

Data Communications - Malibu

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Body Control Module Bracket Fastener	9 N.m	80 lb in

DATA COMMUNICATION WIRING SCHEMATICS

Linear Interconnect Network (LIN) 1, 2, 3 and 4 Busses Wiring Schematics

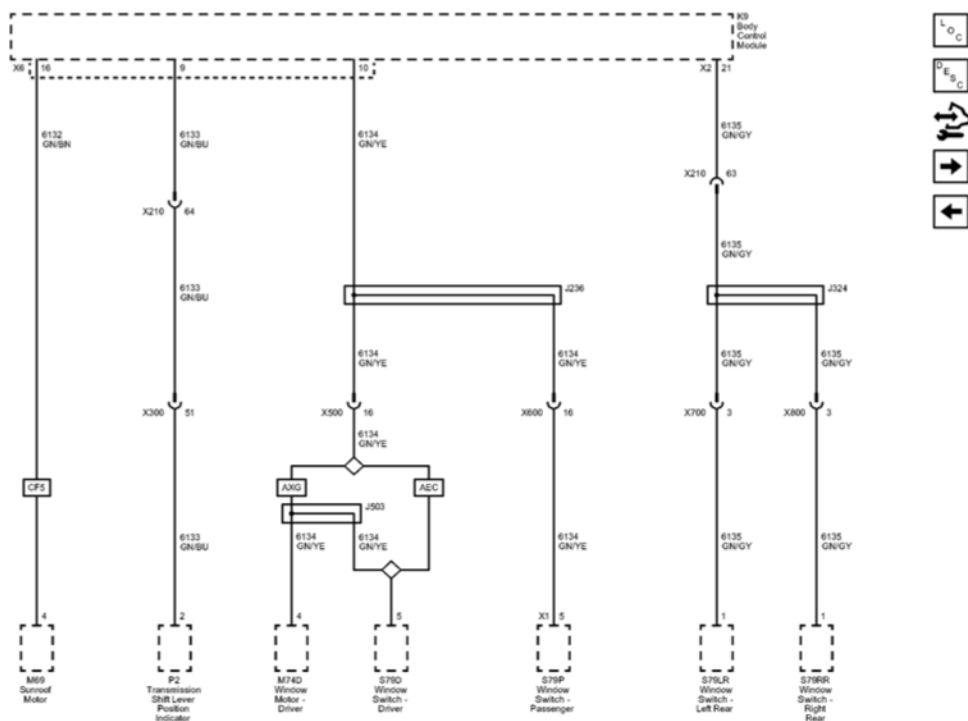


Fig. 2: Linear Interconnect Network (LIN) 1, 2, 3 and 4 Busses Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

Communications Enable Wiring Schematics

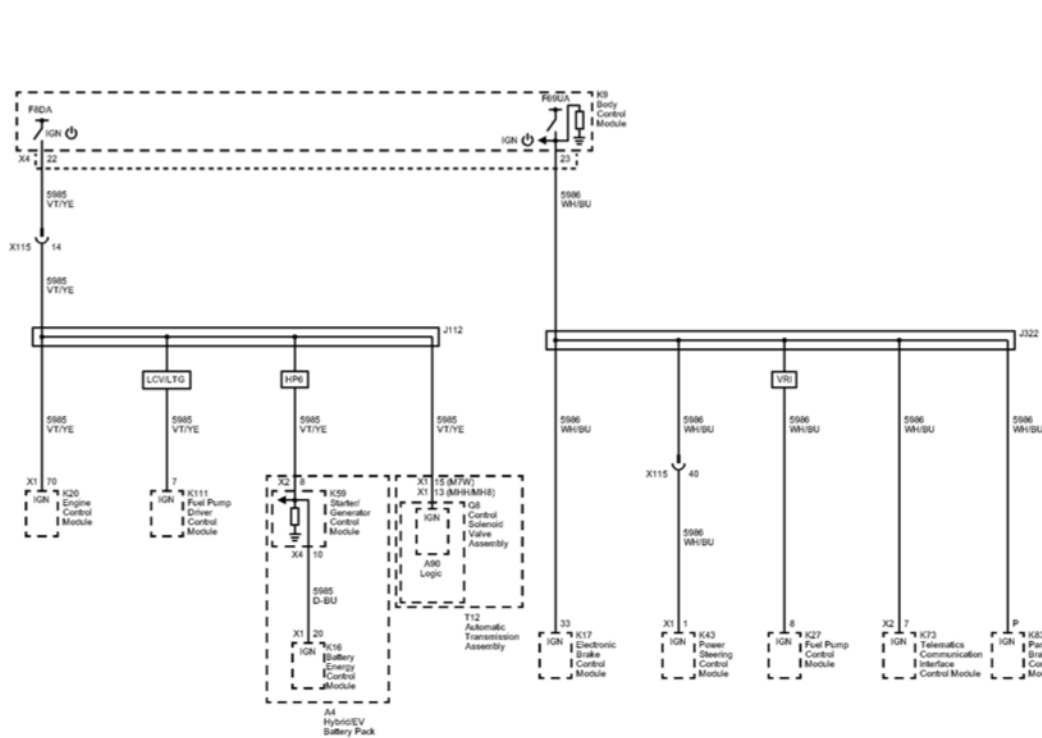


Fig. 3: Communications Enable Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

Linear Interconnect Network (LIN) 6, 7, 8, 9, 10 and 11 Busses Wiring Schematics

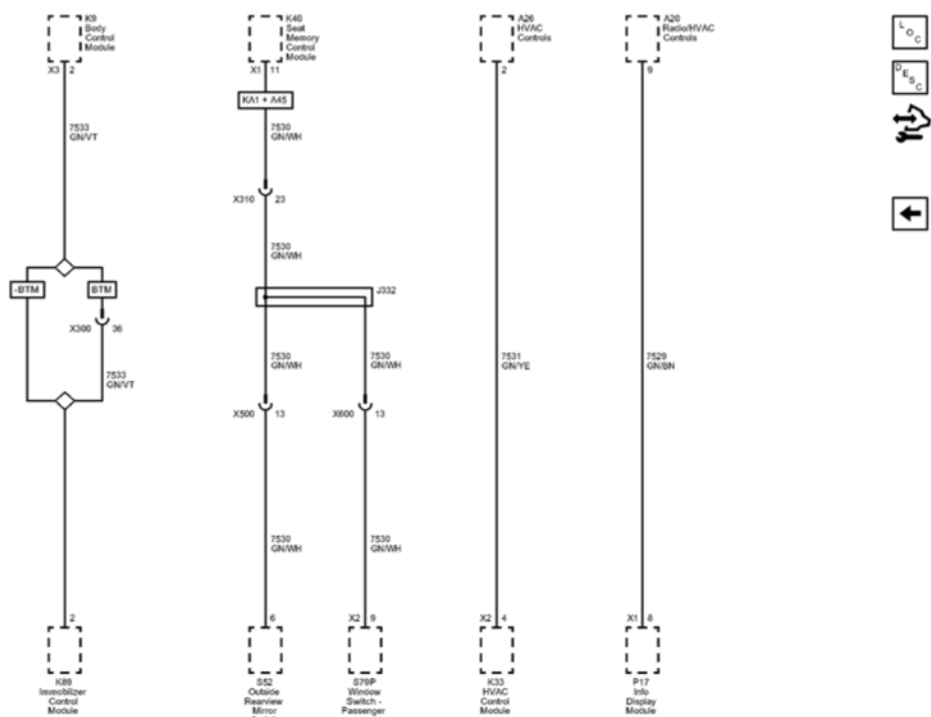


Fig. 4: Linear Interconnect Network (LIN) 6, 7, 8, 9, 10 and 11 Busses Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

Powertrain and Chassis Expansion Busses Wiring Schematics

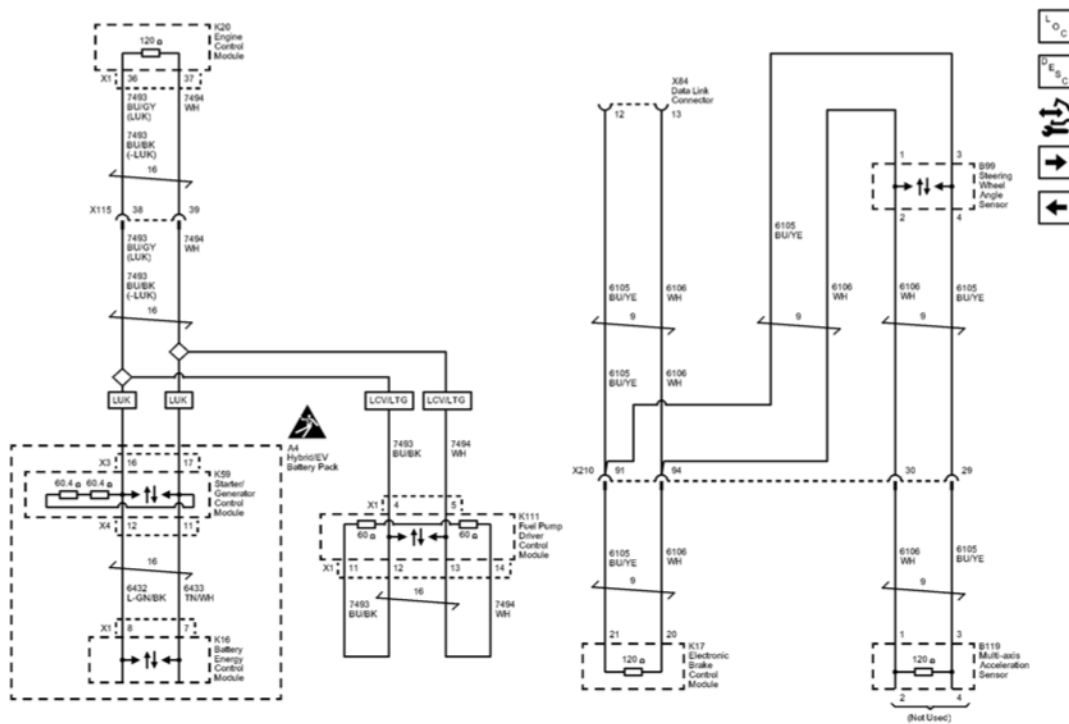


Fig. 5: Powertrain and Chassis Expansion Buses Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

High Speed GMLAN (1 of 2) Wiring Schematics

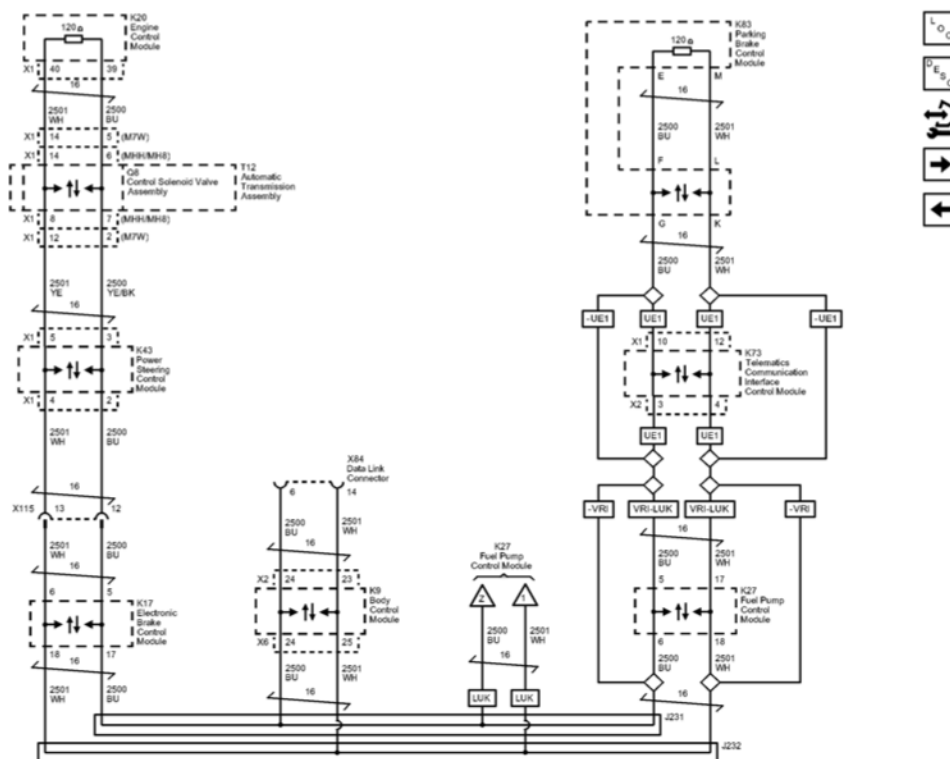


Fig. 6: High Speed GMLAN (1 of 2) Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

High Speed GMLAN (2 of 2) Wiring Schematics

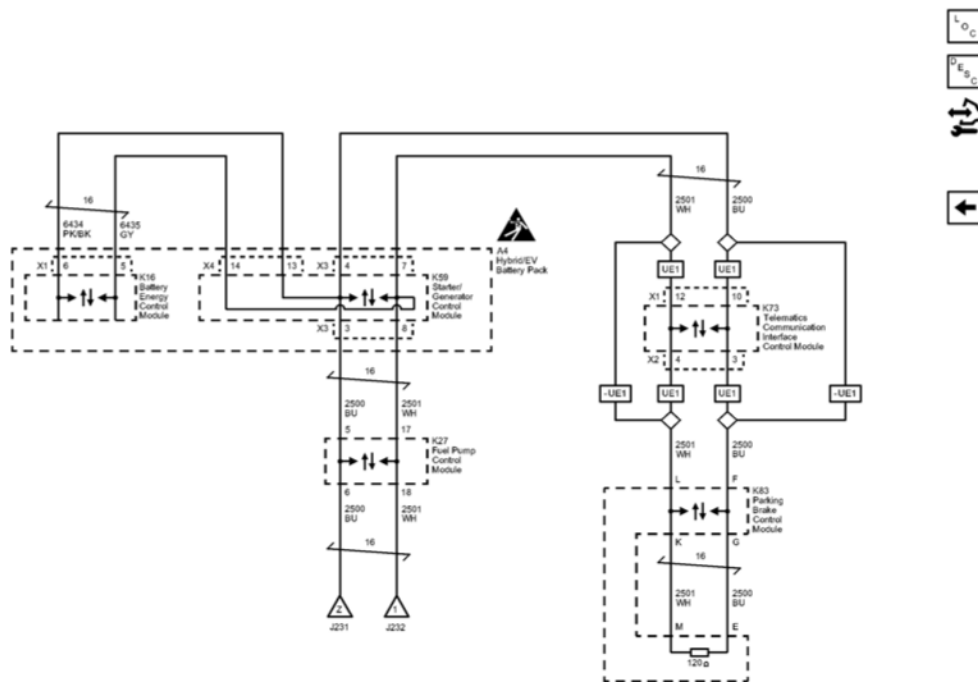


Fig. 7: High Speed GMLAN (2 of 2) Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

BODY CONTROL SYSTEM WIRING SCHEMATICS

Power, Ground, and Data Communication References Wiring Schematics

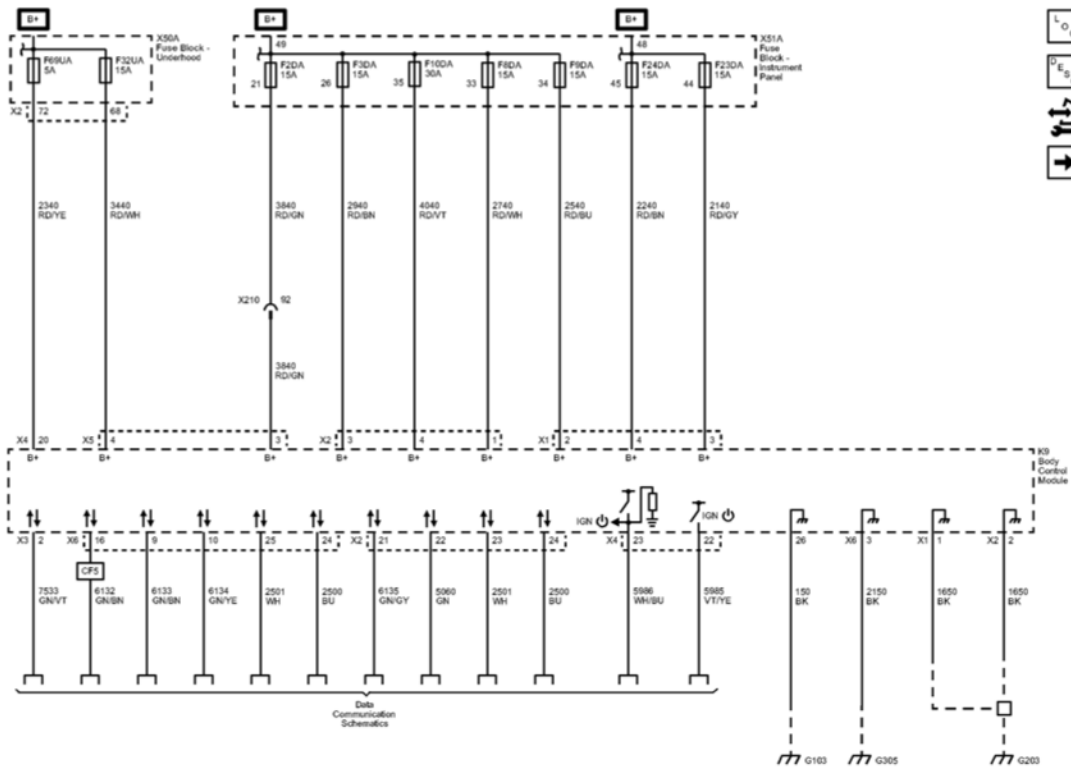


Fig. 8: Power, Ground, and Data Communication References Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

Subsystem References (1 of 3) Wiring Schematics

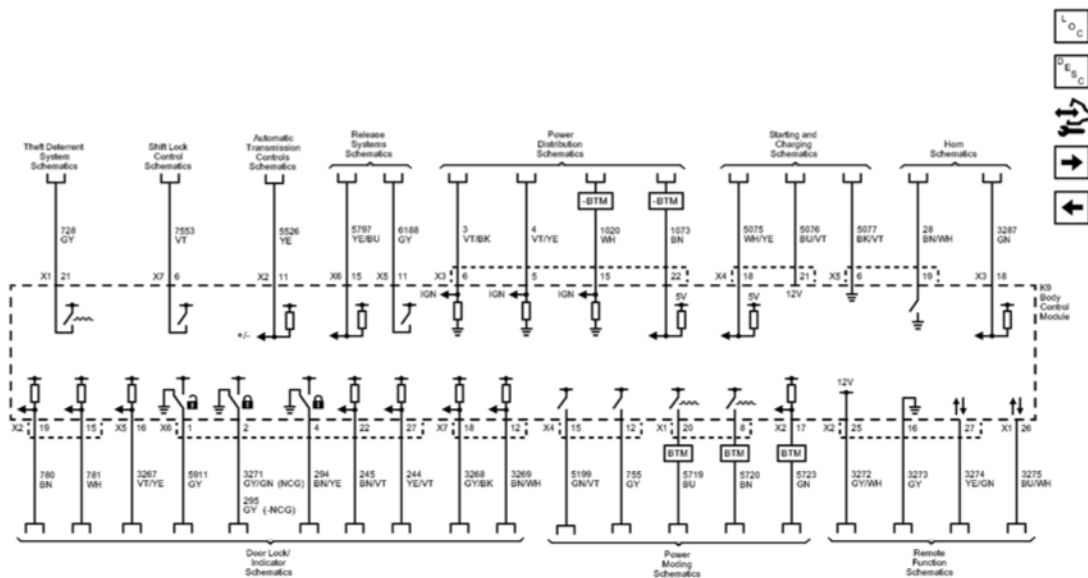


Fig. 9: Subsystem References (1 of 3) Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

Subsystem References (2 of 3) Wiring Schematics

Cardiagn.com

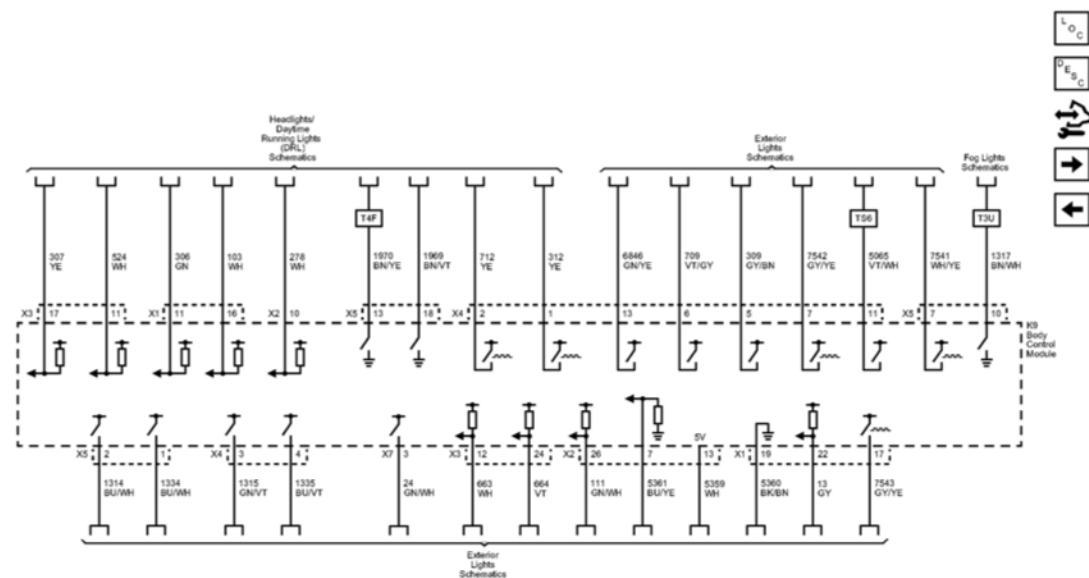


Fig. 10: Subsystem References (2 of 3) Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

Subsystem References (3 of 3) Wiring Schematics

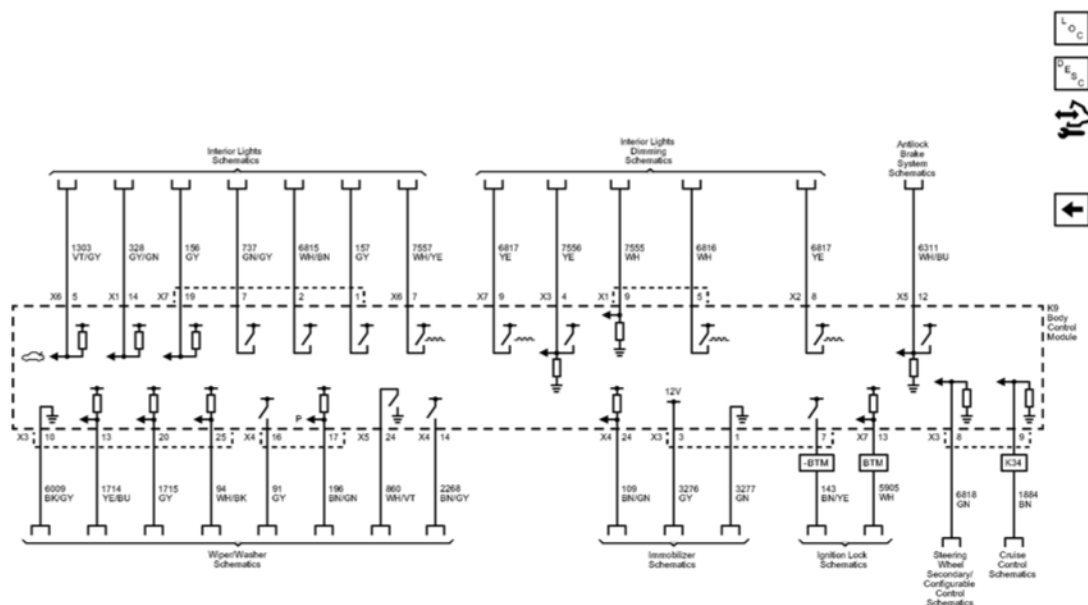


Fig. 11: Subsystem References (3 of 3) Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
Control Module U Code List	
DTC B1000	DTC B1000 Electronic Control Unit
DTC B1001	DTC B1001 Option Configuration
DTC B101D	DTC B101D Electronic Control Unit Hardware
DTC B101E	DTC B101E Electronic Control Unit Software
DTC C056D	DTC C056D Electronic Control Unit Hardware
DTC C056E	DTC C056E Electronic Control Unit Software
DTC P0601-P0604, P0606, or P062F	DTC P0601 Control Module Read Only Memory Performance DTC P0602 Control Module Not Programmed DTC P0603 Control Module Long Term Memory Reset DTC P0604 Control Module Random Access

	Memory Performance DTC P0606 Control Module Processor Performance DTC P062F Control Module Long Term Memory Performance
<u>DTC U0001</u>	DTC U0001 00 High Speed CAN Communication Bus Malfunction
<u>DTC U0020</u>	DTC U0020 Low Speed CAN Bus
<u>DTC U0073 or U2100</u>	DTC U0073 Control Module Communication Bus A Off DTC U2100 CAN Bus Communication
<u>DTC U0074 (Chassis Expansion Bus)</u>	DTC U0074 Control Module Communication Bus B Off
<u>DTC U0074 (Powertrain Expansion Bus with HP6)</u>	DTC U0074 00 Control Module Communication Powertrain Expansion CAN Bus Off Malfunction
<u>DTC U0074 (Powertrain Expansion Bus without HP6)</u>	DTC U0074 00 Control Module Communication Powertrain Expansion CAN Bus Off Malfunction
<u>DTC U0078</u>	DTC U0078 Control Module Communication Low Speed CAN Bus Off
<u>DTC U0100-U02FF (without HP6)</u>	
<u>DTC U0100-U02FF (with HP6)</u>	
<u>DTC U0300-U0336</u>	
<u>DTC U0400-U05FF</u>	
<u>DTC U1500-U15FF</u>	
<u>DTC U180B</u>	DTC U180B 00 Battery Energy Control Module High Speed CAN Bus Off Malfunction
<u>DTC U1811</u>	DTC U1811 00 Battery Energy Control Module Powertrain Expansion CAN Bus Off Malfunction
<u>DTC U1814</u>	DTC U1814 Powertrain Wake-Up Communication Circuit
<u>DTC U1817</u>	DTC U1817 00 Lost Communication with Hybrid Powertrain Control Module on Powertrain Expansion CAN Bus Malfunction
<u>DTC U1818</u>	DTC U1818 00 Lost Communication with Engine Control Module on Powertrain Expansion CAN Bus Malfunction
<u>DTC U182A</u>	DTC U182A 00 Hybrid Powertrain Control Module Lost Communication with Battery Energy Control Module on Powertrain Expansion CAN Bus Malfunction
<u>DTC U1831</u>	DTC U1831 00 Drive Motor Control Module 1 Lost Communication with Hybrid Powertrain Control Module Malfunction
<u>DTC U1844</u>	DTC U1844 00 Battery Energy Control Module Lost Communication with Hybrid Powertrain Control Module on Powertrain Expansion CAN Bus

	Malfunction
<u>DTC U1845 or U1846</u>	DTC U1845 00 Drive Motor Control Module 1 Lost Communication with Hybrid Powertrain Control Module Malfunction
<u>DTC U1847</u>	DTC U1847 00 Drive Motor Control Module 1 Lost Communication with Battery Energy Control Module on Powertrain Expansion CAN Bus Malfunction
<u>DTC U1875</u>	DTC U1875 00 Drive Motor Control Module 1 Lost Communication with Battery Energy Control Module Malfunction
<u>DTC U1876</u>	DTC U1876 00 Drive Motor Control Module 1 Lost Communication with Engine Control Module Malfunction
<u>DTC U1885</u>	DTC U1885 00 Battery Energy Control Module Lost Communication with Hybrid Powertrain Control Module Malfunction
<u>DTC U1886</u>	DTC U1886 00 Battery Energy Control Module Lost Communication with Engine Control Module Malfunction
<u>DTC U18A2</u>	DTC U18A2 Lost Communication with Fuel Pump Driver Control Module
<u>DTC U18B9-U18BF</u>	DTC U18B9 Primary High Speed CAN Bus Subnet Configuration List DTC U18BF Secondary High Speed CAN Bus Subnet Configuration List
<u>DTC U2099</u>	DTC U2099 High Speed Communication Enable Circuit
<u>DTC U2101</u>	DTC U2101 CAN Bus Maximum List of Control Modules
<u>DTC U2616</u>	DTC U2616 Fuel Pump Driver Control Module Lost Communication with ECM

CONTROL MODULE U CODE LIST

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

For symptom byte information, refer to **Symptom Byte List** .

