

SCHEMATIC AND ROUTING DIAGRAMS

DATA COMMUNICATION SCHEMATICS

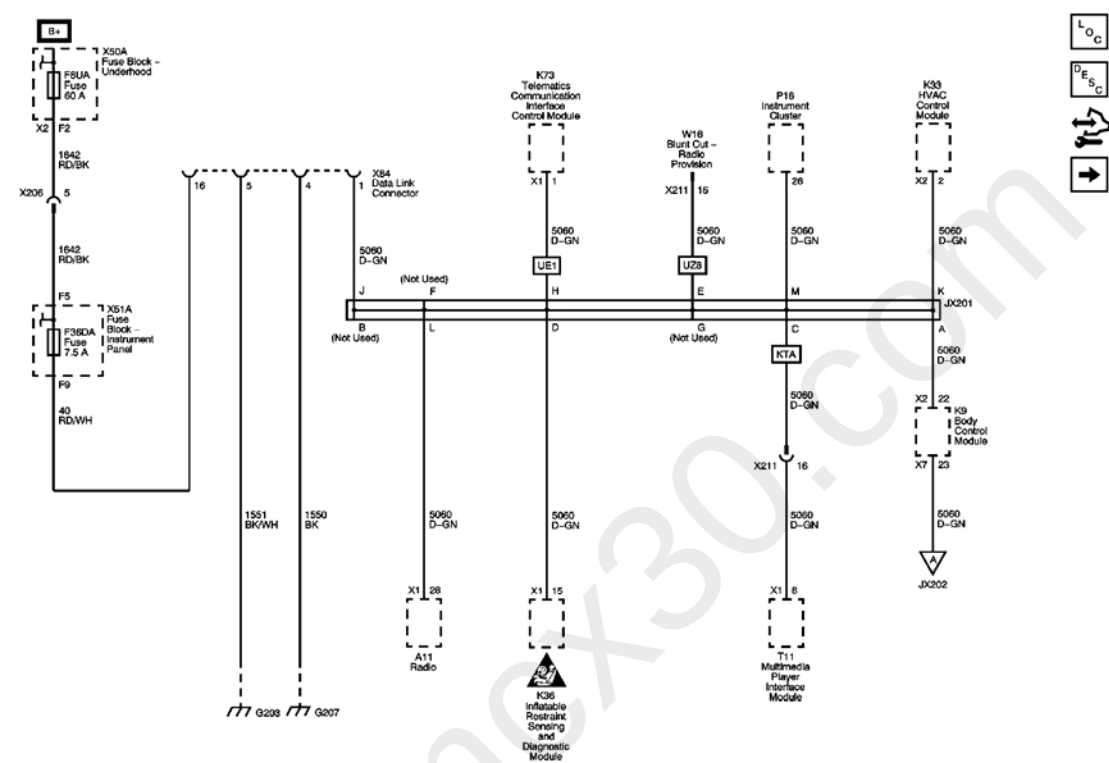


Fig. 1: Low Speed GMLAN (1 of 2)
Courtesy of GENERAL MOTORS CORP.

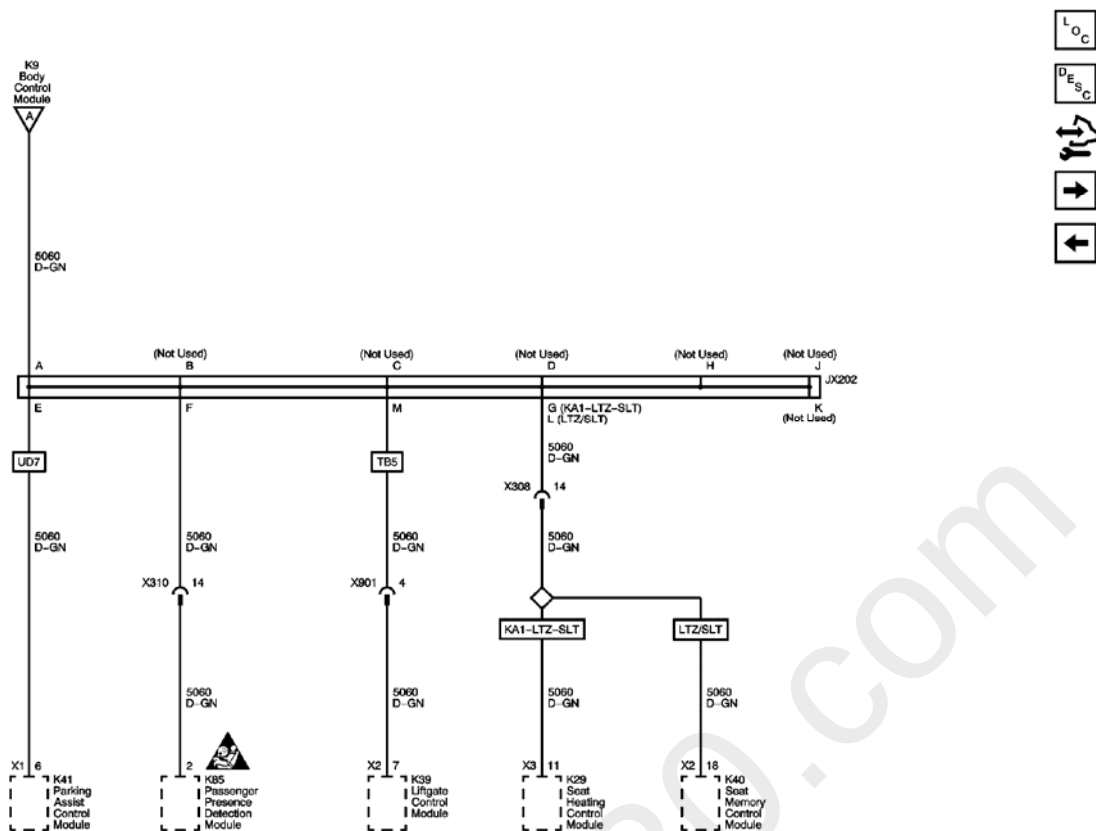


Fig. 2: Low Speed GMLAN (2 of 2)
 Courtesy of GENERAL MOTORS CORP.

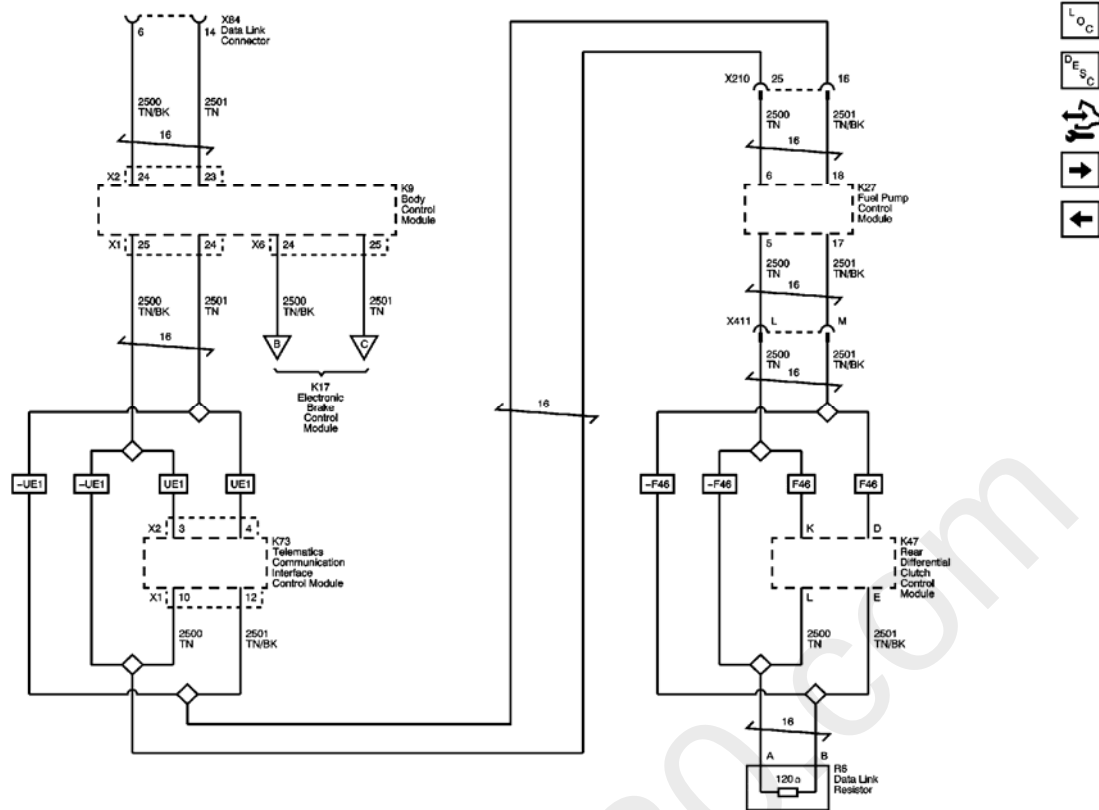


Fig. 3: High Speed GMLAN (1 of 2)
 Courtesy of GENERAL MOTORS CORP.

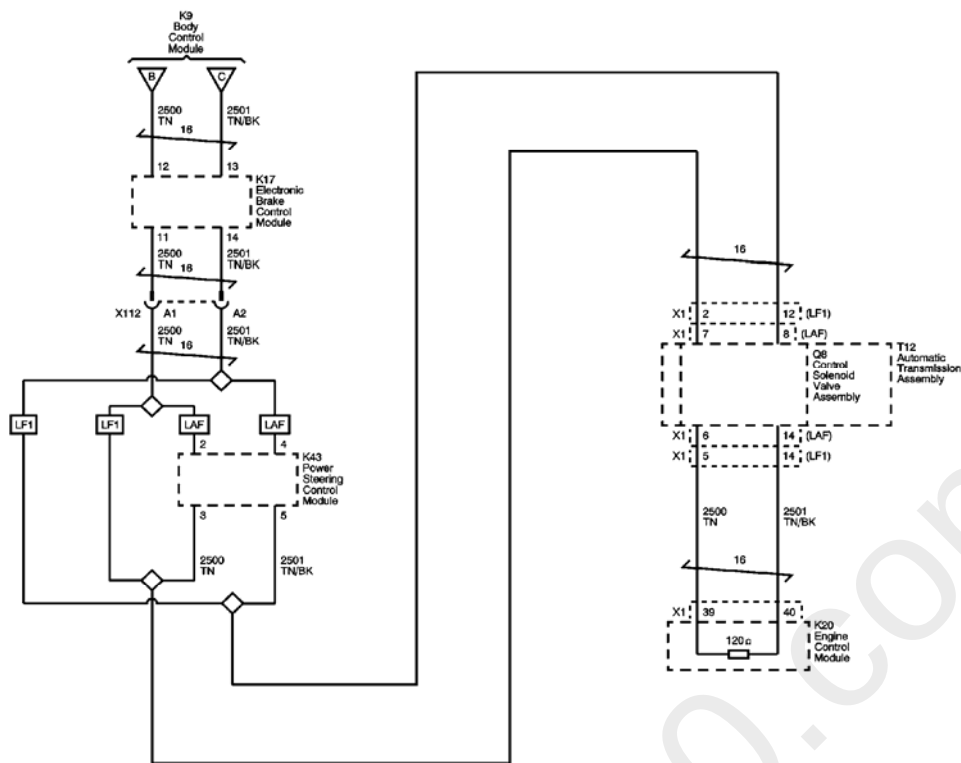


Fig. 4: High Speed GMLAN (2 of 2)
Courtesy of GENERAL MOTORS CORP.

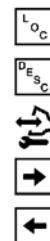
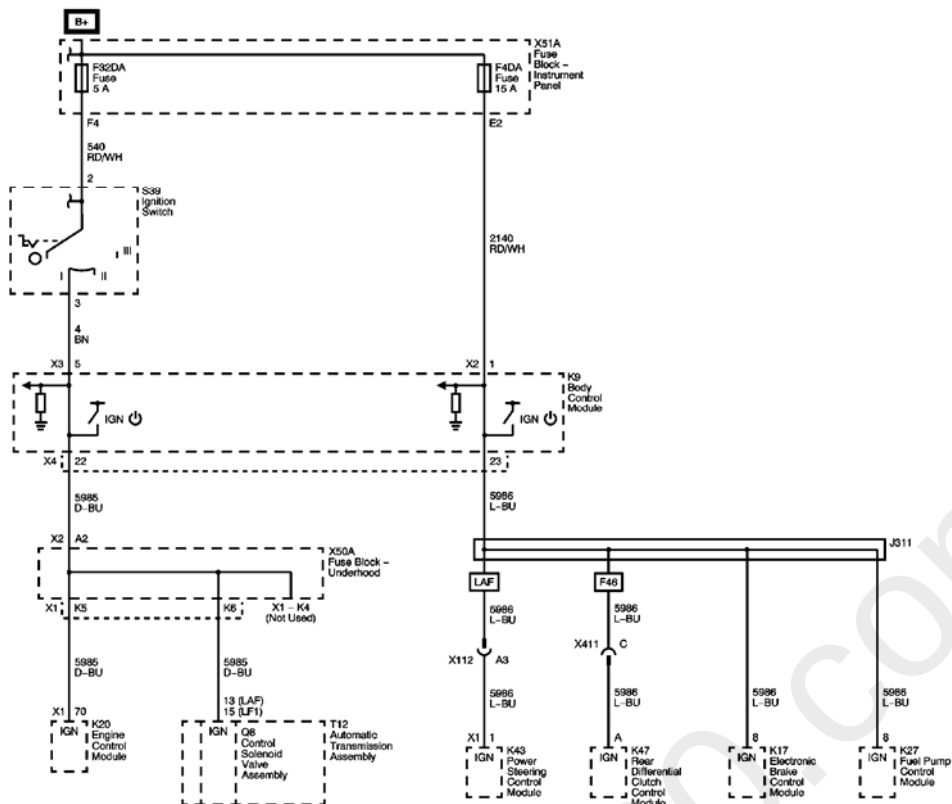


Fig. 5: Enable Serial Data
 Courtesy of GENERAL MOTORS CORP.

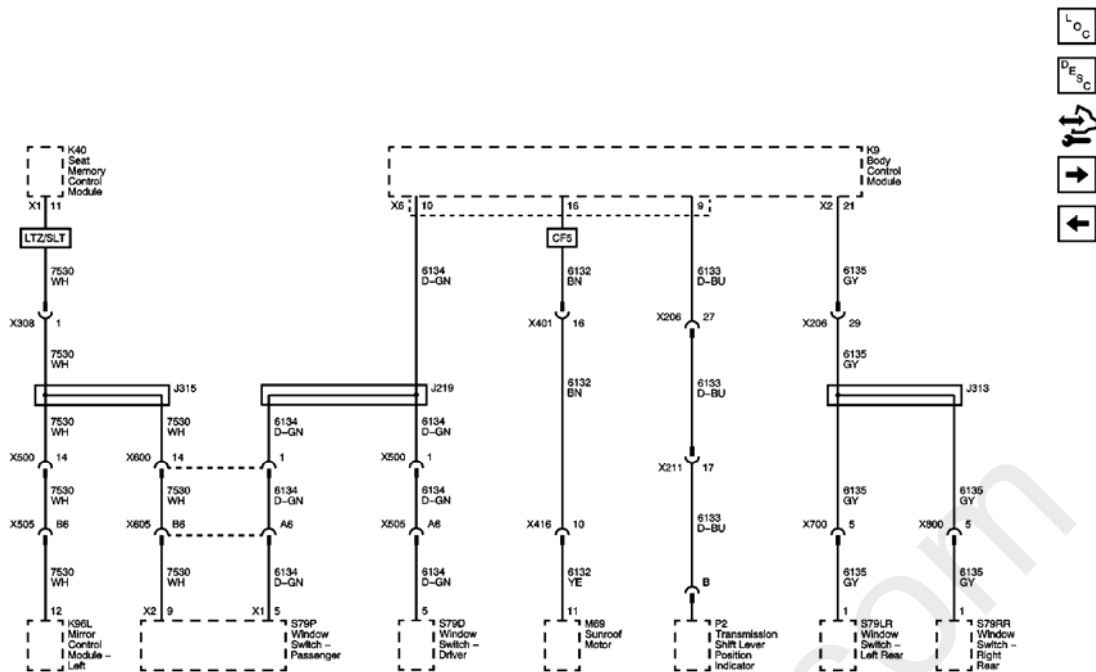


Fig. 6: BCM Local Interconnect Network (LIN) Bus 1, 2, 3, 4 and Memory Seat LIN Bus
Courtesy of GENERAL MOTORS CORP.

