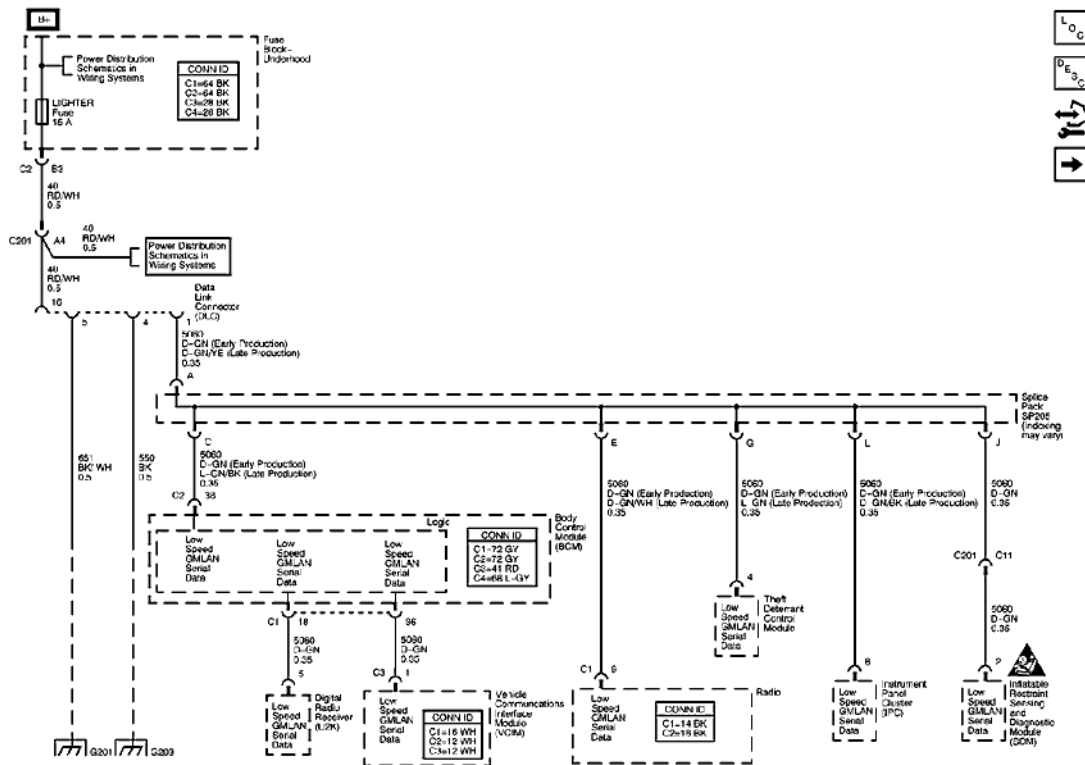
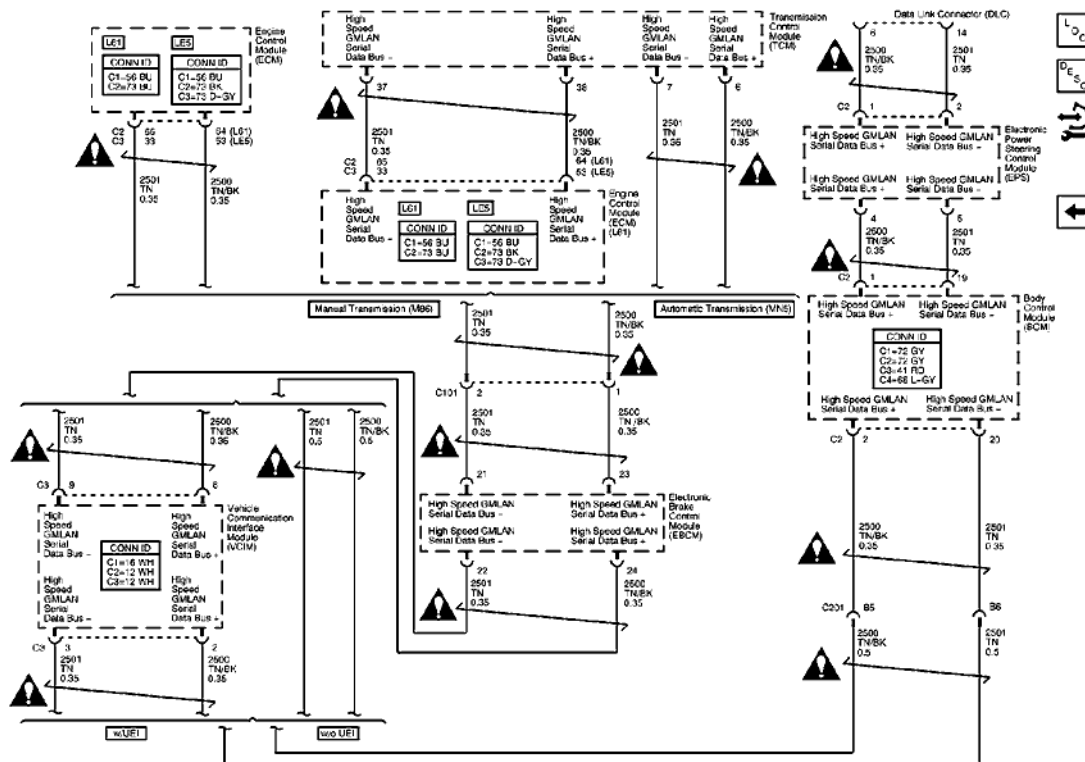


Fig. 6: DLC Power, Ground, and Low Speed GMLAN
 Courtesy of GENERAL MOTORS CORP.



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Fig. 7: DLC High Speed, Serial Data, and Class 2
Courtesy of GENERAL MOTORS CORP.

RETAINED ACCESSORY POWER (RAP) SCHEMATICS

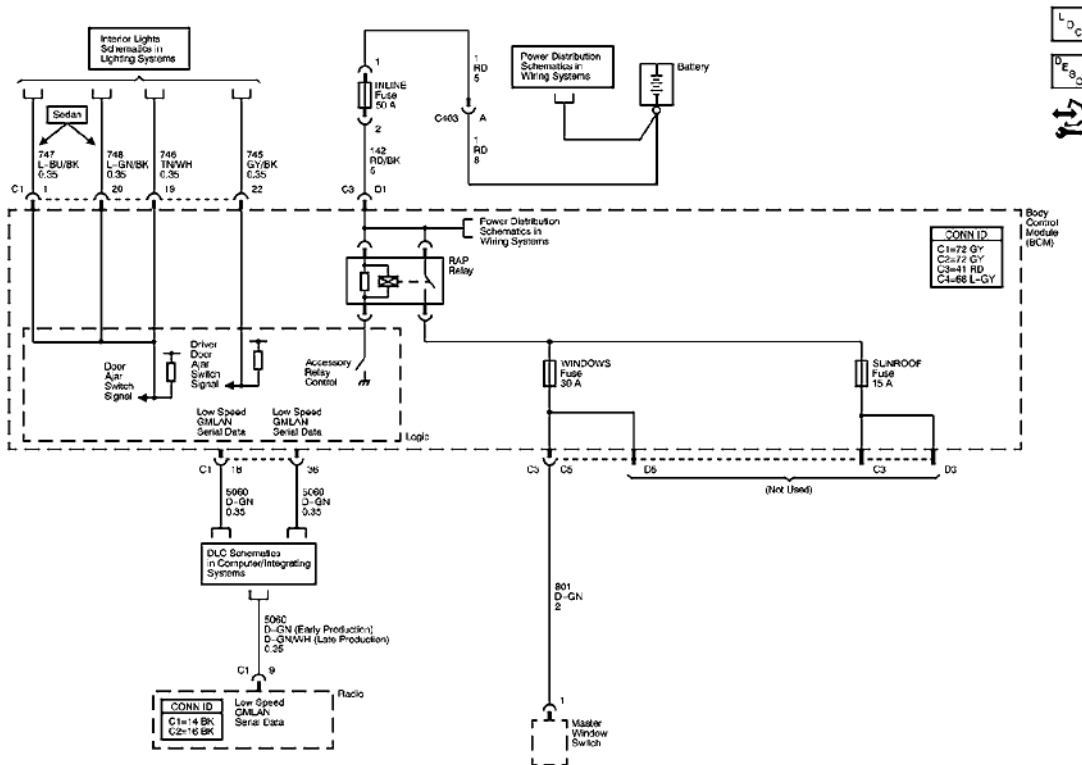


Fig. 8: Retained Accessory Power (RAP) Schematic
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

COMPUTER/INTEGRATING SYSTEMS COMPONENT VIEWS

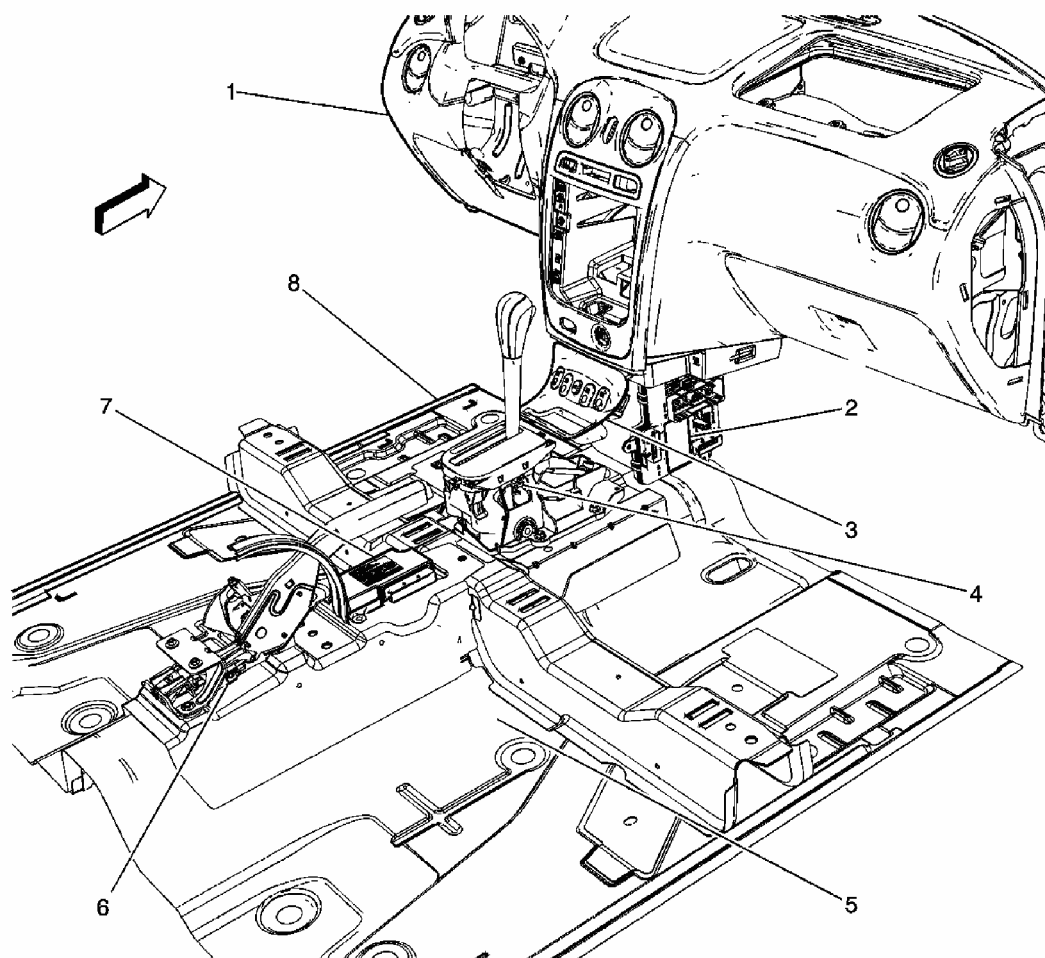


Fig. 9: Center Console Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 9

Callout	Component Name
1	I/P Trim
2	Body Control Module (BCM)
3	Master Window Switch
4	A/T Shift Lock Control Solenoid (MN5)
5	Floor Panel
6	Park Brake Switch
7	Inflatable Restraint Sensing and Diagnostic Module (SDM)
8	Floor Panel

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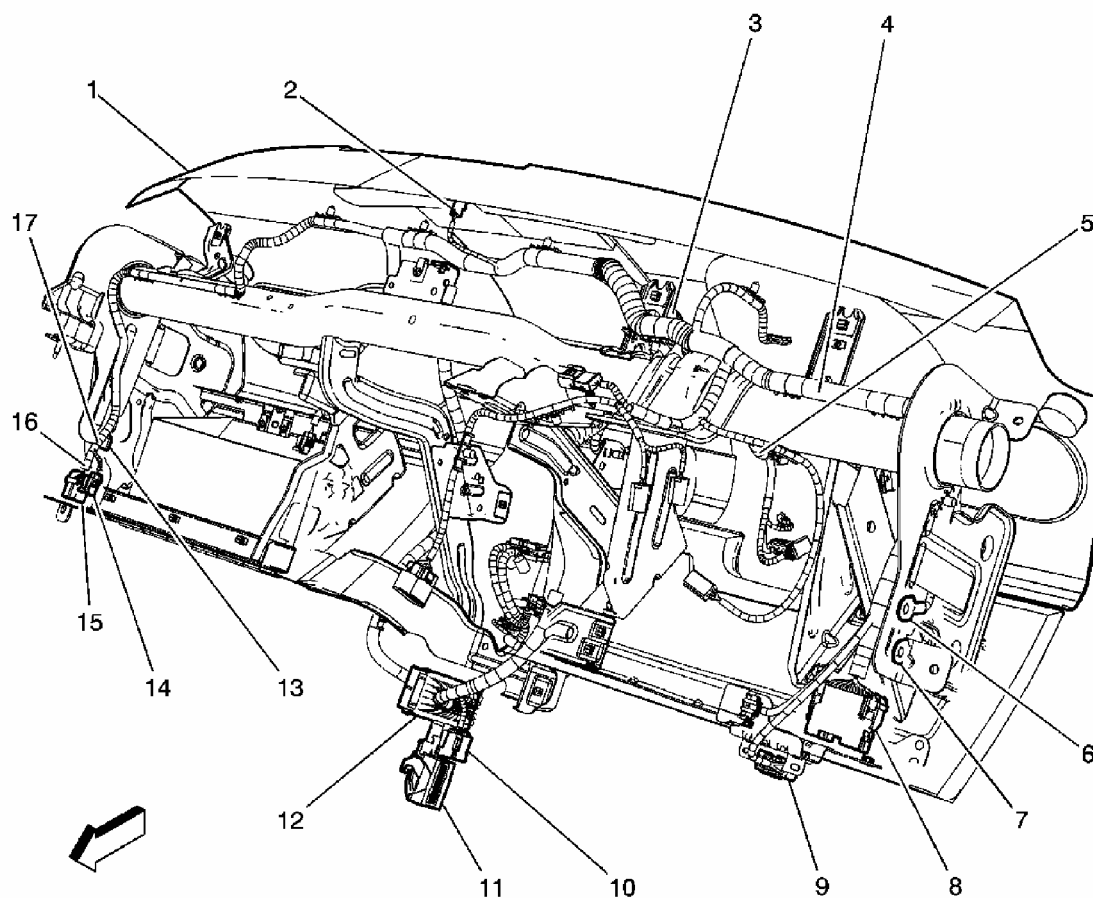


Fig. 10: I/P Harness

Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 10

Callout	Component Name
1	Instrument Panel
2	Ambient Light Sensor
3	S201
4	S200
5	S206
6	G203
7	G201
8	C201
9	Data Link Connector (DLC)
10	SP205
11	Body Control Module (BCM) C2
12	Body Control Module (BCM) C4
13	C210

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14	C206
15	C200 (KA1, UE1, U2K)
16	S204
17	S205 (UE1)

COMPUTER/INTEGRATING SYSTEMS CONNECTOR END VIEWS

Body Control Module (BCM) C1

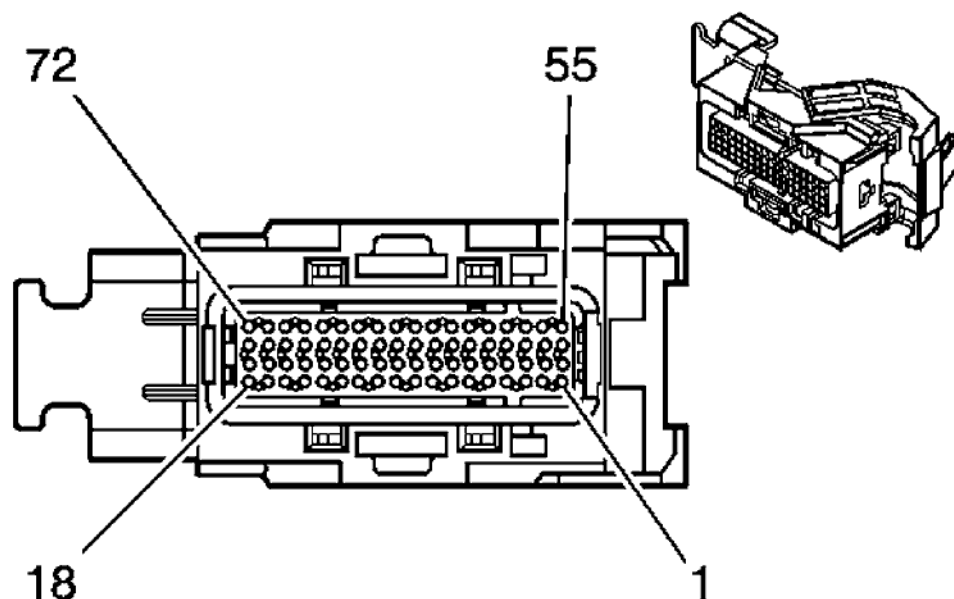


Fig. 11: BCM C1 Connector

Courtesy of GENERAL MOTORS CORP.