Control Module U Code List

DTC	DTC Descriptor
U0001	High Speed CAN Bus Malfunction
U0002	High Speed CAN Bus
U0020	Low Speed CAN Bus

U0028	MOST Bus
U0029	MOST Bus Performance
U0073	Control Module Communication Bus A Off
U0074	Control Module Communication Bus B Off
U0075	Control Module Communication Object Detection CAN Bus Off
U0077	Control Module Communication Chassis Expansion CAN Bus Off
U0078	Control Module Communication Low Speed CAN Bus Off
U007A	Control Module Communication High Voltage Energy Management CAN Bus Off
U0100	Lost Communication With Engine Control Module
U0101	Lost Communication With Transmission Control Module
U0102	Lost Communication with Transfer Case Control Module
U0103	Lost Communication with Shift Lever Module
U0104	Lost Communication With Cruise Control Module
U0105	Lost Communication with Fuel Injector Control Module
U0109	Lost Communication with Fuel Pump Control Module <i>(2013 and prior)</i>
	Lost Communication with Chassis Control Module <i>(2014 and beyond)</i>
U010E	Lost Communication with Reductant Sensor Module
U010F	Lost Communication with Air Conditioning Control Module
U0111	Lost Communication with Battery Energy Control Module
U0112	Lost Communication with Battery Energy Control Module
U0115	Lost Communication with Engine Control Module B
U0117	Lost Communication With Power Take-Off Control Module
U0121	Lost Communication With Electronic Brake Control Module
U0122	Lost Communication With Vehicle Stability Control Module
U0125	Lost Communication With Multi-axis Acceleration Sensor Module
U0126	Lost Communication With Steering Wheel Angle Sensor Module
U0128	Lost Communication With Park Brake Control Module
U0129	Lost Communication with Brake System Control Module
U012A	Lost Communication With Chassis Control Module
U0130	Lost Communication With Electric Power Steering Control Module
U0131	Lost Communication With Power Steering Control Module
U0132	Lost Communication With Suspension Control Module
U0133	Lost Communication With Air Suspension Control Module
U0136	Lost Communication With Differential Control Module - Rear
U0137	Lost Communication with Trailer Brake Control Module
U0139	Lost Communication With Suspension Control Module
U0140	Lost Communication With Body Control Module
U0146	Lost Communication with Infotainment Gateway Module
U0151	Lost Communication With Inflatable Restraint Sensing and Diagnostic Module

U0155	Lost Communication With Instrument Cluster
U0158	Lost Communication With Head-Up Display
U0159	Lost Communication With Parking Assist Control Module
U0160	Lost Communication With Chime Alarm Control Module
U0164	Lost Communication with HVAC Control Module
U0166	Lost Communication with Auxiliary Heater Control Module
U0167	Lost Communication with Immobilizer Control Module
U0168	Lost Communication With Keyless Entry Control Module
U016B	Lost Communication with Electric A/C Compressor Control Module
U0170	Lost Communication with Passenger Presence Detection Sensor Module
U0181	Lost Communication With Headlamp Leveling Control Module
U0182	Lost Communication With Lighting Control Module - Front
U0184	Lost Communication With Radio
U0186	Lost Communication With Speaker Amplifier Module
U0196	Lost Communication With Rear Audio Control Module
U0191	Lost Communication With Television
U0193	Lost Communication With Digital Radio Receiver Control Module
U0197	Lost Communication With Telephone Control Module
U0198	Lost Communication With Telematic Control Module
U0201	Lost Communication With Transfer Case Control Module
U0203	Lost Communication With Left Rear Door Switch Panel Control Module
U0204	Lost Communication With Right Rear Door Switch Panel Control Module
U0207	Lost Communication With Moveable Roof Control Module
U0208	Lost Communication with Seat Memory Control Module
U0209	Lost Communication With Front Seat Heating Control Module
U0210	Lost Communication With Rear Seat Heating Control Module
U0230	Lost Communication With Liftgate Control Module
U0232	Lost Communication with Side Object Detection Control Module - Left
U0233	Lost Communication with Side Object Detection Control Module - Right
U0236	Lost Communication With Steering Column Lock Module
U0237	Lost Communication With Multimedia Player Interface Module
U023A	Lost Communication With Vehicle Direction Camera Control Module (without UGN)
	Lost Communication With Active Safety Control Module (with UGN)
U0248	Lost Communication with Remote Accessory Module
U0249	Lost Communication with Entertainment Control Module - Rear
U0250	Lost Communication with Impact Classification System Module
U0252	Lost Communication With Trailer Interface Control Module
U0254	Lost Communication With Remote Start Module
U0255	Lost Communication With Info Display Module
U0256	Lost Communication With Infotainment Faceplate Control Module

U0257	Lost Communication With Info Display Module/Infotainment Faceplate Control Module
U0264	Lost Communication With Camera Module - Rear
U0265	Lost Communication with Left Front Short Range Radar Sensor Module
U0268	Lost Communication with Right Front Short Range Radar Sensor Module
U0269	Lost Communication with Front Long Range Object Sensor
U026A	Lost Communication with Frontview Camera Module
U026B	Lost Communication with Rear Short Range Object Sensor
U0293	Lost Communication with Hybrid/EV Powertrain Control Module
U029D	Lost Communication with NOx Sensor 1 Module
U029E	Lost Communication with NOx Sensor 2 Module
U0301	Software Incompatibility with Engine Control Module
U0302	Software Incompatibility with Transmission Control Module
U0305	Software Incompatibility With Cruise Control Module
U0315	Software Incompatibility with Electronic Brake Control Module
U0401	Invalid Data Received From Engine Control Module
U0402	Invalid Data Received From Transmission Control Module
U0403	Invalid Data Received From Transfer Case Control Module
U0405	Invalid Data Received From Cruise Control Module
U0415	Invalid Data Received From Electronic Brake Control Module
U0416	Invalid Data Received From Vehicle Dynamics Control Module
U0417	Invalid Data Received From Park Brake Control Module
U0418	Invalid Data Received From Brake System Control Module
U0420	Invalid Data Received From Power Steering Control Module
U0421	Invalid Data Received From Suspension Control Module
U0422	Invalid Data Received From Body Control Module
U0423	Invalid Data Received From Instrument Cluster
U0424	Invalid Data Received From HVAC Control Module
U0428	Invalid Data Received From Steering Wheel Angle Sensor Module
U0431	Invalid Data Received From Body Control Module "A"
U0432	Invalid Data Received From Multi-axis Acceleration Sensor Module
U0437	Invalid Data Received From Differential Control Module - Rear
U0438	Invalid Data Received From Trailer Brake Control Module
U0452	Invalid Data Received From Inflatable Restraint Sensing and Diagnostic Module
U0465	Invalid Data Received From Power Take-Off Control Module
U0499	Invalid Data Received From Telematic Control Module
U053B	Invalid Data Received From Active Safety Control Module
U056B	Invalid Data Received From Camera Module - Front
U0594	Invalid Data Received From Hybrid/EV Powertrain Control Module
U1501	LIN Bus 1

U1502	LIN Bus 2
U1505	LIN Bus 5
U150E	LIN Bus 14
U150F	LIN Bus 15
U1510	(K9 Body Control Module) LIN Bus 1 Lost Communication With Device 0 (B67 Ultrasonic Intrusion Sensor)
	(K33 HVAC Control Module) LIN Bus 1 Lost Communication With Device 0 (A26 HVAC Controls)
	(A11 Radio) LIN Bus 1 Lost Communication with Device 0 (A20 Radio/HVAC Control)
	(P16 Instrument Cluster) LIN Bus 1 Lost Communication with Device 0 (S70R Steering Wheel Controls Switch - Right)
U1511	(K26 Headlamp Control Module / K28 Headlamp Leveling Control Module) LIN Bus 1 Lost Communication With Device 1 (E13L Headlamp - Left)
	(K40 Seat Memory Control Module) LIN Bus 1 Lost Communication With Device 1 (K99 Steering Column Position Control Module)
U1512	(K26 Headlamp Control Module / K28 Headlamp Leveling Control Module) LIN Bus 1 Lost Communication With Device 2 (E13R Headlamp - Right)
U1513	(K26 Headlamp Control Module / K28 Headlamp Leveling Control Module) LIN Bus 1 Lost Communication With Device 3 (E13L Headlamp - Left)
U1514	(K26 Headlamp Control Module / K28 Headlamp Leveling Control Module) LIN Bus 1 Lost Communication With Device 4 (E13R Headlamp - Right)
U1515	(K9 Body Control Module) LIN Bus 1 Lost Communication With Device 5 (M75 Windshield Wiper Motor)
U1516	(K9 Body Control Module) LIN Bus 1 Lost Communication With Device 6 (B110 Battery Sensor Module)
U1517	(K9 Body Control Module) LIN Bus 1 Lost Communication With Device 7 (K62 Sunroof Sunshade Motor Module)
U1518	(P16 Instrument Cluster) LIN Bus 1 Lost Communication with Device 8 (P29 Head-Up Display)
U1519	(K40 Seat Memory Control Module) LIN Bus 1 Lost Communication With Device 9 (S52 Outside Rearview Mirror Switch)
	(K40 Seat Memory Control Module) LIN Bus 1 Lost Communication With Device 9 (K96 Mirror Control Module / K96L Mirror Control Module - Left)
U151A	(K9 Body Control Module) LIN Bus 1 Lost Communication With Device 10 (B117 Rain Sensor)
U151B	(K9 Body Control Module) LIN Bus 1 Lost Communication With Device 11 (K61 Sunroof Control Module)
	(K40 Seat Memory Control Module) LIN Bus 1 Lost Communication With Device 11 (S79P Window Switch - Passenger)
U151C	(K33 HVAC Control Module) LIN Bus 1 Lost Communication With Device 0 (K33A HVAC Control Module - Auxiliary)
U1520	(K9 Body Control Module) LIN Bus 2 Lost Communication With Device 0 (P25 Power Sounder Content Theft Deterrent Alarm Module)

U1521	(K9 Body Control Module) LIN Bus 2 Lost Communication with Device 1 (S48E Multifunction Switch - Center Console) (K26 Headlamp Control Module / K28 Headlamp Leveling Control Module) LIN Bus 2 Lost Communication With Device 1 (E13L Headlamp - Left)
U1522	(K9 Body Control Module) LIN Bus 2 Lost Communication With Device 2 (K65 Tire Pressure Indicator Module) (K26 Headlamp Control Module / K28 Headlamp Leveling Control Module) LIN Bus 2 Lost Communication With Device 2 (E13R Headlamp - Right)
U1523	(K26 Headlamp Control Module / K28 Headlamp Leveling Control Module) LIN Bus 2 Lost Communication With Device 3 (E13L Headlamp - Left)
U1524	(K9 Body Control Module) LIN Bus 2 Lost Communication With Device 4 (K29F Seat Heating Control Module - Front) (K26 Headlamp Control Module / K28 Headlamp Leveling Control Module) LIN Bus 2 Lost Communication With Device 4 (E13R Headlamp - Right)
U1526	(K9 Body Control Module) LIN Bus 2 Lost Communication With Device 6 (K29R Seat Heating Control Module - Rear)
U152C	(K9 Body Control Module) LIN Bus 2 Lost Communication With Device 12 (K18 Compass Module)
U152D	(K9 Body Control Module) LIN Bus 2 Lost Communication With Device 13 (P2 Transmission Shift Lever Position Indicator)
U1530	(K9 Body Control Module) LIN Bus 3 Lost Communication With Device 0 (M74P Window Motor - Passenger)
U1531	(K26 Headlamp Control Module / K28 Headlamp Leveling Control Module) LIN Bus 3 Lost Communication with Device 1 (E13LA Headlamp Assembly - Left)
U1532	(K26 Headlamp Control Module / K28 Headlamp Leveling Control Module) LIN Bus 3 Lost Communication with Device 2 (E13RA Headlamp Assembly - Right)
U1534	(K9 Body Control Module) LIN Bus 3 Lost Communication With Device 4 (M74D Window Motor - Driver)
U1538	(K9 Body Control Module) LIN Bus 3 Lost Communication With Device 8 (S79D Window Switch - Driver)
U153A	(K9 Body Control Module) LIN Bus 3 Lost Communication With Device 10 (S79P Window Switch - Passenger)
U1540	(K9 Body Control Module) LIN Bus 4 Lost Communication With Device 0 (M74RR Window Motor - Right Rear)
U1544	(K9 Body Control Module) LIN Bus 4 Lost Communication With Device 4 (M74LR Window Motor - Left Rear)
U1548	(K9 Body Control Module) LIN Bus 4 Lost Communication With Device 8 (S79LR Window Switch - Left Rear)
U154A	(K9 Body Control Module) LIN Bus 4 Lost Communication With Device 10 (S79RR Window Switch - Right Rear)
U154B	(K9 Body Control Module) LIN Bus 4 Lost Communication With Device 11 (K49 Rear Seat Control Module)

U1550	(K9 Body Control Module) LIN Bus 5 Lost Communication with Device 0 (S31D Seat Heating and Cooling Switch - Driver)
U1556	(K38 Chassis Control Module) LIN Bus 5 Lost Communication with Device 6 (K133 Trailer Brake Power Control Module)
U1558	(K9 Body Control Module) LIN Bus 5 Lost Communication with Device 8 (S31P Seat Heating and Cooling Switch - Passenger)
U15E1	(A11 Radio) LIN Bus 14 Lost Communication with Device 1 (A26 HVAC Controls)
U15E3	(A11 Radio) LIN Bus 14 Lost Communication with Device 3
U15F0	(K74 Human Interface Control Module) LIN Bus 15 Lost Communication with Device 0 (P17 Info Display Module)
U1793	14V Power Module Lost Communication with Hybrid/EV Powertrain Control Module on Powertrain Expansion Communication Bus
U1795	14V Power Module Powertrain Expansion Communication Bus Off
U179A	Lost Communication with Hybrid/EV Powertrain Control Module 2
U1803	Lost Communication with Hybrid/EV Powertrain Control Module 2
U1804	Lost Communication with Inside Rearview Mirror Control Module
U1806	Battery Energy Control Module High Voltage Energy Management CAN Bus Off
U1807	Battery Charger Control Module High Voltage Energy Management CAN Bus Off
U180A	Electric A/C Compressor Control Module High Speed CAN Bus Off
U180B	Battery Energy Control Module High Speed CAN Bus Off
U180C	Battery Charger Control Module High Speed CAN Bus Off
U180D	Electronic Brake Control Module Chassis Expansion CAN Bus Off
U1811	Battery Energy Control Module Powertrain Expansion CAN Bus Off
U1814	Powertrain Wake-Up Communication Circuit
U1815	Lost Communication with Drive Motor Control Module 1 on Bus B
U1816	Lost Communication with Drive Motor Control Module B on Bus B
U1817	Lost Communication with Hybrid/EV Powertrain Control Module on Powertrain Expansion CAN Bus
U1818	Lost Communication with Engine Control Module on Powertrain Expansion Communication Bus
U1821	Lost Communication with 14V Power Module on Powertrain Expansion Communication Bus
U1826	Lost Communication with Multi-Axis Acceleration Sensor Module on Powertrain Expansion CAN Bus
U1827	Lost Communication with Steering Angle Sensor Module on Powertrain Expansion CAN Bus
U182A	Hybrid/EV Powertrain Control Module Lost Communication with Battery Energy Control Module on Powertrain Expansion CAN Bus
U182D	Lost Communication with Hybrid/EV Powertrain Control Module 2 on Powertrain Expansion Communication Bus

U182E	Drive Motor Control Module 1 Lost Communication with Hybrid/EV Powertrain Control Module 2 on Powertrain Expansion Communication Bus
U182F	Drive Motor Control Module 2 Lost Communication with Hybrid/EV Powertrain Control Module 2 on Powertrain Expansion Communication Bus
U1831	Drive Motor Control Module 1 Lost Communication with Hybrid/EV Powertrain Control Module on Powertrain Expansion CAN Bus
U1833	Lost Communication with Electronic Brake Control Module on Chassis Expansion CAN Bus
U1838	Lost Communication with Battery Charger Control Module on High Voltage Energy Management CAN Bus
U1839	Auxiliary Transmission Fluid Pump Control Module Lost Communication with Engine Control Module
U183A	Lost Communication with Telematics Communication Interface Control Module on High Speed CAN Bus
U183B	Auxiliary Transmission Fluid Pump Control Module Lost Communication with Transmission Control Module
U183C	Auxiliary Transmission Fluid Pump Control Module Lost Communication with Hybrid/EV Powertrain Control Module 2 on Powertrain Expansion Communication Bus
U183E	Lost Communication with Telematics Communication Interface Control Module on Low Speed CAN Bus
U1844	Battery Energy Control Module Lost Communication with Hybrid/EV Powertrain Control Module on Bus B
U1845	Drive Motor Control Module 1 Lost Communication with Hybrid/EV Powertrain Control Module
U1846	Drive Motor Control Module 2 Lost Communication with Hybrid/EV Powertrain Control Module
U1847	Drive Motor Control Module 1 Lost Communication with Battery Energy Control Module on Powertrain Expansion CAN Bus
U1849	Drive Motor Control Module 1 Lost Communication with Transmission Control Module
U184A	Lost Communication with Body Control Module on Low Speed CAN Bus
U184B	Lost Communication with Remote Heater and Air Conditioning Control Module on Low Speed CAN Bus
U184C	Lost Communication with Instrument Cluster on Low Speed CAN Bus
U184D	Lost Communication with Radio on Low Speed CAN Bus
U184E	Lost Communication with Inflatable Restraint Sensing and Diagnostic Module on Low Speed CAN Bus
U184F	Electric A/C Compressor Control Module Lost Communication with Engine Control Module
U1850	Drive Motor Control Module 2 Lost Communication with Transmission Control Module
U1858	Electronic Brake Control Module Lost Communication with Hybrid/EV Powertrain Control Module on Chassis Expansion CAN Bus

U185A	Lost Communication with Battery Energy Control Module on High Voltage Energy Management CAN Bus
U185B	Battery Energy Control Module Lost Communication with Hybrid/EV Powertrain Control Module 2 on High Voltage Energy Management CAN Bus
U185C	Battery Charger Control Module Lost Communication with Hybrid/EV Powertrain Control Module 2 on High Voltage Energy Management CAN Bus
U185D	Fuel Injector Control Module Lost Communication with Engine Control Module
U185E	Fuel Injector Control Module Lost Communication with Body Control Module
U1860	Electric A/C Compressor Control Module Lost Communication with Hybrid/EV Powertrain Control Module 2
U1861	Battery Charger Control Module Lost Communication with Engine Control Module
U186A	Electronic Brake Control Module Lost Communication with Engine Control Module
U186B	Electronic Brake Control Module Lost Communication with Transmission Control Module
U1875	Drive Motor Control Module 1 Lost Communication with Battery Energy Control Module
U1876	Drive Motor Control Module 1 Lost Communication with Engine Control Module
U1879	Drive Motor Control Module 2 Lost Communication with Engine Control Module
U1885	Battery Energy Control Module Lost Communication with Hybrid/EV Powertrain Control Module
U1886	Battery Energy Control Module Lost Communication with Engine Control Module
U1888	Hybrid/EV Powertrain Control Module Lost Communication with Battery Energy Control Module
U18A1	Lost Communication with Coolant Temperature Control Module on High Voltage Energy Management CAN Bus
U18A2	Lost Communication with Fuel Pump Driver Control Module
U18A3	Lost Communication with Human Machine Interface Control Module
U18A4	Lost Communication with Hybrid/EV Battery DC Charging Communications Gateway Module on High Voltage Energy Management CAN Bus
U18A5	Lost Communication with Fuel Injector Control Module on Powertrain Expansion CAN Bus
U18A6	Lost Communication with Right Object Detection Control Module on Dedicated Bus 1
U18B9	Primary High Speed CAN Bus Subnet Configuration List
U18BF	Secondary High Speed CAN Bus Subnet Configuration List

U1900	Lost Communication With Speech to Text Interface Module
U1901	Lost Communication with Infotainment Multifunction Switch Module
U2098	MOST Communication Enable Circuit
U2099	High Speed Communication Enable Circuit
U209E	Object Detection Control Module High Speed Communication Enable Circuit 1
U209F	Object Detection Control Module High Speed Communication Enable Circuit 2
U2100	CAN Bus Communication
U2101	CAN Bus Maximum List of Control Modules
U2103	Fewer Controllers On Bus Than Programmed
U2105	Lost Communication with Engine Control Module
U2106	Lost Communication with Transmission Control Module
U2107	Lost Communication with Body Control Module
U2108	Lost Communication with Electronic Brake Control Module
U2125	Lost Communication with Telematic Unit
U2127	Lost Communication with Front HVAC Control Module
U2139	Lost Communication with Column Integration Module
U2144	Lost Communication with Distance Sensing Cruise Control Module
U2176	Lost Communication with Power Take-Off Control Module
U2178	Lost Communication With Trailer Interface Control Module
U2400	Fuel Injector Control Module High Speed CAN Bus Off
U2401	Battery Energy Control Module Dedicated Bus 1 Off
U2501	Invalid Data Received From Hybrid/EV Powertrain Control Module 2
U2502	Invalid Data Received From Electronic Brake Control Module on Chassis Expansion CAN Bus
U2503	Invalid Data Received From Object Detection Control Module
U2504	Invalid Data Received From Trailer Brake Driver Control Module
U2505	Invalid Data Received from Human Machine Interface Control Module on MOST Bus
U2506	Invalid Data Received From Dual Battery Control Module
U2507	Invalid Data Received from Instrument Cluster on MOST Bus
U2508	Invalid Data Received from Audio Amplifier on MOST Bus
U2602	Battery Energy Control Module Lost Communication with Hybrid/EV Powertrain Control Module 2
U2603	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 1
U2604	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 2
U2605	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 3
U2606	Battery Energy Control Module Lost Communication with Hybrid/EV

	Battery Interface Control Module 4
U2608	Electric A/C Compressor Control Module Lost Communication with Hybrid/EV Powertrain Control Module
U2609	Battery Charger Control Module Lost Communication with Hybrid/EV Powertrain Control Module
U2611	Auxiliary Transmission Fluid Pump Control Module Lost Communication with Hybrid/EV Powertrain Control Module
U2612	Battery Charger Control Module Lost Communication with Hybrid/EV Powertrain Control Module 2
U2613	Drive Motor 1 Control Module Lost Communication with Hybrid/EV Powertrain Control Module 2
U2614	Drive Motor 2 Control Module Lost Communication with Hybrid/EV Powertrain Control Module 2
U2615	Auxiliary Transmission Fluid Pump Control Module Lost Communication with Hybrid/EV Powertrain Control Module 2
U2616	Fuel Pump Driver Control Module Lost Communication with ECM
U2617	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 5
U2618	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 6
U2619	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 7
U2620	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 8
U2621	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 9
U2622	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 10

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 Descriptor

DTC B1000

Electronic Control Unit

For symptom byte information, refer to **Symptom Byte List** .

Circuit/System Description

The internal fault detection is handled inside the device. The symptom byte information is for engineering reference only. No external circuit diagnosis is involved.

Conditions for Running the DTC

The device 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 device has detected an internal malfunction.

Action Taken When the DTC Sets

The device 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 device 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 device.
- If stored only as a history DTC and not retrieved as a current DTC, do not replace the device.
- If this DTC is retrieved as both a current and history DTC, replace the device that set the DTC.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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. Ignition ON.
2. Verify DTC B1000 is not set.
 - **If DTC B1000 is set**

Replace the device that set the DTC.

- **If DTC B1000 is not set**
3. All OK

Repair Instructions

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

Control Module References for device replacement, programming and setup

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

Option Configuration

For symptom byte information, refer to **Symptom Byte List** .