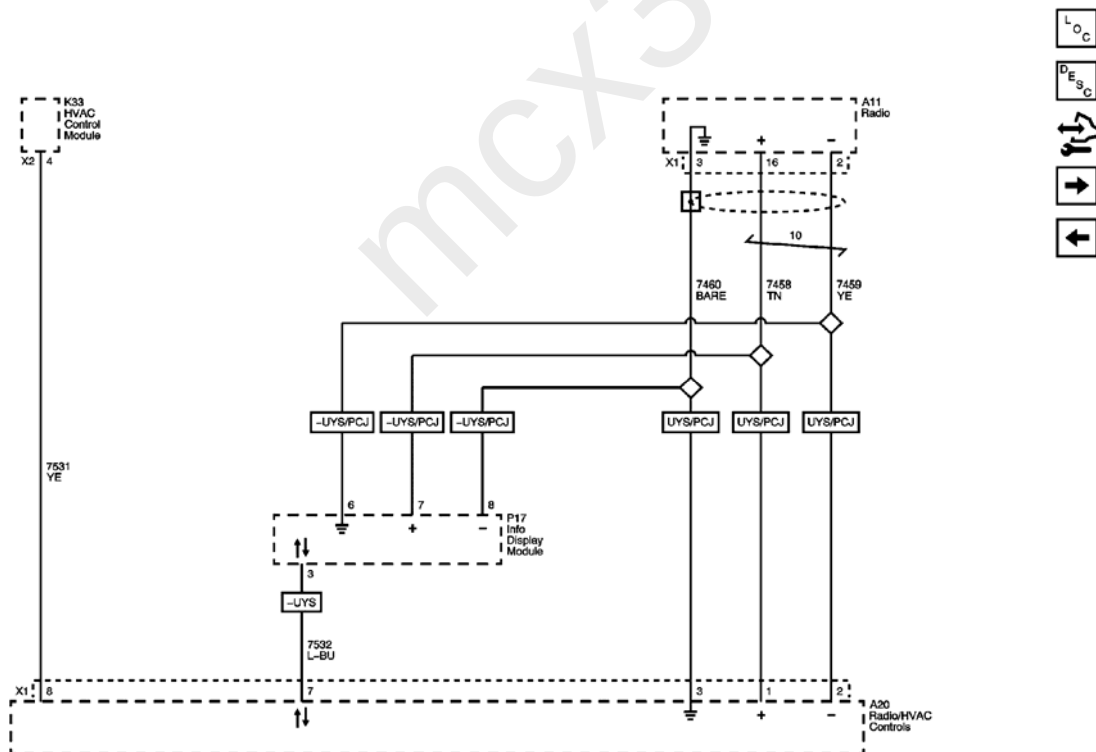


Fig. 7: Radio/HVAC Local Interconnect Network (LIN) Bus and CAN Graphical Interface

Courtesy of GENERAL MOTORS CORP.

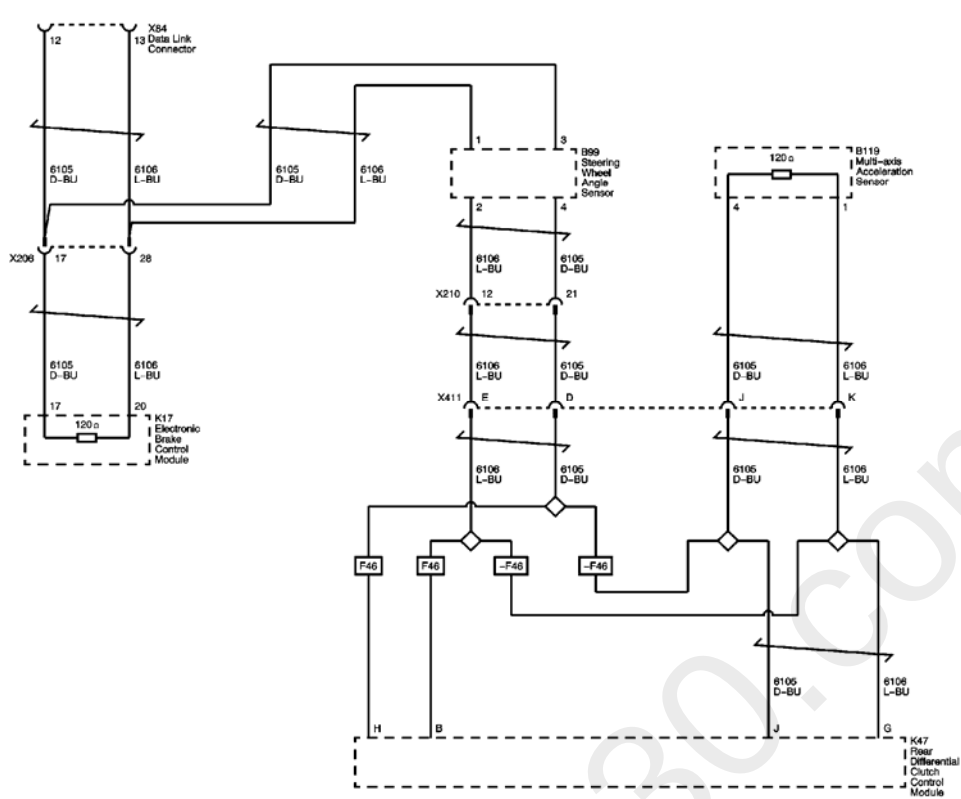


Fig. 8: Chassis Expansion Bus
Courtesy of GENERAL MOTORS CORP.

BODY CONTROL SYSTEM SCHEMATICS

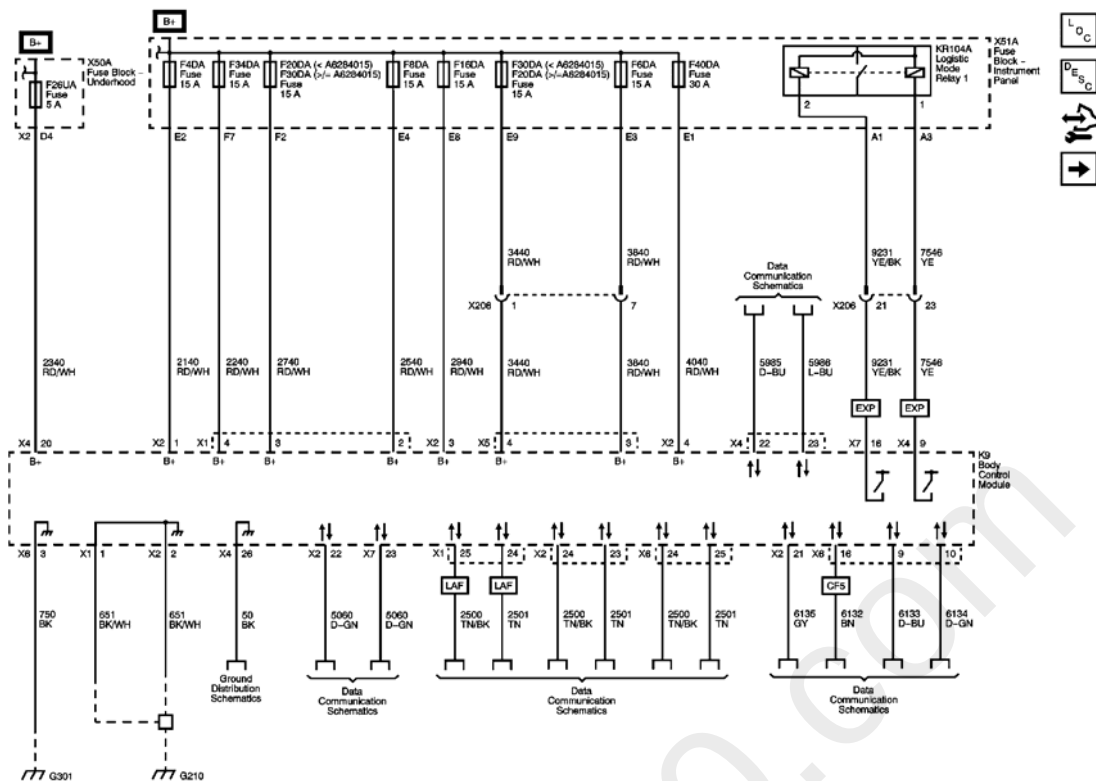


Fig. 9: Module Power, Grounds, and Serial Data References
Courtesy of GENERAL MOTORS CORP.

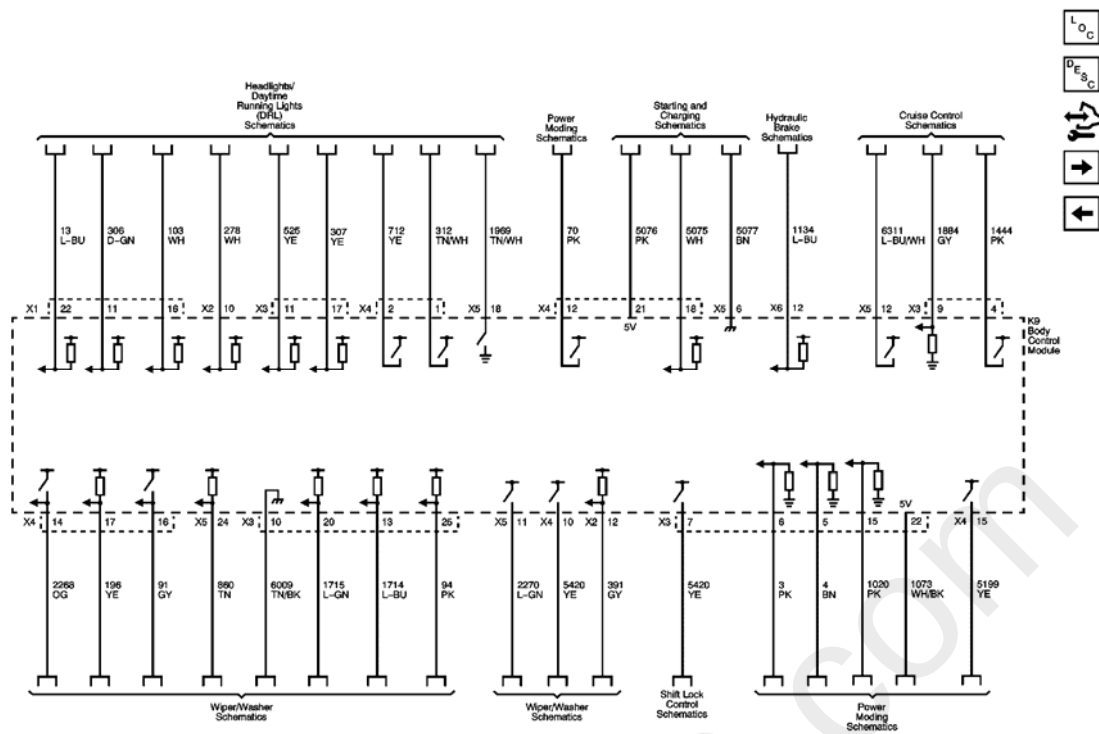


Fig. 10: Power Moding, Shift Lock, Headlights, Starting/Charging, Cruise Control, Wipers/Washers, and Hydraulic Brake References
 Courtesy of GENERAL MOTORS CORP.

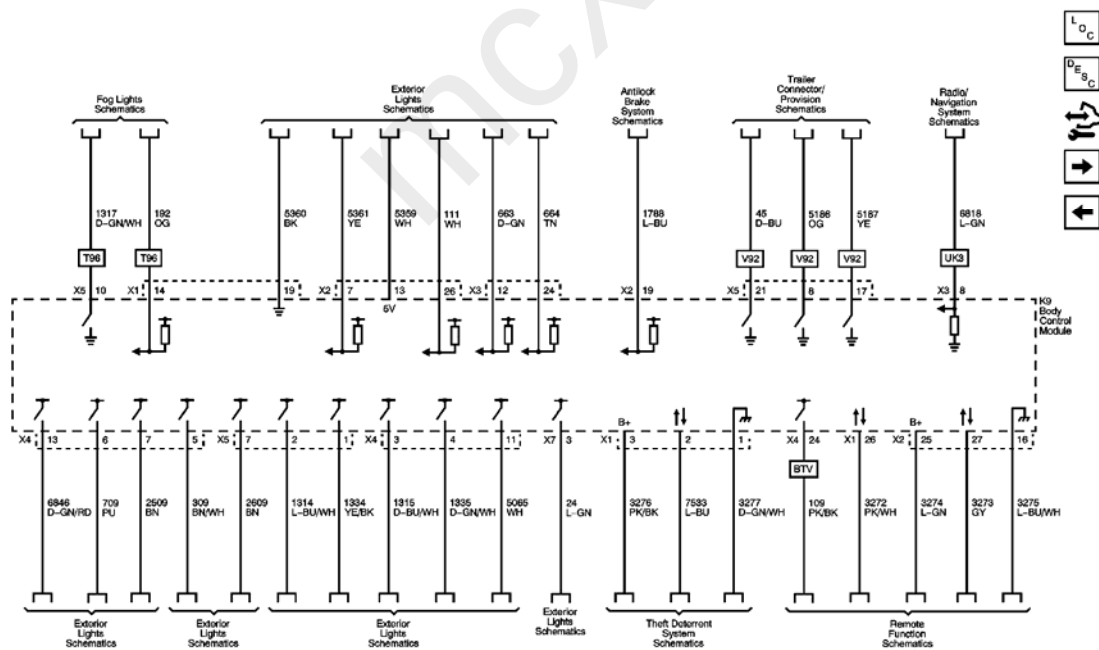


Fig. 11: Exterior Lights, Radio, ABS, Theft Deterrent, and Remote Function References

Courtesy of GENERAL MOTORS CORP.

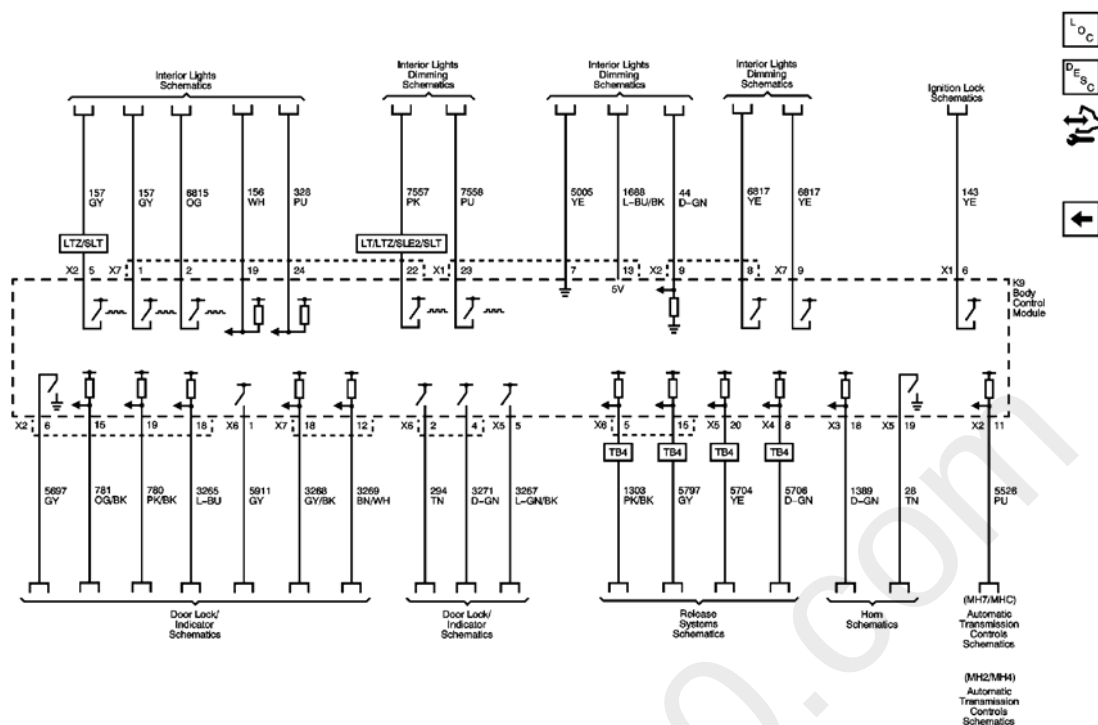


Fig. 12: Interior Lights, Door Locks, Brakes, Release Systems, Ignition Lock, and Automatic Transmission References
Courtesy of GENERAL MOTORS CORP.

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B1000	B1000 XX: Electronic Control Unit
DTC B1001	B1001 XX: Option Configuration
DTC B101D	B101D XX: ECU Hardware
DTC B101E	B101E XX: ECU Software
DTC C0550	C0550 XX: Electronic Control Unit
DTC C056D	C056D XX: Electronic Control Unit Hardware
DTC C056E	C056E XX: Electronic Control Unit Software
DTC C078A	C078A 39: Tire Pressure Indicator Module Internal Malfunction
DTC U0001	U0001 00: High Speed CAN Communication Bus
DTC U0002	U0002: High Speed CAN Bus
DTC U0020	U0020 00: Low Speed CAN Communication Bus Performance

<u>DTC U0073 or U2100</u>	U0073 00: Control Module Communication Bus Off U0073 71: ECU HS Bus Off U0073 72: ECU LS Bus Off U2100 00: Controller Area Network (CAN) Bus Communication U2100 47: Controller Area Network (CAN) Bus Communication
<u>DTC U0074</u>	U0074 00: Control Module Communication Bus B Off
<u>DTC U0100-U02FF</u>	The serial data circuit is the means by which the control modules in the vehicle communicate with each other. Once the scan tool is connected to the serial data circuit through the data link connector (DLC), the scan tool can be used to monitor each control module for diagnostic purposes and to check for diagnostic trouble codes (DTCs). When the ignition switch is in RUN, each control module communicating on the serial data circuit sends a state of health (SOH) message to ensure that the control module is operating properly. When a control module stops communicating on the serial data circuit, for example if the control module loses power or ground, the SOH message it normally sends on the serial data circuit disappears. Other control modules on the serial data circuit, which expect to receive that SOH message, detect its absence; those control modules in turn set a DTC associated with the loss of SOH of the non-communicating control module. The DTC is unique to the control module which is not communicating and one or more control modules may set the same exact code. A loss of serial data communications DTC does not represent a failure of the control modules that contain the stored code.
<u>DTC U0300-U0336</u>	U0301 00: Software Incompatibility with Engine Control Module U0302 00: Software Incompatibility with Transmission Control Module U0315 00: Software Incompatibility with Electronic Brake Control Module
<u>DTC U0400-U05FF</u>	Some control modules are constantly receiving information from other control modules through serial data communication network. The invalid data code will be set when a receiving control module detects a discrepancy in information it receives from another control module causing its integrity to be questioned. The symptom byte listed in the DTC Descriptor is for engineering reference only. No external circuit diagnosis is involved.
<u>DTC U1500-U15BF</u>	The serial data is transmitted over a Local Interconnect Network (LIN) single wire network circuit bus between a master control module and other control modules within a particular subsystem. If serial data communication is lost between any of the control modules on the LIN bus network, a no communication code against the non-communicating control module will be set. A master control module is the one that reports the non communication code. Note: a loss of serial data communications DTC does not represent a failure of the master control module that set it.
<u>DTC U1814</u>	U1814 00: Powertrain Wake Up Communication Circuit
<u>DTC U1826 or U1827</u>	U1826 00: Lost Communication With Multi-Axis Acceleration Sensor Module on Bus "B".