Computer/Integrating Systems Connector End Views

Connector Part Information

- OEM: 15393122
- Service: 88987847
- Description: 72-Way F Micro-64 Unsealed (GY)

Terminal Part Information

- Pins:
- Terminal:

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- Core/Insulation Crimp:
- Release Tool/Test Probe:

Body Control Module (BCM) C1

Pin	Wire Color	Circuit No.	Function
1	L-BU/BK	747	Left Rear Door Ajar Switch Signal
2	-	-	Not Used
3	PU	5531	Hood Closed Switch Signal (AP3)
4	PK/BK	109	Hood Ajar Switch Signal (AP3)
5	TN	755	Sunroof Enable Signal (CF5)
6	WH	682	Door Lock Lock/Unlock Signal
7	WH	682	Door Lock Lock/Unlock Signal
8	WH	1080	Park Lamp Relay Control
9	YE	5456	Rear Wiper Motor Park Signal
10-12	-	-	Not Used
13	PK	849	Brake Fluid Level Sensor Signal (1)
14	L-BU	1134	Park Brake Switch Signal
15	YE	5199	Run/Crank Relay Coil Control
16	WH	193	Rear Defog Relay Control
17	D-BU	15	Right Turn Signal Lamp Supply Voltage
18	D-GN	5060	Low Speed GMLAN Serial Data (U2K)
19	TN/WH	746	Right Front Door Ajar Switch Signal
20	L-GN/BK	748	Right Rear Door Ajar Switch Signal
21	-	-	Not Used
22	GY/BK	745	Left Front Door Ajar Switch Signal
23-30	-	-	Not Used
31	L-BU	1344	Trunk Release Relay Control
32	-	-	Not Used
33	D-GN/WH	1135	Brake Transmission Shift Interlock Solenoid Supply Voltage (MN5)
34	-	-	Not Used
35	L-BU	14	Left Turn Signal Lamp Supply Voltage
36	D-GN	5060	Low Speed GMLAN Serial Data (UE1)
37-43	-	-	Not Used
44	TN/WH	1969	Headlamp High Beam Relay Control

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45-46	-	-	Not Used
47	YE	196	Windshield Wiper Motor Park Switch Signal
48-50	-	-	Not Used
51	D-GN	113	Windshield Wiper Switch On Signal
52-53	-	-	Not Used
54	YE	317	Fog Lamp Relay Coil Supply Voltage (T37)
55	PK/BK	1303	Liftgate Ajar Switch Signal (1)
56-58	-	-	Not Used
59	GY	391	Rear Window Wiper Switch Signal
60	TN	28	Horn Relay Control
61	BK/WH	1251	Signal Ground
62	RD/WH	1240	Battery Positive Voltage
63	GY	596	5-Volt Reference
64	BK/WH	851	Signal Ground
65	TN/WH	1704	Sensor Low Reference
66	-	-	Not Used
67	YE	61	Outside Ambient Temperature Sensor Low Reference
68	WH	5075	Current Sensor Signal
69	WH/BK	1221	Liftgate Release Switch Signal
70	D-GN/WH	636	Outside Ambient Air Temperature Sensor Signal
71	L-GN	2270	Rear Window Washer Relay Control
72	-	-	Not Used

Body Control Module (BCM) C2

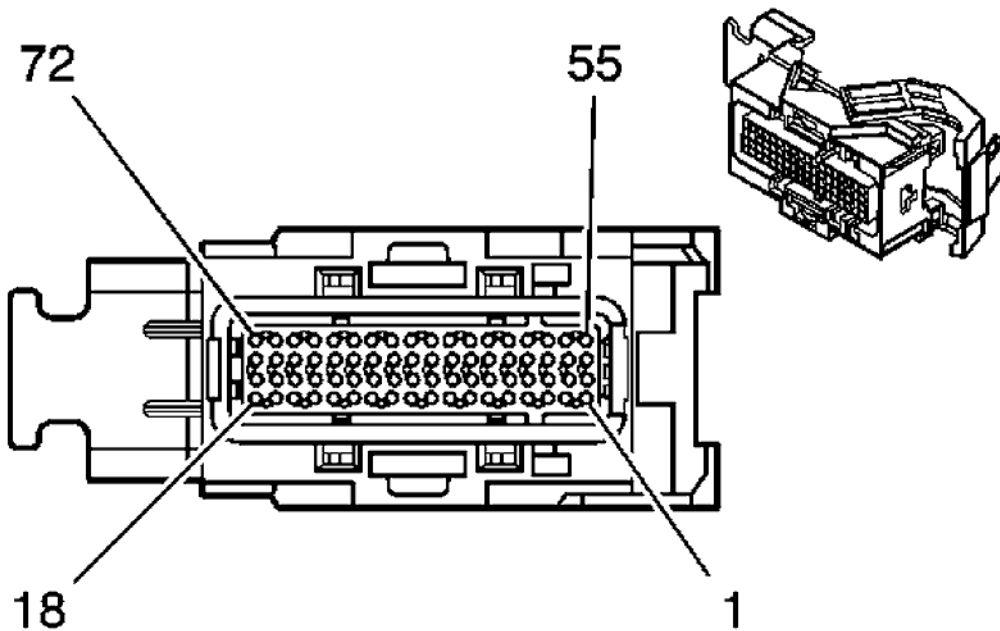


Fig. 12: BCM C2 Connector

Courtesy of GENERAL MOTORS CORP.

Computer/Integrating Systems Connector End Views

Connector Part Information

- OEM: 15393121
- Service: 88987848
- Description: 72-Way F Micro-64 Unsealed (GY)

Terminal Part Information

- Pins:
- Terminal:
- Core/Insulation Crimp:
- Release Tool/Test Probe:

Body Control Module (BCM) C2

Pin	Wire Color	Circuit No.	Function
1	TN/BK	2500	High Speed GMLAN Serial Data (+)
2	TN/BK	2500	High Speed GMLAN Serial Data (+)

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3	YE	10	Headlamp Switch Signal
4	PU	524	Headlamp Dimmer Switch High Beam Signal
5	BN/WH	301	Park Lamp Switch On Signal
6-8	-	-	Not Used
9	WH	111	Hazard Switch Signal
10	-	-	Not Used
11	D-GN	264	Security Indicator Supply Voltage
12	TN/WH	1455	Keyless Entry Program Enable Signal
13	-	-	Not Used
14	TN	28	Horn Relay Control
15	WH	103	Headlamp Switch On Signal
16	OG	192	Front Fog Lamp Switch Signal (T37)
17	PU/WH	549	Headlamp Switch Headlamps Off Signal
18	-	-	Not Used
19	TN	2501	High Speed GMLAN Serial Data (-)
20	TN	2501	High Speed GMLAN Serial Data (-)
21-25	-	-	Not Used
26	D-GN	44	Instrument Panel Lamp Dimmer Switch Signal
27-37	-	-	Not Used
38	D-GN	5060	Low Speed GMLAN Serial Data (Early Production)
	L-GN/BK	5060	Low Speed GMLAN Serial Data (Late Production)
39-43	-	-	Not Used
44	L-GN/BK	1137	DRL Ambient Light Sensor Signal
45-46	-	-	Not Used
47	YE/BK	1138	DRL Ambient Light Sensor Low Reference
48-50	-	-	Not Used
51	BN	1356	Flash To Pass Switch Signal
52-53	-	-	Not Used
54	L-BU	20	Stop Lamp Supply Voltage
55	-	-	Not Used
56	WH	1390	Off/Run/Crank Voltage
57	GY	112	Windshield Wiper Switch Low/Pulse Signal
58	PU	719	Sensor Low Reference
59-60	-	-	Not Used
			Cruise Control Set/Coast/Resume/Accelerate

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61	GY	1884	Switch Signal
62	WH/BK	1073	Ignition Key Resistor Signal
63	-	-	Not Used
64	WH	2283	Rear Wiper/Washer Switch Supply Voltage
65	-	-	Not Used
66	YE/BK	1418	Left Rear Turn Signal Switch Signal
67	D-GN/WH	1419	Right Rear Turn Signal Switch Signal
68	L-BU	292	Rear Defog Switch Signal
69	L-GN	66	A/C Request Signal
70	-	-	Not Used
71	PU	5234	Passenger Seat Belt Indicator
72	WH	193	Rear Defog Relay Control

Body Control Module (BCM) C3

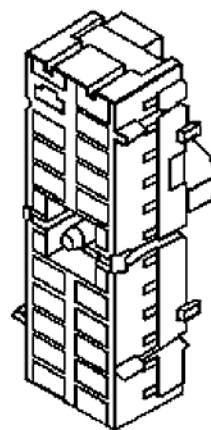
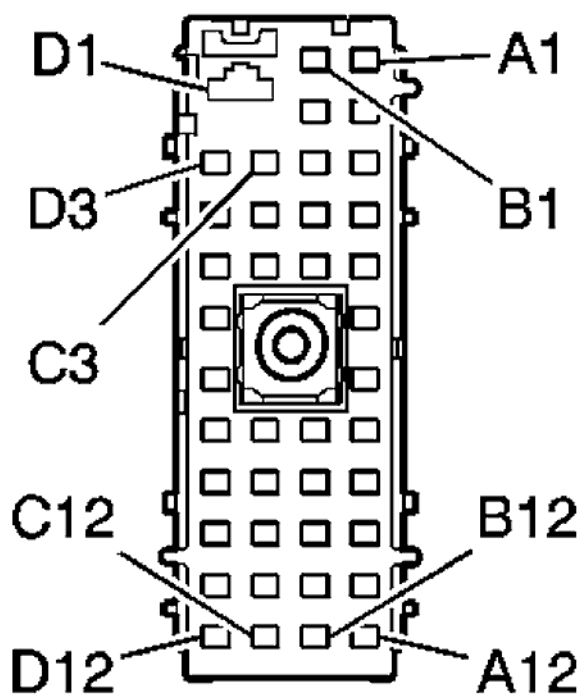


Fig. 13: BCM C3 Connector

Courtesy of GENERAL MOTORS CORP.

Computer/Integrating Systems Connector End Views

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Connector Part Information

- OEM: 15492675
- Service: 15404825
- Description: 41-Way F Micro-64 Unsealed (RD)

Terminal Part Information

- Pins:
- Terminal:
- Core/Insulation Crimp:
- Release Tool/Test Probe:

Body Control Module (BCM) C3

Pin	Wire Color	Circuit No.	Function
A1	TN	294	Door Lock Actuator Unlock Control
	TN	294	Door Lock Actuator Unlock Control
A2	TN	294	Door Lock Actuator Unlock Control
A3	D-BU/WH	149	Courtesy Lamp Supply Voltage
A4	GY	295	Door Lock Actuator Lock Control
	GY	295	Door Lock Actuator Lock Control
A5	GY	295	Door Lock Actuator Lock Control
	GY	295	Door Lock Actuator Lock Control
A6	-	-	Not Used
A7	BN	9	Park Lamp Supply Voltage
A8	PK	339	Run/Crank Ignition 1 Voltage
A9	YE	18	Left Rear Stop/Turn Lamp Supply Voltage
A10	GY	157	Interior Lamp Control
A11	-	-	Not Used
A12	D-GN	19	Right Rear Stop/Turn Lamp Supply Voltage
B1	TN	694	Driver Door Lock Actuator Unlock Control
B2	-	-	Not Used
B3	RD/WH	1240	Battery Positive Voltage
	RD/WH	1240	Battery Positive Voltage
B4	-	-	Not Used
B5	BN	4	Accessory Voltage
	BN	4	Accessory Voltage (MN5)

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B6-B7	-	-	Not Available
B8-B11	-	-	Not Used
B12	GY	8	Instrument Panel Lamp Supply Voltage (1)
	GY	8	Instrument Panel Lamp Supply Voltage (1)
C1-C2	-	-	Not Available
C3-C4	-	-	Not Used
C5	D-GN	801	Retained Accessory Power Fuse Supply Voltage
C6-C7	-	-	Not Available
C8-C11	-	-	Not Used
C12	OG	228	Windshield Washer Pump Control
D1	RD/BK	142	Battery Positive Voltage
D2	-	-	Not Available
D3	-	-	Not Used
D4	RD/WH	840	Battery Positive Voltage
D5	-	-	Not Used
D6	PK	739	Run/Crank Ignition 1 Voltage
D7	PK	1339	Run/Crank Ignition 1 Voltage
	PK	1339	Run/Crank Ignition 1 Voltage
D8-D9	-	-	Not Used
D10	RD/BK	442	Battery Positive Voltage
D11	RD/WH	640	Battery Positive Voltage (UQ3)
D12	RD/BK	242	Battery Positive Voltage

Body Control Module (BCM) C4

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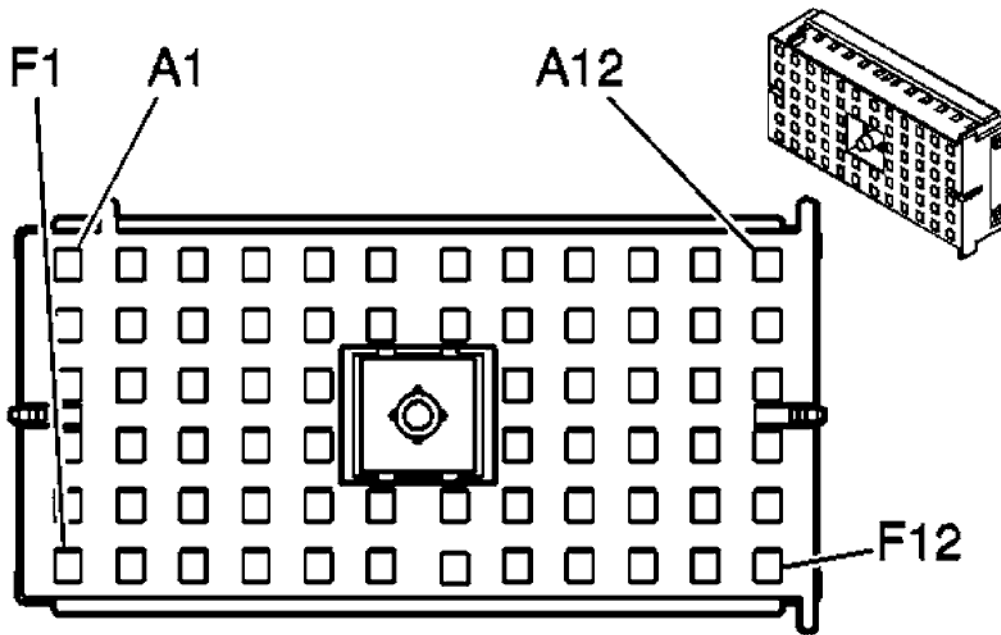


Fig. 14: BCM C4 Connector
Courtesy of GENERAL MOTORS CORP.

Computer/Integrating Systems Connector End Views

Connector Part Information

- OEM: 15492668
- Service: 88988776
- Description: 68-Way F Micro-64 Unsealed (L-GY)

Terminal Part Information

- Pins:
- Terminal:
- Core/Insulation Crimp:
- Release Tool/Test Probe:

Body Control Module (BCM) C4

Pin	Wire Color	Circuit No.	Function
A1-A12	-	-	Not Used
B1	OG	228	Windshield Washer Pump Control

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B2	GY	8	Instrument Panel Lamp Supply Voltage (1)
B3-B12	-	-	Not Used
C1	RD/WH	1440	Battery Positive Voltage
C2	GY	8	Instrument Panel Lamp Supply Voltage (1)
	GY	8	Instrument Panel Lamp Supply Voltage (1)
C3-C5	-	-	Not Used
C6-C7	-	-	Not Available
C8	BN	4	Accessory Voltage (MN5)
C8	BN	4	Accessory Voltage (w/o MN5)
	BN	4	Accessory Voltage (w/o MN5)
C9-C12	-	-	Not Used
D1	RD/WH	1040	Battery Positive Voltage
D2	-	-	Not Used
D3	YE	5199	Run/Crank Relay Coil Control
D4	BN	141	Run Ignition 3 Voltage
D5	-	-	Not Used
D6-D7	-	-	Not Available
D8-D9	-	-	Not Used
D10	RD/WH	1140	Battery Positive Voltage
	RD/WH	1140	Battery Positive Voltage
D11-D12	-	-	Not Used
E1	RD/WH	140	Battery Positive Voltage
E2-E5	-	-	Not Used
E6	PK	439	Run/Crank Ignition 1 Voltage
E7-E11	-	-	Not Used
E12	BK	550	Ground
F1	RD/WH	1540	Battery Positive Voltage
	RD/WH	1540	Battery Positive Voltage
F2	GY	8	Instrument Panel Lamp Supply Voltage (1) (T37)
	GY	8	Instrument Panel Lamp Supply Voltage (1)
F3	GY	8	Instrument Panel Lamp Supply Voltage (1)
F4	PK	339	Run/Crank Ignition 1 Voltage
	PK	339	Run/Crank Ignition 1 Voltage

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F5	PK	339	Run/Crank Ignition 1 Voltage
F6	PK	339	Run/Crank Ignition 1 Voltage
	PK	339	Run/Crank Ignition 1 Voltage (M86)
F7-F8	-	-	Not Used
F9	PK	1539	Run/Crank Ignition 1 Voltage
	PK	1539	Run/Crank Ignition 1 Voltage
F10-F12	-	-	Not Used

Data Link Connector (DLC)

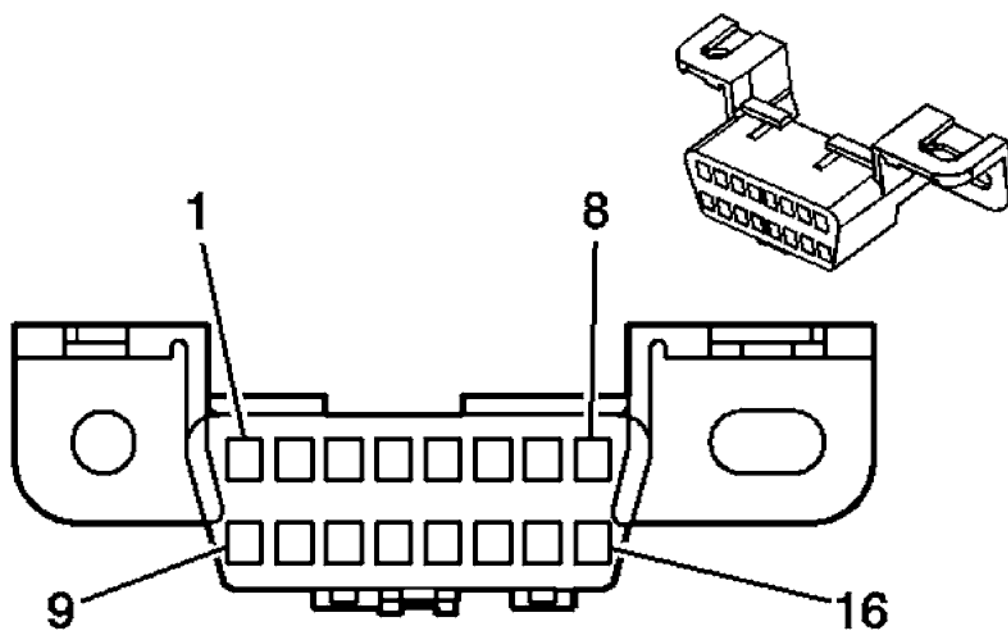


Fig. 15: Data Link Connector (DLC)
Courtesy of GENERAL MOTORS CORP.