Circuit/System Description

Some devices must be configured with serial numbers, vehicle options, or other information. If a device was not

properly configured after installation that device may set DTC B1001. The symptom byte information 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 device 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 device ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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. Ignition ON.

2. Verify DTC B1001 is not set.
 - **If DTC B1001 is set**
 1. Program the device that set the DTC.
 2. Verify the DTC does not set.
 - If the DTC sets, replace the device that set the DTC.
 - If the DTC does not set
 3. All OK.
 - **If DTC B1001 is not set**
3. All OK

Repair Instructions

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

Control Module References for device replacement, programming and setup

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

Electronic Control Unit Hardware

For symptom byte information, refer to **Symptom Byte List** .

Circuit/System Description

The internal fault detection is handled inside the device. The symptom byte information is for engineering reference only. No external circuit diagnosis is involved.

Conditions for Running the DTC

- The device 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.
- The keyless entry control module will set this DTC with symptom byte 39 when the keyless entry control module antenna is activated.

Conditions for Setting the DTC

The device has detected an internal malfunction.

Action Taken When the DTC Sets

The device 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 device 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 device.
- Do not replace a device based only on DTC B101D being set in history with the exception of the following devices:
 - K36 Inflatable Restraint Sensing and Diagnostic Module (SDM)
 - K85 Passenger Presence Detection Module
- If DTC B101D is set as current, replace the appropriate device.

Reference Information

Schematic Reference

- [Data Communication Schematics](#)
- [Control Module References](#)

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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. Ignition ON.
2. Verify DTC B101D is not set.
 - **If DTC B101D is set with symptom byte 43**
 1. Program the device that set the DTC.
 2. Verify the DTC does not set.
 - If the DTC sets, replace the device that set the DTC.
 - If the DTC does not set
 3. All OK.
 - **If DTC B101D is set with any symptom byte, except symptom byte 43**

Replace the device that set the DTC.
 - **If DTC B101D is not set**
3. All OK

Repair Instructions

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

Control Module References for device replacement, programming and setup

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

Electronic Control Unit Software

For symptom byte information, refer to **Symptom Byte List** .

Circuit/System Description

Some devices must be configured with specific software, serial numbers, vehicle options, or other information. If a device was not properly configured after installation that module may set DTC B101E. The symptom byte information 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 device 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 device ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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. Ignition ON.
2. Verify that DTC U0028 or U0029 is not set.
 - o **If any of the DTCs are set**

Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .

- o **If none of the DTCs are set**
3. Verify DTC B101E is not set.
 - o **If DTC B101E is set**
 1. Program the device that set the DTC.
 2. Verify the DTC does not set.
 - o If the DTC sets, replace the device that set the DTC.
 - o If the DTC does not set
 - 3. All OK.
 - o **If DTC B101E is not set**
 4. All OK

Repair Instructions

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

Control Module References for device replacement, programming and setup

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

Electronic Control Unit Hardware

For symptom byte information, refer to **Symptom Byte List** .

Circuit/System Description

The internal fault detection is handled inside the device. The symptom byte information is for engineering reference only. No external circuit diagnosis is involved.

Conditions for Running the DTC

The device 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 device has detected an internal malfunction.

Action Taken When the DTC Sets

The device 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 device 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 device.
- If stored only as a history DTC and not retrieved as a current DTC, do not replace the device.
- If this DTC is retrieved as both a current and history DTC, replace the device that set the DTC.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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. Ignition ON.
2. Verify DTC C056D is not set.
 - **If DTC C056D is set in a device that can be programmed**
 1. Program the device that set the DTC.
 2. Verify the DTC does not set.
 - If the DTC sets, replace the device that set the DTC.
 - If the DTC does not set
 3. All OK.
 - **If DTC C056D is set in a device that cannot be programmed**

Replace the device that set the DTC.
 - **If DTC C056D is not set**
3. All OK

Repair Instructions

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

Control Module References for device replacement, programming and setup

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

Electronic Control Unit Software

For symptom byte information, refer to **Symptom Byte List** .

Circuit/System Description

Some devices must be configured with specific software, serial numbers, vehicle options, or other information. If a device was not properly configured after installation that module may set DTC C056E. The symptom byte information 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 device 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 device 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 - INDEX

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. Ignition ON.

2. Verify DTC C056E is not set.
 - o **If DTC C056E is set**
 1. Program the device that set the DTC.
 2. Verify the DTC does not set.
 - o If the DTC sets, replace the device that set the DTC.
 - o If the DTC does not set
 3. All OK.
 - o **If DTC C056E is not set**
3. All OK

Repair Instructions

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

Control Module References for device replacement, programming and setup

DTC P0601-P0604, P0606, OR P062F

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 P0601

Control Module Read Only Memory Performance

DTC P0602

Control Module Not Programmed

DTC P0603

Control Module Long Term Memory Reset

DTC P0604

Control Module Random Access Memory Performance

DTC P0606

Control Module Processor Performance

DTC P062F

Control Module Long Term Memory Performance

For symptom byte information, refer to **Symptom Byte List** .

Circuit/System Description

This diagnostic applies to internal microprocessor integrity conditions within the device. This diagnostic also addresses if the device is not programmed. The device monitors its ability to read and write to the memory. It also monitors a timing function. No external circuits are involved.

Conditions for Running the DTC

- The ignition is ON.
- The system voltage is greater than 9.5 V.

Conditions for Setting the DTC

The device detects an internal malfunction or incomplete programming.

Action Taken When the DTC Sets

DTCs P0601, P0602, P0603, P0604, P0606, and P062F are Type A DTCs.

Conditions for Clearing the DTC

DTCs P0601, P0602, P0603, P0604, P0606, and P062F are Type A DTCs.

Diagnostic Aids

If stored only as a history DTC and not retrieved as a current DTC, do not replace the device.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool References

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify DTC P0602 is not set.
 - **If DTC P0602 is set**
 1. Program the device that set the DTC.
 2. Verify the DTC does not set.
 - If the DTC sets, replace the device that set the DTC.
 - If the DTC does not set
 - 3. All OK.
3. Verify DTC P0601, P0603, P0604, P0606, or P062F is not set.
 - **If DTC P0601, P0603, P0604, P0606, or P062F is set**

Replace the device that set the DTC.
 - **If DTC P0601, P0603, P0604, P0606, or P062F is not set**
4. All OK

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for device replacement, programming and setup

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 Malfunction

Circuit Description

Devices 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 devices. Each device on GMLAN network maintains a transmit error counter and a receive error counter. The counter values increase with detected errors and will decrease with error-free messages. If the transmit error counter value exceeds 255 the device removes itself from the network and a DTC U0001 will be set.

Conditions for Running the DTC

- System voltage 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 device.

Action Taken When the DTC Sets

- The device suspends all message transmission.
- The device uses default values for all parameters received on the GMLAN serial data circuits.
- The device 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 device ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Circuit/System Verification

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

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 Descriptors

DTC U0020

Low Speed CAN Bus

For symptom byte information, refer to **Symptom Byte List** .

Circuit/System Description

Devices connected to the GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the devices. The devices 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 device as an availability indication of the transmitter device.

Conditions for Running the DTCs

- Supply voltage to the devices is in the normal operating 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 device availability has not been received.

Action Taken When the DTCs Sets

The device 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 device 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 **Scan Tool Does Not Communicate with Low Speed GMLAN Device**, or **Diagnostic Trouble Code (DTC) List - Vehicle** .

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

Control Module Communication Bus A Off

DTC U2100

CAN Bus Communication

For symptom byte information, refer to **Symptom Byte List** .

Circuit/System Description

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

Conditions for Running the DTCs

- Supply voltage to the devices is in the normal operating range.
- The vehicle power mode requires serial data communications.

Conditions for Setting the DTC

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

Action Taken When the DTCs Sets

- The device suspends all message transmission.
- The device uses default values for all parameters received on the serial data circuits.
- In the transmission control module, DTC U0073 will cause the transmission to go into default gears.
- In the engine control module and transmission control module, DTC U0073 will cause the malfunction indicator lamp (MIL) to illuminate.
- If equipped with eAssist, DTC U0073 in the hybrid powertrain control module is a type B DTC and will cause the malfunction indicator lamp to illuminate and result in the engine operating in conventional engine mode and will maintain 14 V module operation.
- The device inhibits the setting of all other communication DTCs.

Conditions for Clearing the DTC

- The engine control module or transmission control module turns OFF the MIL after 4 consecutive ignition cycles that the diagnostic runs and does not fail.
- If equipped with eAssist, the hybrid powertrain control module turns off the MIL after the diagnostic runs and does not fail during subsequent ignition cycles. Normal operation will resume 5 s after subsequent ignition cycle.
- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the device 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 communication system is used for a specific device.
2. This DTC may not be retrieved with a current status. Diagnosis is accomplished using the symptom. Refer to **Symptoms - Data Communications**.

DTC U0074 (CHASSIS EXPANSION BUS)

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

Control Module Communication Bus B Off

For symptom byte information, refer to **Symptom Byte List**.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Chassis High Speed GMLAN Serial Data (+)	U0074	U0074, U0100-U02FF*	U0074	-
Chassis High Speed GMLAN Serial Data (-)	U0074	U0074, U0100-U02FF*	U0074	-
Ground (DLC, terminal 5)	-	1	-	-

* An open between the data link connector (DLC) and the first splice/device will only affect the communication with the scan tool. The devices will still communicate. An open in only one chassis high speed GMLAN serial data circuit may allow degraded communication between the devices.

1. No communication with any chassis high speed GMLAN device.

Circuit/System Description

The devices connected to the chassis high speed GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the devices when the ignition switch is in any position other than OFF. The chassis high speed GMLAN serial data bus uses terminating resistors that are in parallel with the 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 device 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 device 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 chassis high speed GMLAN devices.
- 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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and devices 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 device reporting a U code. The U code identifies which device needs to be diagnosed for a communication issue.
- Communication may be available between some devices and the scan tool with the chassis high speed GMLAN serial data system inoperative. This condition is due to those devices using multiple serial data communication systems.
- An open in the DLC ground circuit terminal 5 will allow the scan tool to operate but not communicate with the vehicle.
- Technicians may find various Local Area Network (LAN) communication Diagnostic Trouble Codes (DTC).
- Some devices 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 device output voltage circuit is shorted to ground before replacing the device.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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. Ignition ON.
2. Verify two or more devices are not communicating on the chassis high speed GMLAN serial data circuit. Refer to **Data Link References** to determine how many devices should be communicating on the bus.
 - **If only one device is not communicating**

Refer to Circuit/System Testing below - Testing the Device Circuits.

- **If two or more devices are not communicating**

3. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. Disconnect the scan tool from the X84 Data Link Connector. The following tests will be done at the X84 Data Link Connector. It may take up to 2 minutes for all vehicle systems to power down.
4. Test for less than 10 ohms between the ground circuit terminal 5 and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
5. Ignition ON.
6. Test for less than 4.5 V between the serial data circuits listed below and ground:
 - Chassis high speed GMLAN serial data terminal 12
 - Chassis high speed GMLAN serial data terminal 13
 - **If 4.5 V or greater**

Refer to Circuit/System Testing below- Testing the Serial Data Circuits for a Short to Voltage.

- **If less than 4.5 V**

7. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
8. Test for greater than 100 ohms between the serial data circuits listed below and ground:
 - Chassis high speed GMLAN serial data terminal 12
 - Chassis high speed GMLAN serial data terminal 13
 - **If 100 ohms or less**

Refer to Circuit/System Testing below- Testing the Serial Data Circuits for a Short to Ground.

- **If greater than 100 ohms**

9. Test for 50-70 ohms between the serial data circuit terminals 12 and 13:
 - **If less than 35 ohms**

Refer to Circuit/System Testing below- Testing the Serial Data Circuits for a Short between the Circuits.

- **If between 35-50 ohms**

There may be a third terminating resistor between the serial data circuits. This can happen if the incorrect device is installed. Some devices are available with and without the terminating resistors

installed to reduce the need of terminating resistors in the wiring harness. Refer to Circuit/System Testing below- Testing the Serial Data Circuits for a Short between the Circuits.

- **If greater than 70 ohms but less than infinite**

Refer to Circuit/System Testing below- Testing the Serial Data Circuits for an Open/High Resistance.

- **If infinite resistance**

Repair the open/high resistance in the circuit between the X84 Data Link Connector and the first splice/device in the serial data circuit.

- **If between 50-70 ohms**

10. Refer to Circuit/System Testing below - Testing the Device Circuits.

Circuit/System Testing

NOTE: Each device may need to be disconnected to isolate a circuit fault.

Use the schematic to identify the following:

- Chassis high speed GMLAN devices the vehicle is equipped with
- Chassis high speed GMLAN serial data circuit terminating resistors
- Device locations on the chassis high speed GMLAN serial data circuits
- Each device's ground, B+, ignition, and chassis high speed GMLAN serial data circuit terminals

Some devices with an internal terminating resistor have a loop in the harness that connects the internal terminating resistor to the serial data circuit. When wired this way, test these loop circuits for the appropriate failure mode short to voltage, short to ground, or open/high resistance prior to replacing the device for each of the following tests.

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 device, ignition ON.
2. Test for greater than 4.5 V between each serial data circuit at the device connector that was just disconnected and ground.
 - **If each serial data circuit is 4.5 V or less**
 1. Ignition OFF.
 2. Test for less than 10 ohms between each of the device's ground circuit terminals and ground.
 - If 10 ohms or greater, repair the open/high resistance in the circuit.

- If less than 10 ohms, replace the device that was disconnected.
- **If any serial data circuit is greater than 4.5 V**
- 3. Ignition OFF, disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at another device, in the direction of the circuit shorted to voltage, ignition ON.
- 4. Test for greater than 4.5 V between each serial data circuit at the device connector that was just disconnected and ground.
 - **If each serial data circuit is 4.5 V or less**
 1. Ignition OFF.
 2. Test for less than 10 ohms between each of the device's ground circuit terminals and ground.
 - If 10 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 10 ohms, replace the device that was disconnected.
 - **If any serial data circuit is greater than 4.5 V**
- 5. Repeat step 3 until one of the following conditions are isolated:
 - A short to voltage on the serial data circuit between two devices or splice packs, if equipped.
 - A short to voltage on the serial data circuit between a device and a terminating resistor.

Testing the Serial Data Circuits for a Short to Ground

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at an easily accessible device.
3. Test for greater than 100 ohms between each serial data circuit at the device connector that was just disconnected and ground.
 - **If each serial data circuit is 100 ohms or greater**

Replace the device that was disconnected.
 - **If any serial data circuit is less than 100 ohms**
4. Disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at another device, in the direction of the circuit shorted to ground.
5. Test for greater than 100 ohms between each serial data circuit at the device connector that was just disconnected and ground.
 - **If both serial data circuits are 100 ohms or greater**

Replace the device that was disconnected.
 - **If any serial data circuit is less than 100 ohms**
6. Repeat step 4 until one of the following conditions are isolated:
 - A short to ground on the serial data circuit between two devices or splice packs, if equipped.
 - A short to ground on the serial data circuit between a device and a terminating resistor.

- A short to ground on the serial data circuit between the X84 Data Link Connector and the first device or splice pack.

Testing the Serial Data Circuits for a Short between the Circuits

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at an easily accessible device that is not communicating.
3. Test for greater than 110 ohms between each pair of serial data circuits at the device connector that was just disconnected.

- **If each pair of serial data circuits is 110 ohms or greater**

Replace the device that was disconnected.

- **If any pair of serial data circuits is less than 110 ohms**

4. Connect the harness connectors at the device that was disconnected.
5. Disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at another device, in the direction of the circuit shorted together.
6. Test for greater than 110 ohms between each pair of serial data circuits at the device connector that was just disconnected.

- **If each pair of serial data circuits is 110 ohms or greater**

Replace the device that was disconnected.

- **If any pair of serial data circuits is less than 110 ohms**

7. Repeat step 4 until one of the following conditions are isolated:
 - Serial data circuits shorted together between two devices or splice packs, if equipped.
 - Serial data circuits shorted together between a device and a terminating resistor.
 - Serial data circuits shorted together between the X84 Data Link Connector and the first device or splice pack.
 - A shorted terminating resistor.

Testing the Serial Data Circuits for an Open/High Resistance

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at an easily accessible device that is not communicating.
3. Test for less than 130 ohms between each pair of serial data circuits at the device connector that was just disconnected.

- **If each pair of serial data circuits is 130 ohms or less**

Replace the device that was disconnected.

- **If any pair of serial data circuits is greater than 130 ohms**

4. Connect the harness connectors at the device that was disconnected.
5. Disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at another device, in the direction of the circuit with the open/high resistance.
6. Test for less than 130 ohms between each pair of serial data circuits at the device connector that was just disconnected.

- **If each pair of serial data circuits is 130 ohms or less**

Replace the device that was disconnected.

- **If any pair of serial data circuits is greater than 130 ohms**

7. Repeat step 4 until one of the following conditions are isolated:
 - An open/high resistance on the serial data circuit between two devices or splice packs, if equipped.
 - An open/high resistance on the serial data circuit between a device and a terminating resistor.
 - An open/high resistance terminating resistor.

Testing the Device Circuits

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Disconnect the harness connectors at an easily accessible device that is not communicating.
3. Test for less than 10 ohms between each ground circuit terminal and ground.

- **If 10 ohms or greater**

1. Ignition OFF.
2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.

- **If less than 10 ohms**

4. If equipped, verify a test lamp illuminates between each B+ circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.

- If infinite resistance, replace the disconnected device.
- **If the test lamp illuminates**
- 5. Ignition ON.
- 6. If equipped, verify a test lamp illuminates between each ignition circuit terminal, which has a fuse in the circuit, and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is OK and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the disconnected device.
 - **If the test lamp illuminates**
- 7. If equipped, verify a test lamp illuminates between each ignition circuit terminal, which is controlled by a control module, and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the harness connectors at the control module that controls the ignition circuit.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the control module that controls the ignition circuit.
 - **If the test lamp illuminates**
- 8. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
- 9. Test for less than 130 ohms between each pair of chassis high speed GMLAN serial data circuits at the device connector that was just disconnected.
 - **If any pair of serial data circuits is greater than 130 ohms**

Repair the open/high resistance in the serial data circuits between the disconnected device and the circuit splice in the serial data circuits.
 - **If each pair of serial data circuits is 130 ohms or less**
- 10. Replace the device that was disconnected.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

DTC U0074 (POWERTRAIN EXPANSION BUS WITH HP6)

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 Powertrain Expansion CAN Bus Off Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Powertrain High Speed GMLAN Serial Data (+)	U0074	U0074	U0074	-
Powertrain High Speed GMLAN Serial Data (-)	U0074	U0074	U0074	-

Circuit/System Description

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

Conditions for Running the DTC

- The system voltage is between 9-16 V.
- The vehicle power mode requires serial data communications.

Conditions for Setting the DTC

A supervised periodic message that includes the transmitter device availability has not been received for more

than 450 ms.

Action Taken When the DTC Sets

- DTC U0074 is a type B DTC.
- DTC U0074 in the hybrid powertrain control module will cause the malfunction indicator lamp (MIL) to illuminate and result in the engine operating in conventional engine mode and will maintain 14 V power operation.

Conditions for Clearing the DTC

- DTC U0074 is a type B DTC.
- The hybrid powertrain control module turns off the MIL after the diagnostic runs and does not fail during subsequent ignition cycles. Normal operation will resume 5 seconds after subsequent ignition cycle.

Diagnostic Aids

- Use the **Data Link References** to identify the powertrain high speed GMLAN devices.
- 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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and devices 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 device reporting a U code. The U code identifies which device needs to be diagnosed for a communication issue.
- Communication may be available between some devices and the scan tool with the powertrain high speed GMLAN serial data system inoperative. This condition is due to those devices using multiple serial data communication systems.
- An open in the DLC ground circuit terminal 5 will allow the scan tool to operate but not communicate with the vehicle.
- Technicians may find various Local Area Network (LAN) communication Diagnostic Trouble Codes (DTC).
- Some devices 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 device output voltage circuit is shorted to ground before replacing the device.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify that DTC P0606 is not set.
 - **If DTC P0606 is set**

Refer to **DTC P0601-P0604, P0606, or P062F.**

- **If DTC P0606 is not set**

3. Refer to Circuit/System Testing below.

Circuit/System Testing

WARNING: Always perform the High Voltage Disabling procedure prior to servicing any High Voltage component or connection. Personal Protection Equipment (PPE) and proper procedures must be followed.

The High Voltage Disabling procedure includes the following steps:

- Identify how to disable high voltage.
- Identify how to test for the presence of high voltage.
- Identify condition under which high voltage is always present and personal protection equipment (PPE) and proper procedures must be followed.

Before working on any high voltage system, be sure to wear the following Personal Protection Equipment:

- Safety glasses with appropriate side shields when within 15 meters (50 feet) of the vehicle, either indoors or outdoors.
- Certified and up-to-date Class "0" Insulation gloves rated at 1000V with leather protectors.
 - Visually and functionally inspect the gloves before use.
 - Wear the Insulation gloves with leather protectors at all times when working with the high voltage battery assembly, whether the system is energized or not.

Failure to follow the procedures may result in serious injury or death.

WARNING: The eAssist battery pack assembly will utilize an exchange program. Please consult the most recent revision of bulletin/PI# PIC5520, available in Service Information (SI), for a list of approved eAssist battery pack assembly service procedures. Components that may be removed and serviced without exchanging the complete battery pack assembly are identified in the bulletin/PI. Please contact the GM Technical Assistance Center (1-877-446-8227) if you have any questions.

NOTE: Each device may need to be disconnected to isolate a circuit fault.

Use the schematic to identify the following:

- Powertrain high speed GMLAN devices the vehicle is equipped with
- Powertrain high speed GMLAN serial data circuit terminating resistors
- Device locations on the powertrain high speed GMLAN serial data circuits
- Each device's ground, B+, ignition, and powertrain high speed GMLAN serial data circuit terminals

Some devices with an internal terminating resistor have a loop in the harness that connects the internal terminating resistor to the serial data circuit. When wired this way, test these loop circuits for the appropriate failure mode short to voltage, short to ground, or open/high resistance prior to replacing the device for each of the following tests.

1. Perform the High Voltage Disabling procedure. Refer to **High Voltage Disabling**.
2. Reconnect the 12 V battery.
3. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. Disconnect the harness connectors with the powertrain high speed GMLAN serial data circuits at an easily accessible device that is not communicating. It may take up to 2 minutes for all vehicle systems to power down. Refer to **Data Link References** to determine which devices are on the powertrain expansion bus.
4. Ignition ON.
5. Test for less than 4.5 V between each powertrain high speed GMLAN serial data circuit at the device that was just disconnected and ground.

- **If 4.5 V or greater**

Refer to Testing the Serial Data Circuits for a Short to Voltage below.

- **If less than 4.5 V**

6. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
7. Test for greater than 100 ohms between each powertrain high speed GMLAN serial data circuit at the device that was just disconnected and ground.

- **If 100 ohms or less**

Refer to Testing the Serial Data Circuits for a Short to Ground below.

- **If greater than 100 ohms**

8. Test for 110-130 ohms between each pair of the powertrain high speed GMLAN serial data circuits at the device that was just disconnected:

- **If less than 110 ohms**

Refer to Testing the Serial Data Circuits for a Short between the Circuits below.

- **If greater than 130 ohms**

Refer to Testing the Serial Data Circuits for an Open/High Resistance below.

- **If between 110-130 ohms**

9. Refer to Testing the Device Circuits below.

Testing the Serial Data Circuits for a Short to Voltage

1. Ignition OFF, disconnect the harness connectors with the powertrain high speed GMLAN serial data circuits at another device, in the direction of the circuit shorted to voltage, ignition ON.
2. Test for greater than 4.5 V between each serial data circuit at the device connector that was just disconnected and ground.
 - **If each serial data circuit is 4.5 V or less**
 1. Ignition OFF.
 2. Test for less than 10 ohms between each of the device's ground circuit terminals and ground.
 - If 10 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 10 ohms, replace the device that was disconnected.
 - **If any serial data circuit is greater than 4.5 V**
3. Repeat step 1 until one of the following conditions are isolated:
 - A short to voltage on the serial data circuit between two devices or splice packs, if equipped.
 - A short to voltage on the serial data circuit between a device and a terminating resistor.

Testing the Serial Data Circuits for a Short to Ground

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Disconnect the harness connectors with the powertrain high speed GMLAN serial data circuits at another device, in the direction of the circuit shorted to ground.
3. Test for greater than 100 ohms between each serial data circuit at the device connector that was just disconnected and ground.
 - **If each serial data circuit is 100 ohms or greater**

Replace the device that was disconnected.
 - **If any serial data circuit is less than 100 ohms**
4. Repeat step 1 until one of the following conditions are isolated:
 - A short to ground on the serial data circuit between two devices or splice packs, if equipped.
 - A short to ground on the serial data circuit between a device and a terminating resistor.

Testing the Serial Data Circuits for a Short between the Circuits

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Connect the harness connectors at the device that was previously disconnected.
3. Disconnect the harness connectors with the powertrain high speed GMLAN serial data circuits at another device, in the direction of the circuit shorted together.
4. Test for greater than 110 ohms between each pair of serial data circuits at the device connector that was just disconnected.
 - **If each pair of serial data circuits is 110 ohms or greater**

Replace the device that was disconnected.

- **If any pair of serial data circuits is less than 110 ohms**

5. Repeat step 1 until one of the following conditions are isolated:
 - Serial data circuits shorted together between two devices or splice packs, if equipped.
 - Serial data circuits shorted together between a device and a terminating resistor.
 - A shorted terminating resistor.

Testing the Serial Data Circuits for an Open/High Resistance

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Connect the harness connectors at the device that was previously disconnected.
3. Disconnect the harness connectors with the powertrain high speed GMLAN serial data circuits at another device, in the direction of the circuit with the open/high resistance.
4. Test for less than 130 ohms between each pair of the serial data circuits at the device connector that was just disconnected.
 - **If each pair of serial data circuits is 130 ohms or less**

Replace the device that was disconnected.

- **If any pair of serial data circuits is greater than 130 ohms**

5. Repeat step 1 until one of the following conditions are isolated:
 - An open/high resistance on the serial data circuit between two devices or splice packs, if equipped.
 - An open/high resistance on the serial data circuit between a device and a terminating resistor.
 - An open/high resistance terminating resistor.