	U1827 00: Lost Communication With Steering Angle Sensor Module on Bus "B".
<u>DTC U18B9-U18BF</u>	U18B9: Primary High Speed CAN Bus Subnet Configuration List U18BF: Secondary High Speed CAN Bus Subnet Configuration List
<u>DTC U2099</u>	U2099 00: High Speed Communication Enable Circuit
<u>DTC U2101</u>	U2101: CAN Bus Maximum Configuration List
<u>DTC U2103</u>	U2103 00: Fewer Controllers On Than Programmed
<u>DTC U2105-U2199</u>	U2105-U2199: Supervised Periodic Message Not Received

CONTROL MODULE U CODE LIST

This list includes all Data Communications related U-code DTCs in alphanumeric order with descriptors for all modules. Not all DTCs listed will be applicable to all vehicles.

DTC	DTC Descriptor
U0001 00	High Speed CAN Bus Malfunction
U0002 00	High Speed CAN Bus
U0020 00	Low Speed CAN Bus
U0073 00	Control Module Communication Bus A Off
U0073 01	Control Module Communication Bus A Off Short to Battery
U0073 02	Control Module Communication Bus A Off Short to Ground
U0073 04	Control Module Communication Bus A Off Open
U0073 71	Control Module Communication Bus A Off Invalid Data
U0074 00	Control Module Communication Bus B Off
U0100 00	Lost Communication With Engine Control Module
U0100 71	Lost Communication With Engine Control Module Invalid Data
U0100 72	Lost Communication With Engine Control Module Message Counter Incorrect
U0100 74	Lost Communication With Engine Control Module Bus Signal Checksum Error
U0101 00	Lost Communication With Transmission Control Module
U0101 71	Lost Communication With Transmission Control Module Invalid Data
U0102 00	Lost Communication with Transfer Case Control Module
U0102 71	Lost Communication with Transfer Case Control Module Invalid Data
U0104 00	Lost Communication With Cruise Control Module
U0104 02	Lost Communication With Cruise Control Module Short to Ground
U0104 71	Lost Communication With Cruise Control Module Invalid Data
U0104 72	Lost Communication With Cruise Control Module Message Counter Incorrect
U0104 74	Lost Communication With Cruise Control Module Bus Signal Checksum Error
U0109 00	Lost Communication with Fuel Pump Control Module
U0115 00	Lost Communication with ECM 2
U0117 00	Lost Communication With Power Take-Off Control Module
U0121 00	Lost Communication With Electronic Brake Control Module
U0121 03	Lost Communication With Electronic Brake Control Module Low Voltage

U0121 71	Lost Communication With Electronic Brake Control Module Invalid Data
U0121 72	Lost Communication With Electronic Brake Control Module Message Counter Incorrect
U0121 74	Lost Communication With Electronic Brake Control Module Bus Signal Checksum Error
U0122 00	Lost Communication With Vehicle Stability Control Module
U0125 00	Lost Communication With Multi-axis Acceleration Sensor Module
U0125 71	Lost Communication With Multi-axis Acceleration Sensor Module Invalid Data
U0125 72	Lost Communication With Multi-axis Acceleration Sensor Module Message Counter Incorrect
U0125 74	Lost Communication With Multi-axis Acceleration Sensor Module Bus Signal Checksum Error
U0126 00	Lost Communication With Steering Wheel Angle Sensor Module
U0126 71	Lost Communication With Steering Wheel Angle Sensor Module Invalid Data
U0126 72	Lost Communication With Steering Wheel Angle Sensor Module Message Counter Incorrect
U0126 74	Lost Communication With Steering Wheel Angle Sensor Module Bus Signal Checksum Error
U0126 5A	Lost Communication With Steering Wheel Angle Sensor Module Not Plausible
U0128 00	Lost Communication With Park Brake Control Module
U0128 71	Lost Communication With Park Brake Control Module Invalid Data
U0128 72	Lost Communication With Park Brake Control Module Message Counter Incorrect
U0128 74	Lost Communication With Park Brake Control Module Bus Signal Checksum Error
U0129 00	Lost Communication with Brake System Control Module
U0130 00	Lost Communication With Electric Power Steering Control Module
U0130 71	Lost Communication With Electric Power Steering Control Module Invalid Data
U0130 72	Lost Communication With Electric Power Steering Control Module Message Counter Incorrect
U0130 74	Lost Communication With Electric Power Steering Control Module Bus Signal Checksum Error
U0131 00	Lost Communication With Power Steering Control Module
U0131 71	Lost Communication With Power Steering Control Module Invalid Data
U0132 00	Lost Communication With Suspension Control Module
U0133 00	Lost Communication With Air Suspension Control Module
U0133 71	Lost Communication With Air Suspension Control Module Invalid Data
U0136 00	Lost Communication With Differential Control Module - Rear
U0136 71	Lost Communication With Differential Control Module - Rear Invalid Data
U0139 00	Lost Communication With Suspension Control Module
U0139 71	Lost Communication With Suspension Control Module Invalid Data
U0140 00	Lost Communication With Body Control Module
U0140 71	Lost Communication With Body Control Module Invalid Data

U0140 72	Lost Communication With Body Control Module Message Counter Incorrect
U0140 74	Lost Communication With Body Control Module Bus Signal Checksum Error
U0146 00	Lost Communication with Gateway
U0151 00	Lost Communication With Inflatable Restraint Sensing and Diagnostic Module
U0155 00	Lost Communication With Instrument Cluster
U0158 00	Lost Communication With Head-Up Display
U0159 00	Lost Communication With Parking Assist Control Module
U0160 00	Lost Communication With Chime Alarm Control Module
U0164 00	Lost Communication with HVAC Control Module
U0166 00	Lost Communication with Auxiliary Heater Control Module
U0167 00	Lost Communication with Immobilizer Control Module
U0168 00	Lost Communication With Keyless Entry Control Module
U0170 00	Lost Communication With Passenger Presence Detection Sensor Module
U0181 00	Lost Communication With Headlamp Leveling Control Module
U0182 00	Lost Communication With Lighting Control Module - Front
U0184 00	Lost Communication With Radio
U0186 00	Lost Communication With Speaker Amplifier Module
U0196 00	Lost Communication With Rear Audio Control Module
U0191 00	Lost Communication With Television
U0193 00	Lost Communication With Digital Radio Receiver Control Module
U0197 00	Lost Communication With Telephone Control Module
U0198 00	Lost Communication With Telematic Control Module
U0201 00	Lost Communication With Transfer Case Control Module
U0203 00	Lost Communication With Left Rear Door Switch Panel Control Module
U0204 00	Lost Communication With Right Rear Door Switch Panel Control Module
U0207 00	Lost Communication With Moveable Roof Control Module
U0208 00	Lost Communication With Memory Seat Control Module
U0209 00	Lost Communication With Front Seat Heating Control Module
U0210 00	Lost Communication With Rear Seat Heating Control Module
U0230 00	Lost Communication With Liftgate Control Module
U0232 00	Lost Communication With Side-Object Detection Control Module - Left
U0233 00	Lost Communication With Side-Object Detection Control Module - Right
U0236 00	Lost Communication With Steering Column Lock Module
U0237 00	Lost Communication With Multimedia Player Interface Module
U023A 00	Lost Communication With Vehicle Direction Camera Control Module
U0249 00	Lost Communication With Rear Radio Audio Control Module
U0252 00	Lost Communication With Trailer Interface Control Module
U0254 00	Lost Communication With Remote Start Module
U0255 00	Lost Communication With Info Display Module
U0256 00	Lost Communication With Infotainment Faceplate Control Module
U0257 00	Lost Communication With Info Display Module/Infotainment Faceplate Control

	Module
U0264 00	Lost Communication With Camera Module - Rear
U0293 00	Lost Communication with Hybrid Powertrain Control Module
U0301 00	Software Incompatibility with Engine Control Module
U0302 00	Software Incompatibility with Transmission Control Module
U0315 00	Software Incompatibility with Electronic Brake Control Module
U0401 00	Invalid Data Received from ECM
U0401 72	Invalid Data Received from ECM Message Counter Incorrect
U0401 74	Invalid Data Received from ECM Bus Signal Checksum Error
U0402 72	Invalid Data Received From Transmission Control Module Message Counter Incorrect
U0402 73	Invalid Data Received From Transmission Control Module Parity Error
U0402 74	Invalid Data Received From Transmission Control Module Bus Signal Checksum Error
U0405 00	Invalid Data Received From Cruise Control Module
U0405 71	Invalid Data Received From Cruise Control Module Invalid Data
U0405 72	Invalid Data Received From Cruise Control Module Message Counter Incorrect
U0405 74	Invalid Data Received From Cruise Control Module Bus Signal Checksum Error
U0415 00	Invalid Data Received From Electronic Brake Control Module
U0415 72	Invalid Data Received From Electronic Brake Control Module Message Counter Incorrect
U0415 74	Invalid Data Received From Electronic Brake Control Module Bus Signal Checksum Error
U0416 00	Invalid Data Received From Vehicle Dynamics Control Module
U0416 72	Invalid Data Received From Vehicle Dynamics Control Module Message Counter Incorrect
U0416 74	Invalid Data Received From Vehicle Dynamics Control Module Bus Signal Checksum Error
U0418 00	Invalid Data Received From Brake System Control Module
U0418 71	Invalid Data Received From Brake System Control Module Invalid Data
U0418 72	Invalid Data Received From Brake System Control Module Message Counter Incorrect
U0418 74	Invalid Data Received From Brake System Control Module Bus Signal Checksum Error
U0422 00	Invalid Data Received From Body Control Module
U0422 70	Invalid Data Received From Body Control Module
U0422 72	Invalid Data Received From Body Control Module Message Counter Incorrect
U0422 74	Invalid Data Received From Body Control Module Bus Signal Checksum Error
U0424 00	Invalid Data Received From HVAC Control Module
U0432 00	Invalid Data Received From Multi-axis Acceleration Sensor Module
U0432 72	Invalid Data Received From Multi-axis Acceleration Sensor Module Message Counter Incorrect

U0432 74	Invalid Data Received From Multi-axis Acceleration Sensor Module Bus Signal Checksum Error
U0438 71	Invalid Data Received From Trailer Brake Control Module
U0465 00	Invalid Data Received From Power Take-Off Control Module
U1501 00	LIN Bus 1
U1502 00	LIN Bus 2
U1510 00	(K9 BCM) LIN Bus 1 Lost Communication With Device 0 (K38 Intrusion Sensor Module)
U1510 00	(K33 HVAC Control Module) LIN Bus 1 Lost Communication With Device 0 (A26 HVAC Control)
U1510 00	(A11 Radio) LIN Bus 1 Lost Communication with Device 0 (A20 Radio/HVAC Control)
U1511 00	(K26 Headlamp Control Module) LIN Bus 1 Lost Communication With Device 1 (E13L Headlamp Assembly-Left)
U1512 00	(K26 Headlamp Control Module) LIN Bus 1 Lost Communication With Device 2 (E13R Headlamp Assembly-Right)
U1513 00	(K26 Headlamp Control Module) LIN Bus 1 Lost Communication With Device 3 (E13L Headlamp Assembly-Left)
U1514 00	(K26 Headlamp Control Module) LIN Bus 1 Lost Communication With Device 4 (E13R Headlamp Assembly-Right)
U1515 00	(K9 BCM) LIN Bus 1 Lost Communication With Device 5 (B117 Windshield Outside Moisture Sensor)
U1517 00	(K9 BCM) LIN Bus 1 Lost Communication With Device 7 (Sunroof Sunshade Module)
U1519 00	(K40 MSM) LIN Bus 1 Lost Communication With Device 9 (S52 Outside Rearview Mirror Switch)
U1519 00	(K40 MSM) LIN Bus 1 Lost Communication With Device 9 (K96 Mirror Control Module)
U151A 00	(K9 BCM) LIN Bus 1 Lost Communication With Device 10 (B117 Windshield Outside Moisture Sensor)
U151B 00	(K9 BCM) LIN Bus 1 Lost Communication With Device 11 (K61 Sunroof Control Module)
U151B 00	(K40 MSM) LIN Bus 1 Lost Communication With Device 11 (S79P Window Switch - Passenger)
U1520 00	(K9 BCM) LIN Bus 2 Lost Communication With Device 0 (P25 Power Sounder Content Theft Deterrent Alarm Module)
U1521 00	(K26 Headlamp Control Module) LIN Bus 2 Lost Communication With Device 1 (E13L Headlamp Assembly-Left)
U1522 00	(K9 BCM) LIN Bus 2 Lost Communication With Device 2 (K65 Tire Pressure Indicator Module)
U1522 00	(K26 Headlamp Control Module) LIN Bus 2 Lost Communication With Device 2 (E13R Headlamp Assembly-Right)
U1523 00	(K26 Headlamp Control Module) LIN Bus 2 Lost Communication With Device 3 (E13L Headlamp Assembly-Left)

U1524 00	(K26 Headlamp Control Module) LIN Bus 2 Lost Communication With Device 4 (E13R Headlamp Assembly-Right)
U152C 00	(K9 BCM) LIN Bus 2 Lost Communication With Device 12 (K18 Electronic Compass Module)
U152D 00	(K9 BCM) LIN Bus 2 Lost Communication With Device 13 (S3 Automatic Gearbox Change Lever)
U1530 00	(K9 BCM) LIN Bus 3 Lost Communication With Device 0 (M74P Window Motor - Passenger)
U1534 00	(K9 BCM) LIN Bus 3 Lost Communication With Device 4 (M74D Window Motor - Driver)
U1538 00	(K9 BCM) LIN Bus 3 Lost Communication With Device 8 (S79D Window Switch - Driver)
U153A 00	(K9 BCM) LIN Bus 3 Lost Communication With Device 10 (S79P Window Switch - Passenger)
U1540 00	(K9 BCM) LIN Bus 4 Lost Communication With Device 0 (M74RR Window Motor - Right Rear)
U1544 00	(K9 BCM) LIN Bus 4 Lost Communication With Device 4 (M74LR Window Motor - Left Rear)
U1548 00	(K9 BCM) LIN Bus 4 Lost Communication With Device 8 (S79LR Window Switch - Left Rear)
U154A 00	(K9 BCM) LIN Bus 4 Lost Communication With Device 10 (S79RR Window Switch - Right Rear)
U154B 00	(K9 BCM) LIN Bus 4 Lost Communication With Device 11 (K49 Rear Seat Control Module)
U1814 01	Powertrain Wake Up Communication Circuit Short to Battery
U1814 02	Powertrain Wake Up Communication Circuit Short to Ground
U1814 04	Powertrain Wake Up Communication Circuit Open
U1826 00	Lost Communication With Multi-Axis Acceleration Sensor Module on Bus B (Chassis Expansion Bus)
U1827 00	Lost Communication With Steering Angle Sensor Module on Bus B (Chassis Expansion Bus)
U18B9 00	Primary High Speed CAN Bus Subnet Configuration List
U18BF 00	Secondary High Speed CAN Bus Subnet Configuration List
U1900 00	Lost Communication With Speech to Text Interface Module
U1901 00	Lost Communication With Front Controls Multifunction Interface Module
U2099 00	High Speed Communication Enable Circuit
U2099 01	High Speed Communication Enable Circuit Short to Battery
U2099 02	High Speed Communication Enable Circuit Short to Ground
U2099 04	High Speed Communication Enable Circuit Open
U2099 5A	High Speed Communication Enable Circuit Not Plausible
U2100 00	CAN Bus Communication
U2101 00	CAN Bus Maximum Configuration List
U2103 00	Fewer Controllers On Bus Than Programmed

U2105 00	Lost Communication with Engine Control Module
U2106 00	Lost Communication with Transmission Control Module
U2107 00	Lost Communication with Body Control Module
U2108 00	Lost Communication with Electronic Brake Control Module
U2127 00	Lost Communication with Front HVAC Control Module
U2139 00	Lost Communication with Column Integrated Module
U2144 00	Lost Communication with Distance Sensing Cruise Control Module
U2176 00	Lost Communication with Power Take-Off Control Module
U2178 00	Lost Communication With Trailer Interface Control Module

DTC B1000

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B1000 XX

Electronic Control Unit

Circuit/System Description

The internal fault detection is handled inside the control module. The symptom byte listed in the DTC Descriptor is for engineering reference only. No external circuit diagnosis is involved.

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.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold of 50, 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 that set the DTC.

Circuit/System Verification

If this DTC is retrieved as a current DTC, replace the module that set the DTC.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for module replacement, setup, and programming

DTC B1001

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B1001 XX

Option Configuration

Circuit/System Description

Some control modules must be configured with serial numbers, vehicle options, or other information. If a control module was not properly configured after installation that module may set DTC B1001. The symptom byte listed in the DTC Descriptor is for engineering reference only. No external circuit diagnosis is involved.

Conditions for Running the DTC

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

Conditions for Setting the DTC

The control module is not configured properly.

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.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool References

Control Module References for scan tool information

Circuit/System Verification

Verify DTC B1001 is not set.

- If the DTC is set, program the control module. If the DTC resets, replace the control module.

Repair Procedures

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

Control Module References for control module replacement, setup, and programming

DTC B101D

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.

- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B101D XX

ECU Hardware

Circuit/System Description

The internal fault detection is handled inside the control module. The symptom byte listed in the DTC Descriptor is for engineering reference only. No external circuit diagnosis is involved.

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.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of the control module.
- Do not replace a control module based only on DTC B101D being set in history with the exception of the following control modules:
 - Sensing and Diagnostic Module (SDM)
 - Passenger Presence System Module
- If DTC B101D is set as current, replace the appropriate control module.

Circuit/System Verification

Verify that DTC B101D is not set.