Computer/Integrating Systems Connector End Views

Connector Part Information

- OEM: 12110250
- Service: Not Serviced
- Description: 16-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Pins:

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- Terminal:
- Core/Insulation Crimp:
- Release Tool/Test Probe:

Data Link Connector (DLC)

Pin	Wire Color	Circuit No.	Function
1	D-GN	5060	Low Speed GMLAN Serial Data (Early Production)
	D-GN/YE	5060	Low Speed GMLAN Serial Data (Late Production)
2-3	-	-	Not Used
4	BK	550	Ground
5	BK/WH	651	Signal Ground
6	TN/BK	2500	High Speed GMLAN Serial Data (+)
7-13	-	-	Not Used
14	TN	2501	High Speed GMLAN Serial Data (-)
15	-	-	Not Used
16	RD/WH	40	Battery Positive Voltage

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B1000	Electronic Control Unit (ECU) Performance
DTC B1001	Option Configuration Error
DTC B1004	Keep Alive Memory (KAM) Reset
DTC B1009	EEPROM Checksum Mismatch
DTC B1370	Device Ignition 1 Circuit
DTC B1380	Device Ignition ACCESSORY Circuit
DTC B1441	Device Ignition OFF, RUN and CRANK Circuit
DTC C0550	Electronic Control Unit (ECU) Performance
DTC P2535	Ignition 1 Switch Circuit High Voltage
DTC U0001	This diagnostic procedure supports the following DTC:
DTC U1300, U1301, or U1305	** MULTIPLE VALUES **
DTC U2100	Controller Area Network (CAN) Bus Communication
DTC U2103	Fewer Controllers On Than Programmed

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DTC U2105-U2199**** MULTIPLE VALUES ******DIAGNOSTIC STARTING POINT - COMPUTER/INTEGRATING SYSTEMS**

Begin the system diagnosis with **Diagnostic System Check - Vehicle** in Vehicle DTC Information. The Diagnostic System Check - Vehicle will provide the following information:

- The identification of the control modules which are not communicating.
- The identification of any stored diagnostic trouble codes (DTCs) and their status.

The use of the Diagnostic System Check - Vehicle will identify the correct procedures to begin vehicle diagnosis. These must be performed before system DTC or symptom diagnosis.

SCAN TOOL OUTPUT CONTROLS**BCM**

Scan Tool Output Control	Additional Menu Selection(s)	Description
Accy. Relay Command	Vehicle Control Systems/Computer Integrating Systems/Special Functions	Commands the Accessory relay On/Off.
Run/Crank Relay Control	Vehicle Control Systems/Computer Integrating Systems/Special Functions	Commands the Run/Crank relay On/Off.

SCAN TOOL DATA LIST**Vehicle Control Systems Data**

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON, Engine OFF			
Accessory Relay Command	Data	On/Off	On
Battery Voltage Signal	Data	Volts	13.5
Ignition Mode Switch	Data	Volts	4.02
Ignition Switch Accessory	Data	Active/Inactive	Active
Ignition Switch Run/Crank Signal	Data	On/Off	On
Key In Ignition Cylinder	Data	Yes/No	Yes
		Run, Accessory,	

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Power Mode	Data	Crank Request	Run
Run Crank Relay Command	Data	On/Off	On
Run Relay Command	Data	On/Off	On

SCAN TOOL DATA DEFINITIONS

Accessory Relay Command

The scan tool displays the state of the accessory relay command.

Battery Voltage Signal

The scan tool displays the vehicle voltage.

Ignition Mode Switch

The scan tool displays the ignition switch voltage signal. This signal is derived from the ignition Off/Run/Crank circuit.

Ignition Switch Accessory

The scan tool displays the state of the ignition switch accessory circuit.

Ignition Switch Run/Crank

The scan tool displays the state of the ignition switch Run/Crank circuit.

Key In Ignition Cylinder

The scan tool displays whether or not the key is in the ignition cylinder.

Power Mode

The scan tool displays the vehicle power mode.

Run Relay Command

The scan tool displays the state of the Run relay.

Run Crank Relay Command

The scan tool displays the state of the Run Crank relay.

DTC B1000

Circuit Description

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The internal fault detection is handled inside the control module. No external circuits are involved.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B1000 Electronic Control Unit (ECU) Performance

This vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to **DTC Symptom Description** in Vehicle DTC Information.

DTC B1000

DTC Symptom	DTC Symptom Descriptor
00	No Additional Information
31	General Checksum Error
57	Expected Reaction After Event Did Not Occur

Conditions for Running the DTC

The module runs the program to detect an internal fault when power up is commanded. The only requirements are voltage and ground. This program runs even if the voltage is out of the valid operating range.

Conditions for Setting the DTC

The module has detected an internal malfunction.

Action Taken When the DTC Sets

The module refuses all additional inputs.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present in all modules.
- A history DTC clears in all of the modules except the sensing and diagnostic module (SDM), when the ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.
- If the code is set in the SDM it will never clear and the Air Bag indicator will remain illuminated.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of a module, except the SDM. If stored only as a history DTC and not retrieved as a current DTC, do not replace the module. Attempt to clear the code from any module except if the code is

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set in the SDM.

- If this DTC is retrieved as both a current and history DTC, replace the module.
- If the code is set as current or history in the SDM, the SDM must be replaced.

DTC B1000

Step	Action	Yes	No
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. Retrieve DTCs. Is DTC retrieved as a current DTC?	Go to Step 3	Go to Diagnostic Aids
3	IMPORTANT: Perform the setup procedure for the module, if required. Replace the module. Refer to Control Module References . Did you complete the replacement?	Go to Step 4	-
4	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	Go to Step 2	System OK

DTC B1001

Circuit Description

The body control module (BCM) stores the last 4 digits of the sensing and diagnostic module (SDM) part number, information also called restraints ID. After the BCM is reprogrammed, the restraints ID is set to zero. A restraints ID relearn needs to be performed for the BCM. For more information on this procedure, refer to **Body Control Module (BCM) Programming/RPO Configuration**.

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DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B1001 Option Configuration Error

This vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to **DTC Symptom Description** in Vehicle DTC Information.

DTC B1001

DTC Symptom	DTC Symptom Descriptor
00	No Additional Information

Conditions for Running the DTC

Battery voltage is between 9-16 volts and data link communications operate normally.

Conditions for Setting the DTC

The restraints ID value stored in the BCM memory is zero.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

DTC B1001

Step	Action	Yes	No
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. Perform the Restraints ID Relearn procedure. Refer to Body Control Module (BCM) Programming/RPO Configuration. 4. Cycle the ignition. 5. Retrieve DTCs from the body control		

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	module (BCM).		
	Is DTC retrieved as a current DTC?	Go to Step 3	Go to Step 4
3	IMPORTANT: Perform the setup procedure for the BCM. Replace the BCM. Refer to Body Control Module Replacement . Did you complete the replacement?	Go to Step 4	-
4	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	Go to Step 1	System OK

DTC B1004**Circuit Description**

The internal fault detection is handled inside the control module. No external circuits are involved.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B1004 Keep Alive Memory (KAM) Reset

This vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to **DTC Symptom Description** in Vehicle DTC Information.

DTC B1004

DTC Symptom	DTC Symptom Descriptor
00	No Additional Information

Conditions for Running the DTC

The module microprocessor must be active/awake.

Conditions for Setting the DTC

This DTC indicates the KAM in the module has been reset. It is a normal occurrence when

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battery positive voltage or ground is removed from the module, such as a battery disconnect.

Action Taken When the DTC Sets

The microprocessor reverts back to the base programmed critical operating data until new data is learned and stored in KAM.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of the module. If stored only as a history DTC and not retrieved as a current DTC, do not replace the module.
- If this DTC is retrieved as both a current and history DTC, replace the module.

DTC B1004

Step	Action	Yes	No
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. Retrieve DTCs. Is DTC retrieved as a current DTC?	Go to Step 3	Go to Diagnostic Aids
3	IMPORTANT: Perform the setup procedure for the module, if required. Replace the module. Refer to Control Module References . Did you complete the replacement?	Go to Step 4	-
	1. Use the scan tool in order to clear the DTCs.		

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4	2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text.		
	Does the DTC reset?	Go to Step 2	System OK

DTC B1009

Circuit Description

The electrically erasable programmable read-only memory (EEPROM) check sum error detection is handled inside the control module. No external circuits are involved.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B1009 EEPROM Checksum Mismatch

This vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to **DTC Symptom Description** in Vehicle DTC Information.

DTC B1009

DTC Symptom	DTC Symptom Descriptor
00	No Additional Information

Conditions for Running the DTC

The module runs the program to detect an EEPROM checksum error after each wake-up. The only requirements are battery positive voltage and ground. This program runs even if the voltage is out of the valid operating range.

Conditions for Setting the DTC

The module retains an inverse copy of the digital value stored in certain blocks of memory in the EEPROM. The module then reads the information from those certain blocks and adds the stored inverse value to the current value. If they do not equal 0, the module sets the DTC.

Action Taken When the DTC Sets

The module reverts to base operation values programed for those blocks of data that have failed the check sum test. The blocks of data that have not failed the check sum test are not affected.

Conditions for Clearing the DTC

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- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of the module. If stored only as a history DTC and not retrieved as a current DTC, do not replace the module.
- If this DTC is retrieved as both a current and history DTC, replace the module.

DTC B1009

Step	Action	Yes	No
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. Retrieve DTCs. Is DTC retrieved as a current DTC?	Go to Step 3	Go to Diagnostic Aids
3	IMPORTANT: Perform the setup procedure for the module, if required. Replace the module. Refer to Control Module References . Did you complete the replacement?	Go to Step 4	-
4	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	Go to Step 2	System OK

DTC B1370

Circuit Description

The body control module (BCM) monitors the ignition 1 signal from the ignition switch. When the vehicle operator places the ignition switch in the RUN or CRANK position, the switch supplies B+ to the BCM ignition 1 input terminal. If this circuit becomes shorted to B+, ground or the circuit opens, DTC B1370 will set.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B1370 Device Ignition 1 Circuit

This vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to **DTC Symptom Description** .

DTC B1370

DTC Symptom	DTC Symptom Descriptor
01	Short to Battery
02	Short to Ground

Conditions for Running the DTC

Voltage supplied to the module is in the normal operating voltage range of 9-16 volts.

Conditions for Setting the DTC

- The BCM detects a short to ground in the ignition 1 voltage circuit when the ignition switch is in RUN or CRANK.
- The BCM detects a short to battery or an open in the ignition 1 voltage circuit when the switch is in the OFF position.
- Any of the conditions above must be present for more than 10 seconds.

Action Taken When the DTC Sets

- The BCM stores DTC to memory.
- The BCM operates in a fail-safe power mode dependent on the last valid power mode detected and the state of the engine run flag data on the GMLAN serial data communications circuits.
- The other modules on the vehicle operate in a fail-safe power mode dependent on the last valid power mode transmitted by the BCM and the state of the engine run flag on the GMLAN serial data communications circuits.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset

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threshold, without a repeat of the malfunction.

Diagnostic Aids

A history DTC may be caused by an intermittent short or open in the ignition 1 circuit. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Test Description

The numbers below refer to the step numbers on the diagnostic table.

3: This tests the ignition switch for a short circuit between the 12-volt reference supply circuit and the ignition 1 circuit in the OFF position.

4: This tests the wiring of the ignition 1 circuit for a short to ground or voltage.

5: This tests the ignition switch for a closed circuit between the ignition switch 12-volt reference supply circuit and the ignition 1 circuit in the Run and Crank switch positions. Care must be taken as the engine may crank during this test.

DTC B1370

Step	Action	Values	Yes	No
Schematic Reference: <u>Body Control System Schematics</u> and <u>Power Distribution Schematics</u>				
Connector End View Reference: Master Electrical Component List				
1	Did you perform the Diagnostic System Check - Vehicle?	-	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u>
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. Check for DTCs B1370 and B1380 in the body control module (BCM). Does the scan tool display DTC B1370 or DTC B1380 as current?	-	Go to Step 3	Go to Diagnostic Aids
	1. Disconnect the BCM harness connector that contains the Ignition 1 circuit. 2. Place the ignition switch in the OFF position, leaving the key in the ignition.			

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3	3. Test for a short to ground and a short to voltage between the ignition 1 circuit and the ignition switch 12-volt reference supply circuit at the BCM harness connector. Refer to <u>Circuit Testing</u> . Did you find a short between the 2 circuits?	B+	Go to Step 4	Go to Step 5
4	1. Disconnect the ignition switch harness connector. 2. Test the ignition 1 ignition switch circuit and the ignition switch 12-volt reference supply circuit for a short to ground or voltage at the BCM harness connector. Refer to <u>Circuit Testing</u> . Did you find and correct the condition?	B+	Go to Step 9	Go to Step 7
5	IMPORTANT: The engine may crank during this procedure. 1. Turn the ignition switch to the RUN position. 2. Test for continuity between the ignition 1 terminal and the ignition switch 12-volt reference supply terminal on the BCM harness connector. Refer to <u>Circuit Testing</u> . 3. Turn the ignition switch to CRANK. 4. Test for continuity between the Ignition 1 terminal and the ignition switch 12-volt reference supply terminal on the BCM harness connector. Can you measure continuity in both Run and Crank?	-	Go to Step 8	Go to Step 6

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6	Test the ignition 1 and the ignition switch 12-volt reference supply terminals of the ignition switch harness connector, for intermittent or poor connections, and an open condition. Did you find and correct the condition?	-	Go to Step 9	Go to Step 7
7	Replace the ignition switch. Refer to Ignition Switch Replacement . Did you complete the replacement?	-	Go to Step 9	-
8	Replace the BCM. Refer to Control Module References for replacement, setup, and programming. Did you complete the replacement?	-	Go to Step 9	-
9	1. Reconnect all disconnected connectors. 2. Install the scan tool. 3. Turn ON the ignition, with the engine OFF. 4. Use the scan tool in order to clear the DTCs. 5. Operate the vehicle within the Conditions for Running the DTCs, as specified in the supporting text. Does the DTC reset?	-	Go to Step 1	System OK

DTC B1380**Circuit Description**

The body control module (BCM) monitors the ACCESSORY signal from the ignition switch. When the vehicle operator places the ignition switch in the Accessory or Run position, the switch supplies B+ to the BCM ACCESSORY input terminal. If this circuit becomes shorted to B+, ground or the circuit opens, DTC B1380 will set.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B1380 Device Ignition ACCESSORY Circuit

This vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to **DTC Symptom Description**.

DTC B1380

DTC Symptom	DTC Symptom Descriptor
01	Short to Battery
02	Short to Ground

Conditions for Running the DTC

Voltage supplied to the module is in the normal operating voltage range of 9-16 volts.

Conditions for Setting the DTC

- The BCM detects a short to ground in the ACCESSORY voltage circuit when the ignition switch is in RUN or CRANK.
- The BCM detects a short to battery or an open in the ACCESSORY voltage circuit when the switch is in the OFF position.
- Any of the conditions above must be present for more than 10 seconds.

Action Taken When the DTC Sets

- The BCM stores DTC to memory.
- The BCM operates in a fail-safe power mode dependent on the last valid power mode detected and the state of the engine run flag data on the GMLAN serial data communications circuits.
- The other modules on the vehicle operate in a fail-safe power mode dependent on the last valid power mode transmitted by the BCM and the state of the engine run flag on the GMLAN serial data communications circuits.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Diagnostic Aids

A history DTC may be caused by an intermittent short or open in the ACCESSORY circuit. Refer to **Testing for Intermittent Conditions and Poor Connections**.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

3: This tests the ignition switch for a short circuit between the 12-volt reference supply circuit and the ACCESSORY circuit in the OFF position.

4: This tests the wiring of the ACCESSORY circuit for a short to ground or voltage.

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5: This tests the ignition switch for a closed circuit between the ignition switch 12-volt reference supply circuit and the ACCESSORY circuit in the Run and Accessory switch positions. Care must be taken as the engine may crank during this test.

DTC B1380

Step	Action	Values	Yes	No
Schematic Reference: <u>Body Control System Schematics</u> and <u>Power Distribution Schematics</u>				
Connector End View Reference: <u>Master Electrical Component List</u>				
1	Did you perform the Diagnostic System Check - Vehicle?	-	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u>
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. Check for DTC B1380 in the body control module (BCM). Does the scan tool display DTC B1380 as current?	-	Go to Step 3	Go to Diagnostic Aids
3	1. Disconnect the BCM harness connector that contains the Accessory circuit. 2. Place the ignition switch in the OFF position, leaving the key in the ignition. 3. Test for a short to ground and a short to voltage between the accessory circuit and the ignition switch 12-volt reference supply circuit at the BCM harness connector. Refer to <u>Circuit Testing</u> . Did you find a short between the 2 circuits?	B+	Go to Step 4	Go to Step 5
	1. Disconnect the ignition switch harness connector. 2. Test the accessory ignition switch			

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4	circuit and the ignition switch 12-volt reference supply circuit for a short to ground or voltage at the BCM harness connector. Refer to <u>Circuit Testing</u> . Did you find and correct the condition?	B+	Go to Step 9	Go to Step 7
5	IMPORTANT: The engine may crank during this procedure. 1. Turn the ignition switch to the RUN position. 2. Test for continuity between the accessory terminal and the ignition switch 12-volt reference supply terminal on the BCM harness connector. Refer to <u>Circuit Testing</u> . 3. Turn the ignition switch to the accessory position. 4. Test for continuity between the accessory terminal and the ignition switch 12-volt reference supply terminal on the BCM harness connector. Can you measure continuity in both the Run and Accessory positions?	-	Go to Step 8	Go to Step 6
6	Test the accessory and the ignition switch 12-volt reference supply terminals of the ignition switch harness connector, for intermittent or poor connections, and an open condition. Did you find and correct the condition?	-	Go to Step 9	Go to Step 7
7	Replace the ignition switch. Refer to <u>Ignition Switch Replacement</u> . Did you complete the replacement?	-	Go to Step 9	-
8	Replace the BCM. Refer to <u>Control Module References</u> for replacement, setup, and programming. Did you complete the replacement?	-	Go to Step 9	-
	1. Reconnect all disconnected			

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9	connectors.	-		
	2. Install the scan tool.			
	3. Turn ON the ignition, with the engine OFF.			
	4. Use the scan tool in order to clear the DTCs.			
	5. Operate the vehicle within the Conditions for Running the DTCs, as specified in the supporting text.			
Does the DTC reset?			Go to Step 1	System OK

DTC B1441

Circuit Description

The body control module (BCM) monitors the OFF/RUN/CRANK signal from the ignition switch. The signal is zero when there is no key in the ignition cylinder. The signal is at the 12-volt reference level when a key is placed into the ignition cylinder. When the vehicle operator places the ignition switch in the Run position, the switch supplies +5 volts to the BCM OFF/RUN/CRANK input terminal. During a crank event, the +5 volt signal is passed through an internal resistor in the ignition switch for discrimination of the crank command. If the OFF/RUN/CRANK circuit becomes shorted to B+, ground or the circuit opens, DTC B1441 will set.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B1441 Device Ignition OFF, RUN and CRANK Circuit

This vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to **DTC Symptom Description**.