Testing the Device Circuits

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 ohms between each ground circuit terminal at the device that was just disconnected and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
3. If equipped, verify a test lamp illuminates between each B+ circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.

2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
1. Ignition OFF.
2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the disconnected device.
 - **If the test lamp illuminates**
4. Ignition ON.
5. If equipped, verify a test lamp illuminates between each ignition circuit terminal, which has a fuse in the circuit, and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
1. Ignition OFF.
2. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is OK and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
1. Ignition OFF.
2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the disconnected device.
 - **If the test lamp illuminates**
6. If equipped, verify a test lamp illuminates between each ignition circuit terminal, which is controlled by a control module, and ground.
 - **If the test lamp does not illuminate**
1. Ignition OFF, disconnect the harness connectors at the control module that controls the ignition circuit.
2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the control module that controls the ignition circuit.
 - **If the test lamp illuminates**
7. Replace the device that was disconnected.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

DTC U0074 (POWERTRAIN EXPANSION BUS WITHOUT HP6)

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 Powertrain Expansion CAN Bus Off Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Powertrain High Speed CAN Serial Data (+)	U0074	U0074	U0074	-
Powertrain High Speed CAN Serial Data (-)	U0074	U0074	U0074	-

Circuit/System Description

The devices connected to the powertrain high speed CAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the devices when the ignition switch is in any position other than OFF. The powertrain high speed CAN serial data bus uses terminating resistors that are in parallel with the powertrain high speed CAN (+) and (-) circuits.

Conditions for Running the DTC

- The system voltage is between 9-16 V.
- The vehicle power mode requires serial data communications.

Conditions for Setting the DTC

A supervised periodic message that includes the transmitter device availability has not been received for more than 450 ms.

Action Taken When the DTC Sets

DTC U0074 is a type B DTC.

Conditions for Clearing the DTC

DTC U0074 is a type B DTC.

Diagnostic Aids

- Use the **Data Link References** to identify the powertrain high speed CAN devices.
- 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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and devices 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 device reporting a U code. The U code identifies which device needs to be diagnosed for a communication issue.
- Communication may be available between some devices and the scan tool with the powertrain high speed CAN serial data system inoperative. This condition is due to those devices using multiple serial data communication systems.
- An open in the DLC ground circuit terminal 5 will allow the scan tool to operate but not communicate with the vehicle.
- Technicians may find various Local Area Network (LAN) communication Diagnostic Trouble Codes (DTC).
- Some devices 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 device output voltage circuit is shorted to ground before replacing the device.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE: Each device may need to be disconnected to isolate a circuit fault.

Use the schematic to identify the following:

- Powertrain high speed CAN devices the vehicle is equipped with
- Powertrain high speed CAN serial data circuit terminating resistors
- Device locations on the powertrain high speed CAN serial data circuits
- Each device's ground, B+, ignition, and powertrain high speed CAN serial data circuit terminals

Some devices with an internal terminating resistor have a loop in the harness that connects the internal terminating resistor to the serial data circuit. When wired this way, test these loop circuits for the appropriate failure mode short to voltage, short to ground, or open/high resistance prior to replacing the device for each of the following tests.

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. Disconnect the harness connectors with the powertrain high speed CAN serial data circuits at an easily accessible device that is not communicating. It may take up to 2 minutes for all vehicle systems to power down. Refer to **Data Link References** to determine which devices are on the

powertrain expansion bus.

2. Ignition ON.
3. Test for less than 4.5 V between each powertrain high speed CAN serial data circuit at the device that was just disconnected and ground.
 - **If 4.5 V or greater**

Refer to Testing the Serial Data Circuits for a Short to Voltage below.

- **If less than 4.5 V**
4. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
 5. Test for greater than 100 ohms between each powertrain high speed CAN serial data circuit at the device that was just disconnected and ground.
 - **If 100 ohms or less**

Refer to Testing the Serial Data Circuits for a Short to Ground below.

- **If greater than 100 ohms**
6. Test for 110-130 ohms between each pair of the powertrain high speed CAN serial data circuits at the device that was just disconnected:
 - **If less than 110 ohms**

Refer to Testing the Serial Data Circuits for a Short between the Circuits below.

- **If greater than 130 ohms**

Refer to Testing the Serial Data Circuits for an Open/High Resistance below.

- **If between 110-130 ohms**

7. Refer to Testing the Device Circuits below.

Testing the Serial Data Circuits for a Short to Voltage

1. Ignition OFF, disconnect the harness connectors with the powertrain high speed CAN serial data circuits at another device, in the direction of the circuit shorted to voltage, ignition ON.
2. Test for greater than 4.5 V between each serial data circuit at the device connector that was just disconnected and ground.
 - **If each serial data circuit is 4.5 V or less**
 1. Ignition OFF.
 2. Test for less than 10 ohms between each of the device's ground circuit terminals and ground.
 - If 10 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 10 ohms, replace the device that was disconnected.
 - **If any serial data circuit is greater than 4.5 V**

3. Repeat step 1 until one of the following conditions are isolated:
 - A short to voltage on the serial data circuit between two devices or splice packs, if equipped.
 - A short to voltage on the serial data circuit between a device and a terminating resistor.

Testing the Serial Data Circuits for a Short to Ground

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Disconnect the harness connectors with the powertrain high speed CAN serial data circuits at another device, in the direction of the circuit shorted to ground.
3. Test for greater than 100 ohms between each serial data circuit at the device connector that was just disconnected and ground.
 - **If each serial data circuit is 100 ohms or greater**

Replace the device that was disconnected.

- **If any serial data circuit is less than 100 ohms**
4. Repeat step 1 until one of the following conditions are isolated:
 - A short to ground on the serial data circuit between two devices or splice packs, if equipped.
 - A short to ground on the serial data circuit between a device and a terminating resistor.

Testing the Serial Data Circuits for a Short between the Circuits

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Connect the harness connectors at the device that was previously disconnected.
3. Disconnect the harness connectors with the powertrain high speed CAN serial data circuits at another device, in the direction of the circuit shorted together.
4. Test for greater than 110 ohms between each pair of serial data circuits at the device connector that was just disconnected.
 - **If each pair of serial data circuits is 110 ohms or greater**

Replace the device that was disconnected.

- **If any pair of serial data circuits is less than 110 ohms**
5. Repeat step 1 until one of the following conditions are isolated:
 - Serial data circuits shorted together between two devices or splice packs, if equipped.
 - Serial data circuits shorted together between a device and a terminating resistor.
 - A shorted terminating resistor.

Testing the Serial Data Circuits for an Open/High Resistance

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet)

away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.

2. Connect the harness connectors at the device that was previously disconnected.
3. Disconnect the harness connectors with the powertrain high speed CAN serial data circuits at another device, in the direction of the circuit with the open/high resistance.
4. Test for less than 130 ohms between each pair of the serial data circuits at the device connector that was just disconnected.
 - **If each pair of serial data circuits is 130 ohms or less**

Replace the device that was disconnected.

- **If any pair of serial data circuits is greater than 130 ohms**
5. Repeat step 1 until one of the following conditions are isolated:
 - An open/high resistance on the serial data circuit between two devices or splice packs, if equipped.
 - An open/high resistance on the serial data circuit between a device and a terminating resistor.
 - An open/high resistance terminating resistor.

Testing the Device Circuits

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 ohms between each ground circuit terminal at the device that was just disconnected and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
3. If equipped, verify a test lamp illuminates between each B+ circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the disconnected device.
 - **If the test lamp illuminates**

4. Ignition ON.
5. If equipped, verify a test lamp illuminates between each ignition circuit terminal, which has a fuse in the circuit, and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is OK and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the disconnected device.
 - **If the test lamp illuminates**
6. If equipped, verify a test lamp illuminates between each ignition circuit terminal, which is controlled by a control module, and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the harness connectors at the control module that controls the ignition circuit.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the control module that controls the ignition circuit.
 - **If the test lamp illuminates**
7. Replace the device that was disconnected.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

DTC U0078

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 U0078

Control Module Communication Low Speed CAN Bus Off

For symptom byte information, refer to **Symptom Byte List** .

Circuit/System Description

The low speed GMLAN serial data bus is used to communicate information between the devices. The serial data is transmitted over a single wire to the appropriate devices. The low speed GMLAN serial data circuits also connect directly to the data link connector (DLC).

Conditions for Running the DTC

- Supply voltage to the devices are in the normal operating range.
- The vehicle power mode requires serial data communications.

Conditions for Setting the DTC

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

Action Taken When the DTC Sets

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

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the device ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Circuit/System Verification

1. Ignition ON.
2. Verify DTC U0078 is not set.
 - **If DTC U0078 is set**

Refer to **Scan Tool Does Not Communicate with Low Speed GMLAN Device**.

- If DTC U0078 is not set

3. All OK

DTC U0100-U02FF (WITHOUT HP6)

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

For device DTC descriptors, refer to Control Module U Code List.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	U0100-U02FF	U0100-U02FF	-	-
Ignition	U0100-U02FF, U1814, U2099	U0100-U02FF	-	-
Object High Speed GMLAN Serial Data (+)	U0075	U0100-U02FF	U0075	-
Object High Speed GMLAN Serial Data (-)	U0075	U0100-U02FF	U0075	-
Chassis High Speed GMLAN Serial Data (+)	U0074, U0077	U0100-U02FF	U0074, U0077	-
Chassis High Speed GMLAN Serial Data (-)	U0074, U0077	U0100-U02FF	U0074, U0077	-
Mid Speed GMLAN Serial Data (+)	U0074	U0100-U02FF	U0074	-
Mid Speed GMLAN Serial Data (-)	U0074	U0100-U02FF	U0074	-
High Speed GMLAN Serial Data (+)	U0073, 2	U0100-U02FF	U0073, 2	-
High Speed GMLAN Serial Data (-)	U0073, 2	U0100-U02FF	U0073, 2	-
Low Speed GMLAN Serial Data	U0078, 1	U0100-U02FF	U0078, 1	-
Ground	-	U0100-U02FF	-	-
1. Scan tool does not communicate with most low speed GMLAN device 2. Scan tool does not communicate with most high speed GMLAN device				

Circuit/System Description

The serial data circuit is the means by which the devices 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 device for diagnostic purposes and to check for DTCs. When the ignition switch is in RUN, each device communicating on the serial data circuit sends a state of health message to ensure that the device is operating properly. When a device stops communicating on the serial data circuit, for example if the device loses power or ground, the state of health message it normally sends on the serial data circuit disappears. Other devices on the serial data circuit, which expect to receive that state of health message, detect its absence; those devices in turn set a DTC associated with the loss of state of health of the non-communicating device. The DTC is unique to the device which is not communicating and one or more devices may set the same exact code. A loss of serial data communications DTC does not represent a failure of the devices 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 device availability has not been received.

Action Taken When the DTC Sets

- Specific subsystems will not function.
- DTC U0100 in the transmission control module will cause the transmission to go into default gears.
- Both DTC U0100 in the transmission control module and DTC U0101 in the engine control module will cause the MIL to illuminate.

Conditions for Clearing the DTC

- The engine control module or transmission control 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 device 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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.

- A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
- Battery power was restored to the vehicle and devices 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 device may have a U-code stored in history that does not require any repairs. Issues with late or corrupted messages between devices can be temporary with no apparent symptom or complaint; this does not mean the device is faulty. Do not replace a device based only on a history U-code.
- Do not replace a device reporting a U-code. The U-code identifies which device needs to be diagnosed for a communication issue.
- Communication may be available between some devices and the scan tool with either the low or high speed GMLAN serial data system inoperative. This condition is due to those devices using multiple serial data communication systems.
- Use **Data Link References** to determine what serial data communications the device uses.
- Some devices 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 device.
- Some intermittent communication concerns may be caused by fretting corrosion on the serial data circuit terminals. Inspect all connectors at the device that set the communication DTC, the device that the communication DTC was set against, and any inline harness connectors between the two devices. Do not replace a device based only on fretting corrosion. Refer to bulletin 09-06-03-004 for assistance with the diagnosis and repair of this condition, if applicable.
- This diagnostic can be used for any device that is not communicating, regardless of the type of serial data circuit it is connected to, providing the vehicle is equipped with the device.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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 device that is not communicating. Refer to **Control Module U Code List**.
2. Verify that DTC U0073, U2100, U0074, U0078, U1814, U2099, B1325, B1330, B1370, B1380, B1424, B1440, B1441, B1517, C0800, C0899, C12E1, P0560, or P0562 is not set.

- **If any of the DTCs are set**

Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .

- **If none of the DTCs are set**

3. Verify that DTC U0125 and DTC U0126 are not set together.

- **If both of the DTCs are set together**

Refer to **Scan Tool Does Not Communicate with Chassis High Speed GMLAN Device**.

- **If both of the DTCs are not set together**

4. Engine running for 10 s.

5. Ignition ON, engine OFF, verify that DTC U0100-U02FF is not set.

- **If the DTC U0100-U02FF is set in any device, except the K17 Electronic Brake Control Module**

Refer to Circuit/System Testing below.

- **If the DTC U0100-U02FF is set in the K17 Electronic Brake Control Module with any symptom byte, except symptom bytes 71, 72, and 74**

Refer to Circuit/System Testing below.

- **If the DTC U0100-U02FF is set in the K17 Electronic Brake Control Module with symptom byte 71, 72, or 74 along with other DTCs set**

Diagnose all other DTCs first. Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .

- **If the DTC U0100-U02FF is set in the K17 Electronic Brake Control Module with symptom byte 71, 72, or 74 and without other DTCs set**

1. Program the K17 Electronic Brake Control Module.

2. Verify the DTC does not set.
 - If the DTC sets, replace the K17 Electronic Brake Control Module.
 - If the DTC does not set
3. All OK.
 - **If the DTC U0100-U02FF is not set**
6. All OK.

Circuit/System Testing

NOTE: Use the schematics and connector end views to identify the device's ground, B+, ignition, accessory wakeup serial data, serial data communication enable, and serial data circuit terminals.

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. Disconnect all the harness connectors at the device that is not communicating. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 ohms between each ground circuit terminal and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
3. Ignition ON.
4. If equipped, verify a test lamp illuminates between each B+ circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the disconnected device.
 - **If the test lamp illuminates**
5. Ignition ON.
6. If equipped, verify a test lamp illuminates between each ignition circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**

1. Ignition OFF.
2. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is OK and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
1. Ignition OFF.
2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the disconnected device.
 - **If the test lamp illuminates**
7. Ignition ON.
8. If equipped, verify a test lamp illuminates between each ignition circuit terminal, which is controlled by a control module, and ground.
 - **If the test lamp does not illuminate**
1. Ignition OFF, disconnect the harness connectors at the control module that controls the ignition circuit.
2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the control module that controls the ignition circuit.
 - **If the test lamp illuminates**

NOTE: This test step is only applicable to a low speed GMLAN device.

9. Test for less than 4.5 V between each low speed GMLAN serial data circuit terminal and ground.
 - **If 4.5 V or greater**

Refer to **Scan Tool Does Not Communicate with Low Speed GMLAN Device** to test for a short to voltage in the serial data circuit.

- **If less than 4.5 V**
10. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
 11. Test for less than 2 ohms in each of the serial data circuits end to end between the device harness connector and the X84 Data Link Connector terminals listed below.
 - Low speed GMLAN serial data circuit terminal 1
 - High speed GMLAN serial data circuit terminal 6 or 14
 - Mid speed GMLAN serial data circuit terminal 3 or 11

- Chassis high speed GMLAN serial data circuit terminal 12 or 13
- Object high speed GMLAN serial data circuit terminal 3 or 11
- **If 2 ohms or greater**

Repair the open/high resistance in the serial data circuit between the non communicating device and the device setting the DTC or a serial data splice pack.

- **If less than 2 ohms**

NOTE: The following test step is only applicable to a high speed GMLAN device with 2 pairs of serial data circuits or a high speed GMLAN device with an internal terminating resistor.

12. Test for 110-130 ohms between each pair of high speed GMLAN serial data circuits.

- **If less than 110 ohms**

Refer to Scan Tool Does Not Communicate with High Speed GMLAN Device to test for a short to ground or a short between the serial data circuits.

- **If greater than 130 ohms**

Refer to Scan Tool Does Not Communicate with High Speed GMLAN Device to test for an open/high resistance in the serial data circuit.

- **If between 110-130 ohms**

13. Replace the device that is not communicating.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs
- Control Module References for device replacement, programming and setup

DTC U0100-U02FF (WITH HP6)

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

For device DTC descriptors, refer to Control Module U Code List.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	U0100-U02FF	U0100-U02FF	-	-
Ignition	U0100-U02FF, U1814, U2099	U0100-U02FF	-	-
Chassis High Speed GMLAN Serial Data (+)	U0074, U0077	U0100-U02FF	U0074, U0077	-
Chassis High Speed GMLAN Serial Data (-)	U0074, U0077	U0100-U02FF	U0074, U0077	-
Mid Speed GMLAN Serial Data (+)	U0074	U0100-U02FF	U0074	-
Mid Speed GMLAN Serial Data (-)	U0074	U0100-U02FF	U0074	-
High Speed GMLAN Serial Data (+)	U0073, 2	U0100-U02FF	U0073, 2	-
High Speed GMLAN Serial Data (-)	U0073, 2	U0100-U02FF	U0073, 2	-
Low Speed GMLAN Serial Data	U0078, 1	U0100-U02FF	U0078, 1	-
Ground	-	U0100-U02FF	-	-
1. Scan tool does not communicate with most low speed GMLAN device 2. Scan tool does not communicate with most high speed GMLAN device				

Circuit/System Description

The serial data circuit is the means by which the devices 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 device for diagnostic purposes and to check for DTCs. When the ignition switch is in RUN, each device communicating on the serial data circuit sends a state of health message to ensure that the device is operating properly. When a device stops communicating on the serial data circuit, for example if the device loses power or ground, the state of health message it normally sends on the serial data circuit disappears. Other devices on the serial data circuit, which expect to receive that state of health message, detect its absence; those devices in turn set a DTC associated with the loss of state of health of the non-communicating device. The DTC is unique to the device which is not communicating and one or more devices may set the same exact code. A loss of serial data communications DTC does not represent a failure of the devices 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 device availability has not been received.

Action Taken When the DTC Sets

- Specific subsystems will not function.
- DTC U0100 in the transmission control module will cause the transmission to go into default gears.
- Both DTC U0100 in the transmission control module and DTC U0101 in the engine control module will cause the MIL to illuminate.
- DTC U0100 and/or U0101 in the hybrid powertrain control module will cause the malfunction indicator lamp (MIL) to illuminate and the engine to operate in conventional mode.

Conditions for Clearing the DTC

- The engine control module or transmission control module turns OFF the MIL after 4 consecutive ignition cycles that the diagnostic runs and does not fail.
- The hybrid powertrain control module DTC clears when the malfunction is no longer present. The hybrid operation returns to normal after an ignition cycle and ignition off for greater than 5 seconds.
- A current DTC clears when the malfunction is no longer present.
- A history DTC clears when the device 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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and devices 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 device may have a U-code stored in history that does not require any repairs. Issues with late or corrupted messages between devices can be temporary with no apparent symptom or complaint; this does not mean the device is faulty. Do not replace a device based only on a history U-code.
- Do not replace a device reporting a U-code. The U-code identifies which device needs to be diagnosed for a communication issue.
- Communication may be available between some devices and the scan tool with either the low or high speed GMLAN serial data system inoperative. This condition is due to those devices using multiple serial

data communication systems.

- Use **Data Link References** to determine what serial data communications the device uses.
- Some devices 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 device.
- Some intermittent communication concerns may be caused by fretting corrosion on the serial data circuit terminals. Inspect all connectors at the device that set the communication DTC, the device that the communication DTC was set against, and any inline harness connectors between the two devices. Do not replace a device based only on fretting corrosion. Refer to bulletin 09-06-03-004 for assistance with the diagnosis and repair of this condition, if applicable.
- This diagnostic can be used for any device that is not communicating, regardless of the type of serial data circuit it is connected to, providing the vehicle is equipped with the device.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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 device that is not communicating. Refer to **Control Module U Code List**.
2. Verify that DTC U0073, U2100, U0074, U0078, U1814, U2099, B1325, B1330, B1370, B1380, B1424, B1440, B1441, B1517, C0800, C0899, C12E1, P0560, or P0562 is not set.
 - If any of the DTCs are set

Refer to Diagnostic Trouble Code (DTC) List - Vehicle .

- If none of the DTCs are set

3. Verify that DTCs U0125 and U0126 are not set.

- If both of the DTCs are set together

Refer to Scan Tool Does Not Communicate with Chassis High Speed GMLAN Device.

- If both of the DTCs are not set together

4. Engine running for 10 seconds.

5. Ignition ON, engine OFF, verify that DTC U0100-U02FF is not set.

- If the DTC U0100-U02FF is set in any device, except the electronic brake control module

Refer to Circuit/System Testing below.

- If the DTC U0100-U02FF is set in the electronic brake control module with any symptom byte, except symptom bytes 71, 72, and 74

Refer to Circuit/System Testing below.

- If the DTC U0100-U02FF is set in the electronic brake control module with symptom byte 71, 72, or 74 along with other DTCs set

Diagnose all other DTCs first. Refer to Diagnostic Trouble Code (DTC) List - Vehicle .

- If the DTC U0100-U02FF is set in the electronic brake control module with symptom byte 71, 72, or 74 and without other DTCs set

1. Program the electronic brake control module.

2. Verify the DTC does not set.

- If the DTC sets, replace the K17 electronic brake control module.

- If the DTC does not set

3. All OK.

- If the DTC U0100-U02FF is not set

6. All OK.

Circuit/System Testing

WARNING: Always perform the High Voltage Disabling procedure prior to servicing any High Voltage component or connection. Personal Protection Equipment (PPE) and proper procedures must be followed.

The High Voltage Disabling procedure includes the following steps:

- Identify how to disable high voltage.

- Identify how to test for the presence of high voltage.
- Identify condition under which high voltage is always present and personal protection equipment (PPE) and proper procedures must be followed.

Before working on any high voltage system, be sure to wear the following Personal Protection Equipment:

- Safety glasses with appropriate side shields when within 15 meters (50 feet) of the vehicle, either indoors or outdoors.
- Certified and up-to-date Class "0" Insulation gloves rated at 1000V with leather protectors.
 - Visually and functionally inspect the gloves before use.
 - Wear the Insulation gloves with leather protectors at all times when working with the high voltage battery assembly, whether the system is energized or not.

Failure to follow the procedures may result in serious injury or death.

WARNING: The eAssist battery pack assembly will utilize an exchange program. Please consult the most recent revision of bulletin/PI# PIC5520, available in Service Information (SI), for a list of approved eAssist battery pack assembly service procedures. Components that may be removed and serviced without exchanging the complete battery pack assembly are identified in the bulletin/PI. Please contact the GM Technical Assistance Center (1-877-446-8227) if you have any questions.

NOTE: Use the schematic to identify the following:

- Devices the vehicle is equipped with
- Device locations on the serial data circuit
- The device's ground, B+, ignition, ground, accessory wakeup serial data, serial data communication enable, and serial data circuit terminals

1. Perform the High Voltage Disabling procedure before proceeding with this diagnostic if the non communicating control module is a high voltage module from the following list. Refer to **High Voltage Disabling**.
 - K16 Battery Energy Control Module
 - K59 Starter/Generator Control Module
2. If high voltage disabling is required, reconnect the 12 V battery after performing the high voltage disabling procedure.
3. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. Disconnect all the harness connectors at the device that is not communicating. It may take up to 2 minutes for all vehicle systems to power down.

4. Test for less than 10 ohms between each ground circuit terminal and ground.
- **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
5. Ignition ON.
6. If equipped, verify a test lamp illuminates between each B+ circuit terminal and ground.
- **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the disconnected device.
 - **If the test lamp illuminates**
7. Ignition ON.
8. If equipped, verify a test lamp illuminates between each ignition circuit terminal and ground.
- **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is OK and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the disconnected device.
 - **If the test lamp illuminates**
9. Ignition ON.
10. If equipped, verify a test lamp illuminates between each ignition circuit terminal, which is controlled by a control module, and ground.
- **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the harness connectors at the control module that controls the ignition

circuit.

2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the control module that controls the ignition circuit.
- **If the test lamp illuminates**

NOTE: This test step is only applicable to low speed GMLAN devices.

11. Test for less than 4.5 V between each low speed GMLAN serial data circuit terminal and ground.
 - **If 4.5 V or greater**

Refer to **Scan Tool Does Not Communicate with Low Speed GMLAN Device** to test for a short to voltage in the serial data circuit.

- **If less than 4.5 V**
12. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
 13. Test for less than 2 ohms in each of the serial data circuits end to end between the device harness connector and the X84 data link connector terminals listed below.
 - Low speed GMLAN serial data circuit terminal 1
 - High speed GMLAN serial data circuit terminal 6 or 14
 - Mid speed GMLAN serial data circuit terminal 3 or 11
 - Chassis high speed GMLAN serial data circuit terminal 12 or 13
- **If 2 ohms or greater**

Repair the open/high resistance in the serial data circuit between the non communicating device and the device setting the DTC or a serial data splice pack.

- **If less than 2 ohms**

NOTE: The following test step is only applicable to high speed GMLAN devices.

14. Test for 110-130 ohms between each pair of high speed GMLAN serial data circuits.
 - **If less than 110 ohms**

Refer to **Scan Tool Does Not Communicate with High Speed GMLAN Device** to test for a short to ground or a short between the serial data circuits.

- **If greater than 130 ohms**

Refer to **Scan Tool Does Not Communicate with High Speed GMLAN Device** to test for an open/high resistance in the serial data circuit.