- If the DTC is set, replace the module that set the DTC.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for module replacement, setup, and programming

DTC B101E

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B101E XX

ECU Software

Circuit/System Description

Some control modules must be configured with specific software, serial numbers, vehicle options, or other information. If a control module was not properly configured after installation that module may set DTC B101E. The symptom byte listed in the DTC Descriptor is for engineering reference only. No external circuit diagnosis is involved.

Conditions for Running the DTC

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

Conditions for Setting the DTC

The control module is not configured properly.

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.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool References

Control Module References for scan tool information

Circuit/System Verification

Verify DTC B101E is not set.

- If the DTC is set, program the control module. If the DTC resets, replace the control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control module replacement, setup, and programming

DTC C0550

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC C0550 XX

Electronic Control Unit

Circuit/System Description

The internal fault detection is handled inside the control module. The symptom byte listed in the DTC Descriptor is for engineering reference only. No external circuit diagnosis is involved.

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.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold of 50, 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 that set the DTC.

Circuit/System Verification

Verify that DTC C0550 is not set.

- If the DTC is set, replace the module that set the DTC.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for module replacement, setup, and programming

DTC C056D

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC C056D XX

Electronic Control Unit Hardware

Circuit/System Description

The internal fault detection is handled inside the control module. The symptom byte listed in the DTC Descriptor is for engineering reference only. No external circuit diagnosis is involved.

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.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold of 50, 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 that set the DTC.

Circuit/System Verification

Verify that DTC C056D is not set.

- If the DTC is set, program the control module. If the DTC resets, replace the control module that set the DTC.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for module replacement, setup, and programming

DTC C056E

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC C056E XX

Electronic Control Unit Software

Circuit/System Description

Some control modules must be configured with specific software, serial numbers, vehicle options, or other information. If a control module was not properly configured after installation that module may set DTC C056E. The symptom byte listed in the DTC Descriptor is for engineering reference only. No external circuit diagnosis is involved.

Conditions for Running the DTC

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

Conditions for Setting the DTC

The control module is not configured properly.

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.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool References

Control Module References for scan tool information

Circuit/System Verification

Verify DTC C056E is not set.

- If the DTC is set, program the control module. If the DTC resets, replace the control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control module replacement, setup, and programming

DTC C078A

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC C078A 39

Tire Pressure Indicator Module Internal Malfunction

Circuit/System Description

The internal fault detection is handled inside the tire pressure sensor locator module. No external circuit

diagnosis is involved.

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.
- A history DTC clears when the module ignition cycle counter reaches the reset threshold of 50, 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 tire pressure sensor locator module.

Circuit/System Verification

Verify that DTC C078A is not set.

- If the DTC is set, replace the tire pressure sensor locator module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for module replacement, setup, and programming

DTC U0001

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC U0001 00

High Speed CAN Communication Bus

Circuit Description

Modules connected to the GMLAN serial data circuits 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.

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 with High Speed GMLAN Device**.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool References

Control Module References for scan tool information

DTC U0002

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

DTC Descriptor

DTC U0002

High Speed CAN Bus

Circuit/System Description

Modules connected to the high speed 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 prerecorded information about what messages are needed to be exchanged on the serial data circuits, for each virtual network. The messages are supervised and also, 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.

Conditions for Running the DTC

- Voltage supplied to the modules is in the normal operating voltage range.
- The vehicle power mode requires serial data communication to occur.
- The DTC U0001 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.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

With a scan tool, attempt to communicate with all modules.

Circuit/System Testing

1. With a scan tool, verify DTC U0100-U0299 or U2105-U2199 is not set as current.
 - If DTC is set, refer to **DTC U0100-U02FF** or **DTC U2105-U2199**.
2. Ignition OFF, test for less than 5 ohms between the applicable module ground circuit and ground.
 - If greater than the specified range, test the circuit for an open/high resistance.
3. Ignition OFF, disconnect the applicable module harness connector.
4. Ignition ON, verify a test lamp illuminates between the following circuits of the applicable module and ground:
 - The battery positive voltage input circuits
 - The battery positive voltage output circuits
 - The ignition voltage input circuits
 - The ignition voltage output circuits
 - The switched battery positive voltage supply circuits
 - If the test lamp does not illuminate, test the circuit for an open/high resistance. If the circuit fuse is open, test the circuit for a short to ground. If the circuit tests normal, replace the applicable control module.
5. Ignition OFF, test for less than 5 ohms between the non-communicating modules GMLAN serial data circuits and the module reporting DTC U0002.
 - If greater than the specified range, test the circuit for an open/high resistance.
6. If all circuits test normal, replace the applicable control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Control Module References** for module replacement, setup, and programming
- **GMLAN Wiring Repairs**

DTC U0020

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC U0020 00

Low Speed CAN Communication Bus Performance

Circuit/System 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. The messages are also supervised and some periodic messages are used by the receiver module as an availability indication of the transmitter module.

DTC U0020 will set when fewer modules are detected on the bus before the modules can learn the other modules IDs. If the communication bus is opened, or if the modules power supply is lost when the vehicle is in the OFF power mode, and then placed in the RUN power mode, U0020 will set in specific modules.

Conditions for Running the DTCs

- Voltage at 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 DTCs 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.

Circuit/System Verification

Diagnosis of this DTC is accomplished via the symptom or an additional DTC, Refer to **Symptoms - Data Communications DTC U0100-U02FF**.

DTC U0073 OR U2100

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC U0073 00

Control Module Communication Bus Off

DTC U0073 71

ECU HS Bus Off

DTC U0073 72

ECU LS Bus Off

DTC U2100 00

Controller Area Network (CAN) Bus Communication

DTC U2100 47

Controller Area Network (CAN) Bus Communication

Circuit/System Description

The serial data circuits are serial data buses are used to communicate information between the control modules. The serial data circuits also connect directly to the data link connector (DLC).

Conditions for Running the DTCs

- Supply voltage at the control modules is in the normal operating range.
- The vehicle power mode requires serial data communications.

Conditions for Setting the DTC

The control module setting the DTC has attempted to establish communications on the serial data circuits more than 3 times in 5 seconds.

Action Taken When the DTCs Sets

- The control module suspends all message transmission.
- The control module uses default values for all parameters received on the serial data circuits.
- In the TCM, DTC U0073 will cause the transmission to go into default gears.
- In the ECM and TCM, DTC U0073 will cause the malfunction indicator lamp (MIL) to illuminate.
- The control module inhibits the setting of all other communication DTCs.

Conditions for Clearing the DTC

- The ECM/TCM modules turn OFF the MIL after 4 consecutive ignition cycles that the diagnostic runs and does not fail.
- 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 of 50, without a repeat of the malfunction.

Circuit/System Verification

1. Refer to **Data Link References** to determine which serial data system is used for a specific control module.
2. This DTC cannot be retrieved with a current status. Diagnosis is accomplished using the symptom. Refer to **Symptoms - Data Communications**.

DTC U0074

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC U0074 00

Control Module Communication Bus B Off

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Battery Positive Voltage (B+)	1	1	-	-
Ground (DLC, terminal 5)	-	1	-	-
Mid Speed GMLAN Serial Data (+)	1	U0074 00, 3*	1	-
Mid Speed GMLAN Serial Data (-)	1	U0074 00, 3*	1	-
Chassis High Speed GMLAN Serial Data (+)	2	U0074 00, 3*	U0074 00, 2	-
Chassis High Speed GMLAN Serial Data (-)	2	U0074 00, 3*	U0074 00, 2	-

* An open between the data link connector (DLC) and the first splice will only effect the communication with the scan tool. The vehicle control modules will still communicate.

1. No communication on any mid speed GMLAN module.
2. No communication on any chassis high speed GMLAN module.
3. An open in only one mid speed or chassis high speed GMLAN serial data circuit may allow degraded

communication between the controls modules.

Circuit/System Description

Control modules connected to the mid speed or chassis high speed GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the control modules when the ignition switch is in any position other than OFF. The mid speed or chassis high speed GMLAN serial data bus uses a terminating resistor that is in parallel with the mid speed or chassis high speed GMLAN (+) and (-) circuits.

Conditions for Running the DTC

The system voltage is between 9-16 V.

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

Specific subsystems will not function.

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 of 50, without a repeat of the malfunction.

Diagnostic Aids

- Use the **Data Link References** to identify the mid speed or chassis high speed GMLAN serial data modules.
- Some control modules may not have internal protection for specific voltage outputs and may open a battery positive voltage or ignition voltage source fuse. If a voltage input fuse is open and no short is found in that circuit, ensure that no control module output voltage circuit is shorted to ground before replacing the control module.
- An open in the DLC ground circuit terminal 5 will allow the scan tool to operate to set up the vehicle on the tool and then not communicate with the vehicle. When the scan tool is to the point of communicating with the vehicle, a message on the scan tool will indicate "no CANdi module detected" and will not communicate.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify there are no other U code DTCs set.
 - If other U code DTCs are set, diagnose them first. Refer to Control Module U Code List.
2. Refer to Data Link References to determine if the control module setting DTC U0074 is on the mid speed or chassis high speed serial data circuits.

Circuit/System Testing

NOTE: Each control module may need to be disconnected to isolate a circuit fault. Use the schematic to identify the following:

- Control modules the vehicle is equipped with
 - Mid speed or chassis high speed serial data circuit terminating resistors
 - Control module locations on the serial data circuits
 - Each control modules mid speed or chassis high speed serial data circuit terminals
1. Attempt to communicate with all control modules on the mid speed or chassis high speed serial data circuit. Refer to Data Link References. Communications should not be available with two or more control modules on the mid speed or chassis high speed serial data circuit.
 - If only one control module is not communicating, diagnose that control module only. Refer to DTC U0100-U02FF.
 2. Disconnect the scan tool from the DLC. The following tests will be done at the DLC connector.
 3. All access doors closed, ignition OFF for 60 seconds, test for less than 10 ohms between the ground

circuit terminal 5 and ground.

- If greater than the specified range, test the ground circuit for an open/high resistance.
4. Ignition ON, test for less than 3 V between the serial data circuits listed below and ground:
 - Mid speed GMLAN serial data terminal 3
 - Mid speed GMLAN serial data terminal 11
 - Chassis high speed GMLAN serial data terminal 12
 - Chassis high speed GMLAN serial data terminal 13
 - If greater than the specified range, test the serial data circuit for a short to voltage. Refer to Testing the Serial Data Circuits for a Short to Voltage.
 5. Ignition OFF for 60 seconds, test for greater than 100 ohms between the serial data circuits listed below and ground:
 - Mid speed GMLAN serial data terminal 3
 - Mid speed GMLAN serial data terminal 11
 - Chassis high speed GMLAN serial data terminal 12
 - Chassis high speed GMLAN serial data terminal 13
 - If not the specified value, test the serial data circuit for a short to ground. Refer to Testing the Serial Data Circuits for a Short to ground.
 6. Test for 50-70 ohms between the serial data circuits listed below:
 - Mid speed GMLAN serial data circuits terminal 3 and terminal 11
 - Chassis high speed GMLAN serial data circuits terminal 12 and terminal 13
 - If less than 35 ohms, test for a short between the serial data circuits. Refer to Testing the Serial Data Circuits for a Short between the Circuits.
 - If 35-50 ohms there may be a third terminating resistor between the serial data circuits. This can happen if the incorrect control module is installed. Some control modules are available with and without the terminating resistors installed to reduce the need of terminating resistors in the wiring harness.
 - If greater than 70 ohms but less than infinite, test the serial data circuit for an open/high resistance. Refer to Testing the Serial Data Circuits for an Open/High Resistance.
 - If infinite, test the serial data circuits between the DLC and the first connection to the serial data circuit for an open/high resistance.

Testing the Serial Data Circuits for a Short to Voltage

1. Ignition OFF, disconnect the harness connectors with the mid speed or chassis high speed serial data circuits at an easily accessible control module.
2. Ignition ON, test for greater than 3 V between the serial data circuits and ground. Verify that one or more serial data circuits are greater than 3 V.
 - If less than the specified range for all serial data circuits, replace the control module that was disconnected.
3. Ignition OFF, disconnect the harness connectors with the mid speed or chassis high speed serial data circuits at another control module, in the direction of the circuit shorted to voltage.

4. Ignition ON, test for greater than 3 V between the serial data circuits and ground. Verify that one or more serial data circuits are greater than 3 V.
 - If less than the specified range for all serial data circuits, replace the control module that was just disconnected.
5. Repeat step 3 until one of the follow conditions are isolated:
 - A short to voltage on the serial data circuit between 2 control modules
 - A short to voltage on the serial data circuit between a control module and a terminating resistor

Testing the Serial Data Circuits for a Short to Ground

1. Ignition OFF, disconnect the harness connectors with the mid speed or chassis high speed serial data circuits at an easily accessible control module.
2. Ignition OFF for 60 seconds, test for less than 100 ohms between the serial data circuits and ground. Verify that one or more serial data circuits are less than 100 ohms.
 - If greater than the specified range for all serial data circuits, replace the control module that was disconnected.
3. Disconnect the harness connectors with the mid speed or chassis high speed serial data circuits at another control module, in the direction of the circuit shorted to ground.
4. Ignition OFF for 60 seconds, test for less than 100 ohms between the serial data circuits and ground. Verify that one or more serial data circuits are less than 100 ohms.
 - If greater than the specified range for all serial data circuits, replace the control module that was just disconnected.
5. Repeat step 3 until one of the follow conditions are isolated:
 - A short to ground on the serial data circuit between 2 control modules
 - A short to ground on the serial data circuit between a control module and a terminating resistor

Testing the Serial Data Circuits for a Short between the Circuits

1. Ignition OFF, disconnect the harness connectors with the mid speed or chassis high speed serial data circuits at an easily accessible control module, that is not communicating.
2. Ignition OFF for 60 seconds, test for less than 110 ohms between each pair of serial data circuits. Verify that one pair of serial data circuits are less than 110 ohms.
 - If greater than the specified range for each pair of serial data circuits, replace the control module that was disconnected.
3. Connect the harness connectors at the control module that was disconnected.
4. Disconnect the harness connectors with the mid speed or chassis high speed serial data circuits at another control module, in the direction of the circuits shorted together.
5. Ignition OFF for 60 seconds, test for less than 110 ohms between each pair of serial data circuits. Verify that one pair of serial data circuits are less than 110 ohms.
 - If between the specified range for each pair of serial data circuits, replace the control module that was just disconnected.
6. Repeat step 3 until one of the following conditions are isolated:

- Serial data circuits shorted together between 2 control modules
- Serial data circuits shorted together between a control module and a terminating resistor
- A shorted terminating resistor

Testing the Serial Data Circuits for a Open/High Resistance

1. Ignition OFF, disconnect the harness connectors with the mid speed or chassis high speed serial data circuits at an easily accessible control module, that is not communicating.
2. Ignition OFF for 60 seconds, test for greater than 130 ohms between each pair of serial data circuits. Verify that one pair of serial data circuits are greater than 130 ohms.
 - If less than the specified range for each pair of serial data circuits, replace the control module that was disconnected.
3. Connect the harness connectors at the control module that was disconnected.
4. Disconnect the harness connectors with the mid speed or chassis high speed serial data circuits at another control module, in the direction of the open circuit.
5. Ignition OFF for 60 seconds, test for greater than 130 ohms between each pair of serial data circuits. Verify that one pair of serial data circuits are greater than 130 ohms.
6. Repeat step 3 until one of the following conditions are isolated:
 - An open/high resistance on the serial data circuit between 2 control modules
 - An open/high resistance on the serial data circuit between a control module and a terminating resistor
 - An open/high resistance terminating resistor

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

- **GMLAN Wiring Repairs**
- **Control Module References** for control module replacement, setup, and programming

DTC U0100-U02FF

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

Refer to **Control Module U Code List**.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Module B+	U0100-U02FF	U0100-U02FF	-	-
Module Ignition	U0100-U02FF	U0100-U02FF	-	-
Module Ground	U0100-U02FF	U0100-U02FF	-	-
Accessory Wake Up Serial Data	U1814	U0100-U02FF	-	-
High Speed GMLAN Serial Data Wake Up	U2099	U0100-U02FF	-	-
High Speed GMLAN Serial Data (+)	2	U0100-U02FF	2	-
High Speed GMLAN Serial Data (-)	2	U0100-U02FF	2	-
Low Speed GMLAN Serial Data	1	U0100-U02FF	1	-
1. Scan tool does not communicate with low speed GMLAN device 2. Scan tool does not communicate with high speed GMLAN device				

Circuit/System Description

The serial data circuit is the means by which the control modules in the vehicle communicate with each other. Once the scan tool is connected to the serial data circuit through the data link connector (DLC), the scan tool can be used to monitor each control module for diagnostic purposes and to check for diagnostic trouble codes (DTCs). When the ignition switch is in RUN, each control module communicating on the serial data circuit sends a state of health (SOH) message to ensure that the control module is operating properly. When a control module stops communicating on the serial data circuit, for example if the control module loses power or ground, the SOH message it normally sends on the serial data circuit disappears. Other control modules on the serial data circuit, which expect to receive that SOH message, detect its absence; those control modules in turn set a DTC associated with the loss of SOH of the non-communicating control module. The DTC is unique to the control module which is not communicating and one or more control modules may set the same exact code. A loss of serial data communications DTC does not represent a failure of the control modules that contain the stored code.

Conditions for Running the DTC

The system voltage is between 9-16 V.

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

- Specific subsystems will not function.
- DTC U0100 in the TCM will cause the transmission to go into default gears.
- Both DTC U0100 in the TCM and DTC U0101 in the ECM will cause the malfunction indicator lamp (MIL) to illuminate.

Conditions for Clearing the DTC

- The ECM/TCM module turns OFF the MIL after 4 consecutive ignition cycles that the diagnostic runs and does not fail.
- 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 of 50, without a repeat of the malfunction.