DTC B1441

DTC Symptom	DTC Symptom Descriptor
01	Short to Battery
02	Short to Ground

Conditions for Running the DTC

Voltage supplied to the module is in the normal operating voltage range of 9-16 volts.

Conditions for Setting the DTC

- The BCM detects a short to ground in the OFF/RUN/CRANK voltage circuit when the ignition switch is in RUN or CRANK.
- The BCM detects a short to battery or an open in the OFF/RUN/CRANK circuit.
- Any of the conditions above must be present for more than 10 seconds.

Action Taken When the DTC Sets

- The BCM stores DTC to memory.
- The BCM operates in a fail-safe power mode dependent on the last valid power mode detected and the state of the engine run flag data on the GMLAN serial data communications circuits.
- The other modules on the vehicle operate in a fail-safe power mode dependent on the last valid power mode transmitted by the BCM and the state of the engine run flag on the GMLAN serial data communications circuits.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Diagnostic Aids

A history DTC may be caused by an intermittent short or open in the OFF/RUN/CRANK circuit or the +5-volt reference circuit. Refer to **Testing for Intermittent Conditions and Poor Connections**.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

3: This tests the OFF/RUN/CRANK circuit for a short circuit to B+ and ground. Because of the control over powermoding this step must be performed with the switch in the OFF position. Any shorts to ground during this step could be a short to a voltage circuit that is only powered in Run or Accessory. The loads on these circuits would indicate a short to ground, but the cause would have to be traced thorough the OFF/RUN/CRANK circuit and repaired.

4: This tests the ignition switch contacts of the OFF/RUN/CRANK circuit for merit.

5: This tests the OFF/RUN/CRANK, +5-volt and +12-volt circuits for an open.

DTC B1441

Step	Action	Values	Yes	No	
Schematic Reference: <u>Body Control System Schematics</u> and <u>Power Distribution Schematics</u>					

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Connector End View Reference: Master Electrical Component List

1	Did you perform the Diagnostic System Check - Vehicle?	-	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u>
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. Check for DTC B1441 in the body control module (BCM). Does the scan tool display DTC B1441 as current?	-	Go to Step 3	Go to Diagnostic Aids
3	1. Disconnect the BCM harness connector that contains the OFF/RUN/CRANK circuit. 2. Place the ignition switch in the OFF position and remove the key from the ignition. 3. Test for a short to ground and a short to voltage in the OFF/RUN/CRANK circuit and the ignition switch +5-volt reference supply circuit at the BCM harness connector. Refer to <u>Circuit Testing</u>. Did you find and correct the condition?	B+	Go to Step 9	Go to Step 4
	IMPORTANT: The engine may crank during this procedure. 1. Place the key into the ignition switch without rotating the switch. 2. Test for continuity between the OFF/RUN/CRANK terminal and the ignition switch +12-volt reference			

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4	supply terminal on the BCM harness connector 3. Turn the ignition switch to the RUN position. 4. Test for continuity between the OFF/RUN/CRANK terminal and the ignition switch +5-volt reference supply terminal on the BCM harness connector. Refer to Circuit Testing . 5. Turn the ignition switch to the CRANK position. 6. Using a DMM measure the resistance between the OFF/RUN/CRANK terminal and the ignition switch +5-volt reference supply terminal on the BCM harness connector. The resistance should be between 1250-1350 ohms only while the switch is in the crank position. Can you measure continuity and is the resistance within value in the CRANK position?	-	Go to Step 7	Go to Step 5
5	Test the OFF/RUN/CRANK, +12-volt reference and +5-volt reference circuits of the ignition switch harness connector and the BCM harness connector for an open condition. Test the terminals at ignition switch harness connector for the proper tension Did you find and correct the condition?	-	Go to Step 9	Go to Step 6
6	Replace the ignition switch. Refer to Ignition Switch Replacement . Did you complete the replacement?	-	Go to Step 9	-
	Test the OFF/RUN/CRANK, +12-			

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7	volt reference and +5-volt reference terminals of the BCM harness connector for the proper terminal tension and intermittent and poor connections. Did you find and correct the condition?		Go to Step 9		Go to Step 8
8	Replace the BCM. Refer to <u>Control Module References</u> for replacement, setup, and programming. Did you complete the replacement?	-	Go to Step 9	-	
9	1. Reconnect all disconnected connectors. 2. Install the scan tool. 3. Turn ON the ignition, with the engine OFF. 4. Use the scan tool in order to clear the DTCs. 5. Operate the vehicle within the Conditions for Running the DTCs, as specified in the supporting text. Does the DTC reset?	-	Go to Step 1	System OK	

DTC C0550

Circuit Description

The internal fault detection is handled inside the control module. No external circuits are involved. DTC C0550 is set when an internal malfunction takes place within the control module.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC C0550 Electronic Control Unit (ECU) Performance

This vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to **DTC Symptom Description** in Vehicle DTC Information.

DTC C0550

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DTC Symptom	DTC Symptom Descriptor
00	No Additional Information
39	Internal Electronic Failure

Conditions for Running the DTC

The microprocessor runs a diagnostic program to detect an internal fault when power up is commanded. The only requirements are voltage and ground. This program runs even if the voltage is out of the valid operating range.

Conditions for Setting the DTC

- The control module detects an internal write malfunction.
- The control module detects an internal checksum malfunction.

Action Taken When the DTC Sets

If equipped, the following module specific actions may occur:

- The antilock brake system (ABS) indicator turns ON.
- The BRAKE warning indicator turns ON.
- The electronic brake control module (EBCM) disables the ABS/dynamic rear proportion (DRP)/traction control system (TCS).
- The driver information center (DIC) displays the power steering warning message No Steering Assist.
- The TCS indicator turns ON.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of the module. If stored only as a history DTC and not retrieved as a current DTC, do not replace the module.
- If this DTC is retrieved as both a current and a history DTC, replace the module.
- If this DTC continues to set intermittently, replace the module.

DTC C0550

Step	Action	Yes	No
	Did you perform the Diagnostic System		Go to

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1	Check - Vehicle?	Go to Step 2	<u>Diagnostic System Check - Vehicle</u> in Vehicle DTC Information
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. Retrieve DTCs. Is the DTC retrieved as a current DTC?	Go to Step 3	Go to Diagnostic Aids
3	IMPORTANT: Perform the programming or setup procedure for the module, if required. Replace the control module setting the DTC as current. Refer to <u>Control Module References</u> . Did you complete the replacement?	Go to Step 4	-
4	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC, as specified in the supporting text. Does the DTC reset?	Go to Step 2	System OK

DTC P2535**Circuit Description**

The Run/Crank relay is controlled by the body control module (BCM). The Run/Crank relay contacts are supplied a hot at all times from the fuse block underhood. The relay supplies power to several components when the vehicle is in the RUN or CRANK power mode. This signal is labeled Ignition 1. When the ignition switch is placed in the RUN or CRANK position, the BCM will receive a Run/Crank signal from the ignition switch and turn ON the Run/Crank relay. When the ignition switch is in the OFF position, the BCM will turn OFF the Run/Crank relay. The powertrain control module (PCM) compares the Run/Crank relay output signal with the BCM Class 2 serial data power mode message. If the ignition 1 voltage signal and the power mode message do not match for an allotted time, the PCM will disable the fuel injectors and DTC P2535 will set.

DTC Descriptor

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This diagnostic procedure supports the following DTC:

DTC P2535 Ignition 1 Switch Circuit High Voltage

This vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to **DTC Symptom Description**.

DTC P2535

DTC Symptom	DTC Symptom Descriptor
00	No Additional Information

Conditions for Running the DTC

- The vehicle is in PARK or NEUTRAL.
- The ignition switch is OFF.

Conditions for Setting the DTC

The ignition 1 voltage signal is higher than normal for more than 7 seconds.

Action Taken When the DTC Sets

- The control module stores the DTC information into memory when the diagnostic runs and fails.
- The malfunction indicator lamp (MIL) will not illuminate.
- The control module records the operating conditions at the time the diagnostic fails. The control module stores this information in the Failure Records.
- The driver information center, if equipped, may display a message.

Conditions for Clearing the DTC

- A current DTC Last Test Failed clears when the diagnostic runs and passes.
- A history DTC clears after 40 consecutive warm-up cycles, if no failures are reported by this or any other non-emission related diagnostic.
- Clear the DTC with a scan tool.

DTC P2535

Step	Action	Values	Yes	No
Schematic Reference: Power Distribution Schematics Connector End View Reference: Master Electrical Component List				
1	Did you perform the Diagnostic System Check - Vehicle?	-		Go to <u>Diagnostic System Check</u> -

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			Go to Step 2	Vehicle
2	1. Turn OFF the ignition. 2. Disconnect the Run/Crank relay. 3. Connect a test lamp between the Run/Crank voltage circuit on the powertrain control module (PCM) side of the relay and a good ground. Does the test lamp illuminate?	-	Go to Step 4	Go to Step 3
3	Connect a test lamp between the Run/Crank voltage circuit on the body control module (BCM) side of the relay and a good ground. Does the test lamp illuminate?	-	Go to Step 5	Go to Step 8
4	Test the Run/Crank voltage circuit between the PCM and the Run/Crank relay for a short to voltage. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> . Did you find and correct the condition?	-	Go to Step 11	Go to Step 6
5	Test the Run/Crank voltage circuit between the BCM and the Run/Crank relay for a short to voltage. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> . Did you find and correct the condition?	-	Go to Step 11	Go to Step 7
6	Test for an intermittent and for a poor connection at the PCM. Refer to <u>Testing for Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> . Did you find and correct the condition?	-	Go to Step 11	Go to Step 9
7	Test for an intermittent and for a poor connection at the BCM. Refer to <u>Testing for Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> . Did you find and correct the condition?	-	Go to Step 11	Go to Step 10
	Replace the Run/Crank relay. Refer to			

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8	Relay Replacement (Within an Electrical Center) or Relay Replacement (Attached to Wire Harness) . Did you complete the replacement?	-	Go to Step 11	-
9	Replace the PCM. Refer to Control Module References for replacement, setup, and programming. Did you complete the replacement?	-	Go to Step 11	-
10	Replace the BCM. Refer to Control Module References for replacement, setup, and programming. Did you complete the replacement?	-	Go to Step 11	-
11	1. Clear the DTCs with a scan tool. 2. Turn OFF the ignition for 30 seconds. 3. Start the engine. 4. Operate the vehicle within the Conditions for Running the DTC. You may also operate the vehicle within the conditions that you observed from the Freeze Frame/Failure Records. Did the DTC fail this ignition?	-	Go to Step 2	Go to Step 12
12	With a scan tool, observe the stored information, Capture Info. Does the scan tool display any DTCs that you have not diagnosed?	-	Go to Diagnostic Trouble Code (DTC) List - Vehicle	System OK

DTC U0001

Circuit Description

Modules connected to the GMLAN serial data circuit monitor for serial data communications on the GMLAN network during normal vehicle operation. Operating information and commands are exchanged among the modules. Each module on GMLAN network maintains a transmit error counter (TEC) and a receive error counter (REC). The counter values increase with detected errors and will decrease with error-free messages. If the TEC value exceeds 255, the controller removes itself from the network and a DTC U0001 will be set.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC U0001 High Speed CAN Communication Bus

This vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to **DTC Symptom Description**.

DTC U0001

DTC Symptom	DTC Symptom Descriptor
00	No additional information

Conditions for Running the DTC

- Voltage supplied to the module is in the normal operating voltage range.
- The vehicle power mode requires serial data communication to occur.

Conditions for Setting the DTC

A certain number of no valid transmitted messages on the GMLAN serial data circuits are detected by the module.

Action Taken When the DTC Sets

- The module suspends all message transmission.
- The module uses default values for all parameters received on the GMLAN serial data circuits.
- The module inhibits the setting of all other GMLAN communication DTCs.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Diagnostic Aids

- This DTC cannot be retrieved with a current status. Diagnosis of current DTC is accomplished via the symptom, Scan Tool Does Not Communicate with GMLAN Device. Refer to **Scan Tool Does Not Communicate with High Speed GMLAN Device**.
- An intermittent condition is likely to be caused by a short on the GMLAN serial data circuits. Use the Scan Tool Does Not Communicate with GMLAN Device procedure in order to isolate an intermittent condition. Refer to **Scan Tool Does Not Communicate**

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with High Speed GMLAN Device.

DTC U1300, U1301, OR U1305

Circuit Description

The powertrain control module (PCM) on this vehicle uses the class 2 serial data buss strictly for diagnostic purposes. When the PCM detects one of the following conditions on the class 2 serial data circuit for approximately 3 seconds, the setting of all other class 2 serial communication DTCs is inhibited and a DTC will set.

DTC Descriptors

This diagnostic procedure supports the following DTCs:

- DTC U1300 Class 2 Data Link Low
- DTC U1301 Class 2 Data Link High
- DTC U1305 Class 2 Data Link Low or High

This vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to **DTC Symptom Description** .

DTC U1300, U1301, or U1305

DTC Symptom	DTC Symptom Descriptor
00	No Additional Information

Conditions for Running the DTCs

- Voltage supplied to the module is in the normal operating voltage range.
- The vehicle power mode requires serial data communication to occur.

Conditions for Setting the DTCs

- No valid messages are detected on the class 2 serial data circuit.
- The voltage level detected on the class 2 serial data circuit is in one of the following conditions:
 - High
 - Low
- The above conditions are met for approximately 3 seconds.

Action Taken When the DTCs Sets

The module uses default values for all parameters received on the class 2 serial data circuit.

Conditions for Clearing the DTC

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- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

3: If you can communicate with the PCM, the malfunction may be an intermittent short to voltage or ground in the wiring of the class 2 serial data circuit.

5: If there are no current DTCs that begin with a "U", the communication malfunction has been repaired.

6: The communication malfunction may have prevented diagnosis of the customer complaint.

DTC U1300, U1301, or U1305

Step	Action	Yes	No
Schematic Reference: <u>Data Link Connector (DLC) Schematics</u> Connector End View Reference: <u>Master Electrical Component List</u>			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u>
2	1. Turn ON the ignition, with the engine OFF. 2. Using a scan tool, attempt to communicate with the powertrain control module (PCM). Can you communicate with the PCM?	Go to Step 4	Go to <u>Scan Tool Does Not Communicate with Class 2 Device</u>
3	IMPORTANT: Turn ON the ignition, with the engine OFF, when testing for a short to voltage. Use the DMM MIN/MAX function to capture intermittent conditions. Test the class 2 serial data circuit for an intermittent short to ground or an intermittent short to voltage. Refer to one of the following procedures: • <u>Testing for Intermittent Conditions and Poor Connections</u> • <u>Circuit Testing</u>		

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	• Connector Repairs • Wiring Repairs		
	Did you find and correct the condition?	Go to Step 5	Go to Step 4
4	IMPORTANT: Perform the module setup procedure, if required. Replace the PCM. Refer to Control Module References for the appropriate repair instructions. Did you complete the replacement?	Go to Step 5	-
5	1. Reconnect all of the disconnected modules. 2. Reconnect any other disconnected connectors. 3. Install a scan tool. 4. Turn ON the ignition, with the engine OFF. 5. Retrieve DTCs using the Vehicle DTC Information feature on the scan tool, under the Computer/Integrating System menu. Did you record any DTCs which begin with a "U" and with a current status?	Go to Diagnostic Trouble Code (DTC) List - Vehicle	Go to Step 6
6	Did you record any DTCs which do not begin with a "U"?	Go to Diagnostic Trouble Code (DTC) List - Vehicle	Go to Step 7
7	Did you diagnose all of the DTCs?	Go to Step 8	Go to Step 5
8	Use the scan tool in order to clear the DTCs. Did you complete the action?	System OK	-

DTC U2100

Circuit Description

The GMLAN serial data circuits are controller area network (CAN) high speed serial data buses used to communicate information between the control modules. Typical data transmission speeds must be high enough to ensure that a required real-time response is maintained. On this vehicle there are 2 utterly different types of GMLAN serial data circuits.

the high speed 2-wire circuit and low speed single wire circuit. Refer to **Data Link Communications Description and Operation** for the complete description of these buses. The GMLAN serial data circuits also communicate directly to the data link connector (DLC). Messages are interpreted by the externally connected CANdi module which acts as a transceiver for the scan tool.

Modules connected to the GMLAN serial data circuits monitor communications during normal vehicle operation, where operation information is exchanged among the modules. All the modules on the GMLAN networks, maintain a transmit error counter (TEC) and a receive error counter (REC). The counter values increase with detected errors and will decrease with error-free messages. If the TEC value exceeds 255, the controller removes itself from the network and DTC U2100 will result.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC U2100 Controller Area Network (CAN) Bus Communication

This vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to **DTC Symptom Description**.

DTC U2100

DTC Symptom	DTC Symptom Descriptor
00	No Additional Information

Conditions for Running the DTCs

- Supply voltage to the modules are in the normal operating range.
- The vehicle is in the RUN power mode.

Conditions for Setting the DTC

The module setting the DTC has attempted to establish communications on the GMLAN circuits for more than 7 times.

Action Taken When the DTCs Sets

- The module suspends all message transmission.
- The module uses default values for all parameters received on the serial data circuits.
- The module inhibits the setting of all other communication DTCs.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.

- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Diagnostic Aids

- This DTC cannot be retrieved with a current status. Diagnosis of a current DTC is accomplished via the symptom, Scan Tool Does Not Communicate with High Speed or Low Speed GMLAN Device. Refer to **Data Link References** for the correct procedure for the specific modules.
- An intermittent condition is likely to be caused by a short on the GMLAN serial data circuits. Use the Scan Tool Does Not Communicate with High Speed or Low Speed GMLAN Device procedure in order to isolate an intermittent condition. Refer to **Data Link References** for the correct procedure for the specific modules.

DTC U2103

Circuit Description

Modules connected to the GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the modules. The modules have programmed information about what messages are needed to be exchanged on the serial data circuits, for each virtual network. The messages are also supervised and some periodic messages are used by the receiver module as an availability indication of the transmitter module.

DTC U2103 will set when fewer modules are detected on the buss before the modules can learn the other module's IDs. If the communication buss is opened, or if the module's power supply is lost when the vehicle is in the OFF power mode, and then placed in the RUN power mode, U2103 will set in specific modules.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC U2103 Fewer Controllers On Than Programmed

When more than one Fewer Controllers On than Programmed DTC is set in either one module or in several modules, diagnose the DTCs in the following order:

1. Current DTCs before history DTCs unless told otherwise in the diagnostic table.
2. The DTC which is reported the most times.

This vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to **DTC Symptom Description**.

DTC U2103

DTC Symptom	DTC Symptom Descriptor
00	No Additional Information

Conditions for Running the DTCs

- Voltage supplied to the modules is in the normal operating voltage range.
- The vehicle power mode requires serial data communication to occur.
- The DTC U2100 does not have a current status.

Conditions for Setting the DTC

A supervised periodic message that includes the transmitter module availability has not been received.

Action Taken When the DTC Sets

The module uses a default value for the missing parameter.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Diagnostic Aids

- A poor connection at the inoperative module may cause this code to set.
- An improperly powered module may cause this code to set.

Test Description

The numbers below refer to the step numbers on the diagnostic table:

3: If the body control module (BCM) will not power up, the vehicle cannot establish the correct power mode. This step tests for the correct power supply conditions for the BCM.

4: If DTC U2103 is set as history and you can communicate with the suspect module, the malfunction is an intermittent communication buss, power supply, ground or internal module connection.

5: This step tests for the correct power supply conditions of the suspect module or modules.

6: This step identifies which of the GMLAN busses the module or modules use for communication. Use the **Data Link References** for identifying the correct buss to analyze.

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11: The module which was not communicating due to an open in the GMLAN serial data circuits may have set Loss of Communication DTCs for those modules that it was monitoring.

20: The modules which can communicate indicate the module which cannot communicate. You must clear the DTC from these modules to avoid future misdiagnosis.

DTC U2103

Step	Action	Yes	No
Schematic Reference: Data Link Connector (DLC) Schematics Connector End View Reference: Master Electrical Component List			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. Attempt to communicate with body control module (BCM). Were you able to communicate with BCM?	Go to Step 4	Go to Step 3
3	1. Turn OFF the ignition. 2. Disconnect the harness connectors from the BCM. 3. Test the following circuits of the BCM harness connector for the indicated condition. Refer to Circuit Testing and Wiring Repairs . • Switched and constant B+ supply circuits, for power • Ground circuits, for continuity • All communications circuits, for continuity Did you find and correct the condition?	Go to Step 9	Go to Step 7
4	Attempt to communicate with all of the modules on the vehicle. Were you able to communicate with all of the modules?	Go to Testing for Intermittent Conditions and Poor Connections	Go to Step 5

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5	Test the following circuits of the modules that do not communicate: • Switched B+ supply circuits • Constant B+ supply circuits • Ground circuits Did you find and correct the condition?	Go to Step 9	Go to Step 6
6	1. Refer to Data Link References to identify the GMLAN buss or busses that the modules use to communicate and make a note. 2. If more than one module is not communicating, use the data link connector (DLC) schematic to determine which module is closest to the DLC. Start the analysis at that module. Refer to Data Link Connector (DLC) Schematics. 3. Disconnect the harness connectors from the non-communicating modules. 4. Test for an open circuit in the appropriate buss between the GMLAN terminals of the disconnected harness connector and the DLC. Use the note from item 1 for buss identification. Did you find and correct the condition?	Go to Step 9	Go to Step 7
7	Inspect for poor connections at the harness connector of the non-communicating module. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs. Did you find and correct the condition?	Go to Step 9	Go to Step 8
8	Replace the non-communicating module. Refer to Control Module References for replacement, setup, and programming. Did you complete the replacement?	Go to Step 9	-
	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF.		

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9	3. Retrieve DTCs from the module that was not communicating. Does the scan tool display any DTCs which do not begin with a "U"?	Go to <u>Diagnostic System Check - Vehicle</u>	Go to Step 10
10	Use the scan tool in order to clear the DTCs. Did you complete the action?	Go to Step 11	-
11	Retrieve DTCs from the modules which had the Loss of Communications DTC set. Does the scan tool display any DTCs which do not begin with a "U"?	Go to <u>Diagnostic System Check - Vehicle</u>	Go to Step 12
12	1. Attempt to communicate with all the modules on the vehicle. 2. Continue diagnosing or clearing the DTCs until all the modules have been diagnosed and all the DTCs have been cleared. Does DTC U2103 set in any module?	Go to Step 2	System OK

DTC U2105-U2199**Circuit Description**

Modules connected to the GMLAN serial data circuits monitor for serial data communications, during normal vehicle operation. Operating information and commands are exchanged among the modules. The modules have programmed information about what messages are needed to be exchanged on the serial data circuits, for each virtual network. The messages are also supervised and some periodic messages are used by the receiver module as an availability indication of the transmitter module. The supervision time-out period is 250 ms. Each message contains the identification number of the transmitter module. When a message that indicates the availability of the transmitter module is not received, the receiver module sets a DTC 21xx where xx is equal to the 2-digit identification number of the transmitter module.

The DTC descriptors listed below provide a method for determining which module is not communicating. A module with a GMLAN serial data circuit malfunction or which loses power during the current ignition cycle will have a Loss of Communication DTC set by other modules that depend on information from that failed module. The modules that can communicate will set a DTC indicating the module that cannot communicate.

DTC Descriptors

This diagnostic procedure supports the following DTCs:

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- DTC U2105 Lost Communications With Engine Control System
- DTC U2106 Lost Communications With Transmission Control System
- DTC U2107 Lost Communications With Body Control System
- DTC U2108 Lost Communications With ABS/TCS Control System
- DTC U2109 Lost Communications With Powertrain Multiple Control System
- DTC U2111 Lost Communications With Steering Control System
- DTC U2113 Lost Communications With Sensing Diagnostic Module (SDM)
- DTC U2116 Lost Communications With Instrument Panel Cluster (IPC)
- DTC U2122 Lost Communications With Radio
- DTC U2125 Lost Communication With Mobile Communications Control Systems
- DTC U2127 Lost Communications With Front HVAC
- DTC U2137 Lost Communications With Vehicle Theft Deterrent (VTD)
- DTC U2171 Lost Communications With DVD Player
- DTC U2172 Lost Communications With Digital Radio Receiver

When more than one Loss of Communication DTC is set in either one module or in several modules, diagnose the DTCs in the following order:

1. Current DTCs before history DTCs unless told otherwise in the diagnostic table.
2. The DTC which is reported the most times.

This vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to **DTC Symptom Description**.

DTC U2105-U2199

DTC Symptom	DTC Symptom Descriptor
00	No Additional Information

Conditions for Running the DTCs

- Voltage supplied to the modules is in the normal operating voltage range.
- The vehicle power mode requires serial data communication to occur.
- DTC U2100 does not have a current status.

Conditions for Setting the DTC

A supervised periodic message that includes the transmitter module availability has not been received.

Action Taken When the DTC Sets

The module uses a default value for the missing parameter.

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Diagnostic Aids

- A poor connection at the inoperative module may cause this code to set.
- An improperly powered module may cause this code to set.

Test Description

The numbers below refer to the step numbers on the diagnostic table:

3: Non ABS equipped vehicles may set a DTC U2108 falsely. If this is the case there is no malfunction with this system.

5: If the body control module (BCM) will not power up, the vehicle cannot establish the correct power mode. This step test for the correct power supply conditions for the BCM.

6: If DTC U2105 to U2177 are set as history and you can communicate with the suspect module, the malfunction is an intermittent communication buss, power supply, ground or internal module connection.

7: This step tests for the correct power supply conditions of the suspect module or modules.

8: This step identifies which of the GMLAN busses the module or modules use for communication. Use the **Data Link References** for identifying the correct buss to analyze.

13: The module which was not communicating due to an open in the GMLAN serial data circuits may have set Loss of Communication DTCs for those modules that it was monitoring.

14: The modules which can communicate indicate the module which cannot communicate. You must clear the DTC from these modules to avoid future misdiagnosis.

DTC U2105-U2199

Step	Action	Yes	No
Schematic Reference: <u>Data Link Connector (DLC) Schematics</u> Connector End View Reference: <u>Master Electrical Component List</u>			
1	Did you perform the Diagnostic System		Go to Diagnostic

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	Check - Vehicle?	Go to Step 2	System Check - Vehicle
2	Is U2108 the only DTC set between the range of U2105 through U2199?	Go to Step 3	Go to Step 4
3	Is the vehicle equipped with ABS?	Go to Step 4	Go to Step 14
4	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. Attempt to communicate with the body control module (BCM). Were you able to communicate with the BCM?	Go to Step 6	Go to Step 5
5	1. Turn the ignition OFF. 2. Disconnect the harness connectors from the BCM. 3. Test the following circuits of the BCM harness connector for the indicated condition. Refer to Circuit Testing and Wiring Repairs . • Switched and constant B+ supply circuits, for power • Ground circuits, for continuity • All communications circuits, for continuity Did you find and correct the condition?	Go to Step 11	Go to Step 10
6	Attempt to communicate with all of the modules on the vehicle. Were you able to communicate with all of the modules?	Go to Testing for Intermittent Conditions and Poor Connections	Go to Step 7
7	Test the following circuits of the modules that do not communicate: • Switched B+ supply circuits • Constant B+ supply circuits • Ground circuits Did you find and correct the condition?	Go to Step 11	Go to Step 8

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8	1. Refer to Data Link References to identify the GMLAN buss or busses that the modules use to communicate and make a note. 2. If more than one module is not communicating, use the data link connector (DLC) schematic to determine which module is closest to the DLC. Start the analysis at that module. Refer to Data Link Connector (DLC) Schematics. 3. Disconnect the harness connectors from the non-communicating modules. 4. Test for an open circuit in the appropriate buss between the GMLAN terminals of the disconnected harness connector and the DLC. Use the note from item one for buss identification. Did you find and correct the condition?	Go to Step 11	Go to Step 9
9	Inspect for poor connections at the harness connector of the non-communicating module. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs. Did you find and correct the condition?	Go to Step 11	Go to Step 10
10	Replace the non-communicating module. Refer to Control Module References for replacement, setup, and programming. Did you complete the replacement?	Go to Step 11	-
11	1. Make sure that the scan tool has been cycled OFF for at least 15 seconds in order to reset it. 2. Install the scan tool, if necessary. 3. Turn ON the ignition, with the engine OFF. 4. Retrieve DTCs from the module that was not communicating. Does the scan tool display any DTCs which do not begin with a "U"?	Go to Diagnostic System Check - Vehicle	Go to Step 12

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12	Use the scan tool to clear the DTCs that begin with a "U". Did you complete the action?	Go to Step 13	-
13	Retrieve DTCs from the modules which had the Loss of Communications DTC set. Does the scan tool display any DTCs which do not begin with a "U"?	Go to <u>Diagnostic System Check - Vehicle</u>	Go to Step 14
14	IMPORTANT: DTC U2108 may set in a non ABS equipped vehicle. If U2108 sets in a non ABS equipped vehicle the system is OK. 1. Attempt to communicate with all the modules on the vehicle. 2. Continue diagnosing or clearing the DTCs until all the modules have been diagnosed and all the DTCs have been cleared. Does DTC U2105-U2177 set in any module?	Go to Step 4	System OK

SYMPTOMS - COMPUTER/INTEGRATING SYSTEMS

IMPORTANT: The following steps must be completed before using the symptom tables.

1. Perform the **Diagnostic System Check - Vehicle** before using the symptom tables in order to verify that all of the following are true:
 - There are no DTCs set.
 - The control modules can communicate via the serial data links.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to:
 - **Data Link Communications Description and Operation**
 - **Body Control System Description and Operation**
 - **Retained Accessory Power (RAP) Description and Operation**

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the systems. Refer to **Checking Aftermarket Accessories**.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

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Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections**.

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Scan Tool Does Not Power Up**
- **Scan Tool Does Not Communicate with Class 2 Device**
- **Scan Tool Does Not Communicate with High Speed GMLAN Device**
- **Scan Tool Does Not Communicate with Low Speed GMLAN Device**
- **Retained Accessory Power (RAP) On After Timeout**
- **Retained Accessory Power (RAP) Inoperative**

SCAN TOOL DOES NOT POWER UP

Circuit Description

The data link connector (DLC) is a standardized 16 cavity connector. Connector design and location is dictated by an industry-wide standard, and is required to provide the following:

- Scan tool power battery positive voltage at terminal 16
- Scan tool power ground at terminal 4
- Common signal ground at terminal 5

The scan tool will power up with the ignition OFF. Some modules, however, will not communicate unless the ignition is ON and the power mode master (PMM) module sends the appropriate power mode message.

Test Description

The number below refers to the step number on the diagnostic table.

4: If the battery positive voltage and ground circuits of the DLC are functioning properly. The malfunction must be due to the scan tool.

Scan Tool Does Not Power Up

Step	Action	Yes	No
Schematic Reference: <u>Data Link Connector (DLC) Schematics</u>			
Connector End View Reference: <u>Computer/Integrating Systems Connector End Views</u>			

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1	Test the battery positive voltage circuit of the data link connector (DLC) for an open or a short to ground. Refer to the following: • <u>Circuit Testing</u> • <u>Wiring Repairs</u> Did you find and correct the condition?	Go to <u>Diagnostic System Check - Vehicle</u>	Go to Step 2
2	Test the ground circuits of the DLC for an open or high resistance. Refer to the following: • <u>Circuit Testing</u> • <u>Wiring Repairs</u> Did you find and correct the condition?	Go to <u>Diagnostic System Check - Vehicle</u>	Go to Step 3
3	Inspect for poor connections and terminal tension at the DLC. Refer to the following: • <u>Testing for Intermittent Conditions and Poor Connections</u> • <u>Connector Repairs</u> Did you find and correct the condition?	Go to <u>Diagnostic System Check - Vehicle</u>	Go to Step 4
4	The scan tool or the CANdi module may be malfunctioning. Refer to the scan tool user guide. Did you obtain a properly operating scan tool and CANdi module?	Go to <u>Diagnostic System Check - Vehicle</u>	-

SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE**Circuit Description**

The powertrain control module (PCM) is connected to the class 2 serial data circuit. The class 2 serial data circuit is used for diagnostic purposes only in this vehicle. Connecting a scan tool to the data link connector (DLC) allows communication with the PCM for diagnostic purposes. DTCs may be set due to this symptom and during this diagnostic procedure. Complete the diagnostic procedure in order to ensure all the DTCs are diagnosed and cleared from memory.

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Diagnostic Aids

The PCM is the only module on the class 2 serial data buss on this vehicle. The most likely cause of the buss failure will be a short or open.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: A partial loss or intermittent loss of communication in the class 2 serial data circuit uses a different procedure than a total loss of communication of the class 2 serial data circuit.

10: If there are no current DTCs that begin with the letter "U", the communication concern has been repaired.

11: The communication concern may have prevented diagnosis of the customer complaint.

Scan Tool Does Not Communicate with Class 2 Device

Step	Action	Yes	No
Schematic Reference: <u>Data Link Connector (DLC) Schematics</u> Connector End View Reference: <u>Master Electrical Component List</u>			
1	Does the scan tool power up?	Go to Step 2	Go to Scan Tool Does Not Power Up
2	1. Turn ON the ignition, with the engine OFF. 2. Attempt to communicate with the powertrain control module (PCM) on the class 2 serial data circuit. Does the scan tool communicate with PCM on the class 2 serial data circuit?	Go to Testing for Intermittent Conditions and Poor Connections	Go to Step 3
3	1. Turn the ignition OFF. 2. Remove the scan tool from the data link connector (DLC). 3. Remove the harness connector from the PCM that contains the class 2 serial data connector. 4. Test for an open between the DLC terminal 2 and the terminal on the PCM harness connector that contains the class 2 serial data circuit.		

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	Did you find and correct the condition?	Go to Step 9	Go to Step 4
4	IMPORTANT: Turn ON the ignition, with the engine OFF, when testing for a short to voltage. Use the DMM MIN/MAX function to capture intermittent conditions. Test the class 2 serial data circuit for a short to ground or a short to voltage. Refer to Circuit Testing. Did you find and correct the condition?	Go to Step 9	Go to Step 5
5	1. Turn OFF the ignition. 2. Inspect for poor connections and terminal tension at the DLC. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs. Did you find and correct the condition?	Go to Step 9	Go to Step 6
6	Test the signal ground circuits of the DLC for an open or high resistance. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs. Did you find and correct the condition?	Go to Step 9	Go to Step 7
7	Inspect for poor connections and terminal tension at the harness connector of the PCM. Refer to Testing for Intermittent Conditions and Poor Connections and Wiring Repairs. Did you find and correct the condition?	Go to Step 9	Go to Step 8
8	IMPORTANT: Perform the module setup procedure if required. Refer to Control Module References. Replace the suspect module. Refer to Control Module References for the appropriate Repair Instructions for module replacement. Did you complete the replacement?	Go to Step 9	-
	1. Connect the PCM. 2. Connect all the connectors. 3. Install a scan tool.		