- **If between 110-130 ohms**

15. Replace the device that is not communicating.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

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 Descriptor

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

Circuit/System Description

Some devices must be configured with specific software, serial numbers, vehicle options, or other information. If a device was not properly configured after installation that device may set the appropriate communication DTCs. 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 device 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 device ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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. Ignition ON.
2. Verify DTC U0300-U0336 is not set.
 - **If DTC U0300-U0336 is set**
 1. Program the device specified by the DTC descriptor.
 2. Verify the DTC does not set.
 - If the DTC sets, replace the device specified by the DTC descriptor.
 - If the DTC does not set
 - 3. All OK.
 - **If DTC U0300-U0336 is not set**
3. All OK

Repair Instructions

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

Control Module References for device replacement, programming and setup

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 devices are constantly receiving information from other devices through serial data communication network. The invalid data code will be set when a receiving device detects a discrepancy in information it receives from another device 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 device 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 device ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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. Engine running for 10 s.
2. Ignition ON, engine OFF, verify DTC U0400-U05FF is not set.
 - **If DTC U0400-U05FF is set along with other DTCs set**

Diagnose all other DTCs first. Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .

- **If DTC U0400-U05FF is set without other DTCs set**
 1. Program the device specified by the DTC descriptor.
 2. Verify the DTC does not set.
 - If the DTC sets, replace the appropriate device.
 - If the DTC does not set
 3. All OK.
 - **If DTC U0400-U05FF is not set**
3. All OK

Repair Instructions

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

Control Module References for device replacement, programming and setup

DTC U1500-U15FF

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

For device DTC descriptors, refer to **Control Module U Code List**.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	U1500-U15BF	U1500-U15BF	-	-
Ignition	U1500-U15BF	U1500-U15BF	-	-
LIN Serial Data	U1500-U15BF	U1500-U15BF	U1500-U15BF	-
Ground	-	U1500-U15BF	-	-

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 LIN devices within a particular subsystem. If serial data communication is lost between any of the LIN devices on the LIN bus network, a no communication code against the non-communicating LIN device will be set. A master control module is the one that reports the non communication 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 device 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 device 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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.

- A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
- Battery power was restored to the vehicle and devices 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 device may have a U-code stored in history that does not require any repairs. Issues with late or corrupted messages between devices can be temporary with no apparent symptom or complaint; this does not mean the device is faulty. Do not replace a device based only on a history U-code.
- Do not replace a device reporting a U-code. The U-code identifies which device 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 LIN devices on the LIN bus network.
- Some devices 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 device.
- Some intermittent communication concerns may be caused by fretting corrosion on the serial data circuit terminals. Inspect all connectors at the device that set the communication DTC, the device that the communication DTC was set against, and any inline harness connectors between the two devices. Do not replace a device based only on fretting corrosion. Refer to bulletin 09-06-03-004 for assistance with the diagnosis and repair of this condition, if applicable.
- An open in the LIN bus serial data circuit between the splice pack and a LIN device will only affect that specific LIN device. This type of failure will set a loss of communication DTC for each LIN device affected and the other LIN devices will still communicate.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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 LIN device that is not communicating. Refer to **Control Module U Code List**.
2. Verify that DTC B1325, B1330, B1370, B1380, B1424, B1440, B1441, B1517, C0800, C0899, C12E1, P0560, or P0562 is not set.
 - **If any of the DTCs are set**

Refer to **Diagnostic Trouble Code (DTC) List - Vehicle**.

- **If none of the DTCs are set**
3. Refer to Circuit/System Testing below.

Circuit/System Testing

NOTE: Use the schematic to identify the following:

- **The master control module and the LIN devices on the same LIN serial data circuit**
- **The master control module's LIN serial data circuit terminal and the LIN device's B+, ignition, ground, and LIN serial data circuit terminals**

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. Disconnect the harness connector at a LIN device that is not communicating. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 ohms between each ground circuit terminal and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
3. Ignition ON.
4. Verify a test lamp illuminates between each B+ circuit terminal and ground, if equipped.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the B+ circuit end to end.

- If 2 ohms or greater, repair the open/high resistance in the circuit.
- If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
- **If the test lamp does not illuminate and the circuit fuse is open**
- 1. Ignition OFF.
- 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the disconnected LIN device.
- **If the test lamp illuminates**
- 5. Ignition ON.
- 6. Verify a test lamp illuminates between each ignition circuit terminal and ground, if equipped.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 - 1. Ignition OFF.
 - 2. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is OK and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 - 1. Ignition OFF.
 - 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the disconnected LIN device.
 - **If the test lamp illuminates**
- 7. Ignition ON.
- 8. Verify a test lamp illuminates between each ignition circuit terminal, which is controlled by a control module, and ground, if equipped.
 - **If the test lamp does not illuminate**
 - 1. Ignition OFF, disconnect the harness connectors at the control module that controls the ignition circuit.
 - 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 - 3. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the control module that controls the ignition circuit.
 - **If the test lamp illuminates**
- 9. Ignition ON.

NOTE: For accurate voltage reading, disconnect the battery charger prior to performing the following test step.

10. Test for 2-13 V between the LIN serial data circuit terminal and ground.

○ **If less than 2 V**

1. Ignition OFF, disconnect the harness connector at the control module setting the DTC and all LIN devices that share the same LIN serial data circuit.
2. Test for infinite resistance between the serial data circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 ohms in the serial data circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms
4. Reconnect the control module that set the DTC, ignition ON.
5. Test for 2-13 V between the LIN serial data circuit terminal and ground.
 - If less than 2 V, replace the control module setting the DTC.
 - If greater than 2 V, replace the LIN device that causes a current DTC to set when connected.

○ **If greater than 13 V**

1. Ignition OFF, disconnect the harness connector at the control module setting the DTC and all LIN devices that share the same LIN serial data circuit.
2. Ignition ON.
3. Test for less than 1 V between the serial data circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
4. Ignition OFF, reconnect the control module that set the DTC, ignition ON.
5. Test for 2-13 V between the LIN serial data circuit terminal and ground.
 - If greater than 13 V, replace the control module setting the DTC.
 - If less than 13 V, replace the LIN device that causes a current DTC to set when connected.

○ **If between 2-13 V**

11. Replace the disconnected LIN device.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

DTC U180B

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 U180B 00

Battery Energy Control Module High Speed CAN Bus Off Malfunction

Circuit/System Description

The high speed GMLAN serial data circuits are serial data buses used to communicate information between the devices. The high speed GMLAN serial data circuits connect directly to the data link connector (DLC) for programming purposes.

This diagnostic is used to check the high speed GMLAN communication bus status.

Conditions for Running the DTC

- The ignition is ON.
- The system voltage is greater than 8.8 V.

Conditions for Setting the DTC

The device setting the DTC has attempted to establish communications on the serial data circuits for more than 1.4 seconds without success.

Action Taken When the DTC Sets

The DTC U180B is a type B DTC.

Conditions for Clearing the DTC

The DTC U180B is a type B DTC.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool References

Control Module References for scan tool information

Circuit/System Verification

Diagnosis is accomplished using the symptom. Refer to **Scan Tool Does Not Communicate with High Speed GMLAN Device**.

DTC U1811

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 U1811 00

Battery Energy Control Module Powertrain Expansion CAN Bus Off Malfunction

Circuit/System Description

The powertrain high speed GMLAN serial data circuits are serial data buses used to communicate information between the devices.

This diagnostic is used to check the powertrain high speed GMLAN communication bus status.

Conditions for Running the DTC

- The ignition is ON.
- The system voltage is greater than 8.8 V.

Conditions for Setting the DTC

The device setting the DTC has attempted to establish communications on the serial data circuits for more than 1.4 seconds without success.

Action Taken When the DTC Sets

The DTC U1811 is a type B DTC.

Conditions for Clearing the DTC

The DTC U1811 is a type B DTC.

Reference Information

Schematic Reference

Data Communication Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool References

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify DTC U1811 is not set.

- If DTC U1811 is set

Refer to **DTC U0074 (Chassis Expansion Bus)**, **DTC U0074 (Powertrain Expansion Bus with HP6)**, **DTC U0074 (Powertrain Expansion Bus without HP6)**.

- If DTC U1811 is not set

3. All OK

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

Powertrain Wake-Up Communication Circuit

For symptom byte information, refer to **Symptom Byte List** .

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ignition	U1814 02*	U0100-U02FF	-	-
* Vehicle may not start.				

Circuit/System Description

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

Conditions for Running the DTC

- The system voltage is between 9-16 V.
- 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 ignition circuit.

Action Taken When the DTC Sets

- The output command is turned off while the malfunction is present.
- The devices use a default value for the missing parameters until the next ignition cycle.
- The device(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 device ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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: Use the schematic to determine which devices are on the K9 Body Control Module's ignition circuit terminal 22 X4. Use the connector end view to identify the ignition circuit terminal for each of those devices.

1. Ignition OFF, disconnect the harness connectors at an easily accessible device that shares the K9 Body Control Module's ignition circuit terminal 22 X4. Ignition ON.

2. Verify that the DTC U1814 remains current.

- **If the DTC becomes history**

Replace the device that was just disconnected.

- **If the DTC remains current**

3. With the prior devices disconnected, repeat steps 1 and 2 for each device on the ignition circuit except the K9 Body Control Module.
4. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
5. Test for infinite resistance between the ignition circuit terminal 22 X4 at the K9 Body Control Module and ground.

- **If less than infinite resistance**

Repair the short to ground on the circuit.

- **If infinite resistance**

6. Replace the K9 Body Control Module.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

DTC U1817

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 U1817 00

Lost Communication with Hybrid Powertrain Control Module on Powertrain Expansion CAN Bus Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	U1817	U1817	-	-

Ignition	U1814, U1817	U1817	-	-
Powertrain High Speed GMLAN Serial Data (+)	U0074*	U0074, U1817*	U0074*	-
Powertrain High Speed GMLAN Serial Data (-)	U0074*	U0074, U1817*	U0074*	-
Ground	-	U1817*	-	-
* Other DTCs may set with this fault.				

Circuit/System Description

Devices connected to the powertrain high speed GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the devices. The devices 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 device as an availability indication of the transmitter device. Each message contains the identification number of the transmitter device.

The motor control module and the hybrid powertrain control module are all internal to the starter/generator control module. All circuits to the hybrid powertrain control module are also internal to the starter/generator control module.

Communication diagnostics for the serial data, including device power and ground as well as the wakeup circuits for the motor control module and the hybrid powertrain control module are all diagnosed from external sources only to the starter/generator control module connector because any circuit fault condition within the starter/generator control module will cause a complete replacement.

Conditions for Running the DTC

- The system voltage is more than 10 V.
- The vehicle power mode master requires serial data communication to occur.

Conditions for Setting the DTC

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

Action Taken When the DTC Sets

DTC U1817 is a type A DTC.

Conditions for Clearing the DTC

DTC U1817 is a type A DTC.

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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and devices 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 device may have a U-code stored in history that does not require any repairs. Issues with late or corrupted messages between devices can be temporary with no apparent symptom or complaint; this does not mean the device is faulty. Do not replace a device based only on a history U-code.
 - Do not replace a device reporting a U-code. The U-code identifies which device needs to be diagnosed for a communication issue.
 - Communication may be available between the device and the scan tool with one or more GMLAN serial data systems inoperative. This condition is due to the device using multiple GMLAN busses.
 - Use **Data Link References** to determine what GMLAN serial data communications the non communicating device uses.
 - The device 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 non communicating device.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify that DTC U0293 is not set.
 - If DTC U0293 is set

Refer to DTC U0100-U02FF (without HP6), DTC U0100-U02FF (with HP6).

- If DTC U0293 is not set
3. Verify that DTC U0074, U1814, B1428, B1370, B1380, B1440, B1441, B1325, or P0562 is not set.
 - If any of the DTCs are set

Refer to Diagnostic Trouble Code (DTC) List - Vehicle .

- If none of the DTCs are set
4. Verify that DTCs U1818, U182A, U1844, and U1847 are not set.
 - If all of those DTCs are set together

Refer to DTC U0074 (Chassis Expansion Bus), DTC U0074 (Powertrain Expansion Bus with HP6), DTC U0074 (Powertrain Expansion Bus without HP6).

- If all of those DTCs are not set together
5. Refer to Circuit/System Testing below.

Circuit/System Testing

WARNING: Always perform the High Voltage Disabling procedure prior to servicing any High Voltage component or connection. Personal Protection Equipment (PPE) and proper procedures must be followed.

The High Voltage Disabling procedure includes the following steps:

- Identify how to disable high voltage.
- Identify how to test for the presence of high voltage.
- Identify condition under which high voltage is always present and personal protection equipment (PPE) and proper procedures must be followed.

Before working on any high voltage system, be sure to wear the following Personal Protection Equipment:

- Safety glasses with appropriate side shields when within 15 meters (50 feet) of the vehicle, either indoors or outdoors.
- Certified and up-to-date Class "0" Insulation gloves rated at 1000V with leather protectors.
 - Visually and functionally inspect the gloves before use.
 - Wear the Insulation gloves with leather protectors at all times when working with the high voltage battery assembly, whether the system is energized or not.

Failure to follow the procedures may result in serious injury or death.

WARNING: The eAssist battery pack assembly will utilize an exchange program. Please consult the most recent revision of bulletin/PI# PIC5520, available in Service Information (SI), for a list of approved eAssist battery pack assembly service procedures. Components that may be removed and serviced without exchanging the complete battery pack assembly are identified in the bulletin/PI. Please contact the GM Technical Assistance Center (1-877-446-8227) if you have any questions.

NOTE: Use the schematic to identify the following:

- The device location on the powertrain high speed GMLAN serial data circuits
- The device B+, ignition, ground, accessory wake up serial data, and serial data circuit terminals.

1. Perform the High Voltage Disabling procedure. Refer to High Voltage Disabling.
2. Reconnect the 12 V battery.
3. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. Disconnect the low voltage harness connector at the K59 starter/generator control module. It may take up to 2 minutes for all vehicle systems to power down.
4. Test for less than 10 ohms between the K59 starter/generator control module case and ground.
 - If 10 ohms or greater

Check the ground connection at the housing.

- **If less than 10 ohms**

5. Ignition ON.
6. If equipped, verify that a test lamp illuminates between each B+ circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K59 starter/generator control module.
 - **If the test lamp illuminates**
7. Ignition ON.
8. If equipped, verify that a test lamp illuminates between each ignition circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is OK and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K59 starter/generator control module.
 - **If the test lamp illuminates**
9. Ignition ON.
10. If equipped, verify that a test lamp illuminates between the ignition circuit terminal, which is controlled by a control module, and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the harness connectors at the control module that controls the ignition circuit.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the ignition circuit end to end.

- If 2 ohms or greater, repair the open/high resistance in the circuit.
- If less than 2 ohms, replace the control module that controls the ignition circuit.

○ **If the test lamp illuminates**

11. Ignition OFF and all vehicle systems OFF, all keys at least 3 meters away from vehicle, all access doors closed. Disconnect the low voltage harness connector at the device setting the DTC. It may take up to 2 minutes for all vehicle systems to power down.
12. Test for less than 2 ohms in each powertrain high speed GMLAN serial data circuit between the K59 starter/generator control module and the device setting the DTC.

○ **If 2 ohms or greater**

Repair the open/high resistance in the serial data circuit between the K59 starter/generator control module and the device setting the DTC.

○ **If less than 2 ohms**

13. Replace the K59 starter/generator control module.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

DTC U1818

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 U1818 00

Lost Communication with Engine Control Module on Powertrain Expansion CAN Bus Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	U1818	U1818	-	-
Ignition	U1814, U1818	U1818	-	-
Powertrain High Speed GMLAN	U0074*	U0074, U1818*	U0074*	-

Serial Data (+)				
Powertrain High Speed GMLAN Serial Data (-)	U0074*	U0074, U1818*	U0074*	-
Ground	-	U1818	-	-
* Other DTCs may set with this fault.				

Circuit/System Description

Devices connected to the powertrain high speed GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the devices. The devices 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 device as an availability indication of the transmitter device. Each message contains the identification number of the transmitter device.

Conditions for Running the DTC

- The system voltage is greater than 9.5 V.
- The vehicle power mode master requires serial data communication to occur.

Conditions for Setting the DTC

A supervised periodic message that includes the transmitter device availability has not been received for more than 500 ms.

Action Taken When the DTC Sets

DTC U1818 is a type B DTC.

Conditions for Clearing the DTC

DTC U1818 is a type B DTC.

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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.

- Battery power was restored to the vehicle and devices 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 device may have a U-code stored in history that does not require any repairs. Issues with late or corrupted messages between devices can be temporary with no apparent symptom or complaint; this does not mean the device is faulty. Do not replace a device based only on a history U-code.
- Do not replace a device reporting a U-code. The U-code identifies which device needs to be diagnosed for a communication issue.
- Communication may be available between the device and the scan tool with one or more GMLAN serial data systems inoperative. This condition is due to the device using multiple GMLAN busses.
- Use **Data Link References** to determine what GMLAN serial data communications the non communicating device uses.
- The device 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 non communicating device.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify that DTC U0100 is not set.
 - **If DTC U0100 is set**

Refer to **DTC U0100-U02FF (without HP6), DTC U0100-U02FF (with HP6).**

- **If DTC U0100 is not set**
3. Verify that DTC U0074, U1814, B1428, B1370, B1380, B1440, B1441, B1325, or P0562 is not set.
 - **If any of the DTCs are set**

Refer to **Diagnostic Trouble Code (DTC) List - Vehicle .**

- **If none of the DTCs are set**
4. Verify that DTCs U1817, U182A, U1844, and U1847 are not set.
 - **If all of those DTCs are set together**

Refer to **DTC U0074 (Chassis Expansion Bus), DTC U0074 (Powertrain Expansion Bus with HP6), DTC U0074 (Powertrain Expansion Bus without HP6).**

- **If all of those DTCs are not set together**
5. Refer to Circuit/System Testing below.

Circuit/System Testing

WARNING: Always perform the High Voltage Disabling procedure prior to servicing any High Voltage component or connection. Personal Protection Equipment (PPE) and proper procedures must be followed.

The High Voltage Disabling procedure includes the following steps:

- Identify how to disable high voltage.
- Identify how to test for the presence of high voltage.
- Identify condition under which high voltage is always present and personal protection equipment (PPE) and proper procedures must be followed.

Before working on any high voltage system, be sure to wear the following Personal Protection Equipment:

- Safety glasses with appropriate side shields when within 15 meters (50 feet) of the vehicle, either indoors or outdoors.

- **Certified and up-to-date Class "0" Insulation gloves rated at 1000V with leather protectors.**
 - Visually and functionally inspect the gloves before use.
 - Wear the Insulation gloves with leather protectors at all times when working with the high voltage battery assembly, whether the system is energized or not.

Failure to follow the procedures may result in serious injury or death.

NOTE: Use the schematic to identify the following:

- **The device location on the powertrain high speed GMLAN serial data circuits**
 - **The device B+, ignition, ground, accessory wake up serial data 2 and serial data circuit terminals**
1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. Disconnect the harness connector at the K20 engine control module. It may take up to 2 minutes for all vehicle systems to power down.
 2. Test for less than 10 ohms between each ground circuit terminal and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
 3. Ignition ON.
 4. If equipped, verify that a test lamp illuminates between each B+ circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K20 engine control module.
 - **If the test lamp illuminates**
 5. Ignition ON.

6. If equipped, verify that a test lamp illuminates between each ignition circuit terminal and ground.
- **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is OK and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K20 engine control module.
 - **If the test lamp illuminates**
7. Ignition ON.
8. If equipped, verify that a test lamp illuminates between the ignition circuit terminal, which is controlled by a control module, and ground.
- **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the harness connectors at the control module that controls the ignition circuit.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the control module that controls the ignition circuit.
 - **If the test lamp illuminates**
9. If the device setting the DTC is a high voltage component, perform the High Voltage Disabling procedure. Refer to **High Voltage Disabling**.
10. Reconnect the 12 V battery if the High Voltage Disabling procedure is performed.
11. Ignition OFF and all vehicle systems OFF, all keys at least 3 meters away from vehicle, all access doors closed. Disconnect the low voltage harness connector at the device setting the DTC. It may take up to 2 minutes for all vehicle systems to power down.
12. Test for less than 2 ohms in each serial data circuit between the K20 engine control module and the device setting the DTC.
- **If 2 ohms or greater**

Repair the open/high resistance in the serial data circuit between the K20 engine control module and the device setting the DTC.
 - **If less than 2 ohms**
13. Replace the K20 engine control module.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

DTC U182A

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 U182A 00

Hybrid Powertrain Control Module Lost Communication with Battery Energy Control Module on Powertrain Expansion CAN Bus Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	U182A*	U182A	-	-
Ignition	U1814, U182A*	U182A	-	-
Powertrain High Speed GMLAN Serial Data (+)	U0074*	U0074, U182A*	U0074*	-
Powertrain High Speed GMLAN Serial Data (-)	U0074*	U0074, U182A*	U0074*	-
Ground	-	U182A*	-	-
* Multiple DTCs may be set and multiple symptoms including a no start condition may occur.				

Circuit/System Description

Devices connected to the powertrain high speed GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the devices. The devices 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 device as an availability indication of the transmitter device. Each message contains the identification number of the transmitter device.

Conditions for Running the DTC

The system voltage is greater than 9.5 V.

Conditions for Setting the DTC

A supervised periodic message that includes the transmitter device availability has not been received for more than 3 seconds.

Action Taken When the DTC Sets

DTC U182A is a type B DTC.

Conditions for Clearing the DTC

DTC U182A is a type B DTC.

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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and devices 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 device may have a U-code stored in history that does not require any repairs. Issues with late or corrupted messages between devices can be temporary with no apparent symptom or complaint; this does not mean the device is faulty. Do not replace a device based only on a history U-code.
- Do not replace a device reporting a U-code. The U-code identifies which device needs to be diagnosed for a communication issue.
- Communication may be available between the device and the scan tool with one or more GMLAN serial data systems inoperative. This condition is due to the device using multiple GMLAN busses.
- Use **Data Link References** to determine what GMLAN serial data communications the non communicating device uses.
- The device 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 non communicating device.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify that DTC U0293 is not set.
 - **If DTC U0293 is set**

Refer to **DTC U0100-U02FF (without HP6), DTC U0100-U02FF (with HP6)**.
 - **If DTC U0293 is not set**
3. Verify that DTC U0073, U0074, U1814, B1428, B1370, B1380, B1440, B1441, B1325, or P0562 is not set.
 - **If any of the DTCs are set**

Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .

- If none of the DTCs are set
- 4. Verify that DTCs U1817, U1818, U1844, and U1847 are not set.
- If all of those DTCs are set together

Refer to DTC U0074 (Chassis Expansion Bus), DTC U0074 (Powertrain Expansion Bus with HP6), DTC U0074 (Powertrain Expansion Bus without HP6).

- If all of those DTCs are not set together
- 5. Refer to Circuit/System Testing below.

Circuit/System Testing

WARNING: Always perform the High Voltage Disabling procedure prior to servicing any High Voltage component or connection. Personal Protection Equipment (PPE) and proper procedures must be followed.

The High Voltage Disabling procedure includes the following steps:

- Identify how to disable high voltage.
- Identify how to test for the presence of high voltage.
- Identify condition under which high voltage is always present and personal protection equipment (PPE) and proper procedures must be followed.

Before working on any high voltage system, be sure to wear the following Personal Protection Equipment:

- Safety glasses with appropriate side shields when within 15 meters (50 feet) of the vehicle, either indoors or outdoors.
- Certified and up-to-date Class "0" Insulation gloves rated at 1000V with leather protectors.
 - Visually and functionally inspect the gloves before use.
 - Wear the Insulation gloves with leather protectors at all times when working with the high voltage battery assembly, whether the system is energized or not.

Failure to follow the procedures may result in serious injury or death.

WARNING: The eAssist battery pack assembly will utilize an exchange program. Please consult the most recent revision of bulletin/PI# PIC5520, available in Service Information (SI), for a list of approved eAssist battery pack assembly service procedures. Components that may be removed and serviced without exchanging the complete battery pack assembly are identified in the bulletin/PI. Please contact the GM Technical Assistance

Center (1-877-446-8227) if you have any questions.

NOTE: Use the schematic to identify the following:

- The device locations on powertrain high speed GMLAN serial data circuits
- The device B+, ignition, ground, accessory wake up serial data, and serial data circuit terminals

1. Perform the High Voltage Disabling procedure. Refer to **High Voltage Disabling**.
2. Reconnect the 12 V battery.
3. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. Disconnect the low voltage harness connector at the K16 battery energy control module. It may take up to 2 minutes for all vehicle systems to power down.
4. Test for less than 10 ohms between the K16 battery energy control module case and ground.

- **If 10 ohms or greater**

Check the ground connection at the housing.

- **If less than 10 ohms**

5. Ignition ON.
6. If equipped, verify that a test lamp illuminates between each B+ circuit terminal and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the low voltage harness connectors at the K59 starter/generator control module.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K59 starter/generator control module.
 - **If the test lamp illuminates**
7. Ignition ON.
8. If equipped, verify that a test lamp illuminates between each ignition circuit terminal and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the low voltage harness connectors at the K59 starter/generator control module.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the ignition circuit end to end.

- If 2 ohms or greater, repair the open/high resistance in the circuit.
- If less than 2 ohms, replace the K59 starter/generator control module.

○ **If the test lamp illuminates**

9. Ignition OFF and all vehicle systems OFF, all keys at least 3 meters away from vehicle, all access doors closed. Disconnect the low voltage harness connector at the K59 starter/generator control module. It may take up to 2 minutes for all vehicle systems to power down.
10. Test for less than 2 ohms in each powertrain high speed GMLAN serial data circuit between the K16 battery energy control module and the K59 starter/generator control module.

○ **If 2 ohms or greater**

Repair the open/high resistance in the serial data circuit between the K16 battery energy control module and the K59 starter/generator control module.

○ **If less than 2 ohms**

11. Replace the K16 battery energy control module.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

DTC U1831

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 U1831 00

Drive Motor Control Module 1 Lost Communication with Hybrid Powertrain Control Module
Malfunction

Circuit/System Description

The motor control module and the hybrid powertrain control module are all internal to the starter/generator control module. The hybrid powertrain control module sends out diagnostic trouble code information to other devices regarding the motor control module. All circuits to the hybrid powertrain control module and motor control module are also internal to the starter/generator control module and replaced as a single component.

Communication diagnostics for the serial data, including device power and ground as well as the wakeup circuits for motor control module and the hybrid powertrain control module are all diagnosed from external sources only to the starter/generator control module connector because any circuit fault condition within the starter/generator control module will cause a complete replacement.