Diagnostic Aids

- Sometimes, while diagnosing a specific customer concern or after a repair, you may notice a history U-code present. However, there is no associated "current" or "active" status. Loss-of- communication U-codes such as these can set for a variety of reasons. Many times, they are transparent to the vehicle operator and technician, and/or have no associated symptoms. Eventually, they will erase themselves automatically after a number of fault-free ignition cycles. This condition would most likely be attributed to one of these scenarios:
 - A control module on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more control modules was interrupted during diagnosis.
 - A low battery condition was present, so some control modules stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and control modules on the communication circuit did not all re-initialize at the same time.
 - If a loss-of-communication U-code appears in history for no apparent reason, it is most likely associated with one of the scenarios above. These are all temporary conditions and should never be interpreted as an intermittent fault, causing you to replace a part.
- A control module may have a U-code stored in history that does not require any repairs. Issues with late or corrupted messages between control modules can be temporary with no apparent symptom or complaint; this does not mean the control module is faulty. Do not replace a control module based only on a history U-code.
- Do not replace a control module reporting a U-code. The U-code identifies which control module needs to be diagnosed for a communication issue.
- Communication may be available between the BCM and the scan tool with either the low or high speed GMLAN serial data system inoperative. This condition is due to the BCM using both the low and high speed GMLAN systems.
- Use **Data Link References** to determine if the control module uses high or low speed GMLAN serial data communications.
- Some control modules may not have internal protection for specific control circuits and may open a B+ or ignition fuse. If a fuse is open and the B+ or ignition circuit is not shorted to ground, ensure none of the control circuits are shorted to ground before replacing the control module.
- This diagnostic can be used for any control module that is not communicating, regardless of the type of serial data circuit it is connected to, providing the vehicle is equipped with the control module.

Reference Information

Schematic Reference

- **Data Communication Schematics**
- **Control Module References**

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Determine the control module that is not communicating. Refer to **Control Module U Code List**.
2. Verify that DTC U1814, U2099, B1428, B1370, B1380, B1440, or B1441 is not set.
 - If any of the DTCs are set, refer to **Diagnostic Trouble Code (DTC) List - Vehicle**.
3. Engine running for 10 seconds.
4. Ignition ON, engine OFF, verify that DTC U0100-U0299 is not set with symptom byte 00.
 - If the DTC U0100-U0299 is set with symptom byte 00, refer to Circuit/System Testing.
5. Verify that DTC U0100-U0299 is not set with symptom byte 71 or 72.
 - If the DTC U0100-U0299 is set with symptom byte 71 or 72 along with other DTCs set, diagnose all other codes first. Refer to **Diagnostic Trouble Code (DTC) List - Vehicle**.
 - If the DTC U0100-U0299 is set with symptom byte 71 or 72 and without other DTCs set, reprogram the control module. If the DTC resets, replace the control module.

Circuit/System Testing

NOTE: Use the schematic to identify the following:

- **Control modules the vehicle is equipped with**
- **Control module locations on the low and high speed GMLAN serial data circuits**

- **The control modules B+, ignition, ground, communication enable and serial data circuit terminals**

1. Ignition OFF, disconnect the harness connector at of the control module that is not communicating.
2. Test for less than 10 ohms between each ground circuit terminal and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. If equipped, verify that a test lamp illuminates between each B+ circuit terminal and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. If the circuit fuse is open, test the control circuits of the control module for a short to ground. If the circuits test normal, replace the control module.
4. If equipped, ignition ON, verify that a test lamp illuminates between each ignition circuit terminal and ground.
 - If the test lamp does not illuminate, test the ignition circuit for a short to ground or an open/high resistance. If the circuit fuse is open, test the control circuits of the control module for a short to ground. If the circuits test normal, replace the control module.

NOTE: Only the high speed GMLAN modules have a serial data communication enable circuit OR an accessory wakeup serial data circuit, and the BCM is the output for these circuits. Refer to the control module schematics to identify which modules have these circuits.

5. If equipped, ignition ON, verify that a test lamp illuminates between the communication enable circuit terminal OR the accessory wakeup circuit terminal and ground.
 - If the test lamp does not illuminate, test the entire circuit, including the B+ circuit to the BCM, for an open/high resistance or short to ground. If the circuits test normal, replace the BCM.
6. Ignition OFF for 60 seconds, test for less than 5 ohms between the serial data circuit terminals and the appropriate DLC terminal listed below:
 - Class 2 serial data circuit terminal 2
 - Low speed GMLAN serial data terminal 1
 - High speed GMLAN serial data terminal 6 or 14
 - If greater than the specified range, test the serial data circuit for an open/high resistance between the non communicating control module and a module setting the DTC or a serial data splice pack.
7. If all circuits test normal, replace the control module that is not communicating.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **GMLAN Wiring Repairs**
- **Control Module References** for control module replacement, setup, and programming

DTC U0300-U0336

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC U0301 00

Software Incompatibility with Engine Control Module

DTC U0302 00

Software Incompatibility with Transmission Control Module

DTC U0315 00

Software Incompatibility with Electronic Brake Control Module

Circuit/System Description

Some control modules must be configured with specific software, serial numbers, vehicle options, or other information. If a control module was not properly configured after installation that module may set the appropriate U Code. No external circuit diagnosis is involved.

Conditions for Running the DTC

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

Conditions for Setting the DTC

The control module is not configured properly.

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.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool References

Control Module References for scan tool information

Circuit/System Verification

Verify the appropriate DTC is not set.

- If the DTC is set, program the control module specified by the DTC descriptor. If the DTC resets, replace the control module specified by the DTC descriptor.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control module replacement, setup, and programming

DTC U0400-U05FF

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

Refer to **Control Module U Code List**.

Circuit/System Description

Some control modules are constantly receiving information from other control modules through serial data communication network. The invalid data code will be set when a receiving control module detects a

discrepancy in information it receives from another control module causing its integrity to be questioned. The symptom byte listed in the DTC Descriptor is for engineering reference only. No external circuit diagnosis is involved.

Conditions for Running the DTC

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

Conditions for Setting the DTC

The control module is not configured properly.

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.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool References

Control Module References for scan tool information

Circuit/System Verification

1. Engine running for 10 seconds.

2. Ignition ON, engine OFF, verify the DTC U0400-U05FF is not set.

- If the DTC U0400-U05FF is set along with other DTCs set, diagnose all other codes first. Refer to **Diagnostic Trouble Code (DTC) List - Vehicle**.
- If the DTC U0400-U05FF is set without other DTCs set, program the control module specified by the DTC descriptor. If the DTC resets, replace the appropriate control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control module replacement, setup, and programming

DTC U1500-U15BF

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

Refer to **Control Module U Code List**.

Circuit/System Description

The serial data is transmitted over a Local Interconnect Network (LIN) single wire network circuit bus between a master control module and other control modules within a particular subsystem. If serial data communication is lost between any of the control modules on the LIN bus network, a no communication code against the non-communicating control module will be set. A master control module is the one that reports the non communication code. Note: a loss of serial data communications DTC does not represent a failure of the master control module that set it.

Diagnostic Aids

- A control module may have a U-code stored in history that does not require any repairs. Issues with late or corrupted messages between control modules can be temporary with no apparent symptom or complaint; this does not mean the control module is faulty. Do not replace a control module based only on a history U-code.
- Do not replace a control module reporting a U-code. The U-code identifies which control module needs to be diagnosed for a communication issue.
- Communication will be available between the master control module and the scan tool if there is a loss of communications with any of the other control modules on the LIN bus network.
- An open in the LIN bus serial data circuit between the splice pack and a module will only affect that specific module. This type of failure will set a loss of communication DTC for each control module affected and the other control modules will still communicate.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Circuit/System Testing

NOTE:

- Use the schematic to identify the following:
 - Control modules and LIN devices the vehicle is equipped with
 - Control module and LIN device locations on the serial data circuit
 - The control module serial data circuit terminals and LIN device B+, ignition, ground, and serial data circuit terminals
- Use the Control Module U-Code list to determine which control module is not communicating with the master control module. Refer to Control Module U Code List.
- A loss of serial data communications DTC does not represent a failure of the master control module that set it.

1. Ignition OFF, disconnect the harness connector at a LIN device that is not communicating.
2. Test for less than 5 ohms between each ground circuit terminal and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. If equipped, verify that a test lamp illuminates between each B+ circuit terminal and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. If the circuit fuse is open, test the control circuits of the LIN device for a short to ground. If the circuits test normal, replace the LIN device.
4. If equipped, ignition ON, verify that a test lamp illuminates between each ignition circuit terminal and ground.

- If the test lamp does not illuminate, test the ignition circuit for a short to ground or an open/high resistance. If the circuit fuse is open, test the control circuits of the LIN device for a short to ground. If the circuits test normal, replace the LIN device.
5. Ignition ON, test for 2-11.5 V between the LIN serial data circuit and ground.
 - If greater than the specified range, test the LIN serial data circuit for a short to voltage. If the circuit tests normal, replace the master control module.
 - If less than the specified range, test the LIN serial data circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the master control module.
 6. If all circuits test normal, replace the LIN device.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

- **GMLAN Wiring Repairs**
- **Control Module References** for control module replacement, setup, and programming

DTC U1814

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC U1814 00

Powertrain Wake Up Communication Circuit

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Powertrain Serial Data Communication Enable	U1814, 1	U0100-U0299	-	-
1. Vehicle will not start.				

Circuit/System Description

The body control module (BCM) activates the serial data communication enable circuit when the ignition key is in ACC, ON or START. The serial data communication enable circuit wakes up the engine control module (ECM) for serial data bus communication.

Conditions for Running the DTC

- The system voltage is between 9-16 volts.
- The vehicle power mode master requires serial data communication to occur.

Conditions for Setting the DTC

The BCM senses a short to ground on the serial data communication enable circuit.

Action Taken When the DTC Sets

- The output command is turned off while the malfunction is present.
- The modules use a default value for the missing parameters until the next ignition cycle.
- The module(s) is never signaled, therefore the specific subsystem(s) will not function.
- The vehicle will not start while the circuit is shorted to ground.

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 of 50, without a repeat of the malfunction.

Diagnostic Aids

- Use the DMM MIN/MAX function to capture/locate intermittent conditions.
- Short to ground will also set multiple history no communication codes for GMLAN high speed modules.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**

• **Wiring Repairs**

Circuit/System Testing

NOTE: **Use the schematic to determine which control modules are on the BCM communications enable circuit 22, X4.**

- 1. Ignition OFF, disconnect the harness connector at the most easily accessible control module on the BCM communications enable circuit.
- 2. Ignition ON, retest for current DTCs. DTC U1814 should remain current.
 - If the DTC becomes history, replace the control module.
- 3. With the prior control modules disconnected, repeat steps 1 and 2 for each control module on the circuit except the BCM.
- 4. Ignition OFF, disconnect the X 4 harness connector at the K9 BCM.
- 5. Test for infinite resistance between the serial data communication enable circuit terminal 22 and ground.
 - If less than infinite resistance, repair the enable circuit for a short to ground.
- 6. If all circuits tests normal, replace the K9 BCM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for module replacement, setup, and programming

DTC U1826 OR U1827

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC U1826 00

Lost Communication With Multi-Axis Acceleration Sensor Module on Bus "B".

DTC U1827 00

Lost Communication With Steering Angle Sensor Module on Bus "B".

Diagnostic Fault Information

	Short to	Open/High	Short to	Signal
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Circuit	Ground	Resistance	Voltage	Performance
Multi-Axis Acceleration Sensor Module Ignition	1	1	-	-
Multi-Axis Acceleration Sensor Module CAN Bus High Serial Data	2	U1826 00,	-	U1826 00
Multi-Axis Acceleration Sensor Module CAN Bus Low Serial Data	2	U1826 00,	-	U1826 00
Multi-Axis Acceleration Sensor Module Ground	2	1	-	-
Steering Wheel Angle Sensor Ignition	1	1	-	-
Steering Wheel Angle Sensor CAN Bus High Serial Data	2	U1827 00	-	U1827 00
Steering Wheel Angle Sensor CAN Bus Low Serial Data	2	U1827 00,	-	U1827 00
Steering Wheel Angle Sensor Ground	2	1	-	-
1. Circuit Inoperative 2. Scan Tool does not communicate with chassis expansion bus.				

Circuit/System Description

The electronic brake control module (EBCM) activates the other modules connected to the Chassis CAN serial data circuits by applying voltage when the ignition key is in ACC, ON or START. The EBCM, Rear Differential Clutch Control Module, Multi-Axis Acceleration Sensor Module, and the Steering Wheel Angle Sensor are connected to the Chassis CAN bus serial data circuits. For more information on CAN bus serial data refer to **Data Link Communications Description and Operation**.

Conditions for Running the DTC

- The system voltage is between 9-16 volts.
- The vehicle power mode master requires serial data communication to occur.

Conditions for Setting the DTC

- A supervised periodic message that includes the transmitter module availability has not been received.
- Rear differential clutch control module detects an invalid signal from Multi-Axis Acceleration Sensor Module and/or Steering Wheel Angle Sensor.

Action Taken When the DTC Sets

All wheel drive performance will be temporarily degraded.

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 of 50, without a repeat of the malfunction.

Diagnostic Aids

- Use the DTC Descriptor list above to determine the module which is not communicating.
- If there are multiple non-communicating modules choose the one closest to the EBCM.

Reference Information

Schematic Reference

- **Data Communication Schematics**
- **Antilock Brake System Schematics**
- **Control Module References**

Connector End View Reference

Component Connector End Views

Description and Operation

ABS Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE: Use the DTC Descriptors and Diagnostic Aids above to determine the control module which is not communicating and should be tested. Use the schematics to identify the following:

- Control modules the vehicle is equipped with
- Control module locations on the Chassis high speed GMLAN serial data circuits
- The control module serial data circuit terminals

1. Ignition OFF, disconnect the harness connector at the non communicating control module.
2. Test for less than 5 ohms between the ground circuit terminal 6 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify that a test lamp illuminates between the ignition circuit terminal 5 and ground.
 - If the test lamp does not illuminate, test the ignition circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the electronic brake control module (EBCM).
4. Ignition OFF, test for less than 1 ohms in each serial data circuit between the non communicating control module and the control module setting the DTC.
 - If greater than the specified range, test the serial data circuits for an open/high resistance.
5. If all circuits test normal, replace the non communicating control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **GMLAN Wiring Repairs**
- **Control Module References** for module replacement, setup, and programming

DTC U18B9-U18BF

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC U18B9

Primary High Speed CAN Bus Subnet Configuration List

DTC U18BF

Secondary High Speed CAN Bus Subnet Configuration List

Circuit/System Description

Control modules on the high speed GMLAN serial data bus and the chassis high speed GMLAN serial data bus must be programmed with software that specifically identifies the correct type and quantity of modules on the bus based on RPO configuration. If a control module was not properly configured after installation, the appropriate U Code may be set for that module. No external circuit diagnosis is involved.

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

- The control module is not configured properly.
- Control unit recognises a programming error.
- CAN-Bus configuration is invalid

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.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool References

Control Module References for scan tool information

Circuit/System Verification

1. Verify the appropriate DTC is not set.
 - If the DTC is set along with other codes, diagnose all other codes first. If no other codes are set, program the control module that set the DTC.

- 2. With a scan tool, clear the DTCs.
- 3. Ignition OFF, remove the scan tool, open and close the drivers door.
- 4. Wait 60 seconds, then verify the DTC is not set.
 - o If the DTC is set, replace the appropriate control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control module replacement, setup, and programming

DTC U2099

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC U2099 00

High Speed Communication Enable Circuit

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Serial Data Communication Enable	U2099, U0100-U0299 ¹	U0100-U0299	U0100-U0299 ²	-
¹ Vehicle will not start.				
² History only. If cleared the DTC will return after several ignition cycles.				

Circuit/System Description

The body control module (BCM) activates the serial data communication enable circuit, when the ignition key is in ACC, ON or START. The serial data communication enable circuit wakes up the modules for serial data buss communication.

Conditions for Running the DTC

- The system voltage is between 9-16 volts.
- The vehicle power mode master requires serial data communication to occur.

Conditions for Setting the DTC

The BCM senses a short to ground on the serial data communication enable circuit.

Action Taken When the DTC Sets

- The output command is turned off while the malfunction is present.
- The modules use a default value for the missing parameters until the next ignition cycle.
- The module(s) is never signaled, therefore the specific subsystem(s) will not function.
- The vehicle will not start while the circuit is shorted to ground.

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 of 50, without a repeat of the malfunction.

Diagnostic Aids

- Use the DMM MIN/MAX function to capture/locate intermittent conditions.
- Short to ground will also set multiple history no communication codes for GMLAN high speed modules.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Circuit/System Testing

NOTE: Use the schematic to determine which control modules are on the BCM communications enable circuit 23, X4.

1. Ignition OFF, disconnect the harness connector at the most easily accessible control module on the BCM communications enable circuit.
2. Ignition ON, retest for current DTCs. DTC U2099 should remain current.
 - If the DTC becomes history, replace the control module.
3. With the prior control modules disconnected, repeat steps 1 and 2 for each control module on the circuit except the BCM.
4. Ignition OFF, disconnect the X 4 harness connector at the K9 BCM.
5. Test for infinite resistance between the serial data communication enable circuit terminal 23 and ground.
 - If less than infinite resistance, repair the enable circuit for a short to ground.
6. If all circuits tests normal, replace the K9 BCM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for module replacement, setup, and programming

DTC U2101

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC U2101

CAN Bus Maximum Configuration List

Circuit/System Description

Some control modules must be programmed with software that specifically identifies the correct type and quantity of modules on the serial data bus based on RPO configuration. If a control module was not properly configured after installation, the appropriate U Code may be set for that module. No external circuit diagnosis is involved.

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

- The control module is not configured properly.
- Control unit recognises a programming error.
- CAN-Bus configuration is invalid

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.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool References

Control Module References for scan tool information

Circuit/System Verification

1. Verify the appropriate DTC is not set.
 - If the DTC is set along with other codes, diagnose all other codes first. If no other codes are set, program the control module specified by the DTC descriptor.
2. With a scan tool, clear the DTCs.
3. Ignition OFF, remove the scan tool, open and close the drivers door.
4. Wait 60 seconds, then verify the DTC is not set.