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9	4. Turn ON the ignition leaving the engine OFF. IMPORTANT: The scan tool may require a power up reset before communication will occur due to a short on the class 2 serial data circuit. Turn OFF or disconnect the scan tool before you display DTCs.		
	5. Wait for 10 seconds. 6. Select the display DTCs function for the PCM. If using a Tech 2, use the Class 2 DTC Check feature in order to determine if the PCM has DTCs set. 7. Record all of the displayed DTCs and the DTC status. Did your record any DTCs which begin with a letter "U" and with a current status?	Go to Step 11	Go to Step 10
10	Did you record any DTCs which do not begin with a letter "U"?	Go to Step 11	Go to Step 13
11	Diagnose the DTCs as directed by the diagnostic procedures for the particular concern. Did you complete the action?	Go to Step 12	-
12	Did you diagnose all of the DTCs?	Go to Step 13	Go to Step 11
13	Clear the DTCs using the scan tool. Did you complete the action?	System OK	-

SCAN TOOL DOES NOT COMMUNICATE WITH HIGH SPEED GMLAN DEVICE

Modules connected to the high speed GMLAN serial data circuits monitor for serial data communications on the high speed GMLAN network during normal vehicle operation. Operating information and commands are exchanged among the modules. When a module detects a bus-off condition, a DTC U0001 or U2100 will be set. These DTCs can be retrieved as history only.

Diagnostic Aids

The high speed GMLAN serial data buss uses two 120 ohms terminating resistors that are in parallel with the high speed GMLAN (+) and (-) circuits. One of the resistors is connected at the data link connector (DLC) end of the link and the other is at the engine management module, engine control module (ECM), or powertrain control module (PCM) end of the link.

The DLC terminating resistor resides internally in the body control module (BCM). When testing for a short between high speed GMLAN (+) and (-) with the engine management module removed, a reading off 120 ohms is normal. However, to completely analyze the buss, the BCM should be temporally removed when testing for shorts between the high speed GMLAN (+) and (-) while also making sure that all modules and the scan tool are disconnected from the buss. A normal reading across the high speed GMLAN buss with the terminating resistor at the DLC remove and all module and scan tool disconnected is infinite ohms. Make certain to reconnect the BCM after testing. It is necessary for proper vehicle powermoding.

The engine will not start when there is a total malfunction of the high speed GMLAN serial data circuits while the engine is not running. The following conditions may cause a total loss of high speed GMLAN data communication:

- A short between high speed GMLAN (+) and high speed GMLAN (-) circuits
- Any of the high speed GMLAN serial data circuits shorted to ground or voltage
- A module internal malfunction that causes a short to voltage or ground on the high speed GMLAN circuits

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: A partial malfunction in the high speed GMLAN serial data circuits uses a different procedure from a total malfunction of the high speed GMLAN data circuits. Refer to **Data Link References** to identify which modules communicate on the high speed GMLAN serial data circuits.

3: The DTC U2100 may be retrieved with a history status, but is not the cause of the present condition.

8: Data link connector terminals 6 and 14 provide the connection to the GMLAN serial data high circuit and the GMLAN serial data low circuit respectively.

17: The communication malfunction may have prevented diagnosis of the customer complaint.

Scan Tool Does Not Communicate with High Speed GMLAN Device

Step	Action	Yes	No
Schematic Reference: Data Link Connector (DLC) Schematics Connector End View Reference: Master Electrical Component List			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle
	IMPORTANT:		

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2	Make sure the CANdi module is not malfunctioning. When functioning properly, the CANdi module LED will be flashing. In the event of a problem, the LED will be continually illuminated. 1. Turn ON the ignition, with the engine OFF. 2. Perform the Vehicle DTC Information function on the scan tool, under Computer/Integrating Systems. Does the scan tool communicate with any module on the GMLAN serial data circuits?	Go to Step 3	Go to Step 6
3	Did you record any DTCs in the range of U2105 to U2177?	Go to <u>DTC U2105-U2199</u>	Go to Step 4
4	Did you record DTC U0001?	Go to <u>DTC U0001</u>	Go to Step 5
5	IMPORTANT: Turn ON the ignition, with the engine OFF, when testing for a short to voltage. Use the DMM MIN/MAX function to capture intermittent conditions. Test the high speed GMLAN serial data circuits for the following conditions: • An intermittent short to ground • An intermittent short to voltage • An intermittent short between them Refer to the following procedures: • <u>Testing for Intermittent Conditions and Poor Connections</u> • <u>Circuit Testing</u> • <u>Connector Repairs</u> • <u>Wiring Repairs</u> Did you find and correct the condition?	Go to Step 19	Go to Diagnostic Aids
	Test the following circuits of the body control module (BCM) for an open or short to ground:		

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6	• The battery positive voltage input circuits • The battery positive voltage output circuits • The ignition mode switch input circuits • The switched battery positive voltage circuits Refer to Circuit Testing and Wiring Repairs . Did you find and correct the condition?	Go to Step 16	Go to Step 7
7	Test the ground circuits of the BCM for an open. Refer to Circuit Testing and Wiring Repairs . Did you find and correct the condition?	Go to Step 16	Go to Step 8
8	1. Turn OFF the ignition. 2. Disconnect the scan tool from the data link connector (DLC). 3. Inspect for poor connections at the DLC terminals 6 and 14. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs . Did you find and correct the condition?	Go to Diagnostic System Check - Vehicle	Go to Step 9
9	1. Disconnect the farthest module from the DLC that is connected to high speed GMLAN serial data circuits. Refer to Data Link Connector (DLC) Schematics. 2. Turn ON the ignition, with the engine OFF. 3. Attempt to communicate with the BCM. Does the scan tool communicate with the BCM?	Go to Step 14	Go to Step 10
	1. Turn OFF the ignition. 2. Disconnect the farthest module from the DLC that is still connected to high		

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10	speed GMLAN serial data circuits. Refer to Data Link Connector (DLC) Schematics. - Turn ON the ignition, with the engine OFF. - Attempt to communicate with the BCM. Does the scan tool communicate with the BCM?	Go to Step 11	Go to Step 12
11	IMPORTANT: There are two 120-ohm terminating resistors that connect between the (+) and (-) high speed GMLAN buss. Refer to Diagnostic Aids. Test the high speed GMLAN (+) and (-) serial data circuits between the last 2 disconnected modules for the following conditions: - A short to ground - A short to battery - A short between GMLAN (+) and GMLAN (-) - Refer to Diagnostic Aids. Did you find and correct the condition?	Go to Step 16	Go to Step 14
12	Is the BCM the last module still connected to high speed GMLAN data circuits?	Go to Step 13	Go to Step 10
13	- Turn OFF the ignition. - Disconnect the BCM. - Test the high speed GMLAN serial data circuits between the BCM and the previous disconnected module and between the BCM and DLC for the following conditions: - Short to ground - Short to battery - Short between high speed GMLAN (+) and high speed GMLAN (-) - Refer to Diagnostic Aids. - An open		

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	Did you find and correct the condition?	Go to Step 16	Go to Step 14
14	Inspect for poor connections at the high speed GMLAN serial data circuits of the last disconnected module. Refer to <u>Testing for Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> . Did you find and correct the condition?	Go to Step 16	Go to Step 15
15	IMPORTANT: Perform the module setup procedure if required. Replace the last disconnected module. Refer to <u>Control Module References</u> for the appropriate repair instructions. Did you complete the replacement?	Go to Step 16	-
16	1. Reconnect all of the disconnected modules. 2. Install a scan tool. 3. Turn ON the ignition, with the engine OFF. 4. Wait for 10 seconds. The scan tool may require a power up reset before communication will occur due to a short on the high speed GMLAN serial data circuits. Turn OFF or disconnect the scan tool prior to performing this test. 5. Select the Display DTCs function for each module. 6. Record all of the displayed DTCs and the DTC status. Did you record any DTCs which begin with a "U" and with a current status?	Go to <u>Diagnostic Trouble Code (DTC) List - Vehicle</u>	Go to Step 17
17	Did you record any DTCs which do not begin with a "U"?	Go to <u>Diagnostic Trouble Code (DTC) List - Vehicle</u>	Go to Step 18
18	Did you diagnose all of the DTCs?	Go to Step 19	Go to Step 16

19	Use the scan tool in order to clear the DTCs. Did you complete the action?	System OK	-
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SCAN TOOL DOES NOT COMMUNICATE WITH LOW SPEED GMLAN DEVICE

Modules connected to the low speed GMLAN serial data circuits monitor for serial data communications on the low speed GMLAN network during normal vehicle operation. Operating information and commands are exchanged among the modules. When a module detects a bus-off condition, DTC U2100 will be set. These DTCs can be retrieved as history only.

Diagnostic Aids

The engine will not start when there is a total malfunction of the low speed GMLAN serial data circuits while the engine is not running. The following conditions may cause a total loss of low speed GMLAN data communication:

- Any of the low speed GMLAN serial data circuits shorted to ground or voltage
- A module internal malfunction that causes a short to voltage or ground on the low speed GMLAN circuits

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: A partial malfunction in the low speed GMLAN serial data circuits uses a different procedure from a total malfunction of the low speed GMLAN data circuits. Refer to **Data Link References** to identify which modules communicate on the low speed GMLAN serial data circuits.

3: The DTC U2100 may be retrieved with a history status, but is not the cause of the present condition.

7: Data link connector terminal 1 provides the connection to the GMLAN serial data low circuit and the GMLAN serial data low circuit respectively.

16: The communication malfunction may have prevented diagnosis of the customer complaint.

Scan Tool Does Not Communicate with Low Speed GMLAN Device

Step	Action	Yes	No
Schematic Reference: Data Link Connector (DLC) Schematics Connector End View Reference: Master Electrical Component List			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle

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2	IMPORTANT: Make sure the CANdi module is not malfunctioning. When functioning properly, the CANdi module LED will be flashing. In the event of a problem, the LED will be continually illuminated. 1. Turn ON the ignition, with the engine OFF. 2. Perform the Vehicle DTC Information function on the scan tool, under Computer/Integrating Systems. Does the scan tool communicate with any module on the low speed GMLAN serial data circuit?	Go to Step 3	Go to Step 5
3	Did you record any DTCs in the range of U2105 to U2177?	Go to <u>DTC U2105-U2199</u>	Go to Step 4
4	IMPORTANT: Turn ON the ignition, with the engine OFF, when testing for a short to voltage. Use the DMM MIN/MAX function to capture intermittent conditions. Test the low speed GMLAN serial data circuits for the following conditions: • An intermittent short to ground • An intermittent short to voltage • An intermittent open Refer to the following procedures: • <u>Testing for Intermittent Conditions and Poor Connections</u> • <u>Circuit Testing</u> • <u>Connector Repairs</u> • <u>Wiring Repairs</u> Did you find and correct the condition?	Go to Step 18	Go to Diagnostic Aids
	Test the following circuits of the body control module (BCM) for an open or short to ground:		

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5	• The battery positive voltage input circuits • The battery positive voltage output circuits • The ignition mode switch input circuits • The switched battery positive voltage circuits Refer to Circuit Testing and Wiring Repairs . Did you find and correct the condition?	Go to Step 15	Go to Step 6
6	Test the ground circuits of the BCM for an open. Refer to Circuit Testing and Wiring Repairs . Did you find and correct the condition?	Go to Step 15	Go to Step 7
7	1. Turn OFF the ignition. 2. Disconnect the scan tool from the data link connector (DLC). 3. Inspect for poor a connection at the DLC terminal 1. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs . Did you find and correct the condition?	Go to Diagnostic System Check - Vehicle	Go to Step 8
8	1. Disconnect the farthest module from the DLC that is connected to low speed GMLAN serial data circuit. Refer to Data Link Connector (DLC) Schematics. 2. Turn ON the ignition, with the engine OFF. 3. Attempt to communicate with the BCM. Does the scan tool communicate with the BCM?	Go to Step 13	Go to Step 9
	1. Turn OFF the ignition. 2. Disconnect the farthest module from the DLC that is still connected to low speed GMLAN serial data circuit.		

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9	Refer to Data Link Connector (DLC) Schematics. 3. Turn ON the ignition, with the engine OFF. 4. Attempt to communicate with the BCM. Does the scan tool communicate with the BCM?	Go to Step 10	Go to Step 11
10	Test the low speed GMLAN serial data circuit between the last 2 disconnected modules for the following conditions: • A short to ground • A short to battery Did you find and correct the condition?	Go to Step 15	Go to Step 13
11	Is the BCM the last module still connected to low speed GMLAN data circuit?	Go to Step 12	Go to Step 9
12	1. Turn OFF the ignition. 2. Disconnect the BCM. 3. Test the low speed GMLAN serial data circuit between the BCM and the previous disconnected module and between the BCM and DLC for the following conditions: • A short to ground • A short to battery • An open Did you find and correct the condition?	Go to Step 15	Go to Step 13
13	Inspect for poor connections at the low speed GMLAN serial data circuit of the last disconnected module. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs. Did you find and correct the condition?	Go to Step 15	Go to Step 14
	IMPORTANT: Perform the module setup procedure if required.		

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14	Replace the last disconnected module. Refer to Control Module References for the appropriate repair instructions. Did you complete the replacement?	Go to Step 15	-
15	1. Reconnect all of the disconnected modules. 2. Install a scan tool. 3. Turn ON the ignition, with the engine OFF. 4. Wait for 10 seconds. The scan tool may require a power up reset before communication will occur due to a short on the low speed GMLAN serial data circuits. Turn OFF or disconnect the scan tool prior to performing this test. 5. Select the Display DTCs function for each module. 6. Record all of the displayed DTCs and the DTC status. Did you record any DTCs which begin with a "U" and with a current status?	Go to Diagnostic Trouble Code (DTC) List - Vehicle	Go to Step 16
16	Did you record any DTCs which do not begin with a "U"?	Go to Diagnostic Trouble Code (DTC) List - Vehicle	Go to Step 17
17	Did you diagnose all of the DTCs?	Go to Step 18	Go to Step 15
18	Use the scan tool in order to clear the DTCs. Did you complete the action?	System OK	-

POWER MODE MISMATCH

Circuit Description

Normal vehicle serial data communications and the control modules operations will not begin until the system power mode has been identified. Discrete wires from the ignition switch contacts are monitored by a module which acts as the power mode master (PMM) in order to determine the correct power mode. The module which is the PMM communicates the system power mode to all modules on the serial data lines. Refer to **Body Control**

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System Description and Operation to identify which module is the PMM and the applicable power mode look up table.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

6: This step tests for battery voltage on the incorrect signal circuits.

7: This step tests for no battery voltage on the required signal circuits.

8: If any ignition switch parameters that should be inactive in the present ignition switch position are active, 2 ignition switch signal circuits may be shorted together.

9: This step eliminates open circuits as the cause of the malfunction.

Power Mode Mismatch

Step	Action	Yes	No
Schematic Reference: Power Distribution Schematics Connector End View Reference: Master Electrical Component List IMPORTANT: Open the driver door and leave it open during this test. This will disable the retained accessory power (RAP) power mode and eliminate the RAP power mode from the power mode parameter list.			
1	1. Install a scan tool. 2. Turn OFF the ignition. 3. With a scan tool, under Vehicle Control Systems, Computer/Integrating Systems, BCM Data menu observe the Power Mode parameter. Does the displayed power mode parameter match the actual ignition switch position?	Go to Step 2	Go to Step 6
2	1. Turn the ignition switch to the UNLOCK position. 2. With a scan tool, under Vehicle Control Systems, Computer/Integrating Systems, BCM Data menu observe the Power Mode parameter. Does the displayed power mode parameter match the actual ignition switch position?	Go to Step 3	Go to Step 6
	1. Turn the ignition switch to the RUN position, with the engine OFF.		

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3	2. With a scan tool, under Vehicle Control Systems, Computer/Integrating Systems, BCM Data menu observe the Power Mode parameter. Does the displayed power mode parameter match the actual ignition switch position?	Go to Step 4	Go to Step 6
4	IMPORTANT: The engine may start during this procedure. Turn the ignition OFF after verifying this power mode. 1. Turn the ignition switch to the CRANK position. 2. With a scan tool, under Vehicle Control Systems, Computer/Integrating Systems, BCM Data menu observe the Power Mode parameter. Does the displayed power mode parameter match the actual ignition switch position?	Go to Step 5	Go to Step 6
5	1. Turn the ignition switch to the ACCY position. 2. With a scan tool, under Vehicle Control Systems, Computer/Integrating Systems, BCM Data menu observe the Power Mode parameter. Does the displayed power mode parameter match the actual ignition switch position?	Go to Testing for Intermittent Conditions and Poor Connections	Go to Step 6
6	IMPORTANT: The engine may start during this procedure. Turn the ignition OFF after verifying this power mode. 1. Turn OFF the ignition. 2. Disconnect the power mode master (PMM). 3. Hold the ignition switch in the position that indicated the incorrect power mode. 4. With a DMM attached to a good ground, test all the PMM ignition switch inputs for the proper positive voltage. Refer to Body Control System Description and Operation for the		

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	state of the input circuits at a specified ignition switch position.		
	Is voltage present on only the inputs selected by the ignition switch position?	Go to Step 7	Go to Step 8
7	IMPORTANT: The engine may start during this procedure. Turn the ignition OFF after verifying this power mode. 1. Hold the ignition switch in the position that indicated the incorrect power mode. 2. With a DMM attached to a good ground, test the PMM ignition switch inputs for voltage. Refer to Body Control System Description and Operation. Do the acquired readings match the PMM table in ?	Go to Step 9	Go to Step 11
8	1. Disconnect the ignition switch. 2. Test the PMM ignition switch input circuits for a short to voltage. Refer to Circuit Testing and Wiring Repairs. 3. Test the PMM ignition switch circuits for a short between circuits. Refer to Circuit Testing and Wiring Repairs. Did you find and correct the condition?	Go to Step 14	Go to Step 10
9	1. Disconnect the ignition switch. 2. Test the PMM ignition switch input circuits for an open. Refer to Circuit Testing and Wiring Repairs. Did you find and correct the condition?	Go to Step 14	Go to Step 10
10	Inspect for poor connections and terminal tension at the harness connector of the ignition switch. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs. Did you find and correct the condition?	Go to Step 14	Go to Step 12
	Inspect for poor connections and terminal tension at the harness connector of the PMM.		

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11	Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs . Did you find and correct the condition?	Go to Step 14	Go to Step 13
12	Replace the ignition switch. Refer to Ignition Switch Replacement . Did you complete the replacement?	Go to Step 14	-
13	IMPORTANT: After replacement of the PMM perform the Programming/RPO Configuration for the module. Refer to Body Control Module (BCM) Programming/RPO Configuration Replace the PMM. Refer to Control Module References . Did you complete the replacement?	Go to Step 14	-
14	1. Reconnect all disconnected components. 2. With a scan tool, under Vehicle Control Systems, Computer/Integrating Systems, BCM Data menu observe the Power Mode parameter. 3. Cycle the ignition switch through all possible positions one at a time. Does the displayed power mode parameter match the actual ignition switch position?	System OK	Go to Step 1

RETAINED ACCESSORY POWER (RAP) ON AFTER TIMEOUT

Retained Accessory Power (RAP) On After Timeout

Step	Action	Yes	No
Schematic Reference: Retained Accessory Power (RAP) Schematics Connector End View Reference: Master Electrical Component List			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle
2	Do only the devices powered by the accessory relay exhibit this symptom?	Go to Step 4	Go to Step 3
	1. Install a scan tool. 2. Select body control module (BCM) data in data display.		