Conditions for Running the DTC

- The system voltage is greater than 9.5 V.
- The vehicle power mode master requires serial data communication to occur.

Conditions for Setting the DTC

A supervised periodic message that includes the transmitter device availability has not been received for more than 500 ms.

Action Taken When the DTC Sets

The DTC U1831 is a type B DTC.

Conditions for Clearing the DTC

The DTC U1831 is a type B DTC.

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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and devices 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 device may have a U-code stored in history that does not require any repairs. Issues with late or corrupted messages between devices can be temporary with no apparent symptom or complaint; this does not mean the device is faulty. Do not replace a device based only on a history U-code.
- The device 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 non communicating device.

- If DTC U1831 is only set current in the hybrid powertrain control module, the starter/generator control module must be replaced due to all circuits between the hybrid powertrain control module and motor control module being internal to the starter/generator control module.

Reference Information

Schematic Reference

- Data Communication Schematics
- Control Module References

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

WARNING: The eAssist battery pack assembly will utilize an exchange program. Please consult the most recent revision of bulletin/PI# PIC5520, available in Service Information (SI), for a list of approved eAssist battery pack assembly service procedures. Components that may be removed and serviced without exchanging the complete battery pack assembly are identified in the bulletin/PI. Please contact the GM Technical Assistance Center (1-877-446-8227) if you have any questions.

1. Ignition ON.

2. Verify that DTC U0293 is not set.

- **If DTC U0293 is set**

Refer to **DTC U0100-U02FF (without HP6)**, **DTC U0100-U02FF (with HP6)**.

- **If DTC U0293 is not set**

3. Verify that DTC U1831 is not set current.

- **If DTC U1831 is set current**

Replace the K59 starter/generator control module.

- **If DTC U1831 is not set**

4. All OK.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

DTC U1844

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 U1844 00

Battery Energy Control Module Lost Communication with Hybrid Powertrain Control Module on Powertrain Expansion CAN Bus Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	U1844*	U1844	-	-
Ignition	U1814, U1844*	U1844*	-	-
Powertrain High Speed GMLAN Serial Data (+)	U0074*	U0074, U1844*	U0074*	-

Powertrain High Speed GMLAN Serial Data (-)	U0074*	U0074, U1844*	U0074*	-
Ground	-	U1844*	-	-
* Other modules/DTCs may set with this fault and multiple symptoms including a no start condition may occur.				

Circuit/System Description

Devices connected to the powertrain high speed GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the devices. The devices 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 device as an availability indication of the transmitter device. Each message contains the identification number of the transmitter device.

This diagnostic is used to check the loss of communication with hybrid powertrain control module on powertrain high speed GMLAN bus. The battery energy control module supervises a periodic serial data message to check the communication status of the hybrid powertrain control module. If this message is not received within 3 seconds, then this DTC is set.

Conditions for Running the DTC

- The system voltage is greater than 8.8 V.
- The DTC U1811 is not set.

Conditions for Setting the DTC

A supervised periodic message that includes the transmitter device availability has not been received within 3 seconds.

Action Taken When the DTC Sets

The DTC U1844 is a type B DTC.

Conditions for Clearing the DTC

The DTC U1844 is a type B DTC.

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 device on the data communication circuit was disconnected while the communication circuit is

awake.

- Power to one or more devices was interrupted during diagnosis.
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and devices 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 device may have a U-code stored in history that does not require any repairs. Issues with late or corrupted messages between devices can be temporary with no apparent symptom or complaint; this does not mean the device is faulty. Do not replace a device based only on a history U-code.
 - Do not replace a device reporting a U-code. The U-code identifies which device needs to be diagnosed for a communication issue.
 - Communication may be available between the device and the scan tool with one or more GMLAN serial data systems inoperative. This condition is due to the device using multiple GMLAN busses.
 - Use **Data Link References** to determine what GMLAN serial data communications the non communicating device uses.
 - The device 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 non communicating device.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify that DTC U0293 is not set.
 - If DTC U0293 is set

Refer to DTC U0100-U02FF (without HP6), DTC U0100-U02FF (with HP6).

- If DTC U0293 is not set
3. Verify that DTC U0073, U0074, U1814, B1428, B1370, B1380, B1440, B1441, B1325, or P0562 is not set.
 - If any of the DTCs are set

Refer to Diagnostic Trouble Code (DTC) List - Vehicle .

- If none of the DTCs are set
4. 3. Verify that DTCs U1817, U1818, U182A, and U1847 are not set.
 - If all of those DTCs are set together

Refer to DTC U0074 (Chassis Expansion Bus), DTC U0074 (Powertrain Expansion Bus with HP6), DTC U0074 (Powertrain Expansion Bus without HP6).

- If all of those DTCs are not set together
5. Refer to Circuit/System Testing below.

Circuit/System Testing

WARNING: Always perform the High Voltage Disabling procedure prior to servicing any High Voltage component or connection. Personal Protection Equipment (PPE) and proper procedures must be followed.

The High Voltage Disabling procedure includes the following steps:

- Identify how to disable high voltage.
- Identify how to test for the presence of high voltage.
- Identify condition under which high voltage is always present and personal protection equipment (PPE) and proper procedures must

be followed.

Before working on any high voltage system, be sure to wear the following Personal Protection Equipment:

- Safety glasses with appropriate side shields when within 15 meters (50 feet) of the vehicle, either indoors or outdoors.
- Certified and up-to-date Class "0" Insulation gloves rated at 1000V with leather protectors.
 - Visually and functionally inspect the gloves before use.
 - Wear the Insulation gloves with leather protectors at all times when working with the high voltage battery assembly, whether the system is energized or not.

Failure to follow the procedures may result in serious injury or death.

WARNING: The eAssist battery pack assembly will utilize an exchange program. Please consult the most recent revision of bulletin/PI# PIC5520, available in Service Information (SI), for a list of approved eAssist battery pack assembly service procedures. Components that may be removed and serviced without exchanging the complete battery pack assembly are identified in the bulletin/PI. Please contact the GM Technical Assistance Center (1-877-446-8227) if you have any questions.

NOTE: Use the schematic to identify the following:

- The device location on the powertrain high speed GMLAN serial data circuits
- The device B+, ignition, ground, accessory wake up serial data, and serial data circuit terminals

1. Perform the High Voltage Disabling procedure. Refer to High Voltage Disabling.
2. Reconnect the 12 V battery.
3. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. Disconnect the low voltage harness connector at the K59 starter/generator control module. It may take up to 2 minutes for all vehicle systems to power down.
4. Test for less than 10 ohms between the K59 starter/generator control module case and ground.
 - **If 10 ohms or greater**

Check the ground connection at the housing.

- **If less than 10 ohms**

5. Ignition ON.
6. If equipped, verify that a test lamp illuminates between each B+ circuit terminal and ground.

- **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K59 starter/generator control module.
 - **If the test lamp illuminates**
- 7. Ignition ON.
- 8. If equipped, verify that a test lamp illuminates between each ignition circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is OK and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K59 starter/generator control module.
 - **If the test lamp illuminates**
- 9. Ignition ON.
- 10. If equipped, verify that a test lamp illuminates between the ignition circuit terminal, which is controlled by a control module, and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the harness connectors at the control module that controls the ignition circuit.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the control module that controls the ignition circuit.
 - **If the test lamp illuminates**
- 11. Ignition OFF and all vehicle systems OFF, all keys at least 3 meters away from vehicle, all access doors

closed. Disconnect the low voltage harness connector at the K16 battery energy control module. It may take up to 2 minutes for all vehicle systems to power down.

12. Test for less than 2 ohms in each powertrain high speed GMLAN serial data circuit between the K59 starter/generator control module and the K16 battery energy control module.

- **If 2 ohms or greater**

Repair the open/high resistance in the serial data circuit between the K59 starter/generator control module and the K16 battery energy control module.

- **If less than 2 ohms**

13. Replace the K59 starter/generator control module.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

DTC U1845 OR U1846

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 U1845 00

Drive Motor Control Module 1 Lost Communication with Hybrid Powertrain Control Module
Malfunction

Circuit/System Description

The motor control module and the hybrid powertrain control module are all internal to the starter/generator control module. The hybrid powertrain control module sends out diagnostic trouble code information to other devices regarding the motor control module. All circuits to the hybrid powertrain control module and motor control module are also internal to the starter/generator control module and replaced as a single component.

Communication diagnostics for the serial data, including device power and ground as well as the wakeup circuits for motor control module and the hybrid powertrain control module are all diagnosed from external sources only to the starter/generator control module connector because any circuit fault condition within the starter/generator control module will cause a complete replacement.

Conditions for Running the DTC

- The system voltage is greater than 9.5 V.
- The vehicle power mode master requires serial data communication to occur.

Conditions for Setting the DTC

A supervised periodic message that includes the transmitter device availability has not been received for more than 500 ms.

Action Taken When the DTC Sets

The DTC U1845 is a type B DTC.

Conditions for Clearing the DTC

The DTC U1845 is a type B DTC.

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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and devices 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 device may have a U-code stored in history that does not require any repairs. Issues with late or corrupted messages between devices can be temporary with no apparent symptom or complaint; this does not mean the device is faulty. Do not replace a device based only on a history U-code.
- The device 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 non communicating device.
- If DTC U1845 is only set current in the hybrid powertrain control module, the starter/generator control module must be replaced due to all circuits between the hybrid powertrain control module and motor control module being internal to the starter/generator control module.

Reference Information

Schematic Reference

- [Data Communication Schematics](#)
- [Control Module References](#)

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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](#)

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

WARNING: The eAssist battery pack assembly will utilize an exchange program. Please consult the most recent revision of bulletin/PI# PIC5520, available in Service Information (SI), for a list of approved eAssist battery pack assembly service procedures. Components that may be removed and serviced without exchanging the complete battery pack assembly are identified in the bulletin/PI. Please contact the GM Technical Assistance Center (1-877-446-8227) if you have any questions.

1. Ignition ON.
2. Verify that DTC U0293 is not set.
 - If DTC U0293 is set

Refer to [DTC U0100-U02FF \(without HP6\)](#), [DTC U0100-U02FF \(with HP6\)](#).

- If DTC U0293 is not set
- 3. Verify that DTC U1845 is not set current.
- If DTC U1845 is set current

Replace the K59 starter/generator control module.

- If DTC U1845 is not set
- 4. All OK.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

DTC U1847

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 U1847 00

Drive Motor Control Module 1 Lost Communication with Battery Energy Control Module on Powertrain Expansion CAN Bus Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	U1847*	U1847	-	-
Ignition	U1814, U1847*	U1847*	-	-
Powertrain High Speed GMLAN Serial Data (+)	U0074*	U0074, U1847*	U0074*	-
Powertrain High Speed GMLAN Serial Data (-)	U0074*	U0074, U1847*	U0074*	-
Ground	-	U1847*	-	-

* Other modules/DTCs may set with this fault and multiple symptoms including a no start condition may occur.

Circuit/System Description

Devices connected to the powertrain high speed GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the devices. The devices 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 device as an availability indication of the transmitter device. Each message contains the identification number of the transmitter device.

Conditions for Running the DTC

- The ignition is ON.
- The system voltage is greater than 9.5 V.

Conditions for Setting the DTC

A supervised periodic message that includes the transmitter device availability has not been received for more than 500 ms.

Action Taken When the DTC Sets

The DTC U1847 is a type B DTC.

Conditions for Clearing the DTC

The DTC U1847 is a type B DTC.

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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and devices 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 device may have a U-code stored in history that does not require any repairs. Issues with late or

corrupted messages between devices can be temporary with no apparent symptom or complaint; this does not mean the device is faulty. Do not replace a device based only on a history U-code.

- Do not replace a device reporting a U-code. The U-code identifies which device needs to be diagnosed for a communication issue.
- Communication may be available between the device and the scan tool with one or more GMLAN serial data systems inoperative. This condition is due to the device using multiple GMLAN busses.
- Use **Data Link References** to determine what GMLAN serial data communications the non communicating device uses.
- The device 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 non communicating device.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.

2. Verify that DTC U0293 is not set.

- If DTC U0293 is set

Refer to DTC U0100-U02FF (without HP6), DTC U0100-U02FF (with HP6).

- If DTC U0293 is not set

3. Verify that DTC U0073, U0074, U1814, B1428, B1370, B1380, B1440, B1441, B1325, or P0562 is not set.

- If any of the DTCs are set

Refer to Diagnostic Trouble Code (DTC) List - Vehicle.

- If none of the DTCs are set

4. Verify that DTCs U1817, U1818, U182A, and U1844 are not set.

- If all of those DTCs are set together

Refer to DTC U0074 (Chassis Expansion Bus), DTC U0074 (Powertrain Expansion Bus with HP6), DTC U0074 (Powertrain Expansion Bus without HP6).

- If all of those DTCs are not set together

5. Refer to Circuit/System Testing below.

Circuit/System Testing

WARNING: Always perform the High Voltage Disabling procedure prior to servicing any High Voltage component or connection. Personal Protection Equipment (PPE) and proper procedures must be followed.

The High Voltage Disabling procedure includes the following steps:

- Identify how to disable high voltage.
- Identify how to test for the presence of high voltage.
- Identify condition under which high voltage is always present and personal protection equipment (PPE) and proper procedures must be followed.

Before working on any high voltage system, be sure to wear the following Personal Protection Equipment:

- Safety glasses with appropriate side shields when within 15 meters (50 feet) of the vehicle, either indoors or outdoors.
- Certified and up-to-date Class "0" Insulation gloves rated at 1000V with leather protectors.
 - Visually and functionally inspect the gloves before use.

- Wear the Insulation gloves with leather protectors at all times when working with the high voltage battery assembly, whether the system is energized or not.

Failure to follow the procedures may result in serious injury or death.

WARNING: The eAssist battery pack assembly will utilize an exchange program. Please consult the most recent revision of bulletin/PI# PIC5520, available in Service Information (SI), for a list of approved eAssist battery pack assembly service procedures. Components that may be removed and serviced without exchanging the complete battery pack assembly are identified in the bulletin/PI. Please contact the GM Technical Assistance Center (1-877-446-8227) if you have any questions.

NOTE: Use the schematic to identify the following:

- The device location on the powertrain high speed GMLAN serial data circuits
- The device B+, ignition, ground, accessory wake up serial data, and serial data circuit terminals

1. Perform the High Voltage Disabling procedure. Refer to High Voltage Disabling.
2. Reconnect the 12 V battery.
3. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. Disconnect the low voltage harness connector at the K16 battery energy control module. It may take up to 2 minutes for all vehicle systems to power down.
4. Test for less than 10 ohms between the K16 battery energy control module case and ground.
 - If 10 ohms or greater

Check the ground connection at the housing.

- If less than 10 ohms
5. Ignition ON.
 6. If equipped, verify that a test lamp illuminates between each B+ circuit terminal and ground.
 - If the test lamp does not illuminate
 1. Ignition OFF, disconnect the low voltage harness connectors at the K59 starter/generator control module.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.

- If less than 2 ohms, replace the K59 starter/generator control module.
- **If the test lamp illuminates**
- 7. Ignition ON.
- 8. If equipped, verify that a test lamp illuminates between each ignition circuit terminal and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the low voltage harness connectors at the K59 starter/generator control module.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K59 starter/generator control module.
 - **If the test lamp illuminates**
- 9. Ignition OFF and all vehicle systems OFF, all keys at least 3 meters away from vehicle, all access doors closed. Disconnect the low voltage harness connector at the K59 starter/generator control module. It may take up to 2 minutes for all vehicle systems to power down.
- 10. Test for less than 2 ohms in each powertrain high speed GMLAN serial data circuit between the K16 battery energy control module and the K59 starter/generator control module.
 - **If 2 ohms or greater**

Repair the open/high resistance in the serial data circuit between the K16 battery energy control module and the K59 starter/generator control module.
 - **If less than 2 ohms**
- 11. Replace the K16 battery energy control module.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

DTC U1875

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 U1875 00

Drive Motor Control Module 1 Lost Communication with Battery Energy Control Module Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	U1875*	U1875	-	-
Ignition	U1814, U1875*	U1875*	-	-
High Speed GMLAN Serial Data (+)	U0073*	U0073, U1875*	U0073*	-
High Speed GMLAN Serial Data (-)	U0073*	U0073, U1875*	U0073*	-
Ground	-	U1875*	-	-
* Other modules/DTCs may set with this fault and multiple symptoms including a no start condition may occur.				

Circuit/System Description

Devices connected to the powertrain high speed GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the devices. The devices 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 device as an availability indication of the transmitter device. Each message contains the identification number of the transmitter device.

Conditions for Running the DTC

- The ignition is ON.
- The system voltage is greater than 9.5 V.

Conditions for Setting the DTC

A supervised periodic message that includes the transmitter device availability has not been received within 3 seconds.

Action Taken When the DTC Sets

The DTC U1875 is a type B DTC.

Conditions for Clearing the DTC

The DTC U1875 is a type B DTC.

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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and devices 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 device may have a U-code stored in history that does not require any repairs. Issues with late or corrupted messages between devices can be temporary with no apparent symptom or complaint; this does not mean the device is faulty. Do not replace a device based only on a history U-code.
 - Do not replace a device reporting a U-code. The U-code identifies which device needs to be diagnosed for a communication issue.
 - Communication may be available between the device and the scan tool with one or more GMLAN serial data systems inoperative. This condition is due to the device using multiple GMLAN busses.
 - Use **Data Link References** to determine what GMLAN serial data communications the non communicating device uses.
 - The device 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 non communicating device.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify that DTC U0293 is not set.
 - If DTC U0293 is set

Refer to DTC U0100-U02FF (without HP6), DTC U0100-U02FF (with HP6).

- If DTC U0293 is not set
3. Verify that DTC U0073, U0074, U1814, B1428, B1370, B1380, B1440, B1441, B1325, or P0562 is not set.
 - If any of the DTCs are set

Refer to Diagnostic Trouble Code (DTC) List - Vehicle .

- If none of the DTCs are set
4. Refer to Circuit/System Testing below.

Circuit/System Testing

WARNING: Always perform the High Voltage Disabling procedure prior to servicing any High Voltage component or connection. Personal Protection Equipment (PPE) and proper procedures must be followed.

The High Voltage Disabling procedure includes the following steps:

- Identify how to disable high voltage.
- Identify how to test for the presence of high voltage.
- Identify condition under which high voltage is always present and personal protection equipment (PPE) and proper procedures must be followed.

Before working on any high voltage system, be sure to wear the following Personal Protection Equipment:

- **Safety glasses with appropriate side shields when within 15 meters (50 feet) of the vehicle, either indoors or outdoors.**
- **Certified and up-to-date Class "0" Insulation gloves rated at 1000V with leather protectors.**
 - **Visually and functionally inspect the gloves before use.**
 - **Wear the Insulation gloves with leather protectors at all times when working with the high voltage battery assembly, whether the system is energized or not.**

Failure to follow the procedures may result in serious injury or death.

WARNING: The eAssist battery pack assembly will utilize an exchange program. Please consult the most recent revision of bulletin/PI# PIC5520, available in Service Information (SI), for a list of approved eAssist battery pack assembly service procedures. Components that may be removed and serviced without exchanging the complete battery pack assembly are identified in the bulletin/PI. Please contact the GM Technical Assistance Center (1-877-446-8227) if you have any questions.

NOTE: Use the schematic to identify the following:

- **The device location on the high speed GMLAN serial data circuits**
- **The device B+, ignition, ground, accessory wake up serial data, and serial data circuit terminals**

1. Perform the High Voltage Disabling procedure. Refer to **High Voltage Disabling** .
2. Reconnect the 12 V battery.
3. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. Disconnect the low voltage harness connector at the K16 battery energy control module. It may take up to 2 minutes for all vehicle systems to power down.
4. Test for less than 10 ohms between the K16 battery energy control module case and ground.
 - **If 10 ohms or greater**

Check the ground connection at the housing.

- **If less than 10 ohms**
5. Ignition ON.
 6. If equipped, verify that a test lamp illuminates between each B+ circuit terminal and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the low voltage harness connectors at the K59 starter/generator control

module.

2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K59 starter/generator control module.
 - **If the test lamp illuminates**
7. Ignition ON.
8. If equipped, verify that a test lamp illuminates between each ignition circuit terminal and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the low voltage harness connectors at the K59 starter/generator control module.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K59 starter/generator control module.
 - **If the test lamp illuminates**
9. Ignition OFF and all vehicle systems OFF, all keys at least 3 meters away from vehicle, all access doors closed. Disconnect the low voltage harness connector at the K59 starter/generator control module. It may take up to 2 minutes for all vehicle systems to power down.
10. Test for less than 2 ohms in each serial data circuit between the K16 battery energy control module and the K59 starter/generator control module.
 - **If 2 ohms or greater**

Repair the open/high resistance in the serial data circuit between the K16 battery energy control module and the K59 starter/generator control module.

 - **If less than 2 ohms**
11. Replace the K16 battery energy control module.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

DTC U1876

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 U1876 00

Drive Motor Control Module 1 Lost Communication with Engine Control Module Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	U1876	U1876	-	-
Ignition	U1814, U1876*	U1876	-	-
High Speed GMLAN Serial Data (+)	U0073*	U0073, U1876*	U0073*	-
High Speed GMLAN Serial Data (-)	U0073*	U0073, U1876*	U0073*	-
Ground	-	U1876	-	-
* Other DTCs may set with this fault.				

Circuit/System Description

Devices connected to the powertrain high speed GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the devices. The devices 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 device as an availability indication of the transmitter device. Each message contains the identification number of the transmitter device.

Conditions for Running the DTC

- The system voltage is greater than 9.5 V.
- The vehicle power mode master requires serial data communication to occur.

Conditions for Setting the DTC

A supervised periodic message that includes the transmitter device availability has not been received for more than 500 ms.

Action Taken When the DTC Sets

DTC U1876 is a type B DTC.

Conditions for Clearing the DTC

DTC U1876 is a type B DTC.

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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and devices 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 device may have a U-code stored in history that does not require any repairs. Issues with late or corrupted messages between devices can be temporary with no apparent symptom or complaint; this does not mean the device is faulty. Do not replace a device based only on a history U-code.
- Do not replace a device reporting a U-code. The U-code identifies which device needs to be diagnosed for a communication issue.
- Communication may be available between the device and the scan tool with one or more GMLAN serial data systems inoperative. This condition is due to the device using multiple GMLAN busses.
- Use **Data Link References** to determine what GMLAN serial data communications the non communicating device uses.
- The device 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 non communicating device.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify that DTC U0100 is not set.
 - **If DTC U0100 is set**

Refer to **DTC U0100-U02FF (without HP6), DTC U0100-U02FF (with HP6).**

- **If DTC U0100 is not set**
3. Verify that DTC U0073, U0074, U1814, B1428, B1370, B1380, B1440, B1441, B1325, or P0562 is not set.
 - **If any of the DTCs are set**

Refer to **Diagnostic Trouble Code (DTC) List - Vehicle .**

- **If none of the DTCs are set**
4. Refer to Circuit/System Testing below.

Circuit/System Testing

NOTE: Use the schematic to identify the following:

- The device location on the high speed GMLAN serial data circuits
- The device B+, ignition, ground, accessory wake up serial data 2 and serial data circuit terminals

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. Disconnect the harness connector at the K20 engine control module. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 ohms between each ground circuit terminal and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
3. Ignition ON.
4. If equipped, verify that a test lamp illuminates between each B+ circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K20 engine control module.
 - **If the test lamp illuminates**
5. Ignition ON.
6. If equipped, verify that a test lamp illuminates between each ignition circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is OK and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K20 engine control module.
 - **If the test lamp illuminates**
7. Ignition ON.
8. If equipped, verify that a test lamp illuminates between the ignition circuit terminal, which is controlled

by a control module, and ground.

- **If the test lamp does not illuminate**

1. Ignition OFF, disconnect the harness connectors at the control module that controls the ignition circuit.
2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the control module that controls the ignition circuit.

- **If the test lamp illuminates**

9. Ignition OFF and all vehicle systems OFF, all keys at least 3 meters away from vehicle, all access doors closed. Disconnect the low voltage harness connector at the K59 starter/generator control module. It may take up to 2 minutes for all vehicle systems to power down.
10. Test for less than 2 ohms in each serial data circuit between the K20 engine control module and the K59 starter/generator control module.
 - **If 2 ohms or greater**

Repair the open/high resistance in the serial data circuit between the K20 engine control module and the K59 starter/generator control module.

- **If less than 2 ohms**

11. Replace the K20 engine control module.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

DTC U1885

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 U1885 00

Battery Energy Control Module Lost Communication with Hybrid Powertrain Control Module

Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	U1885*	U1885	-	-
Ignition	U1814, U1885*	U1885*	-	-
High Speed GMLAN Serial Data (+)	U0073*	U0073, U1885*	U0073*	-
High Speed GMLAN Serial Data (-)	U0073*	U0073, U1885*	U0073*	-
Ground	-	U1885*	-	-
* Other modules/DTCs may set with this fault and multiple symptoms including a no start condition may occur.				

Circuit/System Description

Devices connected to the powertrain high speed GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the devices. The devices 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 device as an availability indication of the transmitter device. Each message contains the identification number of the transmitter device.

This diagnostic is used to check the loss of communication with hybrid powertrain control module on high speed GMLAN bus. The battery energy control module supervises a periodic serial data message to check the communication status of the hybrid powertrain control module. If this message is not received within 3 seconds, then this DTC is set.

Conditions for Running the DTC

- The system voltage is greater than 8.8 V.
- The DTC U180B is not set.

Conditions for Setting the DTC

A supervised periodic message that includes the transmitter device availability has not been received within 3 seconds.

Action Taken When the DTC Sets

The DTC U1885 is a type B DTC.

Conditions for Clearing the DTC

The DTC U1885 is a type B DTC.

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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and devices 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 device may have a U-code stored in history that does not require any repairs. Issues with late or corrupted messages between devices can be temporary with no apparent symptom or complaint; this does not mean the device is faulty. Do not replace a device based only on a history U-code.
- Do not replace a device reporting a U-code. The U-code identifies which device needs to be diagnosed for a communication issue.
- Communication may be available between the device and the scan tool with one or more GMLAN serial data systems inoperative. This condition is due to the device using multiple GMLAN busses.
- Use **Data Link References** to determine what GMLAN serial data communications the non communicating device uses.
- The device 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 non communicating device.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify that DTC U0293 is not set.
 - If DTC U0293 is set

Refer to DTC U0100-U02FF (without HP6), DTC U0100-U02FF (with HP6).