- If the DTC is set, replace the appropriate control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for control module replacement, setup, and programming

DTC U2103

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC U2103 00

Fewer Controllers On Than Programmed

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 IDs. If the communication buss is opened, or if the module 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.

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

- Diagnosis of this DTC is accomplished via the symptom or an additional DTC. Refer to **Symptoms - Data Communications** or **DTC U0100-U02FF**.
- An intermittent condition is likely to be caused by a short on the GMLAN serial data circuits. Use the **DTC U0100-U02FF** procedure in order to isolate an intermittent condition.

DTC U2105-U2199

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using the diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Low Speed GMLAN Serial Data	1	U2105-U2199	1	-
Battery Positive Voltage Circuits	U2105-U2199	U2105-U2199	-	-
Ignition Voltage Circuits	U2105-U2199	U2105-U2199	-	-
Module Ground Circuits	U2105-U2199	U2105-U2199	-	-
Accessory Wake Up Serial Data	U1814	U2105-U2199	-	-
High Speed GMLAN Serial Data Wake Up	U2099	U2105-U2199	-	-
1. Scan tool does not communicate with low speed GMLAN device				

Circuit/System Description

Modules connected to the high and low speed 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 prerecorded information about what messages are needed to be exchanged on the serial data circuits, for each virtual network. The messages are supervised and also, some periodic messages are used by the receiver module as an availability indication of the transmitter module. Each message contains the identification number of the transmitter module.

The body control module (BCM) activates the high speed GMLAN serial data wake up and the accessory wake up serial data circuits by applying voltage when the ignition key is in ACC, ON or START. The high speed GMLAN serial data wake up circuit wakes up the electronic brake control module (EBCM) for bus

communication and the accessory wake up serial data circuit wakes up the engine control module (ECM) and transmission control module (TCM).

Conditions for Running the DTC

- The system voltage is between 9-16 volts.
- The vehicle power mode requires serial data communication to occur.

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 parameters.

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 of 50, without a repeat of the malfunction.

Diagnostic Aids

- Use the DTC Descriptor list above to determine the module which is not communicating.
- If there are multiple non-communicating modules choose the one closest to the data link connector (DLC).
- Use **Data Link References** to determine if the module uses high or low speed GMLAN serial data communications
- Some modules may not have internal protection for specific voltage outputs and may open a battery positive voltage or ignition voltage source fuse. If a voltage input fuse is open and no short is found in that circuit, ensure that no module output voltage circuit is shorted to ground before replacing the module.
- This diagnostic can be used for any module that should communicate with high or low speed GMLAN serial data providing the vehicle is equipped with the option that uses that module.

Reference Information

- **Data Communication Schematics**
- **Control Module References**

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool References

Control Module References for scan tool information

Circuit/System Testing

NOTE: If more than one module is not communicating use Data Communication Schematics to determine which module is closest to the DLC. Start diagnostics with that module.
Terminal and connector identifiers will be different depending on the individual module being tested. Use Schematic Reference and Connector End View Reference to determine which connector and terminal to access.

1. Using the DTC Descriptor and Diagnostic Aids, determine the module that is not communicating that should be tested.
2. Ignition OFF, disconnect the harness connector of the module that is not communicating.
3. Test for less than 2 ohms between the module ground circuits and ground.
 - If greater than specified range, test the ground circuit for an open/high resistance.

NOTE: Only the high speed GMLAN modules have a wired serial data wake up circuit. Refer to the module schematics to identify which modules have a wake up circuit. If the module that is not communicating does not have a serial data wake up circuit, proceed to step 5.

4. Ignition ON, verify that a test lamp illuminates between the high speed GMLAN serial data wake up circuit OR the accessory wake up serial data circuit and ground.
 - If the test lamp does not illuminate, test the circuit for an open/high resistance. If the circuits test normal, replace the BCM.
5. Ignition ON, verify that a test lamp illuminates between all B+ circuits and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. If the circuit fuse is open, also test the positive voltage outputs of the module for a short to ground. If the circuits test normal, replace the appropriate module.
6. Verify that a test lamp illuminates between all ignition voltage circuits and ground.
 - If the test lamp does not illuminate, test the ignition voltage circuits for a short to ground or an open/high resistance. If the circuit fuse is open, also test the positive voltage outputs of the module

for a short to ground. If the circuits test normal, replace the appropriate module.

7. Test for less than 1 ohms in the GMLAN serial data circuits between the non-communicating module and the module that displays the DTC.
 - If greater than specified range, test the GMLAN serial data circuits for open/high resistance.
8. If all circuits test normal, replace the module that is not communicating.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **GMLAN Wiring Repairs**
- **Control Module References** for module replacement, setup, and programming

SYMPTOMS - DATA COMMUNICATIONS

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**.

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.

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 High Speed GMLAN Device**
- **Scan Tool Does Not Communicate with Mid Speed GMLAN Device**
- **Scan Tool Does Not Communicate with Low Speed GMLAN Device**

- **Scan Tool Does Not Communicate with Chassis High Speed GMLAN Device**

SCAN TOOL DOES NOT POWER UP

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
DLC B+	1	1	-	-
DLC Ground	-	1	-	-
1. Scan Tool Does Not Power Up				

Circuit/System 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 B+ voltage at terminal 16
- Scan tool ground at terminal 4
- Common ground at terminal 5

Diagnostic Aids

- 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 module sends the appropriate power mode message.
- If the B+ circuit, ground circuits, and connections of the DLC are functioning properly, the malfunction must be due to the scan tool.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information.

Circuit/System Testing

1. Test for less than 2.0 ohms between the ground circuits terminal 4 of the DLC and ground, and terminal 5 of the DLC and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
2. Ignition ON, verify a test lamp illuminates between the B+ circuit terminal 16 at the DLC and ground.
 - If the test lamp does not illuminate, test the voltage supply circuit for a short to ground or an open/high resistance.
3. If all circuits test normal, refer to the scan tool user guide.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

SCAN TOOL DOES NOT COMMUNICATE WITH CHASSIS HIGH SPEED GMLAN DEVICE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Chassis High Speed GMLAN Serial Data (+)	1	U0100-U0299*	1	-
Chassis High Speed GMLAN Serial Data (-)	1	U0100-U0299*	1	-
Ground (DLC, terminal 5)	-	1	-	-

* No communications with one or more chassis high speed GMLAN modules. An open in only one

chassis high speed GMLAN serial data circuit may allow degraded communication between the modules. An open between the data link connector (DLC) and the first splice will only effect the communication with the scan tool. The vehicle modules will still communicate.

1. No communication with any chassis high speed GMLAN module

Circuit/System Description

The GMLAN high speed chassis expansion bus functions the same as the GMLAN high speed bus, and the two buses operate in parallel. The expansion chassis bus was added to reduce message congestion on the primary high speed bus. Since the GMLAN high speed chassis bus and primary GMLAN high speed bus operate in the same manner, the diagnostics for each are the same.

The serial data is transmitted on two twisted wires that allow speeds up to 500 Kb/s. The twisted pair is terminated with two 120 ohms resistors, one is internal to the engine control module (ECM) and the other can be a separate resistor in a connector assembly or in another control module. The resistors are used as the load for 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 of approximately 2.5 V. Driving the lines to their extremes, adds one volt to the high speed GMLAN serial data bus (+) circuit and subtracts one volt from the high speed GMLAN serial data bus (-) circuit. If serial data is lost, control modules will set a no communication code against the non-communicating control module. Note that a loss of serial data DTC does not represent a failure of the module that set it.

Diagnostic Aids

- Sometimes, while diagnosing a specific customer concern or after a repair, you may notice a history U-code present. However, there is no associated "current" or "active" status. Loss-of-communication U-codes such as these can set for a variety of reasons. Many times, they are transparent to the vehicle operator and technician, and/or have no associated symptoms. Eventually, they will erase themselves automatically after a number of fault-free ignition cycles. This condition would most likely be attributed to one of these scenarios:
 - A control module on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more modules was interrupted during diagnosis
 - A low battery condition was present, so some control modules stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and control modules on the communication circuit did not all re-initialize at the same time.
 - If a loss-of-communication U-code appears in history for no apparent reason, it is most likely associated with one of the scenarios above. These are all temporary conditions and should never be interpreted as an intermittent fault, causing you to replace a part.
- Do not replace a control module reporting a U code. The U code identifies which control module needs to be diagnosed for a communication issue.
- Communication may be available between the BCM and the scan tool with the high speed GMLAN serial data system inoperative. This condition is due to the BCM using both the high and low speed GMLAN systems.

- An open in the DLC ground circuit terminal 5 will allow the scan tool to operate but not communicate with the vehicle.
- The engine will not start when there is a total malfunction of the high speed GMLAN serial data bus.
- Technicians may find various Local Area Network (LAN) communication Diagnostic Trouble Codes (DTC) and no low speed GMLAN communications with the scan tool.
- The engine will not start when there is a total malfunction of the high speed GMLAN serial data bus.

These conditions may be caused by the installation of an aftermarket navigation radio module (see bulletins). Some customers may comment of one or more of the following concerns:

- Vehicle will not crank
- Vehicle cranks but will not start
- Vehicle stability enhancement system warning lights and messages
- PRNDL gear indicator position errors

Reference Information

Schematic Reference

- **Data Communication Schematics**
- **Control Module References**

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE: Each control module may need to be disconnected to isolate a circuit fault. Use

the schematic to identify the following:

- **Control modules the vehicle is equipped with**
- **Chassis high speed GMLAN serial data circuit terminating resistors**
- **Control module locations on the chassis high speed GMLAN serial data circuits**
- **Each control module chassis high speed GMLAN serial data circuit terminals**

1. Attempt to communicate with all control modules on the high speed GMLAN serial data circuit. Refer to **Data Link References**. Communications should not be available with two or more control modules on the chassis high speed GMLAN serial data circuit.
 - If only one control module is not communicating, diagnose that control module only. Refer to **DTC U0100-U02FF**.
2. Disconnect the scan tool from the DLC. The following tests will be done at the DLC connector.
3. All access doors closed, ignition OFF for 60 seconds, test for less than 10 ohms between the ground circuit terminal 5 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
4. Ignition ON, test for less than 4.5 V between the serial data circuits listed below and ground:
 - Terminal 12
 - Terminal 13
 - If greater than the specified range, test the serial data circuit for a short to voltage. Refer to Testing the Serial Data Circuits for a Short to Voltage.
5. Ignition OFF for 60 seconds, test for greater than 100 ohms between the serial data circuits listed below and ground:
 - Terminal 12
 - Terminal 13
 - If not the specified value, test the serial data circuit for a short to ground. Refer to Testing the Serial Data Circuits for a Short to ground.
6. Test for 50-70 ohms between the serial data circuits terminal 12 and terminal 13.
 - If less than 35 ohms, test for a short between the serial data circuits. Refer to Testing the Serial Data Circuits for a Short between the Circuits.
 - If 35-50 ohms there may be a third terminating resistor between the serial data circuits. This can happen if the incorrect control module is installed. Some control modules are available with and without the terminating resistors installed to reduce the need of terminating resistors in the wiring harness.
 - If greater than 70 ohms but less than infinite, test the serial data circuit for an open/high resistance. Refer to Testing the Serial Data Circuits for an Open/High Resistance.
 - If infinite, test the serial data circuits between the DLC and the first connection to the serial data circuit for an open/high resistance.

Testing the Serial Data Circuits for a Short to Voltage

1. Ignition OFF, disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at an easily accessible control module.
2. Ignition ON, test for greater than 4.5 V between each serial data circuit at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are greater than 4.5 V.
 - If all serial data circuits are less than the specified range, replace the control module that was disconnected.
3. Ignition OFF, disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at another control module, in the direction of the circuit shorted to voltage.
4. Ignition ON, test for greater than 4.5 V between the serial data circuits at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are greater than 4.5 V.
 - If all serial data circuits are less than the specified range, replace the control module that was just disconnected.
5. Repeat step 3 until one of the follow conditions are isolated:
 - A short to voltage on the serial data circuit between 2 control modules or splice packs, if equipped
 - A short to voltage on the serial data circuit between a control module and a terminating resistor.

Testing the Serial Data Circuits for a Short to Ground

1. Ignition OFF, disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at an easily accessible control module.
2. Ignition OFF for 60 seconds, test for less than 1k ohms between each serial data circuit at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are less than 1k ohms.
 - If all serial data circuits are greater than the specified range, replace the control module that was disconnected.
3. Disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at another control module, in the direction of the circuit shorted to ground.
4. Ignition OFF for 60 seconds, test for less than 1k ohms between the serial data circuits at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are less than 1k ohms.
 - If greater than the specified range for all serial data circuits, replace the control module that was just disconnected.
5. Repeat step 3 until one of the follow conditions are isolated:
 - A short to ground on the serial data circuit between 2 control modules or splice packs, if equipped
 - A short to ground on the serial data circuit between a control module and a terminating resistor.

Testing the Serial Data Circuits for a Short between the Circuits

1. Ignition OFF, disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at an easily accessible control module that is not communicating.
2. Ignition OFF for 60 seconds, test for less than 35 ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are less than 35 ohms.

- If each pair of serial data circuits is greater than the specified range, replace the control module that was disconnected.
- 3. Connect the harness connectors at the control module that was disconnected.
- 4. Disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at another control module, in the direction of the circuits shorted together.
- 5. Ignition OFF for 60 seconds, test for less than 35 ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are less than 35 ohms.
 - If each pair of serial data circuits is within the specified range, replace the control module that was just disconnected.
- 6. Repeat step 3 until one of the following conditions are isolated:
 - Serial data circuits shorted together between 2 control modules or splice packs, if equipped
 - Serial data circuits shorted together between a control module and a terminating resistor
 - A shorted terminating resistor

Testing the Serial Data Circuits for an Open/High Resistance

- 1. Ignition OFF, disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at an easily accessible control module that is not communicating.
- 2. Ignition OFF for 60 seconds, test for greater than 100k ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are greater than 100k ohms.
 - If each pair of serial data circuits is less than the specified range, replace the control module that was disconnected.
- 3. Connect the harness connectors at the control module that was disconnected.
- 4. Disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at another control module, in the direction of the open circuit.
- 5. Ignition OFF for 60 seconds, test for greater than 100k ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are greater than 100k ohms.
 - If each pair of serial data circuits is less than the specified range, replace the control module that was just disconnected.
- 6. Repeat step 3 until one of the following conditions are isolated:
 - An open/high resistance on the serial data circuit between 2 control modules or splice packs, if equipped
 - An open/high resistance on the serial data circuit between a control module and a terminating resistor
 - An open/high resistance terminating resistor

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

- **GMLAN Wiring Repairs**
- **Control Module References** for control module replacement, setup, and programming

SCAN TOOL DOES NOT COMMUNICATE WITH HIGH SPEED GMLAN DEVICE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
High Speed GMLAN Serial Data (+)	1	U0100-U0299*	1	-
High Speed GMLAN Serial Data (-)	1	U0100-U0299*	1	-
Ground (DLC, terminal 5)	-	1	-	-
* No communications with one or more high speed GMLAN modules. An open in only one high speed GMLAN serial data circuit may allow degraded communication between the modules. An open between the data link connector (DLC) and the first splice will only effect the communication with the scan tool. The vehicle modules will still communicate. 1. No communication with any high speed GMLAN module				

Circuit/System Description

The serial data is transmitted on two twisted wires that allow speeds up to 500 Kb/s. The twisted pair is terminated with two 120 ohms resistors, one is internal to the engine control module (ECM) and the other can be a separate resistor in a connector assembly or in another control module. The resistors are used as the load for 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 of approximately 2.5 V. Driving the lines to their extremes, adds one volt to the high speed GMLAN serial data bus (+) circuit and subtracts one volt from the high speed GMLAN serial data bus (-) circuit. If serial data is lost, control modules will set a no communication code against the non-communicating control module. Note that a loss of serial data DTC does not represent a failure of the module that set it.

Diagnostic Aids

- Sometimes, while diagnosing a specific customer concern or after a repair, you may notice a history U-code present. However, there is no associated "current" or "active" status. Loss-of-communication U-codes such as these can set for a variety of reasons. Many times, they are transparent to the vehicle operator and technician, and/or have no associated symptoms. Eventually, they will erase themselves automatically after a number of fault-free ignition cycles. This condition would most likely be attributed

to one of these scenarios:

- A control module on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more modules was interrupted during diagnosis.
 - A low battery condition was present, so some control modules stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and control modules on the communication circuit did not all re-initialize at the same time.
 - If a loss-of-communication U-code appears in history for no apparent reason, it is most likely associated with one of the scenarios above. These are all temporary conditions and should never be interpreted as an intermittent fault, causing you to replace a part.
- Do not replace a control module reporting a U code. The U code identifies which control module needs to be diagnosed for a communication issue.
 - Communication may be available between the BCM and the scan tool with the high speed GMLAN serial data system inoperative. This condition is due to the BCM using both the high and low speed GMLAN systems.
 - An open in the DLC ground circuit terminal 5 will allow the scan tool to operate but not communicate with the vehicle.
 - The engine will not start when there is a total malfunction of the high speed GMLAN serial data bus.
 - Technicians may find various Local Area Network (LAN) communication Diagnostic Trouble Codes (DTC) and no low speed GMLAN communications with the scan tool.
 - The engine will not start when there is a total malfunction of the high speed GMLAN serial data bus.