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3	3. Close all the doors. 4. Turn ON the ignition, with the engine OFF. 5. Wait 5 seconds, then turn the ignition OFF. 6. Wait for the retained accessory power (RAP) time-out. Does the scan tool display the Accessory power mode, then time-out, and display Off-Awake or OFF power mode?	Go to Testing for Intermittent Conditions and Poor Connections	Go to Step 10
4	1. Turn the ignition switch to the OFF position. 2. Disconnect the accessory relay. Do the devices controlled by the accessory relay operate?	Go to Step 5	Go to Step 6
5	Repair the short to battery in the accessory relay switched output circuit. Refer to Wiring Repairs. Did you complete the repair?	Go to Step 12	-
6	1. Open the driver door. 2. Connect a test lamp across the relay coil circuits of the accessory relay socket. Does the test lamp illuminate?	Go to Step 7	Go to Step 8
7	Test the accessory relay control circuit for a short to ground. Refer to Circuit Testing and Wiring Repairs. Did you find and correct the condition?	Go to Step 12	Go to Step 10
8	Inspect for poor connections at the accessory relay. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs. Did you find and correct the condition?	Go to Step 12	Go to Step 9
9	Replace the accessory relay. Did you complete the replacement?	Go to Step 12	-
10	Inspect for poor connections at the harness connector of the BCM. Refer to Testing for Intermittent Conditions and Poor		

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	Connections and Connector Repairs . Did you find and correct the condition?	Go to Step 12	Go to Step 11
11	IMPORTANT: Perform the module setup procedure, if required. Replace the BCM. Refer to Body Control Module Replacement . Did you complete the procedure?	Go to Step 12	-
12	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 2

RETAINED ACCESSORY POWER (RAP) INOPERATIVE

Retained Accessory Power (RAP) Inoperative

Step	Action	Yes	No
Schematic Reference: Retained Accessory Power (RAP) Schematics Connector End View Reference: Master Electrical Component List			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle
2	1. Close all of the doors. 2. Turn ON the ignition, with the engine OFF. 3. Turn OFF the ignition. Do all the retained accessory power functions operate during the retained accessory power (RAP) mode?	Go to Testing for Intermittent Conditions and Poor Connections	Go to Step 3
3	Do only the devices powered by the accessory relay exhibit this symptom?	Go to Step 5	Go to Step 4
4	1. Install a scan tool. Select body control module (BCM) data in data display. 2. Close all of the doors. 3. Turn ON the ignition, with the engine OFF. 4. Wait 5 seconds, then turn the ignition OFF. 5. Wait for the RAP time-out.	Go to Testing	

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	Does the scan tool display the Accessory power mode, then time-out, and display Off-Awake or OFF power mode?	for Intermittent Conditions and Poor Connections	Go to Step 15
5	1. Turn OFF the ignition. 2. Disconnect the accessory relay. 3. Turn ON the ignition, with the engine OFF. 4. With a test lamp that is connected to a good ground, probe the battery positive voltage circuit of the accessory relay. Does the test lamp illuminate?	Go to Step 6	Go to Step 12
6	1. Connect a test lamp across the relay coil circuit of the accessory relay. 2. Turn ON the ignition, with the engine OFF. Does the test lamp illuminate?	Go to Step 9	Go to Step 7
7	Test the accessory relay control circuit for a short to ground or an open. Turn the ignition ON, with the engine OFF, when testing for a short to ground. Refer to Circuit Testing and Wiring Repairs . Did you find and correct the condition?	Go to Step 17	Go to Step 8
8	Test the accessory relay ground circuit for an open. Did you find and correct the condition?	Go to Step 17	Go to Step 15
9	1. Turn OFF the ignition. 2. Reconnect the accessory relay. 3. Turn ON the ignition, with the engine OFF. 4. With a test lamp that is connected to a good ground, probe the accessory relay switched output circuit at the accessory relay. Does the test lamp illuminate?	Go to Step 10	Go to Step 11
	Repair the open in the accessory relay switched output circuit. Refer to Wiring		

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10	Repairs . Did you complete the replacement?	Go to Step 17	-
11	Inspect for poor connections at the accessory relay. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs . Did you find and correct the condition?	Go to Step 17	Go to Step 14
12	Test the accessory relay switched output circuit for a short to ground. Did you find and correct the condition?	Go to Step 17	Go to Step 13
13	1. Repair the battery positive voltage circuit of the accessory relay. Refer to Wiring Repairs . 2. Reconnect the accessory relay. Did you complete the repair?	Go to Step 17	-
14	Replace the accessory relay. Did you complete the replacement?	Go to Step 17	-
15	Inspect for poor connections at the harness connector of the BCM. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs . Did you find and correct the condition?	Go to Step 17	Go to Step 16
16	IMPORTANT: Perform the module setup procedure, if required. Replace the BCM. Refer to Body Control Module Replacement . Did you complete the procedure?	Go to Step 17	-
17	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 3

CONTROL MODULE REFERENCES

Control Module References

Control Module	Schematic	Repair Instruction	Programming and Setup
• Diagnostic System Check - Vehicle • Diagnostic Trouble Code (DTC) List - Vehicle • DTC Symptom Description			

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• Symptoms - Vehicle

Audio Amplifier	<u>Radio/Audio System Schematics</u>	<u>Amplifier Replacement</u>	This device requires no programming or setup.
Body Control Module	<u>Body Control System Schematics</u>	<u>Body Control Module Replacement</u>	<u>Body Control Module Programming and Setup</u>
Communication Interface Module (OnStar(R))	<u>OnStar Schematics</u>	<u>Communication Interface Module Replacement</u>	<u>OnStar Reconfiguration</u> after VCIM replacement.
Digital Radio Receiver	<u>Radio/Audio System Schematics</u>	<u>Receiver Replacement - Digital Radio</u>	<u>Digital Radio Receiver Setup</u> after DRR replacement.
Electronic Brake Control Module	<u>ABS Schematics</u>	<u>Electronic Brake Control Module Replacement</u>	<u>Service Programming System (SPS)</u> after EBCM replacement.
Engine Control Module	<u>Engine Controls Schematics</u> for the 2.2L (L61) engine or <u>Engine Controls Schematics</u> for the 2.4L engine	<u>Engine Control Module (ECM) Replacement</u> for the 2.2L (L61) engine or <u>Engine Control Module (ECM) Replacement</u> for the 2.4L engine	<u>Engine Control Module Programming and Setup</u>
Heated Seat Control Module	<u>Driver Seat Schematics</u> or <u>Passenger Seat Schematics</u>	<u>Heated Seat Control Module Replacement - Front</u>	This device requires no programming or setup.
Ignition Control Module	<u>Engine Controls Schematics</u> for the 2.2L (L61) engine	<u>Ignition Control Module Replacement</u> for the 2.2L (L61) engine	This device requires no programming or setup.
Inflatable Restraint Passenger Presence System	<u>SIR Schematics</u>	<u>Inflatable Restraint Passenger Presence System Replacement - Front</u>	<u>Passenger Presence System Programming and Setup</u>

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Inflatable Restraint Sensing and Diagnostic Module	<u>SIR Schematics</u>	<u>Inflatable Restraint Sensing and Diagnostic Module Replacement</u>	<u>Inflatable Restraint Sensing and Diagnostic Module Programming and Setup</u>
Inside Rearview Mirror	<u>Inside Rearview Mirror Schematics</u>	<u>Rearview Mirror Replacement</u>	<u>Rearview Mirror Replacement</u>
Instrument Panel Cluster	<u>Instrument Cluster Schematics</u>	<u>Instrument Panel Cluster (IPC) Replacement</u>	This device requires no programming or setup.
Power Steering Control Module (Electric Power Steering)	<u>Power Steering System Schematics</u>	<u>Steering Column Replacement</u>	<u>Power Steering Control Module Programming and Setup</u>
Radio	<u>Radio/Audio System Schematics</u>	<u>Radio Replacement</u>	<u>Radio Setup</u> after radio replacement
Remote Control Door Lock Receiver	<u>Keyless Entry Schematics</u>	<u>Remote Control Door Lock Receiver Replacement</u>	<u>Transmitter Programming</u> after RCDLR replacement.
Sunroof Motor/Actuator	<u>Power Sunroof Schematics</u>	<u>Sunroof Motor/Actuator Replacement</u>	<u>Sunroof Track Timing/Synchronization</u>
Transmission Control Module	<u>Automatic Transmission Controls Schematics</u>	<u>Transmission Control Module (TCM) Replacement</u>	<u>Transmission Control Module Programming and Setup</u>

DATA LINK REFERENCES

This table identifies which serial data link that a particular module uses for in-vehicle data transmission. Some modules may use more than one data link to communicate. Some modules may have multiple communication circuits passing through them without actively communicating on that data link. This table is used to assist in correcting a communication malfunction. For the description and operation of these serial data communication circuits, refer to **Data Link Communications Description and Operation**.

Data Link References

Control Module	Data Link Type	Diagnostic Procedure
Schematic Reference: Data Link Connector (DLC) Schematics		
		Scan Tool Does Not

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Body Control Module (BCM)	• High Speed GMLAN • Low Speed GMLAN	<u>Communicate with High Speed GMLAN Device and Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Digital Radio Receiver (DRR)	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Electronic Brake Control Module (EBCM)	High Speed GMLAN	<u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u>
Instrument Panel Cluster (IPC)	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Inflatable Restraint Sensing and Diagnostic Module (SDM)	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Power Steering Control Module (PSCM)	High Speed GMLAN	<u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u>
Powertrain Control Module (PCM) Manual Transmission Only	• High Speed GMLAN Communications Buss. • Class 2 for diagnostics and SPS Programming Only	<u>Scan Tool Does Not Communicate with High Speed GMLAN Device for communications malfunctions or Scan Tool Does Not Communicate with Class 2 Device for SPS malfunctions</u>
Radio	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Vehicle Communication Interface Module (VCIM)	• High Speed GMLAN - pass through only • Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>

REPAIR INSTRUCTIONS**BODY CONTROL MODULE REPLACEMENT**

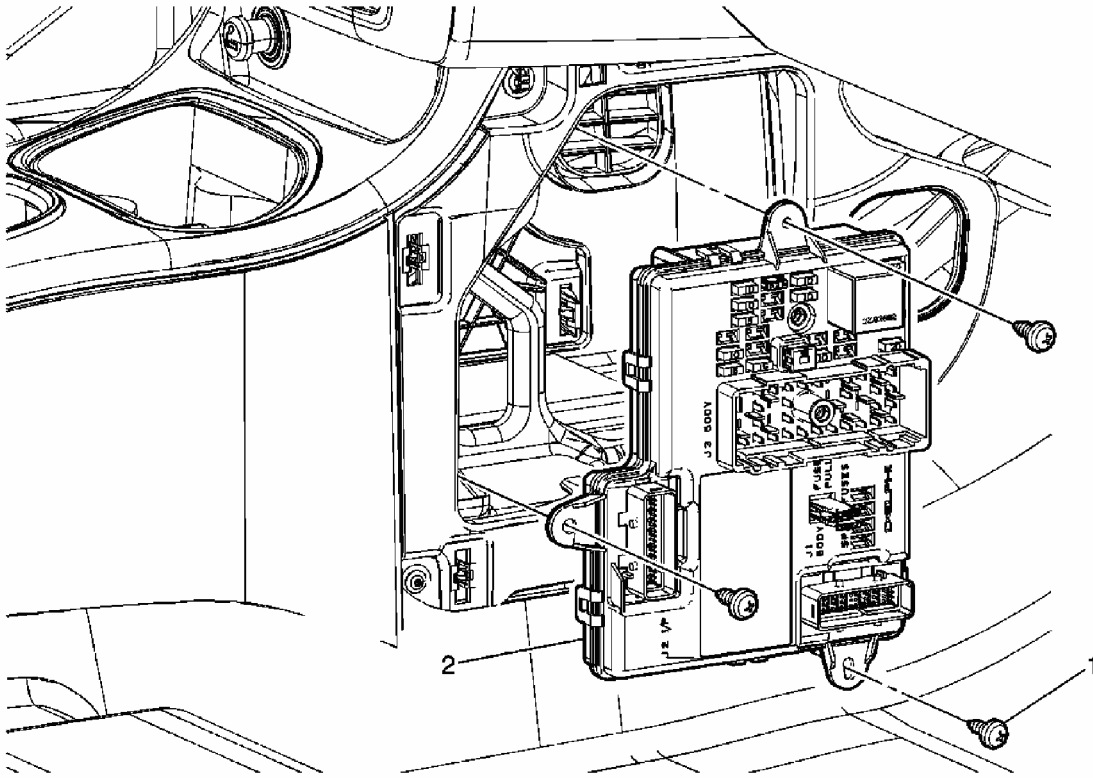


Fig. 16: Body Control Module Replacement
 Courtesy of GENERAL MOTORS CORP.

Body Control Module Replacement

Callout	Component Name
NOTE: Refer to Fastener Notice .	
Fastener Tightening Specifications: Refer to Fastener Tightening Specifications . Preliminary Procedures: Remove the right console extension panel. Refer to Extension Replacement - Floor Console - Side .	
1	Screw, Body Control Module Assembly Tighten: 2 N.m (18 lb in)
2	Module Assembly, Body Control Tip: Reprogram the body control module (BCM) after replacement. Refer to Control Module References .

DATA LINK CONNECTOR REPLACEMENT

Removal Procedure

1. Lower the instrument panel (I/P) closeout panel. Refer to **Insulator Replacement -**

Instrument Panel (I/P) .

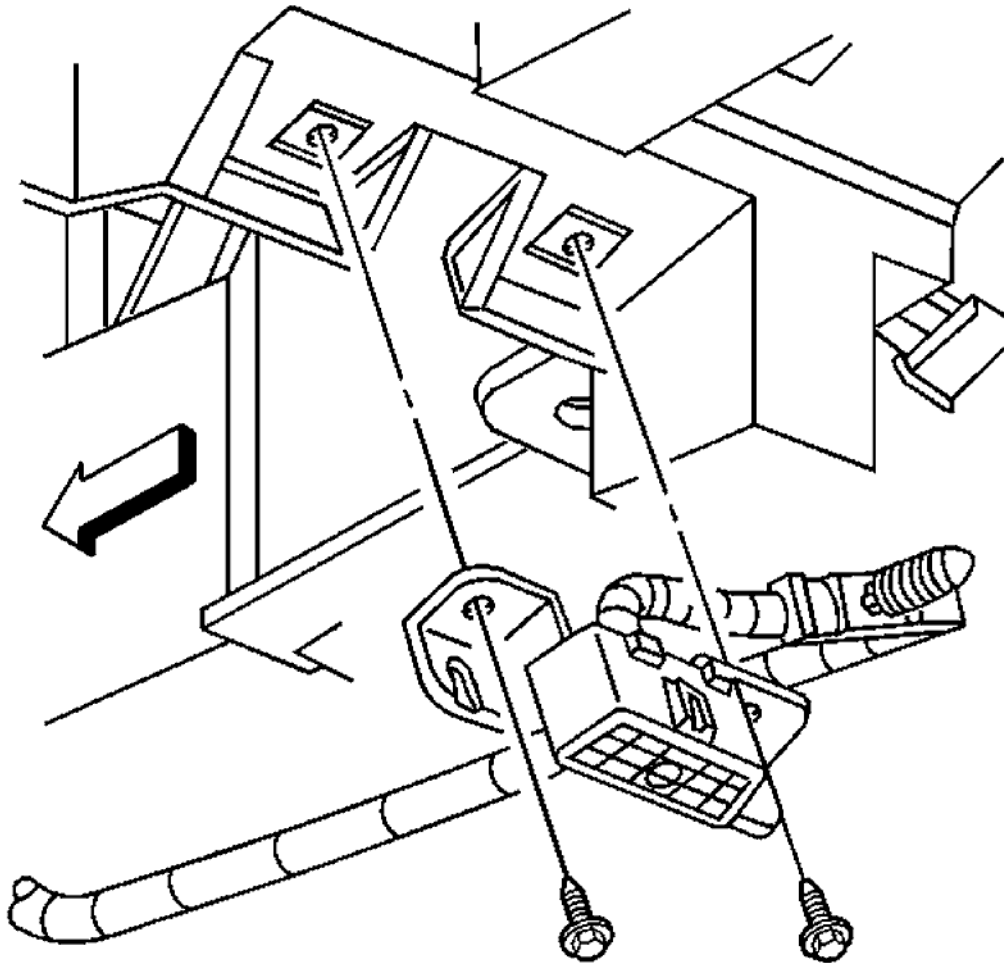


Fig. 17: View Of Data Link Connector
Courtesy of GENERAL MOTORS CORP.