- If DTC U0293 is not set
3. Verify that DTC U0073, U0074, U1814, B1428, B1370, B1380, B1440, B1441, B1325, or P0562 is not set.
 - If any of the DTCs are set

Refer to Diagnostic Trouble Code (DTC) List - Vehicle .

- If none of the DTCs are set
4. Refer to Circuit/System Testing below.

Circuit/System Testing

WARNING: Always perform the High Voltage Disabling procedure prior to servicing any High Voltage component or connection. Personal Protection Equipment (PPE) and proper procedures must be followed.

The High Voltage Disabling procedure includes the following steps:

- Identify how to disable high voltage.
- Identify how to test for the presence of high voltage.
- Identify condition under which high voltage is always present and

personal protection equipment (PPE) and proper procedures must be followed.

Before working on any high voltage system, be sure to wear the following Personal Protection Equipment:

- Safety glasses with appropriate side shields when within 15 meters (50 feet) of the vehicle, either indoors or outdoors.
- Certified and up-to-date Class "0" Insulation gloves rated at 1000V with leather protectors.
 - Visually and functionally inspect the gloves before use.
 - Wear the Insulation gloves with leather protectors at all times when working with the high voltage battery assembly, whether the system is energized or not.

Failure to follow the procedures may result in serious injury or death.

WARNING: The eAssist battery pack assembly will utilize an exchange program. Please consult the most recent revision of bulletin/PI# PIC5520, available in Service Information (SI), for a list of approved eAssist battery pack assembly service procedures. Components that may be removed and serviced without exchanging the complete battery pack assembly are identified in the bulletin/PI. Please contact the GM Technical Assistance Center (1-877-446-8227) if you have any questions.

NOTE: Use the schematic to identify the following:

- The device location on the high speed GMLAN serial data circuits
- The device B+, ignition, ground, accessory wake up serial data, and serial data circuit terminals

1. Perform the High Voltage Disabling procedure. Refer to High Voltage Disabling.
2. Reconnect the 12 V battery.
3. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. Disconnect the low voltage harness connector at the K59 starter/generator control module. It may take up to 2 minutes for all vehicle systems to power down.
4. Test for less than 10 ohms between the K59 starter/generator control module case and ground.
 - **If 10 ohms or greater**

Check the ground connection at the housing.

- **If less than 10 ohms**

5. Ignition ON.
6. If equipped, verify that a test lamp illuminates between each B+ circuit terminal and ground.

- **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
- **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K59 starter/generator control module.
- **If the test lamp illuminates**
- 7. Ignition ON.
- 8. If equipped, verify that a test lamp illuminates between each ignition circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is OK and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K59 starter/generator control module.
 - **If the test lamp illuminates**
- 9. Ignition ON.
- 10. If equipped, verify that a test lamp illuminates between the ignition circuit terminal, which is controlled by a control module, and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the harness connectors at the control module that controls the ignition circuit.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the control module that controls the ignition circuit.
 - **If the test lamp illuminates**
- 11. Ignition OFF and all vehicle systems OFF, all keys at least 3 meters away from vehicle, all access doors

closed. Disconnect the low voltage harness connector at the K16 battery energy control module. It may take up to 2 minutes for all vehicle systems to power down.

12. Test for less than 2 ohms in each serial data circuit between the K59 starter/generator control module and the K16 battery energy control module.

- **If 2 ohms or greater**

Repair the open/high resistance in the serial data circuit between the K59 starter/generator control module and the K16 battery energy control module.

- **If less than 2 ohms**

13. Replace the K59 starter/generator control module.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

DTC U1886

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 U1886 00

Battery Energy Control Module Lost Communication with Engine Control Module Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	U1886	U1886	-	-
Ignition	U1814, U1886*	U1886	-	-
High Speed GMLAN Serial Data (+)	U0073*	U1886*	U0073*	-
High Speed GMLAN Serial Data (-)	U0073*	U1886*	U0073*	-
Ground	-	U1886	-	-
* Other DTCs may set with this fault.				

Circuit/System Description

Devices connected to the powertrain high speed GMLAN serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the devices. The devices 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 device as an availability indication of the transmitter device. Each message contains the identification number of the transmitter device.

Conditions for Running the DTC

- The system voltage is greater than 8.8 V.
- The DTC U180B is not set.

Conditions for Setting the DTC

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

Action Taken When the DTC Sets

DTC U1886 is a type B DTC.

Conditions for Clearing the DTC

DTC U1886 is a type B DTC.

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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and devices 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 device may have a U-code stored in history that does not require any repairs. Issues with late or corrupted messages between devices can be temporary with no apparent symptom or complaint; this does

not mean the device is faulty. Do not replace a device based only on a history U-code.

- Do not replace a device reporting a U-code. The U-code identifies which device needs to be diagnosed for a communication issue.
- Communication may be available between the device and the scan tool with one or more GMLAN serial data systems inoperative. This condition is due to the device using multiple GMLAN busses.
- Use **Data Link References** to determine what GMLAN serial data communications the non communicating device uses.
- The device 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 non communicating device.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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**

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify that DTC U0100 or U0293 is not set.

- If any of the DTCs are set

Refer to DTC U0100-U02FF (without HP6), DTC U0100-U02FF (with HP6).

- If none of the DTCs are set

3. Verify that DTC U0073, U1814, B1428, B1370, B1380, B1440, B1441, B1325, or P0562 is not set.

- If any of the DTCs are set

Refer to Diagnostic Trouble Code (DTC) List - Vehicle .

- If none of the DTCs are set

4. Refer to Circuit/System Testing below.

Circuit/System Testing

WARNING: Always perform the High Voltage Disabling procedure prior to servicing any High Voltage component or connection. Personal Protection Equipment (PPE) and proper procedures must be followed.

The High Voltage Disabling procedure includes the following steps:

- Identify how to disable high voltage.
- Identify how to test for the presence of high voltage.
- Identify condition under which high voltage is always present and personal protection equipment (PPE) and proper procedures must be followed.

Before working on any high voltage system, be sure to wear the following Personal Protection Equipment:

- Safety glasses with appropriate side shields when within 15 meters (50 feet) of the vehicle, either indoors or outdoors.
- Certified and up-to-date Class "0" Insulation gloves rated at 1000V with leather protectors.
 - Visually and functionally inspect the gloves before use.
 - Wear the Insulation gloves with leather protectors at all times when working with the high voltage battery assembly, whether the system is energized or not.

Failure to follow the procedures may result in serious injury or death.

NOTE: Use the schematic to identify the following:

- The device location on the high speed GMLAN serial data circuits

- **The device B+, ignition, ground, accessory wake up serial data, and serial data circuit terminals**

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. Disconnect the harness connector at the K20 engine control module. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 ohms between each ground circuit terminal and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
3. Ignition ON.
4. If equipped, verify that a test lamp illuminates between each B+ circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K20 engine control module.
 - **If the test lamp illuminates**
5. Ignition ON.
6. If equipped, verify that a test lamp illuminates between each ignition circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is OK and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K20 engine control module.

○ **If the test lamp illuminates**

7. Ignition ON.

8. If equipped, verify that a test lamp illuminates between the ignition circuit terminal, which is controlled by a control module, and ground.

○ **If the test lamp does not illuminate**

1. Ignition OFF, disconnect the harness connectors at the control module that controls the ignition circuit.

2. Test for infinite resistance between the ignition circuit and ground.

○ If less than infinite resistance, repair the short to ground on the circuit.

○ If infinite resistance

3. Test for less than 2 ohms in the ignition circuit end to end.

○ If 2 ohms or greater, repair the open/high resistance in the circuit.

○ If less than 2 ohms, replace the control module that controls the ignition circuit.

○ **If the test lamp illuminates**

9. Ignition OFF and all vehicle systems OFF, all keys at least 3 meters away from vehicle, all access doors closed. Disconnect the low voltage harness connector at the K59 starter/generator control module. It may take up to 2 minutes for all vehicle systems to power down.

10. Test for less than 2 ohms in each serial data circuit between the K20 engine control module and the K59 starter/generator control module.

○ **If 2 ohms or greater**

Repair the open/high resistance in the serial data circuit between the K20 engine control module and the K59 starter/generator control module.

○ **If less than 2 ohms**

11. Perform the High Voltage Disabling procedure. Refer to **High Voltage Disabling** .

12. Reconnect the 12 V battery.

13. Ignition OFF and all vehicle systems OFF, all keys at least 3 meters away from vehicle, all access doors closed. Disconnect the low voltage harness connector at the K16 battery energy control module.

14. Test for less than 2 ohms in each serial data circuit between the K59 starter/generator control module and the K16 battery energy control module.

○ **If 2 ohms or greater**

Repair the open/high resistance in the serial data circuit between the K59 starter/generator control module and the K16 battery energy control module.

○ **If less than 2 ohms**

15. Replace the K20 engine control module.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

DTC U18A2

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 U18A2

Lost Communication with Fuel Pump Driver Control Module

For symptom byte information, refer to **Symptom Byte List** .

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	U18A2	U18A2	-	-
Ignition	U18A2	U18A2	-	-
Accessory Wake Up Serial Data	U1814, U2099	U18A2	-	-
Powertrain High Speed GMLAN Serial Data (+)	U0074*	U0074*	U0074*	-
Powertrain High Speed GMLAN Serial Data (-)	U0074*	U0074*	U0074*	-
Ground	-	U18A2	-	-
* Other DTCs may set with this fault.				

Circuit/System Description

Devices connected to the serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the devices. The devices 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 device as an availability indication of the transmitter device. Each message contains the identification number of the transmitter device.

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 device 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 device 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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and devices 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 device may have a U-code stored in history that does not require any repairs. Issues with late or corrupted messages between devices can be temporary with no apparent symptom or complaint; this does not mean the device is faulty. Do not replace a device based only on a history U-code.
- Do not replace a device reporting a U-code. The U-code identifies which device needs to be diagnosed for a communication issue.
- Communication may be available between the device and the scan tool with one or more GMLAN serial data systems inoperative. This condition is due to the device using multiple GMLAN busses.
- Use **Data Link References** to determine what GMLAN serial data communications the non communicating device uses.
- The device 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 non communicating device.

Reference Information

Schematic Reference

- [Data Communication Schematics](#)
- [Control Module References](#)

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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. Ignition ON.
2. Verify that DTC U0073, U0074, U0075, U0076, U0077, U0078, U2100, U1814, U2099, B1325, B1330, B1370, B1380, B1424, B1428, B1440, B1441, B1517, C0800, C0899, C12E1, P0560, or P0562 is not set.
 - If any of the DTCs are set
Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#) .
 - If none of the DTCs are set
3. Refer to Circuit/System Testing below.

Circuit/System Testing

NOTE: Use the schematics and connector end views to identify the device's ground, B+, ignition, accessory wake up serial data, and serial data circuit terminals.

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet)

away from vehicle. Disconnect the harness connectors at the K111 Fuel Pump Driver Control Module. It may take up to 2 minutes for all vehicle systems to power down.

2. Test for less than 10 ohms between each ground circuit terminal and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
3. Ignition ON.
4. If equipped, verify a test lamp illuminates between each B+ circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K111 Fuel Pump Driver Control Module.
 - **If the test lamp illuminates**
5. Ignition ON.
6. If equipped, verify a test lamp illuminates between each ignition circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is OK and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K111 Fuel Pump Driver Control Module.
 - **If the test lamp illuminates**
7. Ignition ON.
8. If equipped, verify a test lamp illuminates between the accessory wakeup serial data circuit terminal and ground.

- **If the test lamp does not illuminate**

1. Ignition OFF, disconnect the harness connectors at the K9 Body Control Module.
2. Test for infinite resistance between the accessory wakeup serial data circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 ohms in the accessory wakeup serial data circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.

- **If the test lamp illuminates**

9. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. Disconnect the harness connectors at the device setting the DTC. It may take up to 2 minutes for all vehicle systems to power down.
10. Test for less than 2 ohms in each serial data circuits end to end between the K111 Fuel Pump Driver Control Module and the device setting the DTC.

- **If 2 ohms or greater**

Repair the open/high resistance in the serial data circuit.

- **If less than 2 ohms**

11. Replace the K111 Fuel Pump Driver Control Module.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

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

For symptom byte information, refer to **Symptom Byte List** .

Circuit/System Description

Devices 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 devices on the bus based on RPO configuration. If a device was not properly configured after installation, the appropriate U Code may be set for that device. No external circuit diagnosis is involved.

Conditions for Running the DTC

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

Conditions for Setting the DTC

- The device 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 device ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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. Ignition ON.
2. Verify DTC U18B9-U18BF is not set.
 - **If DTC U18B9-U18BF is set along with other DTCs set**

Diagnose all other DTCs first. Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .

- **If DTC U18B9-U18BF is set without other DTCs set**
 1. Program the device that set the DTC.
 2. Ignition OFF, remove the scan tool, open and close the driver door. Wait 60 s.
 3. Verify the DTC does not set.
 - If the DTC sets, replace the appropriate device.
 - If the DTC does not set
 4. All OK.
 - **If DTC U18B9-U18BF is not set**
3. All OK

Repair Instructions

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

Control Module References for device replacement, programming and setup

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

High Speed Communication Enable Circuit

For symptom byte information, refer to **Symptom Byte List** .

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ignition	U2099*	U0100-U02FF	U0100-U02FF	-
* Vehicle may not start.				

Circuit/System Description

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

Conditions for Running the DTC

- The system voltage is between 9-16 V.
- 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 ignition circuit.

Action Taken When the DTC Sets

- The output command is turned off while the malfunction is present.
- The devices use a default value for the missing parameters until the next ignition cycle.
- The device(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 device ignition cycle counter reaches the reset threshold of 50, without a repeat of the malfunction.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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: Use the schematic to determine which devices are on the K9 Body Control Module's ignition circuit terminal 23 X4. Use the connector end view to identify the ignition circuit terminal for each of those devices.

1. Ignition OFF, disconnect the harness connectors at an easily accessible device that shares the K9 Body Control Module's ignition circuit terminal 23 X4. Ignition ON.
2. Verify that the DTC U2099 remains current.
 - **If the DTC becomes history**

Replace the device that was just disconnected.
 - **If the DTC remains current**
3. With the prior devices disconnected, repeat steps 1 and 2 for each device on the ignition circuit except the K9 Body Control Module.
4. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
5. Test for infinite resistance between the ignition circuit terminal 23 X4 at the K9 Body Control Module and ground.
 - **If less than infinite resistance**

Repair the short to ground on the circuit.
 - **If infinite resistance**
6. Replace the K9 Body Control Module.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

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 List of Control Modules

For symptom byte information, refer to **Symptom Byte List** .

Circuit/System Description

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

Conditions for Running the DTC

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

Conditions for Setting the DTC

- The device is not configured properly.
- Control unit recognizes 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 device ignition cycle counter reaches the reset threshold, without a repeat of the malfunction.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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

Circuit/System Verification

1. Ignition ON.
2. Verify DTC U2101 is not set.
 - **If DTC U2101 is set along with other DTCs set**

Diagnose all other DTCs first. Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .

- **If DTC U2101 is set without other DTCs set**
 1. Program the device that set the DTC.
 2. Clear the DTC.
 3. Ignition OFF, remove the scan tool, open and close the driver door. Wait 60 s.
 4. Verify the DTC does not set.
 - If the DTC sets, replace the appropriate device.
 - If the DTC does not set
 5. All OK.
 - **If DTC U2101 is not set**
3. All OK

Repair Instructions

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

Control Module References for device replacement, programming and setup

DTC U2616

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 U2616

Fuel Pump Driver Control Module Lost Communication with ECM

For symptom byte information, refer to **Symptom Byte List** .

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	U2616, U0100	U2616, U0100	-	-
Ignition	U2616, U0100	U2616, U0100	-	-
Accessory Wake Up Serial Data	U1814, U2099	U2616, U0100	-	-
Powertrain High Speed GMLAN Serial Data (+)	U0074*	U0074*	U0074*	-
Powertrain High Speed GMLAN Serial Data (-)	U0074*	U0074*	U0074*	-
Ground	-	U2616, U0100	-	-

* Other DTCs may set with this fault.

Circuit/System Description

Devices connected to the serial data circuits monitor for serial data communications during normal vehicle operation. Operating information and commands are exchanged among the devices. The devices 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 device as an availability indication of the transmitter device. Each message contains the identification number of the transmitter device.

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 device 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 device 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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and devices 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 device may have a U-code stored in history that does not require any repairs. Issues with late or corrupted messages between devices can be temporary with no apparent symptom or complaint; this does not mean the device is faulty. Do not replace a device based only on a history U-code.
- Do not replace a device reporting a U-code. The U-code identifies which device needs to be diagnosed for a communication issue.
- Communication may be available between the device and the scan tool with one or more GMLAN serial data systems inoperative. This condition is due to the device using multiple GMLAN busses.
- Use **Data Link References** to determine what GMLAN serial data communications the non communicating device uses.
- The device 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 non communicating device.

Reference Information

Schematic Reference

- [Data Communication Schematics](#)
- [Control Module References](#)

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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. Ignition ON.
2. Verify that DTC U0073, U0074, U0075, U0076, U0077, U0078, U2100, U1814, U2099, B1325, B1330, B1370, B1380, B1424, B1428, B1440, B1441, B1517, C0800, C0899, C12E1, P0560, or P0562 is not set.
 - If any of the DTCs are set
Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#) .
 - If none of the DTCs are set
3. Refer to Circuit/System Testing below.

Circuit/System Testing

NOTE: Use the schematics and connector end views to identify the device's ground, B+, ignition, accessory wake up serial data, and serial data circuit terminals.

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet)

away from vehicle. Disconnect the harness connectors at the K20 Engine Control Module. It may take up to 2 minutes for all vehicle systems to power down.

2. Test for less than 10 ohms between each ground circuit terminal and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
3. Ignition ON.
4. If equipped, verify a test lamp illuminates between each B+ circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K20 Engine Control Module.
 - **If the test lamp illuminates**
5. Ignition ON.
6. If equipped, verify a test lamp illuminates between each ignition circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is OK and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K20 Engine Control Module.
 - **If the test lamp illuminates**
7. Ignition ON.
8. If equipped, verify a test lamp illuminates between the accessory wakeup serial data circuit terminal and ground.

○ **If the test lamp does not illuminate**

1. Ignition OFF, disconnect the harness connectors at the K9 Body Control Module.
2. Test for infinite resistance between the accessory wakeup serial data circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 ohms in the accessory wakeup serial data circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.

○ **If the test lamp illuminates**

9. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. Disconnect the harness connectors at the K111 Fuel Pump Driver Control Module. It may take up to 2 minutes for all vehicle systems to power down.
10. Test for less than 2 ohms in each serial data circuits end to end between the K20 Engine Control Module and the K111 Fuel Pump Driver Control Module.

○ **If 2 ohms or greater**

Repair the open/high resistance in the serial data circuit.

○ **If less than 2 ohms**

11. Replace the K20 Engine Control Module.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

SYMPTOMS - DATA COMMUNICATIONS

NOTE: **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 Diagnostic Trouble Codes (DTC) set.
 - The devices 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 Low 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
Data Link Connector B+	1	1	-	-
Data Link Connector 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 devices however, will not communicate unless

the ignition is ON and the power mode master device sends the appropriate power mode message.

- If the B+ circuit, ground circuits, and connections of the data link connector are functioning properly, the malfunction must be due to the scan tool.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 2 ohms between each of the X84 Data Link Connector ground circuit terminals listed below and ground.
 - Ground circuit terminal 4
 - Ground circuit terminal 5
 - **If 2 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 2 ohms**

3. Ignition ON.
4. Verify a test lamp illuminates between the B+ circuit terminal 16 at the X84 Data Link Connector and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - **If the test lamp illuminates**
5. Refer to the scan tool user guide.

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-U02FF*	1	-
Chassis High Speed GMLAN Serial Data (-)	1	U0100-U02FF*	1	-
Ground (DLC, terminal 5)	-	1	-	-
* No communications with one or more chassis high speed GMLAN devices. An open in only one chassis high speed GMLAN serial data circuit may allow degraded communication between the devices. An open between the data link connector (DLC) and the first splice/device will only affect the communication with the scan tool. The devices will still communicate. 1. No communication with any chassis high speed GMLAN device.				

Circuit/System Description

The chassis high speed GMLAN bus functions the same as the primary high speed GMLAN bus, and the two buses operate in parallel. The chassis high speed GMLAN bus is added to reduce message congestion on the primary high speed bus. Since the chassis high speed GMLAN bus and primary high speed GMLAN 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 kbit/s. The twisted pair is terminated with two 120 ohms resistors, one is internal to the electronic brake control module and the other can be a separate resistor in a connector assembly or in another device. The resistors are used as the load for the chassis high speed GMLAN bus during normal vehicle operation. The chassis high speed GMLAN is a differential bus. The chassis high speed GMLAN serial data bus (+) and chassis 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 1 V to the chassis high speed GMLAN serial data bus (+) circuit and subtracts 1 V from the chassis high speed GMLAN serial data bus (-) circuit. If serial data is lost, devices will set a no communication code against the non-communicating device. Note that a loss of serial data DTC does not represent a failure of the device 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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and devices 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 device reporting a U code. The U code identifies which device needs to be diagnosed for a communication issue.
- Communication may be available between some devices and the scan tool with one or more GMLAN serial data systems inoperative. This condition is due to those devices using multiple serial data communication systems.
- An open in the DLC ground circuit terminal 5 will allow the scan tool to operate but not communicate with the vehicle.
- Technicians may find various Local Area Network (LAN) communication Diagnostic Trouble Codes (DTC).

Reference Information

Schematic Reference

- **Data Communication Schematics**

- **Control Module References**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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. Ignition ON.
2. Verify two or more devices are not communicating on the chassis high speed GMLAN serial data circuit. Refer to **Data Link References** to determine how many devices should be communicating on the bus.
 - **If only one device is not communicating**

Refer to Circuit/System Testing below- Testing the Device Circuits.
 - **If two or more devices are not communicating**
3. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. Disconnect the scan tool from the X84 Data Link Connector. The following tests will be done at the X84 Data Link Connector. It may take up to 2 minutes for all vehicle systems to power down.
4. Test for less than 10 ohms between the ground circuit terminal 5 and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
5. Ignition ON.
6. Test for less than 4.5 V between the serial data circuits listed below and ground.

- Terminal 12
- Terminal 13
- **If 4.5 V or greater**

Refer to Circuit/System Testing below- Testing the Serial Data Circuits for a Short to Voltage.

- **If less than 4.5 V**

7. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
8. Test for greater than 100 ohms between the serial data circuits listed below and ground.
 - Terminal 12
 - Terminal 13
 - **If 100 ohms or less**

Refer to Circuit/System Testing below- Testing the Serial Data Circuits for a Short to Ground.

- **If greater than 100 ohms**

9. Test for 50-70 ohms between the serial data circuit terminals 12 and 13.
 - **If less than 35 ohms**

Refer to Circuit/System Testing below- Testing the Serial Data Circuits for a Short between the Circuits.

- **If between 35-50 ohms**

There may be a third terminating resistor between the serial data circuits. This can happen if the incorrect device is installed. Some devices are available with and without the terminating resistors installed to reduce the need of terminating resistors in the wiring harness. Refer to Circuit/System Testing below- Testing the Serial Data Circuits for a Short between the Circuits.

- **If greater than 70 ohms but less than infinite**

Refer to Circuit/System Testing below- Testing the Serial Data Circuits for an Open/High Resistance.

- **If infinite resistance**

Repair the open/high resistance in the circuit between the X84 Data Link Connector and the first splice/device in the serial data circuit.

- **If between 50-70 ohms**

10. Refer to Circuit/System Testing below- Testing the Device Circuits.

Circuit/System Testing

NOTE: Each device may need to be disconnected to isolate a circuit fault.

Use the schematic to identify the following:

- Chassis high speed GMLAN devices the vehicle is equipped with
- Chassis high speed GMLAN serial data circuit terminating resistors
- Device locations on the chassis high speed GMLAN serial data circuits
- Each device's ground, B+, ignition, and chassis high speed GMLAN serial data circuit terminals

Some devices with an internal terminating resistor have a loop in the harness that connects the internal terminating resistor to the serial data circuit. When wired this way, test these loop circuits for the appropriate failure mode short to voltage, short to ground, or open/high resistance prior to replacing the device for each of the following tests.

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 device, ignition ON.
2. Test for greater than 4.5 V between each serial data circuit at the device connector that was just disconnected and ground.
 - If each serial data circuit is 4.5 V or less
 1. Ignition OFF.
 2. Test for less than 10 ohms between each of the device's ground circuit terminals and ground.
 - If 10 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 10 ohms, replace the device that was disconnected.
 - If any serial data circuit is greater than 4.5 V
3. Ignition OFF, disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at another device, in the direction of the circuit shorted to voltage, ignition ON.
4. Test for greater than 4.5 V between each serial data circuit at the device connector that was just disconnected and ground.
 - If each serial data circuit is 4.5 V or less
 1. Ignition OFF.
 2. Test for less than 10 ohms between each of the device's ground circuit terminals and ground.
 - If 10 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 10 ohms, replace the device that was disconnected.
 - If any serial data circuit is greater than 4.5 V
5. Repeat step 3 until one of the following conditions are isolated:
 - A short to voltage on the serial data circuit between two devices or splice packs, if equipped.
 - A short to voltage on the serial data circuit between a device and a terminating resistor.

Testing the Serial Data Circuits for a Short to Ground

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at an easily accessible device.
3. Test for greater than 100 ohms between each serial data circuit at the device connector that was just disconnected and ground.

- **If each serial data circuit is 100 ohms or greater**

Replace the device that was disconnected.

- **If any serial data circuit is less than 100 ohms**

4. Disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at another device, in the direction of the circuit shorted to ground.
5. Test for greater than 100 ohms between each serial data circuit at the device connector that was just disconnected and ground.

- **If both serial data circuits are 100 ohms or greater**

Replace the device that was disconnected.