These conditions may be caused by the installation of an aftermarket navigation radio module (see bulletins). Some customers may comment of one or more of the following concerns:

- Vehicle will not crank
- Vehicle cranks but will not start
- Vehicle stability enhancement system warning lights and messages
- PRNDL gear indicator position errors

Reference Information

Schematic Reference

- **Data Communication Schematics**
- **Control Module References**

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE: Each control module may need to be disconnected to isolate a circuit fault. Use the schematic to identify the following:

- Control modules the vehicle is equipped with
 - High speed GMLAN serial data circuit terminating resistors
 - Control module locations on the high speed GMLAN serial data circuits
 - Each control module's high speed GMLAN serial data circuit terminals
1. Attempt to communicate with all control modules on the high speed GMLAN serial data circuit Refer to Data Link References. Communications should not be available with two or more control modules on the high speed GMLAN serial data circuit.
 - If only one control module is not communicating, diagnose that control module only. Refer to DTC U0100-U02FF.
 2. Disconnect the scan tool from the DLC. The following tests will be done at the DLC connector.
 3. All access doors closed, ignition OFF for 60 seconds, test for less than 10 ohms between the ground circuit terminal 5 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
 4. Ignition ON, test for less than 4.5 V between the serial data circuits listed below and ground:
 - Terminal 6
 - Terminal 14
 - If greater than the specified range, test the serial data circuit for a short to voltage. Refer to Testing the Serial Data Circuits for a Short to Voltage.
 5. Ignition OFF for 60 seconds, test for greater than 100 ohms between the serial data circuits listed below and ground:
 - Terminal 6
 - Terminal 14
 - If not the specified value, test the serial data circuit for a short to ground. Refer to Testing the Serial

Data Circuits for a Short to ground.

6. Test for 50-70 ohms between the serial data circuits terminal 6 and terminal 14.
 - If less than 35 ohms, test for a short between the serial data circuits. Refer to Testing the Serial Data Circuits for a Short between the Circuits.
 - If 35-50 ohms there may be a third terminating resistor between the serial data circuits. This can happen if the incorrect control module is installed. Some control modules are available with and without the terminating resistors installed to reduce the need of terminating resistors in the wiring harness.
 - If greater than 70 ohms but less than infinite, test the serial data circuit for an open/high resistance. Refer to Testing the Serial Data Circuits for an Open/High Resistance.
 - If infinite, test the serial data circuits between the DLC and the first connection to the serial data circuit for an open/high resistance.

Testing the Serial Data Circuits for a Short to Voltage

1. Ignition OFF, disconnect the harness connectors with the high speed GMLAN serial data circuits at an easily accessible control module.
2. Ignition ON, test for greater than 4.5 V between each serial data circuit at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are greater than 4.5 V.
 - If all serial data circuits are less than the specified range, replace the control module that was disconnected.
3. Ignition OFF, disconnect the harness connectors with the high speed GMLAN serial data circuits at another control module, in the direction of the circuit shorted to voltage.
4. Ignition ON, test for greater than 4.5 V between the serial data circuits at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are greater than 4.5 V.
 - If all serial data circuits are less than the specified range, replace the control module that was just disconnected.
5. Repeat step 3 until one of the follow conditions are isolated:
 - A short to voltage on the serial data circuit between 2 control modules or splice packs, if equipped
 - A short to voltage on the serial data circuit between a control module and a terminating resistor.

Testing the Serial Data Circuits for a Short to Ground

1. Ignition OFF, disconnect the harness connectors with the high speed GMLAN serial data circuits at an easily accessible control module.
2. Ignition OFF for 60 seconds, test for less than 1k ohms between each serial data circuit at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are less than 1k ohms.
 - If all serial data circuits are greater than the specified range, replace the control module that was disconnected.
3. Disconnect the harness connectors with the high speed GMLAN serial data circuits at another control module, in the direction of the circuit shorted to ground.
4. Ignition OFF for 60 seconds, test for less than 1k ohms between the serial data circuits at the control

module connector that was just disconnected and ground. Verify that one or more serial data circuits are less than 1k ohms.

- If greater than the specified range for all serial data circuits, replace the control module that was just disconnected.

5. Repeat step 3 until one of the follow conditions are isolated:

- A short to ground on the serial data circuit between 2 control modules or splice packs, if equipped
- A short to ground on the serial data circuit between a control module and a terminating resistor.

Testing the Serial Data Circuits for a Short between the Circuits

1. Ignition OFF, disconnect the harness connectors with the high speed GMLAN serial data circuits at an easily accessible control module that is not communicating.
2. Ignition OFF for 60 seconds, test for less than 35 ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are less than 35 ohms.
 - If each pair of serial data circuits is greater than the specified range, replace the control module that was disconnected.
3. Connect the harness connectors at the control module that was disconnected.
4. Disconnect the harness connectors with the high speed GMLAN serial data circuits at another control module, in the direction of the circuits shorted together.
5. Ignition OFF for 60 seconds, test for less than 35 ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are less than 35 ohms.
 - If each pair of serial data circuits is within the specified range, replace the control module that was just disconnected.
6. Repeat step 3 until one of the following conditions are isolated:
 - Serial data circuits shorted together between 2 control modules or splice packs, if equipped
 - Serial data circuits shorted together between a control module and a terminating resistor
 - A shorted terminating resistor

Testing the Serial Data Circuits for an Open/High Resistance

1. Ignition OFF, disconnect the harness connectors with the high speed GMLAN serial data circuits at an easily accessible control module that is not communicating.
2. Ignition OFF for 60 seconds, test for greater than 100k ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are greater than 100k ohms.
 - If each pair of serial data circuits is less than the specified range, replace the control module that was disconnected.
3. Connect the harness connectors at the control module that was disconnected.
4. Disconnect the harness connectors with the high speed GMLAN serial data circuits at another control module, in the direction of the open circuit.
5. Ignition OFF for 60 seconds, test for greater than 100k ohms between each pair of serial data circuits at

the control module connector that was just disconnected. Verify that one pair of serial data circuits are greater than 100k ohms.

- If each pair of serial data circuits is less than the specified range, replace the control module that was just disconnected.

6. Repeat step 3 until one of the following conditions are isolated:

- An open/high resistance on the serial data circuit between 2 control modules or splice packs, if equipped
- An open/high resistance on the serial data circuit between a control module and a terminating resistor
- An open/high resistance terminating resistor

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

- **GMLAN Wiring Repairs**
- **Control Module References** for control module replacement, setup, and programming

SCAN TOOL DOES NOT COMMUNICATE WITH MID SPEED GMLAN DEVICE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Mid Speed GMLAN Serial Data (+)	1	U0100-U0299*	1	-
Mid Speed GMLAN Serial Data (-)	1	U0100-U0299*	1	-
Ground (DLC, terminal 5)	-	1	-	-

* No communications with one or more mid speed GMLAN modules. An open in only one mid speed GMLAN serial data circuit may allow degraded communication between the modules. An open between the data link connector (DLC) and the first splice will only effect the communication with the scan tool. The vehicle modules will still communicate.

1. No communication on any mid speed GMLAN module.

Circuit/System Description

Modules connected to the mid speed GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the modules when the ignition switch is in any position other than OFF. The mid speed GMLAN serial data bus uses a terminating

resistor that is in parallel with the mid speed GMLAN (+) and (-) circuits.

Diagnostic Aids

- Sometimes, while diagnosing a specific customer concern or after a repair, you may notice a history U-code present. However, there is no associated "current" or "active" status. Loss-of- communication U-codes such as these can set for a variety of reasons. Many times, they're transparent to the vehicle operator and technician, and/or have no associated symptoms. Eventually, they will erase themselves automatically after a number of fault-free ignition cycles. This condition would most likely be attributed to one of these scenarios:
 - A control module on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more modules was interrupted during diagnosis.
 - A low battery condition was present, so some control modules stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and control modules on the communication circuit did not all re-initialize at the same time.
 - If a loss-of-communication U-code appears in history for no apparent reason, it is most likely associated with one of the scenarios above. These are all temporary conditions and should never be interpreted as an intermittent fault, causing you to replace a part.
- Do not replace a control module reporting a U code. The U code identifies which control module needs to be diagnosed for a communication issue.
- Communication may be available between the BCM and the scan tool with the mid speed GMLAN serial data system inoperative. This condition is due to the BCM using the high, mid, and low speed GMLAN systems.
- An open in the DLC ground circuit terminal 5 will allow the scan tool to operate but not communicate with the vehicle.
- The engine will not start when there is a total malfunction of the mid speed GMLAN serial data bus.
- Technicians may find various Local Area Network communication Diagnostic Trouble Codes (DTC) and no low speed GMLAN communications with the scan tool.

These conditions may be caused by the installation of an aftermarket navigation radio module (see bulletins). Some customers may comment of one or more of the following concerns:

- Vehicle will not crank
- Vehicle cranks but will not start
- Vehicle stability enhancement system warning lights and messages
- PRNDL gear indicator position errors

Reference Information

Schematic Reference

- **Data Communication Schematics**

- **Control Module References**

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE: Each control module may need to be disconnected to isolate a circuit fault. Use the schematic to identify the following:

- Control modules the vehicle is equipped with
- Mid speed GMLAN serial data circuit terminating resistors
- Control module locations on the mid speed GMLAN serial data circuits
- Each control module's mid speed GMLAN serial data circuit terminals

1. Attempt to communicate with all control modules on the mid speed GMLAN serial data circuit. Refer to **Data Link References**. Communications should not be available with two or more control modules on the mid speed GMLAN serial data circuit.
 - If only one control module is not communicating, diagnose that control module only. Refer to **DTC U0100-U02FF**.
2. Disconnect the scan tool from the DLC. The following tests will be done at the DLC connector.
3. All access doors closed, ignition OFF for 60 seconds, test for less than 10 ohms between the ground circuit terminal 5 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
4. Ignition ON, test for less than 4.5 V between the serial data circuits listed below and ground:
 - Terminal 3
 - Terminal 11

- If greater than the specified range, test the serial data circuit for a short to voltage. Refer to Testing the Serial Data Circuits for a Short to Voltage.
- 5. Ignition OFF for 60 seconds, test for greater than 100 ohms between the serial data circuits listed below and ground:
 - Terminal 3
 - Terminal 11
 - If not the specified value, test the serial data circuit for a short to ground. Refer to Testing the Serial Data Circuits for a Short to ground.
- 6. Test for 50-70 ohms between the serial data circuits terminal 3 and terminal 11.
 - If less than 35 ohms, test for a short between the serial data circuits. Refer to Testing the Serial Data Circuits for a Short between the Circuits.
 - If 35-50 ohms there may be a third terminating resistor between the serial data circuits. This can happen if the incorrect control module is installed. Some control modules are available with and without the terminating resistors installed to reduce the need of terminating resistors in the wiring harness.
 - If greater than 70 ohms but less than infinite, test the serial data circuit for an open/high resistance. Refer to Testing the Serial Data Circuits for an Open/High Resistance.
 - If infinite, test the serial data circuits between the DLC and the first connection to the serial data circuit for an open/high resistance.

Testing the Serial Data Circuits for a Short to Voltage

1. Ignition OFF, disconnect the harness connectors with the mid speed GMLAN serial data circuits at an easily accessible control module.
2. Ignition ON, test for greater than 4.5 V between each serial data circuit at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are greater than 4.5 V.
 - If all serial data circuits are less than the specified range, replace the control module that was disconnected.
3. Ignition OFF, disconnect the harness connectors with the mid speed GMLAN serial data circuits at another control module, in the direction of the circuit shorted to voltage.
4. Ignition ON, test for greater than 4.5 V between the serial data circuits at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are greater than 4.5 V.
 - If all serial data circuits are less than the specified range, replace the control module that was just disconnected.
5. Repeat step 3 until one of the follow conditions are isolated:
 - A short to voltage on the serial data circuit between 2 control modules or splice packs, if equipped
 - A short to voltage on the serial data circuit between a control module and a terminating resistor

Testing the Serial Data Circuits for a Short to Ground

1. Ignition OFF, disconnect the harness connectors with the mid speed GMLAN serial data circuits at an easily accessible control module.
2. Ignition OFF for 60 seconds, test for less than 1k ohms between each serial data circuit at the control

module connector that was just disconnected and ground. Verify that one or more serial data circuits are less than 1k ohms.

- If all serial data circuits are greater than the specified range, replace the control module that was disconnected.
3. Disconnect the harness connectors with the mid speed GMLAN serial data circuits at another control module, in the direction of the circuit shorted to ground.
 4. Ignition OFF for 60 seconds, test for less than 1k ohms between the serial data circuits at the control module connector that was just disconnected and ground. Verify that one or more serial data circuits are less than 1k ohms.
 - If greater than the specified range for all serial data circuits, replace the control module that was just disconnected.
 5. Repeat step 3 until one of the follow conditions are isolated:
 - A short to ground on the serial data circuit between 2 control modules or splice packs, if equipped
 - A short to ground on the serial data circuit between a control module and a terminating resistor

Testing the Serial Data Circuits for a Short between the Circuits

1. Ignition OFF, disconnect the harness connectors with the mid speed GMLAN serial data circuits at an easily accessible control module that is not communicating.
2. Ignition OFF for 60 seconds, test for less than 35 ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are less than 35 ohms.
 - If each pair of serial data circuits is greater than the specified range, replace the control module that was disconnected.
3. Connect the harness connectors at the control module that was disconnected.
4. Disconnect the harness connectors with the mid speed GMLAN serial data circuits at another control module, in the direction of the circuits shorted together.
5. Ignition OFF for 60 seconds, test for less than 35 ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are less than 35 ohms.
 - If each pair of serial data circuits is within the specified range, replace the control module that was just disconnected.
6. Repeat step 3 until one of the following conditions are isolated:
 - Serial data circuits shorted together between 2 control modules or splice packs, if equipped
 - Serial data circuits shorted together between a control module and a terminating resistor
 - A shorted terminating resistor

Testing the Serial Data Circuits for an Open/High Resistance

1. Ignition OFF, disconnect the harness connectors with the mid speed GMLAN serial data circuits at an easily accessible control module that is not communicating.
2. Ignition OFF for 60 seconds, test for greater than 100k ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits are

greater than 100k ohms.

- If each pair of serial data circuits is less than the specified range, replace the control module that was disconnected.
3. Connect the harness connectors at the control module that was disconnected.
 4. Disconnect the harness connectors with the mid speed GMLAN serial data circuits at another control module, in the direction of the open circuit.
 5. Ignition OFF for 60 seconds, test for greater than 100k ohms between each pair of serial data circuits at the control module connector that was just disconnected. Verify that one pair of serial data circuits is greater than 100k ohms.
 - If each pair of serial data circuits is less than the specified range, replace the control module that was just disconnected.
 6. Repeat step 3 until one of the following conditions are isolated:
 - An open/high resistance on the serial data circuit between 2 control modules or splice packs, if equipped
 - An open/high resistance on the serial data circuit between a control module and a terminating resistor
 - An open/high resistance terminating resistor

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

- **GMLAN Wiring Repairs**
- **Control Module References** for control module replacement, setup, and programming

SCAN TOOL DOES NOT COMMUNICATE WITH LOW SPEED GMLAN DEVICE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Low Speed GMLAN Serial Data	1	U0100-U0299*	1	-
Ground (DLC, terminal 5)	-	1*	-	-
* An open between the data link connector serial data circuit terminal 1 or ground circuit terminal 5 and the BCM circuit will only effect the communication with the scan tool.				
1. No communication on any low speed GMLAN module				

Circuit/System Description

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. The control modules toggle the serial data circuit between 0-5 V during normal communications. To wake the control modules connected to the GMLAN low speed serial data circuit, a voltage wake up pulse of 10 V is sent out. If serial data is lost, control modules will set a no communication code against the non-communicating control module. Note: a loss of serial data communications DTC does not represent a failure of the module that set it.

Diagnostic Aids

- Sometimes, while diagnosing a specific customer concern or after a repair, you may notice a history U-code present. However, there is no associated "current" or "active" status. Loss-of- communication U-codes such as these can set for a variety of reasons. Many times, they are transparent to the vehicle operator and technician, and/or have no associated symptoms. Eventually, they will erase themselves automatically after a number of fault-free ignition cycles. This condition would most likely be attributed to one of these scenarios:
 - A control module on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more modules was interrupted during diagnosis
 - A low battery condition was present, so some control modules stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and control modules on the communication circuit did not all re-initialize at the same time.
 - If a loss-of-communication U-code appears in history for no apparent reason, it is most likely associated with one of the scenarios above. These are all temporary conditions and should never be interpreted as an intermittent fault, causing you to replace a part.
- Do not replace a control module reporting a U-code. The U-code identifies which control module needs to be diagnosed for a communication issue.
- Communication may be available between the body control module (BCM) and the scan tool with the low speed GMLAN serial data system inoperative. This condition is due to the BCM using both the high and low speed GMLAN systems.
- An open in the low speed GMLAN serial data circuit between the splice pack and a module will only affect that specific module. This type of failure will set a loss of communication DTC for each module effected, and the other modules will still communicate.
- An open in the data link connector (DLC) ground circuit terminal 5 will allow the scan tool to operate but not communicate with the vehicle.
- The engine may not start when there is a total malfunction of the low speed GMLAN serial data circuit.
- Technicians may find various Local Area Network (LAN) communication Diagnostic Trouble Codes (DTC) and no low speed LAN communications with the scan tool.

These conditions may be caused by the installation of an aftermarket navigation radio module (see bulletins). Some customers may comment of one or more of the following concerns:

- Vehicle will not crank
- Vehicle cranks but will not start

- Vehicle stability enhancement system warning lights and messages
- PRNDL gear indicator position errors

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Data Link Communications Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Circuit/System Testing

NOTE: Use the schematic to identify the following:

- Control modules the vehicle is equipped with
 - Control module and splice pack locations on the low speed GMLAN serial data circuit
 - The low speed GMLAN serial data circuit terminals for each control module, component, or splice pack
1. Attempt to communicate with all control modules on the low speed GMLAN serial data circuit. Refer to **Data Link References**. Communications should not be available with two or more control modules on the low speed GMLAN serial data circuit.
 - If only one control module is not communicating, diagnose that control module only. Refer to **DTC U0100-U02FF**.
 - If one or more control modules are communicating but not all, refer to Testing the Serial Data Circuit for an Open/High Resistance.
 2. Disconnect the scan tool from the DLC. The following tests will be done at the DLC connector.
 3. All access doors closed, ignition OFF for 60 seconds, test for less than 10 ohms between the ground circuit terminal 5 and ground.