2. Remove the screws securing the data link connector (DLC) to the I/P carrier.

Installation Procedure

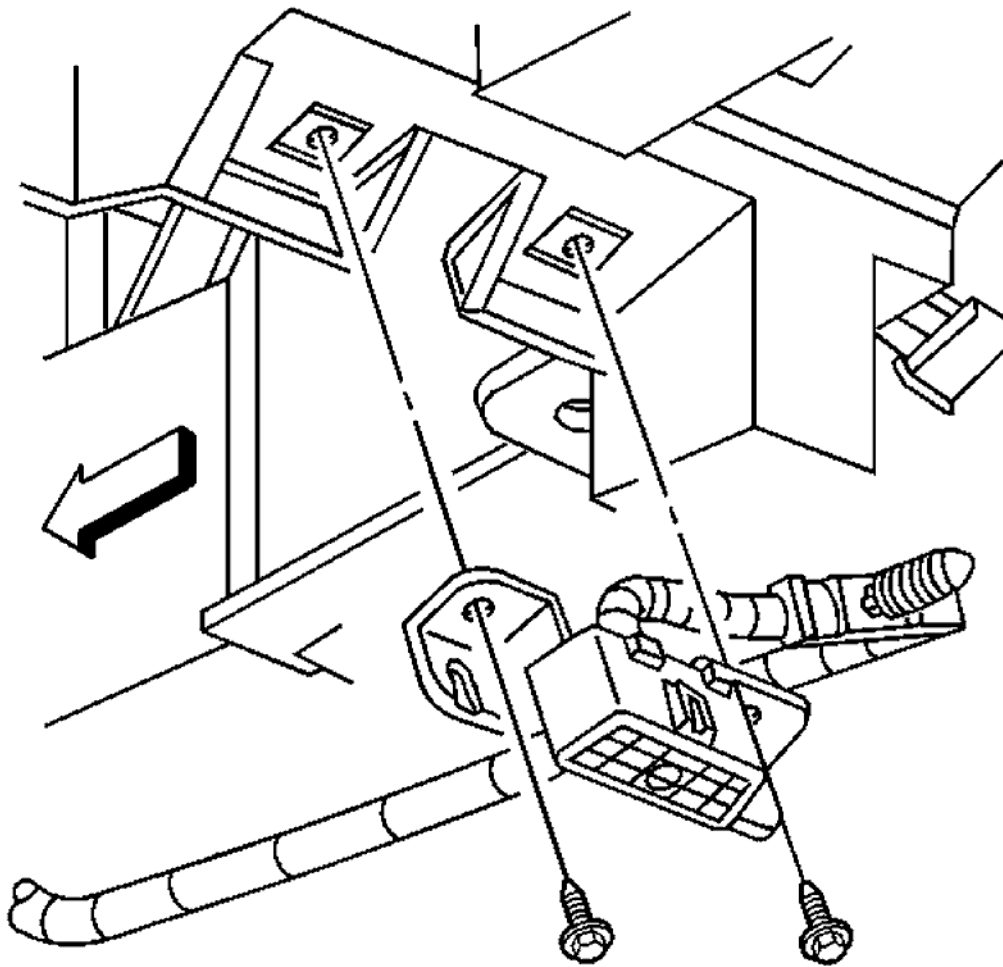


Fig. 18: View Of Data Link Connector
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

1. Install the screws securing the DLC to the I/P carrier.

Tighten: Tighten the screws to 2 N.m (18 lb in).

2. Install the I/P closeout panel. Refer to Insulator Replacement - Instrument Panel (I/P) .

1. A new body control module (BCM) must be programmed with the proper regular production option (RPO) configurations. The BCM stores the information regarding the vehicle options and if the BCM is not properly configured with the correct RPO codes, the BCM will not control all of the features properly. The Tech 2 software will automatically prompt you with the RPO available for the vehicle. Ensure that the following conditions exist in order to prepare for BCM programming:
 - The battery is fully charged.
 - The ignition switch is in the ON position.
 - The data link connector (DLC) is accessible.
 - All disconnected modules and devices are reconnected before programming.
2. To setup a new BCM, access the Vehicle Control Systems in Computer/Integrating Systems menu on the scan tool to program the BCM. Select Module Replacement/Setup and follow the instructions on the scan tool.
3. If the BCM fails to accept the program, perform the following steps:
 - Inspect all BCM connections.
 - Verify that the scan tool has the latest software version.

Passkey 3 Programming Procedures

IMPORTANT: If any module or device listed is replaced, programming of the module must be done prior to performing the Passkey 3 Programming procedure.

Perform the Passkey 3 Programming Procedure if any of the following components have been replaced:

- The BCM
- The powertrain control module (PCM)

Refer to **Programming Theft Deterrent System Components** in Theft Deterrent for the proper procedure.

IMPORTANT: After programming, perform the following to avoid future misdiagnosis:

1. Turn the ignition OFF for 10 seconds.
2. Connect the scan tool to the data link connector.
3. Turn the ignition ON with the engine OFF.
4. Use the scan tool in order to retrieve history DTCs from all modules.
5. Clear all history DTCs.

DESCRIPTION AND OPERATION

DATA LINK COMMUNICATIONS DESCRIPTION AND OPERATION

Circuit Description

The communication among control modules is performed through the GMLAN high speed serial data circuit and the GMLAN low speed serial data circuit. The modules that need real time communication are attached to the high speed GMLAN network. The body control module (BCM) is the gateway between the networks. The purpose of the gateway is to translate serial data messages between the GMLAN high speed buss and the GMLAN low speed buss. The gateway will interact with each network according to that network's transmission protocol. Refer to **Body Control System Description and Operation** for more information about the gateway.

The powertrain control module (PCM) on this vehicle, uses a class 2 serial data buss. The class 2 buss is only used for diagnostics and the service programming system (SPS). During normal vehicle operations, there is no communications over the class 2 serial data buss. Normal vehicle operational messaging for the PCM is sent over the PCMs GMLAN high speed serial data buss.

GMLAN High Speed Circuit Description

The data link connector (DLC) allows a scan tool to communicate with the high speed GMLAN serial data circuit. The serial data is transmitted on 2 twisted wires that allow speed up to 500 Kb/s. The twisted pair is terminated with two 120 ohms resistors, one is internal to the powertrain control module (PCM) or engine control module (ECM) depending on regular production option (RPO) and the other is internal to the body control module (BCM). The BCM is considered the DLC termination point of the link and the engine management controller is the other end of the link. The resistors are used to reduce noise on the High Speed GMLAN buss during normal vehicle operation. The high speed GMLAN is a differential bus. The high speed GMLAN serial data bus (+) and high speed GMLAN serial data (-) are driven to opposite extremes from a rest or idle level. The idle level, which is approximately 2.5 volts, is considered recessive transmitted data and is interpreted as a logic 1. Driving the lines to their extremes, adds one volt to the high speed GMLAN serial data bus (+) and subtracts one volt from the high speed GMLAN serial data bus (-) wire. This dominant state is interpreted as a logic 0. GMLAN network management supports selective start up and is based on virtual networks. A virtual network is a collection of signals started in response to a vehicle event. The starting of a virtual network signifies that a particular aspect of the vehicles functionality has been requested. A virtual network is supported by virtual devices, which represents a collection of signals owned by a single physical device. So, any physical device can have one or more virtual devices. The signal supervision is the process of determining whether an expected signal is being received or not. Failsofting is the ability to substitute a signal with a default value or a default algorithm, in the absence of a valid signal. Some messages are also interpreted as a heartbeat of a virtual device. If such a

signal is lost, the application will set a no communication code against the respective virtual device. This code is mapped on the Tech 2 screen as a code against the physical device. Note: a loss of serial data DTC does not represent a failure of the module that the code is set in.

GMLAN Low Speed Circuit Description

The data link connector (DLC) allows a scan tool to communicate with the low speed GMLAN serial data circuit. The serial data is transmitted over a single wire to the appropriate control modules. The transmission speed for GMLAN low speed is up to 83.33 Kb/s. Under normal vehicle operating conditions, the speed of the buss is 33.33 Kb/s. This protocol produces a simple pules train sent out over the GMLAN low speed serial data bus. When a module pulls the buss high, 5 volts, this creates a dominant logic state or 0 on the buss. When the buss is pulled low 0 volts, it is translated as a recessive logic state or 1. To wake the control modules connected to the GMLAN low speed serial data buss, a high voltage wake up pulse is sent out over the buss, the voltage level of the pules is +10 volts. Modules connected to the GMLAN low speed buss can be part of a virtual network as described in the previous paragraph. The modules on the GMLAN low speed serial data buss are connected to the buss in a parallel configuration.

Class 2 Circuit Description

The data link connector (DLC) allows a scan tool to communicate with the class 2 serial data circuit. Class 2 serial data is transmitted on a single wire at an average of 10.4 Kbps. The bus is active at 7 volts nominal and inactive at ground potential. When the ignition switch is in RUN, and a scan tool is connected to the DLC, the powertrain control module (PCM) will start communicating diagnostic information over the class 2 serial data circuit.

Data Link Connector (DLC)

The data link connector (DLC) is a standardized 16-cavity connector. Connector design and location is dictated by an industry wide standard, and is required to provide the following:

- Pin 1 GMLAN low speed communications terminal
- Pin 2 Class 2 signal terminal
- Pin 4 Scan tool power ground terminal
- Pin 5 Common signal ground terminal
- Pin 6 High speed GMLAN serial data bus (+) terminal
- Pin 14 High speed GMLAN serial data bus (-) terminal
- Pin 16 Scan tool power, battery positive voltage terminal

Class 2 Serial Data Usage

The class 2 serial data communications circuit on this vehicle is only used for powertrain

control module (PCM) diagnostics and PCM service programming system (SPS) programming.

Serial Data Reference

The scan tool communicates over the various busses on the vehicle. When a scan tool is installed on a vehicle, the scan tool will try to communicate with every module that could be optioned into the vehicle. If an option is not installed on the vehicle, the scan tool will display No Comm for that options control module. In order to avert misdiagnoses of No Communication with a specific module, refer to **Data Link References** for a list of modules, the busses they communicate with, and the RPO codes for a specific module.

BODY CONTROL SYSTEM DESCRIPTION AND OPERATION

The body control module (BCM) has a bussed electrical center integrated into the housing. Body control relays and fuses are installed directly on the BCM, which simplifies wiring and junction blocks on the vehicle. The body control system consists of the BCM and its associated controls. Battery positive voltage is provided to the BCM from IBCM BATT 1 fuse and the IBCM BATT 2 fuse in the underhood fuse block. The module grounds are wired to ground G201, G203 and G305. The BCM is wired to the GMLAN High speed serial data buss, and the GMLAN Low speed serial data buss, as well as discrete input and output terminals to control the functions of the vehicle's body.

Serial Data Gateway

The body control module (BCM) in this vehicle functions as a translator between the High and Low speed GMLAN busses. The 2 communication protocols use the BCM to translate communicated serial data messages between the control modules over the 2 serial data busses.

Power Mode Master

This vehicles body control module (BCM) functions as the power mode master (PMM). Refer to **Power Mode Description and Operation** for a complete description of power mode functions.

Body Control Module

The various body control module (BCM) input and output circuits are described in the corresponding functional areas indicated on the BCM electrical schematics. The BCM functions include the following:

- A/C compressor request - Refer to **Air Temperature Description and Operation** .
- A/C cooling fan - Refer to **Air Delivery Description and Operation** .
- Battery rundown protection (inadvertent power) - Refer to **Interior Lighting Systems Description and Operation** .

- Bulb check - Refer to **Instrument Panel Cluster (IPC) Description and Operation** .
- Chimes - Refer to **Indicator/Warning Message Description and Operation** .
 - Check gages
 - Door ajar warning
 - Headlamps ON
 - Key-in-ignition
 - Oil reset
 - Park brake warning
 - Seat belt not fastened
 - Turn signal ON
- Door lock interface - Refer to **Power Door Locks Description and Operation** .
- Electronic power steering (EPS) - Refer to **Power Steering System Description and Operation** .
- Engine coolant level sensing - Refer to **Cooling System Description and Operation** .
- Exterior and interior lighting control - Refer to **Exterior Lighting Systems Description and Operation** .
 - Automatic lighting control
 - Daytime running lamps (DRL)
 - Fog lamps
 - Park brake lights
 - Turn hazard lamps
- Gage control - Refer to **Instrument Panel Cluster (IPC) Description and Operation** .
- Horn interface - Refer to **Horns System Description and Operation** .
- Instrument cluster indicator control - Refer to **Instrument Panel Cluster (IPC) Description and Operation** .
- Interior lighting - Refer to **Interior Lighting Systems Description and Operation** .
- Key-in-ignition sensing - Refer to **Indicator/Warning Message Description and Operation** .
- Parking brake state sensing - Refer to **Brake Warning System Description and Operation** .
- Retained accessory power (RAP) - Refer to **Retained Accessory Power (RAP) Description and Operation** .
- Rear compartment interface - Refer to **Power Door Locks Description and Operation** .
- Rear defogger - Refer to **Rear Window Defogger Description and Operation** .
- Remote function control - Refer to **Keyless Entry System Description and**

Operation .

- Seat belt use sensing - Refer to Seat Belt System Description and Operation .
- Content theft deterrent - Refer to Theft Systems Description and Operation .
- Vehicle theft deterrent - Refer to Vehicle Theft Deterrent (VTD) Description and Operation .
- Washer solvent level sensing - Refer to Wiper/Washer System Description and Operation .
- Wiper/washer - Refer to Wiper/Washer System Description and Operation .

POWER MODE DESCRIPTION AND OPERATION

Power to many of this vehicle's circuits are controlled by the module that is designated the power mode master (PMM). This vehicle's PMM is the body control module (BCM). The PMM controls which power mode (Run, Accessory, Crank, Retained Accessory Power, or Off) is active.

Serial Data Power Mode Master

On vehicles that have several control modules connected by serial data circuits, one module is the power mode master (PMM). On this vehicle, the PMM is the body control module (BCM). The PMM receives 3 discrete ignition switch signals to differentiate which power mode will be sent over the Serial Data circuits. The 3-wire Ignition Switch table below illustrates the state of these inputs in correspondence to the ignition switch position:

3-Wire Ignition Switch

Ignition Switch Position	Accessory	Ignition 1	Off/Run/Crank	Power Mode Transmitted
IMPORTANT: States marked with the * indicate a derived positive voltage level of 3 volts. States marked with the ** indicate a derived positive voltage level of 4 volts.				
Off	0	0	0 Key out. 1 Key in.	OFF/Awake or RAP
Start	0	1	1 *	Crank
Accessory	1	0	0	Accessory
Run	1	1	1 **	Run

Relay Controlled Power Mode

The body control module (BCM) uses the discrete ignition switch inputs Off/Run/Crank, Accessory, and ignition 1, to distinguish the correct power mode. The ignition 1 circuit is also routed to the Run/Crank relay for relay controlled power feeds during the appropriate power mode. The BCM, after determining the desired power mode, will activate the

appropriate relays for that power mode.

Run/Crank Relay

The run/crank relay control circuit is connected to a constant ground and is switched by the ignition 1 circuit or the body control module (BCM). The BCM, will in lieu of the ignition switch position, activate the Run/Crank relay during a remote start event. The Run/Crank relay supplies a power signal to the following circuits, when the a Run or Crank power mode is selected:

- Automatic transmission shift indicator
- Automatic transmission (A/T)
- Switched power feeds to the BCM
- Electronic brake control module (EBCM)
- Electronic ignition module (spark control)
- Electronic power steering module (EPS)
- Fuel injectors
- Powertrain control module (PCM)
- Park neutral position (PNP) switch

Accessory (ACC) Relay

The adaptive cruise control (ACC) relay is energized when the Run or accessory power mode has been selected. The relay uses a Hot At All Times B+ power source derived from the underhood electrical center. The ACC relay is also energized by the body control module (BCM) to supply power during the retained accessory power (RAP) mode. The following devices are controlled by this relay:

- Inside rearview mirror
- Heated seats
- Power windows
- Sunroof
- Wiper washers switch

Fail-Safe Operation

Since the operation of the vehicle systems depends on the power mode, there is a fail-safe plan in place should the power mode master (PMM) fail to send a power mode message. The fail-safe plan covers those modules, using exclusively serial data control of power mode, as well as those modules with discrete ignition signal inputs.

Serial Data Messages

The modules that depend exclusively on serial data messages for power modes stay in the state dictated by the last valid power mode master (PMM) message until they can check for the engine run flag status on the serial data circuits. If the PMM fails, the modules monitor the serial data circuit for the engine run flag serial data. If the engine run flag serial data is True, indicating that the engine is running, the modules fail-safe to RUN. In this state, the modules and their subsystems can support all operator requirements. If the engine run flag serial data is False, indicating that the engine is not running, the modules fail-safe to OFF-AWAKE. In this state, the modules are constantly checking for a change status message on the serial data circuits and can respond to both local inputs and serial data inputs from other modules on the vehicle.

Discrete Ignition Signals

Those modules that have discrete ignition signal inputs, also remain in the state dictated by the last valid power mode master (PMM) message received on the serial data circuits. They then check the state of their discrete ignition input to determine the current valid state. If the discrete ignition input is active, battery positive voltage, the modules will fail-safe to the RUN power mode. If the discrete ignition input is not active, open or 0 volts, the modules will fail-safe to OFF-AWAKE. In this state, the modules are constantly checking for a change status message on the serial data circuits and can respond to both local inputs and serial data inputs from other modules on the vehicle.

BCM Wake-Up/Sleep States

The body control module (BCM) is able to control or perform all of the BCM functions in the wake-up state. The BCM enters the sleep state when active control or monitoring of system functions has stopped, and the BCM has become idle again. The BCM must detect certain wake-up inputs before entering the wake-up state. The BCM monitors for these inputs during the sleep state, where the BCM is able to detect switch transitions that cause the BCM to wake-up when activated or deactivated. Multiple switch inputs are needed in order to sense both the insertion of the ignition key and the power mode requested.

The BCM will enter a wake-up state, if any of the following wake-up inputs are detected:

- Activity on the serial data line
- Detection of a battery disconnect and reconnect condition
- Headlamps are ON.
- Ignition is turned ON.
- Key-in-ignition switch
- Park lamps are ON.
- RFA message

The BCM will enter a sleep state when all of the following conditions exist:

- The ignition switch is OFF.
- No activity exists on the serial data line.
- No outputs are commanded.
- No delay timers are actively counting.
- No wake-up inputs are present.

If all these conditions are met, the BCM will enter a low power or sleep condition. This condition indicates that the BCM, which is the power mode master (PMM) of the vehicle, has sent an OFF or OFF-ASLEEP message to the other systems on the serial data line.

RETAINED ACCESSORY POWER (RAP) DESCRIPTION AND OPERATION

Serial Data Control of Retained Accessory Power (RAP)

The modules receive the power mode message from the body control module (BCM) over the serial data circuits, indicating when the retained accessory power (RAP) power mode is current. The BCM monitors the ignition switch position, battery condition and passenger compartment doors status to determine whether RAP should be initiated. The modules then support the operation of the systems under their control as required by their RAP power mode operation.

RAP will end when one of the following conditions is met:

- The BCM receives an input indicating the opening of any compartment door.
- The BCM internal timer for the RAP expires after approximately 10 minutes.
- The BCM detects a decrease in battery capacity below a prescribed limit.
- The Radio uses an exclusive RAP message that can not be circumvented by any door but the driver's door.

The BCM then sends a serial data power mode message ending the RAP function.

The radio is the only module that is controlled by the serial data circuits.

Relay Control of Retained Accessory Power (RAP)

The body control module (BCM) keeps the accessory relay energized during all power modes, except Off-Awake and Crank.

The devices powered by the accessory relay during the retained accessory power (RAP) power mode are the sunroof and windows.