- If greater than the specified range, test the ground circuit for an open/high resistance.
- 4. Ignition ON, test for less than 4.5 V between the serial data circuit terminal 1 and ground.
 - If greater than the specified range, test the serial data circuit for a short to voltage. Refer to Testing the Serial Data Circuit for a Short to Voltage.
- 5. Ignition OFF for 60 seconds, test for greater than 100 ohms between the serial data circuit terminal 1 and ground.
 - If less than the specified range, test the serial data circuit for a short to ground. Refer to Testing the Serial Data Circuits for a Short to ground.
- 6. Disconnect the harness connector at the first splice pack closest in the circuit to the DLC.
- 7. Test for less than 2 ohms between the DLC serial data circuit terminal 1 and the splice pack connector serial data input terminal.
 - If greater than the specified range, test the serial data circuit for an open/high resistance. If the circuit tests normal, replace the splice pack.

Testing the Serial Data Circuits for a Short to Voltage

1. Ignition OFF, disconnect the appropriate harness connectors at the following components:
 - All low speed serial data splice packs
 - Any module or component between that may be between the splice packs
2. Ignition ON, test for less than 4.5 V between the DLC serial data circuit terminal 1 and ground.
 - If greater than the specified range, repair the short to voltage.
3. Test for less than 4.5 V between each serial data circuit at each component connector and ground.
 - If greater than the specified range, perform the appropriate test listed below:
 - Serial data circuits with one control module, test the serial data circuit for a short to voltage. If the circuit tests normal, replace the control module.
 - Serial data circuits with 2 or more control modules, test each section of the serial data circuit for a short to voltage. If the circuits test normal, replace the control module that causes the short to voltage when connected.

Testing the Serial Data Circuits for a Short to Ground

1. Ignition OFF, disconnect the appropriate harness connectors at the following components:
 - All low speed serial data splice packs
 - Any module or component between that may be between the splice packs
2. Test for infinite resistance between the DLC serial data circuit terminal 1 and ground.
 - If not the specified value, repair the short to ground.
3. Ignition OFF for 60 seconds, test for greater than 100 ohms between each serial data circuit at the splice pack and ground.
 - If less than the specified range, perform the appropriate test listed below:
 - Serial data circuits with one control module, test the serial data circuit for a short to ground. If the circuit

tests normal, replace the control module.

- Serial data circuits with 2 or more control modules, test each section of the serial data circuit for a short to ground. If the circuits test normal, replace the control module that causes the short to ground when connected.

Testing the Serial Data Circuit for an Open/High Resistance

1. If equipped with a second splice pack, ignition ON, verify the scan tool communicates with one or more control modules connected to the second splice pack.
 - If all control modules on the second splice pack do not communicate, test the serial data circuit between the first and second splice packs for an open/high resistance. If the circuit tests normal, test the second splice pack for an open/high resistance. If the splice pack tests normal, replace any module or component that may be between those two splice packs.
2. If equipped with a third splice pack, ignition ON, verify the scan tool communicates with one or more control modules connected to the third splice pack.
 - If all control modules on the third splice pack do not communicate, test the serial data circuit between the second and third splice packs for an open/high resistance. If the circuit tests normal, test the third splice pack for an open/high resistance. If the splice pack tests normal, replace any module or component that may be between the those two splice packs.
3. Ignition OFF, disconnect the splice pack containing the serial data circuits to the modules that are not communicating.
4. Install a 3 A fused jumper wire between the splice pack connector serial data input terminal and a low speed GMLAN serial data circuit that is not communicating:
5. Ignition ON, verify the scan tool communicates with the control modules connected to the low speed GMLAN serial data circuit.
 - If any control module does not communicate, test each section of the serial data circuit for an open/high resistance. If the circuits test normal, replace the control module that does not communicate when connected.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the repair.

- **GMLAN Wiring Repairs**
- **Control Module References** for module replacement, setup, and programming

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. Not all modules listed will be applicable to all vehicles. Refer to the schematics to determine which modules apply. For the description and operation of these serial data communication circuits refer to **Data Link Communications Description and Operation**.

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Control Module	Data Link Type	Diagnostic Procedure
Schematic Reference: <u>Data Communication Schematics</u>		
Advanced Parking Assist Control Module	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Body Control Module	• High Speed GMLAN • Mid Speed GMLAN • Low Speed GMLAN • Local Interconnect Network (LIN)	• <u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u> • <u>Scan Tool Does Not Communicate with Mid Speed GMLAN Device</u> • <u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u> • <u>DTC U1500-U15BF</u>
Chime Alarm Control Module	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Compass Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Content Theft Deterrent Sensor Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Digital Radio Receiver Control Module	Mid Speed GMLAN	<u>Scan Tool Does Not Communicate with Mid Speed GMLAN Device</u>
Driver Door Switch Panel Control Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Driver Mirror Control Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Electronic Brake Control Module	• High Speed GMLAN • Chassis High Speed GMLAN	<u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u> or <u>Scan Tool Does Not Communicate with Chassis High Speed GMLAN Device</u>
Engine Control Module	High Speed GMLAN	<u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u>
Front Seat Heating Control Module	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Fuel Pump Control Module	High Speed GMLAN	<u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u>
		<u>Scan Tool Does Not</u>

Headlamp Control Module	High Speed GMLAN	<u>Communicate with High Speed GMLAN Device</u>
Headlamp High Beam Control Module	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Inflatable Restraint Sensing and Diagnostic Module	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Info Display Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Infotainment Faceplate Control Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Inside Rear View Mirror	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Instrument Cluster	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Keyless Entry Control Module	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Left Front Window Motor Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Left Headlamp Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Left Rear Door Switch Panel Control Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Left Rear Window Motor Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Liftgate Control Module	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Memory Seat Control Module	Low Speed GMLAN Local Interconnect Network (LIN)	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u> or <u>DTC U1500-U15BF</u>
Mobile Telephone Control Module	• Mid Speed GMLAN • Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Mid Speed GMLAN Device</u> or <u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Multi-axis Acceleration Sensor Module	Chassis High Speed GMLAN	<u>Scan Tool Does Not Communicate with Chassis High Speed GMLAN Device</u>
Parking Assist Control Module	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>

Parking Brake Control Module	High Speed GMLAN	<u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u>
Parking Heater Control Module (GME Only)	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Passenger Door Switch Panel Control Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Passenger Mirror Control Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Passenger Presence Detection Module	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Power Sounder Content Theft Deterrent Alarm Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Power Steering Control Module	• High Speed GMLAN • Chassis High Speed GMLAN	<u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u> or <u>Scan Tool Does Not Communicate with Chassis High Speed GMLAN Device</u>
Radio (Base)	• Mid Speed GMLAN • Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Mid Speed GMLAN Device</u> or <u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Radio (High Content Navigation)	• Mid Speed GMLAN • Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Mid Speed GMLAN Device</u> or <u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Radio (In-Dash CD Changer)	• Mid Speed GMLAN • Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Mid Speed GMLAN Device</u> or <u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Radio (Medium Content Navigation)	• Mid Speed GMLAN	<u>Scan Tool Does Not Communicate with Mid Speed GMLAN Device</u> or

	• Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Radio (Rear Seat Entertainment Lite)	• Mid Speed GMLAN • Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Mid Speed GMLAN Device</u> or <u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Rain/Ambient Light Sensor Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Rear Differential Clutch Control Module	• High Speed GMLAN • Chassis High Speed GMLAN	<u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u> or <u>Scan Tool Does Not Communicate with Chassis High Speed GMLAN Device</u>
Remote Heater and Air Conditioning Control Module	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Right Front Window Motor Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Right Headlamp Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Right Rear Door Switch Panel Control Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Right Rear Window Motor Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Steering Angle Sensor Module	Chassis High Speed GMLAN	<u>Scan Tool Does Not Communicate with Chassis High Speed GMLAN Device</u>
Steering Column Lock Control Module	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Sunroof Sunshade Motor Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Sunroof Window Motor Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Suspension Control Module	• High Speed GMLAN • Chassis High Speed GMLAN	<u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u> or <u>Scan Tool Does Not Communicate with Chassis High Speed GMLAN Device</u>
Tire Pressure Sensor Locator Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>

Trailer Interface Control Module	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Transmission Control Module	High Speed GMLAN	<u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u>
Transmission Range Indicator Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15BF</u>
Variable Power Steering Control Module	High Speed GMLAN	<u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u>
Vehicle Communication Interface Module (VCIM)	• High Speed GMLAN • Low Speed GMLAN	<u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u> or <u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
Vehicle Direction Camera Control Module	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>

REPAIR INSTRUCTIONS

BODY CONTROL MODULE REPLACEMENT

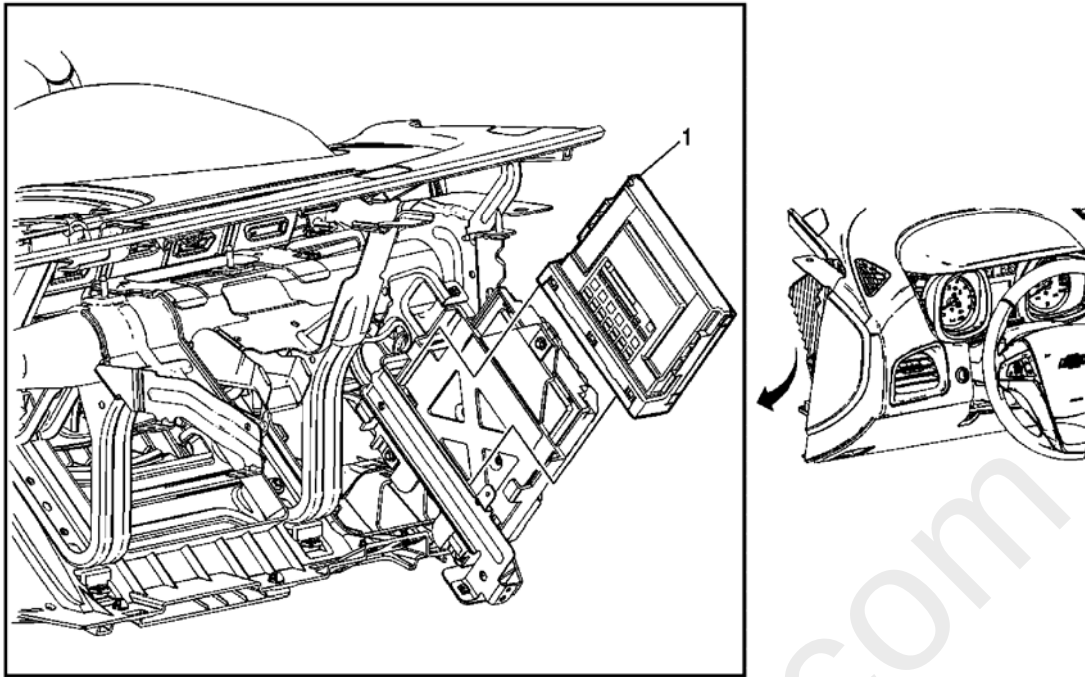


Fig. 13: Body Control Module
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
1. Remove the drivers side insulator panel. Refer to <u>Instrument Panel Insulator Panel Replacement - Left Side (Equinox)</u> or <u>Instrument Panel Insulator Panel Replacement - Left Side (Terrain)</u> 2. Remove the driver knee bolster reinforcement. Refer to <u>Driver Knee Bolster Reinforcement Replacement (Equinox)</u> or <u>Driver Knee Bolster Reinforcement Replacement (Terrain)</u>	
1	Body Control Module Procedure 1. Disconnect the electrical connectors. 2. Depress the tab on the bracket and slide the module forward. 3. Reprogram the module if replaced. Refer to <u>Control Module References</u> .

DESCRIPTION AND OPERATION

BODY CONTROL SYSTEM DESCRIPTION AND OPERATION

The body control system consists of the body control module (BCM), communications, and various input and outputs. Some inputs, outputs and messages require other modules to interact with the BCM. The BCM also has

discrete input and output terminals to control the vehicle's body functions. The BCM is wired to the high speed GMLAN serial data bus, low speed GMLAN serial data bus and Multiple LIN buses and acts as a gateway between them.

Power Mode Master

This vehicle body control module (BCM) functions as the power mode master (PMM). The ignition switch is a low current switch with multiple discrete ignition switch signals to the PMM for determining the power mode that will be sent over the serial data circuits to the other modules that need this information; the PMM will activate relays and other direct outputs of the PMM as needed. Refer to **Power Mode Description and Operation** for a complete description of power mode functions.

Gateway

The body control module (BCM) in this vehicle functions as a gateway or translator. The purpose of the gateway is to translate serial data messages between the GMLAN high speed bus and the GMLAN low speed bus for communication between the various modules. The gateway will interact with each network according to that network's transmission protocol.

All communication between the BCM and a scan tool is on the high speed GMLAN serial data circuits. A lost communication DTC typically is set in modules other than the module with a communication failure.

Body Control

The various body control module (BCM) input and output circuits are illustrated in the corresponding functional areas on the BCM electrical schematics. Refer to the **Body Control System Schematics** for more detailed information.

DATA LINK COMMUNICATIONS DESCRIPTION AND OPERATION

Circuit Description

The communication among control modules is performed through the high speed GMLAN serial data circuit, the chassis high speed GMLAN serial data circuit, the mid speed GMLAN serial data circuit, and the low speed GMLAN serial data circuit. The modules that need real time communication are attached to the high speed GMLAN network and the chassis 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 high speed GMLAN bus and the low speed GMLAN bus. 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.

High Speed GMLAN 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 two twisted wires that allow speed up to 500 Kb/s. The twisted pair is terminated with 120 ohms resistors. The resistors are used to reduce noise on the high speed GMLAN bus 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. Note: a loss of serial data DTC does not represent a failure of the module that the code is set in.

Chassis High Speed GMLAN Circuit Description

The high speed GMLAN chassis expansion bus functions the same as the high speed GMLAN bus, and the two buses operate in parallel. The expansion chassis bus was added to reduce message congestion on the primary high speed bus. Since the high speed GMLAN chassis bus and primary high speed GMLAN bus operate in the same manner, the diagnostics for each are the same.

Mid Speed GMLAN Circuit Description

The data link connector (DLC) allows a scan tool to communicate with the mid speed GMLAN serial data circuit. Modules connected to the mid speed GMLAN serial data circuit monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the modules when the ignition switch is in any position other than OFF. The mid speed GMLAN serial data bus uses a terminating resistor that is in parallel with the mid speed GMLAN (+) and (-) circuits.

Low Speed GMLAN 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 low speed GMLAN is up to 83.33 Kb/s. Under normal vehicle operating conditions, the speed of the bus is 33.33 Kb/s. This protocol produces a simple pulse train sent out over the low speed GMLAN serial data bus. When a module pulls the bus high, 5 volts, this creates a dominant logic state or 0 on the bus. When the bus is pulled low, 0 volts, it is translated as a recessive logic state or 1. To wake the control modules connected to the low speed GMLAN serial data bus, a high voltage wake up pulse is sent out over the bus, the voltage level of the pulse is +10 volts. Modules connected to the low speed GMLAN bus can be part of a virtual network as described in the previous paragraph. The modules on the low speed GMLAN serial data bus are connected to the bus in a parallel configuration.

Local Interconnect Network (LIN) Circuit Description

Serial data is transmitted over a Local Interconnect Network (LIN) single wire network circuit bus between a primary control module and other control modules within a particular subsystem. If serial data communication is lost between any of the control modules on the LIN bus network, a no communication code against the non-communicating control module will be set.

CAN Graphical Interface (CGI) Circuit Description

The CAN graphical interface (CGI) is a high speed UART-based serial data interface utilizing a CAN physical layer. It is used by the Entertainment sub-system to transfer high-rate display graphics between the Radio and the Info Display Module and/or Radio/HVAC Control. In the case where the Info Display Module and Radio/HVAC Control are separate control modules, the Radio interfaces only with the Info Display Module and the Info Display Module communicates with the Radio/HVAC Control through a LIN interface. The Info Display Module therefore is responsible for passing information between the Radio and the Radio/HVAC Control. A bus wake up signal will be generated by the Radio or by the Info Display Module when the systems functionality is required. Once the CGI network is awake, all message transfers on the CGI are initiated by the Radio. Slave devices such as the Info Display Module and Radio/HVAC Control may not transmit unless they are responding to a request from the Radio.

Dual wire CGI networks have a termination resistance between the CGI+ (CAN- High) and CGI- (CAN- Low) conductors at each end of the bus. Each termination resistance is 120 ohms.

The communication function of the CGI shall be enabled or disabled based on the voltage level of a dedicated input (typically called "Center Stack Wake"). The network will stay awake as long as this discrete signal is driven low to less than 1.5 V. When the Radio determines that the communication bus needs to be operational or active, it shall generate the wake-up signal by pulling this signal circuit low.

The Radio can execute a warm reset of the Info Display Module if the Info Display Module fails to respond to Radio's request via the CGI interface. Center Stack Reset is a low-asserted pull down output (less than 1.5 V) from the Radio to the Info Display Module and has the same electrical characteristics as those for the Center Stack Wake signal defined above.

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 Low speed GMLAN communications terminal
- Pin 3 Mid speed GMLAN serial bus (+) terminal
- Pin 4 Scan tool power ground terminal
- Pin 5 Common signal ground terminal
- Pin 6 High speed GMLAN serial data bus (+) terminal
- Pin 11 Mid speed GMLAN serial bus (-) terminal
- Pin 12 Chassis high speed GMLAN serial bus terminal
- Pin 13 Chassis high speed GMLAN serial bus terminal
- Pin 14 High speed GMLAN serial data bus (-) terminal
- Pin 16 Scan tool power, battery positive voltage terminal

Serial Data Reference

The scan tool communicates over the various buses 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 buses they communicate with, and the RPO codes for a specific module.

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