- **If any serial data circuit is less than 100 ohms**

6. Repeat step 4 until one of the following conditions are isolated:
 - A short to ground on the serial data circuit between two devices or splice packs, if equipped.
 - A short to ground on the serial data circuit between a device and a terminating resistor.
 - A short to ground on the serial data circuit between the X84 Data Link Connector and the first device or splice pack.

Testing the Serial Data Circuits for a Short between the Circuits

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at an easily accessible device that is not communicating.
3. Test for greater than 110 ohms between each pair of serial data circuits at the device connector that was just disconnected.

- **If each pair of serial data circuits is 110 ohms or greater**

Replace the device that was disconnected.

- **If any pair of serial data circuits is less than 110 ohms**

4. Connect the harness connectors at the device that was disconnected.
5. Disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at another device, in the direction of the circuit shorted together.

6. Test for greater than 110 ohms between each pair of serial data circuits at the device connector that was just disconnected.

- **If each pair of serial data circuits is 110 ohms or greater**

Replace the device that was disconnected.

- **If any pair of serial data circuits is less than 110 ohms**

7. Repeat step 4 until one of the following conditions are isolated:
 - Serial data circuits shorted together between two devices or splice packs, if equipped.
 - Serial data circuits shorted together between a device and a terminating resistor.
 - Serial data circuits shorted together between the X84 Data Link Connector and the first device or splice pack.
 - A shorted terminating resistor.

Testing the Serial Data Circuits for an Open/High Resistance

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at an easily accessible device that is not communicating.
3. Test for less than 130 ohms between each pair of serial data circuits at the device connector that was just disconnected.

- **If each pair of serial data circuit is 130 ohms or less**

Replace the device that was disconnected.

- **If any pair of serial data circuits is greater than 130 ohms**

4. Connect the harness connectors at the device that was disconnected.
5. Disconnect the harness connectors with the chassis high speed GMLAN serial data circuits at another device, in the direction of the circuit with the open/high resistance.
6. Test for less than 130 ohms between each pair of serial data circuits at the device connector that was just disconnected.

- **If each pair of serial data circuits is 130 ohms or less**

Replace the device that was disconnected.

- **If any pair of serial data circuits is greater than 130 ohms**

7. Repeat step 4 until one of the following conditions are isolated:
 - An open/high resistance on the serial data circuit between two devices or splice packs, if equipped.
 - An open/high resistance on the serial data circuit between a device and a terminating resistor.
 - An open/high resistance terminating resistor.

Testing the Device Circuits

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Disconnect the harness connectors at an easily accessible device that is not communicating.
3. Test for less than 10 ohms between each ground circuit terminal and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
4. If equipped, verify a test lamp illuminates between each B+ circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the disconnected device.
 - **If the test lamp illuminates**
5. Ignition ON.
6. If equipped, verify a test lamp illuminates between each ignition circuit terminal, which has a fuse in the circuit, and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is OK and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the disconnected device.
 - **If the test lamp illuminates**
7. If equipped, verify a test lamp illuminates between each ignition circuit terminal, which is controlled by a control module, and ground.

○ **If the test lamp does not illuminate**

1. Ignition OFF, disconnect the harness connectors at the control module that controls the ignition circuit.
2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the control module that controls the ignition circuit.

○ **If the test lamp illuminates**

8. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
9. Test for less than 130 ohms between each pair of chassis high speed GMLAN serial data circuits at the device connector that was just disconnected.

○ **If any pair of serial data circuits is greater than 130 ohms**

Repair the open/high resistance in the serial data circuits between the disconnected device and the circuit splice in the serial data circuits.

○ **If each pair of serial data circuits is 130 ohms or less**

10. Replace the device that was disconnected.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

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-U02FF*	1	-

High Speed GMLAN Serial Data (-)	1	U0100-U02FF*	1	-
Ground (DLC, terminal 5)	-	1	-	-

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

1. No communication with any high speed GMLAN device

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 device. The resistors are used as the load for 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 of approximately 2.5 V. Driving the lines to their extremes, adds 1 V to the high speed GMLAN serial data bus (+) circuit and subtracts 1 V from the high speed GMLAN serial data bus (-) circuit. If serial data is lost, devices will set a no communication code against the non-communicating device. Note that a loss of serial data DTC does not represent a failure of the device 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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis.
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and devices 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 device reporting a U code. The U code identifies which device needs to be diagnosed for a communication issue.
- Communication may be available between some devices and the scan tool with the high speed GMLAN serial data system inoperative. This condition is due to those devices using multiple serial data communication 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.
- 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 - INDEX

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. Ignition ON.
2. Verify two or more devices are not communicating on the high speed GMLAN serial data circuit. Refer to **Data Link References** to determine how many devices should be communicating on the bus.
 - **If only one device is not communicating**

Refer to Circuit/System Testing below- Testing the Device Circuits.

- **If two or more devices are not communicating**

3. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. Disconnect the scan tool from the X84 data link connector. The following tests will be done at the X84 data link connector. It may take up to 2 minutes for all vehicle systems to power down.
4. Test for less than 10 ohms between the ground circuit terminal 5 and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
5. Ignition ON.
6. Test for less than 4.5 V between the serial data circuits listed below and ground.
 - Terminal 6
 - Terminal 14
 - **If 4.5 V or greater**

Refer to Circuit/System Testing below- Testing the Serial Data Circuits for a Short to Voltage.

- **If less than 4.5 V**

7. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
8. Test for greater than 100 ohms between the serial data circuits listed below and ground.
 - Terminal 6
 - Terminal 14
 - **If 100 ohms or less**

Refer to Circuit/System Testing below- Testing the Serial Data Circuits for a Short to Ground.

- **If greater than 100 ohms**

9. Test for 50-70 ohms between the serial data circuit terminals 6 and 14.
 - **If less than 35 ohms**

Refer to Circuit/System Testing below- Testing the Serial Data Circuits for a Short between the Circuits.

- **If between 35-50 ohms**

There may be a third terminating resistor between the serial data circuits. This can happen if the

incorrect device is installed. Some devices are available with and without the terminating resistors installed to reduce the need of terminating resistors in the wiring harness. Refer to Circuit/System Testing below- Testing the Serial Data Circuits for a Short between the Circuits.

- **If greater than 70 ohms but less than infinite**

Refer to Circuit/System Testing below - Testing the Serial Data Circuits for an Open/High Resistance.

- **If infinite resistance**

Refer to Circuit/System Testing below- Testing the Data Link Connector Serial Data Circuits for an Open/High Resistance.

- **If between 50-70 ohms**

10. Refer to Circuit/System Testing below - Testing the Device Circuits.

Circuit/System Testing

NOTE: Each device may need to be disconnected to isolate a circuit fault.

Use the schematic to identify the following:

- High speed GMLAN devices the vehicle is equipped with
- High speed GMLAN serial data circuit terminating resistors
- Device locations on the high speed GMLAN serial data circuits
- Each device's ground, B+, ignition, and high speed GMLAN serial data circuit terminals

Some devices with an internal terminating resistor have a loop in the harness that connects the internal terminating resistor to the serial data circuit. When wired this way, test these loop circuits for the appropriate failure mode short to voltage, short to ground, or open/high resistance prior to replacing the device for each of the following tests.

Testing the Data Link Connector Serial Data Circuits for an Open/High Resistance

1. Ignition OFF, disconnect the harness connectors at the K9 body control module.
2. Test for less than 2 ohms in each serial data circuit between the X84 data link connector and the K9 body control module.
 - **If 2 ohms or greater**

Repair the open/high resistance in the circuit.

- **If less than 2 ohms**

3. Test for less than 2 ohms in each serial data circuit between the K9 body control module and the first splice or splice pack.

- **If 2 ohms or greater**

Repair the open/high resistance in the circuit.

- **If less than 2 ohms**

4. Replace the K9 body control module.

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 device, ignition ON.
2. Test for greater than 4.5 V between each serial data circuit at the device connector that was just disconnected and ground.

- **If each serial data circuit is 4.5 V or less**

1. Ignition OFF.
2. Test for less than 10 ohms between each of the device's ground circuit terminals and ground.
 - If 10 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 10 ohms, replace the device that was disconnected.

- **If any serial data circuit is greater than 4.5 V**

3. Ignition OFF, disconnect the harness connectors with the high speed GMLAN serial data circuits at another device, in the direction of the circuit shorted to voltage, ignition ON.
4. Test for greater than 4.5 V between each serial data circuit at the device connector that was just disconnected and ground.

- **If each serial data circuit is 4.5 V or less**

1. Ignition OFF.
2. Test for less than 10 ohms between each of the device's ground circuit terminals and ground.
 - If 10 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 10 ohms, replace the device that was disconnected.

- **If any serial data circuit is greater than 4.5 V**

5. Repeat step 3 until one of the following conditions are isolated:
 - A short to voltage on the serial data circuit between two devices or splice packs, if equipped.
 - A short to voltage on the serial data circuit between a device and a terminating resistor.

Testing the Serial Data Circuits for a Short to Ground

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Disconnect the harness connectors with the high speed GMLAN serial data circuits at an easily accessible device.

3. Test for greater than 100 ohms between each serial data circuit at the device connector that was just disconnected and ground.

- **If each serial data circuit is 100 ohms or greater**

Replace the device that was disconnected.

- **If any serial data circuit is less than 100 ohms**

4. Disconnect the harness connectors with the high speed GMLAN serial data circuits at another device, in the direction of the circuit shorted to ground.
5. Test for greater than 100 ohms between each serial data circuit at the device connector that was just disconnected and ground.

- **If both serial data circuits are 100 ohms or greater**

Replace the device that was disconnected.

- **If any serial data circuit is less than 100 ohms**

6. Repeat step 4 until one of the following conditions are isolated:
 - A short to ground on the serial data circuit between two devices or splice packs, if equipped.
 - A short to ground on the serial data circuit between a device and a terminating resistor.
 - A short to ground on the serial data circuit between the X84 data link connector and the first device or splice pack.

Testing the Serial Data Circuits for a Short between the Circuits

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Disconnect the harness connectors with the high speed GMLAN serial data circuits at an easily accessible device that is not communicating.
3. Test for greater than 110 ohms between each pair of serial data circuits at the device connector that was just disconnected.

- **If each pair of serial data circuits is 110 ohms or greater**

Replace the device that was disconnected.

- **If any pair of serial data circuits is less than 110 ohms**

4. Connect the harness connectors at the device that was disconnected.
5. Disconnect the harness connectors with the high speed GMLAN serial data circuits at another device, in the direction of the circuit shorted together.
6. Test for greater than 110 ohms between each pair of serial data circuits at the device connector that was just disconnected.

- **If each pair of serial data circuits is 110 ohms or greater**

Replace the device that was disconnected.

○ **If any pair of serial data circuits is less than 110 ohms**

7. Repeat step 4 until one of the following conditions are isolated:

- Serial data circuits shorted together between two devices or splice packs, if equipped.
- Serial data circuits shorted together between a device and a terminating resistor.
- Serial data circuits shorted together between the X84 data link connector and the first device or splice pack.
- A shorted terminating resistor.

Testing the Serial Data Circuits for an Open/High Resistance

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Disconnect the harness connectors with the high speed GMLAN serial data circuits at an easily accessible device that is not communicating.
3. Test for less than 130 ohms between each pair of serial data circuits at the device connector that was just disconnected.

○ **If each pair of serial data circuits is 130 ohms or less**

Replace the device that was disconnected.

○ **If any pair of serial data circuits is greater than 130 ohms**

4. Connect the harness connectors at the device that was disconnected.
5. Disconnect the harness connectors with the high speed GMLAN serial data circuits at another device, in the direction of the circuit with the open/high resistance.
6. Test for less than 130 ohms between each pair of serial data circuits at the device connector that was just disconnected.

○ **If each pair of serial data circuits is 130 ohms or less**

Replace the device that was disconnected.

○ **If any pair of serial data circuits is greater than 130 ohms**

7. Repeat step 4 until one of the following conditions are isolated:

- An open/high resistance on the serial data circuit between two devices or splice packs, if equipped.
- An open/high resistance on the serial data circuit between a device and a terminating resistor.
- An open/high resistance terminating resistor.

Testing the Device Circuits

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
2. Disconnect the harness connectors at an easily accessible device that is not communicating.
3. Test for less than 10 ohms between each ground circuit terminal and ground.

- **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
- **If less than 10 ohms**
- 4. If equipped, verify a test lamp illuminates between each B+ circuit terminal and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the disconnected device.
 - **If the test lamp illuminates**
- 5. Ignition ON.
- 6. If equipped, verify a test lamp illuminates between each ignition circuit terminal, which has a fuse in the circuit, and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ignition circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is OK and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the disconnected device.
 - **If the test lamp illuminates**
- 7. If equipped, verify a test lamp illuminates between each ignition circuit terminal, which is controlled by a control module, and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the harness connectors at the control module that controls the ignition circuit.
 2. Test for infinite resistance between the ignition circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

3. Test for less than 2 ohms in the ignition circuit end to end.

- If 2 ohms or greater, repair the open/high resistance in the circuit.
- If less than 2 ohms, replace the control module that controls the ignition circuit.

○ **If the test lamp illuminates**

8. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 meters (9.8 feet) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.

9. Test for less than 130 ohms between each pair of high speed GMLAN serial data circuits at the device connector that was just disconnected.

○ **If any pair of serial data circuits is greater than 130 ohms**

Repair the open/high resistance in the serial data circuits between the disconnected device and the circuit splice in the serial data circuits.

○ **If each pair of serial data circuits is 130 ohms or less**

10. Replace the device that was disconnected.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

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-U02FF*	1	-
Ground (DLC, terminal 5)	-	1*	-	-
* An open between the data link connector (DLC) and the first splice pack/device will only affect the communication with the scan tool.				
1. No communication with any low speed GMLAN device				

Circuit/System Description

The serial data is transmitted over a single wire to the appropriate devices. The transmission speed for GMLAN low speed is up to 83.33 kbit/s. Under normal vehicle operating conditions, the speed of the bus is 33.33 kbit/s. The devices toggle the serial data circuit between 0-5 V during normal communications. To wake the devices connected to the low speed GMLAN serial data circuit, a voltage wake up pulse of 10 V is sent out. If serial data is lost, devices will set a no communication code against the non-communicating device. A loss of serial data communications DTC does not represent a failure of the device 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 device on the data communication circuit was disconnected while the communication circuit is awake.
 - Power to one or more devices was interrupted during diagnosis
 - A low battery condition was present, so some devices stop communicating when battery voltage drops below a certain threshold.
 - Battery power was restored to the vehicle and devices 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 device reporting a U-code. The U-code identifies which device needs to be diagnosed for a communication issue.
- Communication may be available between the device and the scan tool with the low speed GMLAN serial data system inoperative. This condition is due to the device 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 device will only affect that specific device. This type of failure will set a loss of communication DTC for each device affected, and the other devices 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 device (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 - INDEX

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

NOTE: Use the schematic to identify the following:

- Devices the vehicle is equipped with
- Device and splice pack locations on the low speed GMLAN serial data circuit
- The low speed GMLAN serial data circuit terminals for each device or splice pack

1. Attempt to communicate with all devices on the low speed GMLAN serial data circuit. Refer to **Data Link References**.
2. Verify which devices are communicating on the low speed GMLAN serial data circuit.
 - **If only one device is not communicating**

Diagnose that device only. Refer to **DTC U0100-U02FF (without HP6)**, **DTC U0100-U02FF (with HP6)**.

- **If one or more devices are communicating but not all**

Refer to Circuit/System Testing below- Testing the Serial Data Circuit for an Open/High Resistance.

- **If none of the devices are communicating**

3. Ignition OFF, all access doors closed, all vehicle systems OFF, all keys at least 3 m (9.8 ft) away from vehicle. Disconnect the scan tool from the X84 Data Link Connector. The following tests will be done at the X84 Data Link Connector. It may take up to 2 minutes for all vehicle systems to power down.
4. Test for less than 10 ohms between the ground circuit terminal 5 and ground.

- **If 10 ohms or greater**

1. Ignition OFF.
2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.

- **If less than 10 ohms**

5. Ignition ON.
6. Test for less than 4.5 V between the serial data circuit terminal 1 and ground.

- **If 4.5 V or greater**

Refer to Circuit/System Testing below- Testing the Serial Data Circuits for a Short to Voltage.

- **If less than 4.5 V**

7. Ignition OFF, all access doors closed, all vehicle systems OFF, all keys at least 3 m (9.8 ft) away from vehicle. It may take up to 2 minutes for all vehicle systems to power down.
8. Test for greater than 100 ohms between the serial data circuit terminal 1 and ground.

- **If 100 ohms or less**

Refer to Circuit/System Testing below- Testing the Serial Data Circuits for a Short to Ground.

- **If greater than 100 ohms**

9. Disconnect the appropriate harness connector at the first splice pack closest in the circuit to the X84 Data Link Connector.
10. Test for less than 2 ohms between the X84 Data Link Connector's serial data circuit terminal 1 and the splice pack harness connector's serial data input terminal.

- **If 2 ohms or greater**

Repair the open/high resistance in the serial data circuit.

- **If less than 2 ohms**

11. Replace the splice pack.

Circuit/System Testing

Testing the Serial Data Circuits for a Short to Voltage

1. Ignition OFF, disconnect the appropriate harness connectors at all low speed GMLAN serial data splice packs, ignition ON.
2. Test for less than 4.5 V between the serial data circuit terminal 1 at the X84 Data Link Connector and ground.

- **If 4.5 V or greater**

Repair the short to voltage on the serial data circuit.

- **If less than 4.5 V**

3. Test for less than 4.5 V between each low speed GMLAN serial data circuit at a splice pack and ground.

- **If any serial data circuit is greater than 4.5 V**

1. Ignition OFF, disconnect all devices on the failed serial data circuit, ignition ON.
2. Test for less than 1 V between each section of the failed serial data circuit and ground.
 - If 1 V or greater, repair the short to voltage in the circuit.
 - If less than 1 V
3. Connect the splice pack and connect the first device on the failed serial data circuit, ignition ON.
4. Verify the scan tool communicates or not with the low speed GMLAN serial data circuit.
 - If the scan tool does not communicate, replace the device that was just connected.
 - If the scan tool communicates and there are more devices to connect, connect the next device and repeat step 3.4.
 - If the scan tool communicates and there are no more devices to connect

5. All OK.

- **If all serial data circuits are less than 4.5 V**

4. All OK.

Testing the Serial Data Circuits for a Short to Ground

1. Ignition OFF, all access doors closed, all vehicle systems OFF, and all keys at least 3 m (9.8 ft) away from vehicle. Disconnect the appropriate harness connectors at all low speed GMLAN serial data splice packs.
2. Test for infinite resistance between the serial data circuit terminal 1 at the X84 Data Link Connector and ground.

- **If less than infinite resistance**

Repair the short to ground on the serial data circuit.

- **If infinite resistance**

3. Test for greater than 100 ohms between each low speed GMLAN serial data circuit at a splice pack and ground.

- **If any serial data circuit is 100 ohms or less**

1. Disconnect all devices on the failed serial data circuit.

2. Test for greater than 2 ohms between each section of the failed serial data circuit and ground.
 - If 2 ohms or less, repair the short to ground in the circuit.
 - If greater than 2 ohms
3. Connect the splice pack and connect the first device on the failed serial data circuit, ignition ON.
4. Verify the scan tool communicates or not with the low speed GMLAN serial data circuit.
 - If the scan tool does not communicate, replace the device that was just connected.
 - If the scan tool communicates and there are more devices to connect, connect the next device and repeat step 3.4.
 - If the scan tool communicates and there are no more devices to connect
5. All OK.
 - **If all serial data circuits are greater than 100 ohms**
4. All OK.

Testing the Serial Data Circuit for an Open/High Resistance

1. Ignition OFF and all vehicle systems OFF, disconnect the splice pack containing the devices that are not communicating on the low speed GMLAN serial data circuit.
2. Test for less than 2 ohms between the X84 Data Link Connector terminal 1 and the disconnected splice pack.

- **If 2 ohms or greater**

Repair the open/high resistance in the serial data circuit.

- **If less than 2 ohms**

3. Disconnect all devices on the failed serial data circuit.
4. Test for less than 2 ohms between each section of the failed serial data circuit end to end.

- **If 2 ohms or greater**

Repair the open/high resistance in the serial data circuit.

- **If less than 2 ohms**

5. Connect the splice pack and connect the first device on the failed serial data circuit.
6. Verify if the device communicates or not with the scan tool.

- **If the device does not communicates**

Replace the device.

- **If the device communicates and there are more devices to connect**

Connect the next device on the failed serial data circuit and repeat step 6.

- **If all devices are connected and communicating**

7. All OK.

Repair Instructions

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

- **GMLAN and Media Oriented Systems Transport (MOST) Wiring Repairs**
- **Control Module References** for device replacement, programming and setup

DATA LINK REFERENCES

This table identifies which serial data link that a particular device uses for in-vehicle data transmission. Some devices may use more than one data link to communicate. Some devices 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 devices listed will be applicable to all vehicles. Refer to the schematics to determine which devices apply. For the description and operation of these serial data communication circuits, refer to **Data Link Communications Description and Operation**.

Data Link References

Code	Device	Data Link Type	Diagnostic Procedure
Schematic Reference: <u>Data Communication Schematics</u>			
A11	Radio	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
A22	Radio Controls	Local Interconnect Network (LIN)	<u>DTC U1500-U15FF</u>
A26	HVAC Controls	Local Interconnect Network (LIN)	<u>DTC U1500-U15FF</u>
B60	Passenger Presence Sensor	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
B99	Steering Wheel Angle Sensor	Chassis High Speed GMLAN	<u>Scan Tool Does Not Communicate with Chassis High Speed GMLAN Device</u>
B119	Multi-axis Acceleration Sensor	Chassis High Speed GMLAN	<u>Scan Tool Does Not Communicate with Chassis High Speed GMLAN Device</u>
K9	Body Control Module	• High 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 Low Speed GMLAN Device</u> • <u>DTC U1500-U15FF</u>
			• <u>Scan Tool Does Not</u>

K16	Battery Energy Control Module	• High Speed GMLAN • Powertrain Expansion Bus (with HP6)	<u>Communicate with High Speed GMLAN Device</u> • <u>DTC U0074 (Chassis Expansion Bus), DTC U0074 (Powertrain Expansion Bus with HP6), DTC U0074 (Powertrain Expansion Bus without HP6)</u> (with HP6)
K17	Electronic Brake Control Module	• High Speed GMLAN • Chassis High Speed GMLAN	• <u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u> • <u>Scan Tool Does Not Communicate with Chassis High Speed GMLAN Device</u>
K19	Suspension Control Module	High Speed GMLAN	<u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u>
K20	Engine Control Module	• High Speed GMLAN • Powertrain Expansion Bus (with HP6) • Powertrain Expansion Bus (without HP6)	• <u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u> • <u>DTC U0074 (Chassis Expansion Bus), DTC U0074 (Powertrain Expansion Bus with HP6), DTC U0074 (Powertrain Expansion Bus without HP6)</u> (with HP6) • <u>DTC U0074 (Chassis Expansion Bus), DTC U0074 (Powertrain Expansion Bus with HP6), DTC U0074 (Powertrain Expansion Bus without HP6)</u> (without HP6)
K27	Fuel Pump Control Module	High Speed GMLAN	<u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u>
K29D	Seat Heating Control Module - Driver	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>

K33	HVAC Control Module	• Low Speed GMLAN • Local Interconnect Network (LIN)	• <u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u> • <u>DTC U1500-U15FF</u>
K36	Inflatable Restraint Sensing and Diagnostic Module	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
K40	Seat Memory Control Module	• Low Speed GMLAN • Local Interconnect Network (LIN)	• <u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u> • <u>DTC U1500-U15FF</u>
K41R	Rear Parking Assist Control Module	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
K43	Power Steering Control Module	High Speed GMLAN	<u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u>
K59	Starter/Generator Control Module	• High Speed GMLAN • Powertrain Expansion Bus (with HP6)	• <u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u> • <u>DTC U0074 (Chassis Expansion Bus), DTC U0074 (Powertrain Expansion Bus with HP6), DTC U0074 (Powertrain Expansion Bus without HP6) (with HP6)</u>
K71	Transmission Control Module	High Speed GMLAN	<u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u>
K73	Telematics Communication Interface Control Module	• High Speed GMLAN • Low Speed GMLAN	• <u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u> • <u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
K83	Parking Brake Control Module	High Speed GMLAN	<u>Scan Tool Does Not Communicate with High Speed GMLAN Device</u>
K84	Keyless Entry Control Module	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
	Immobilizer Control	Local Interconnect Network	

K89	Module	(LIN)	<u>DTC U1500-U15FF</u>
K109	Vehicle Camera Module	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
K111	Fuel Pump Driver Control Module	Powertrain Expansion Bus (without HP6)	<u>DTC U0074 (Chassis Expansion Bus), DTC U0074 (Powertrain Expansion Bus with HP6), DTC U0074 (Powertrain Expansion Bus without HP6) (without HP6)</u>
M69	Sunroof Motor	Local Interconnect Network (LIN)	<u>DTC U1500-U15FF</u>
M74D	Window Motor - Driver	Local Interconnect Network (LIN)	<u>DTC U1500-U15FF</u>
P2	Transmission Shift Lever Position Indicator	Local Interconnect Network (LIN)	<u>DTC U1500-U15FF</u>
P16	Instrument Cluster	Low Speed GMLAN	<u>Scan Tool Does Not Communicate with Low Speed GMLAN Device</u>
P17	Info Display Module	Local Interconnect Network (LIN)	<u>DTC U1500-U15FF</u>
S52	Outside Rearview Mirror Switch	Local Interconnect Network (LIN)	<u>DTC U1500-U15FF</u>
S79D	Window Switch - Driver	Local Interconnect Network (LIN)	<u>DTC U1500-U15FF</u>
S79LR	Window Switch - Left Rear	Local Interconnect Network (LIN)	<u>DTC U1500-U15FF</u>
S79P	Window Switch - Passenger	Local Interconnect Network (LIN)	<u>DTC U1500-U15FF</u>
S79RR	Window Switch - Right Rear	Local Interconnect Network (LIN)	<u>DTC U1500-U15FF</u>

REPAIR INSTRUCTIONS

BODY CONTROL MODULE REPLACEMENT

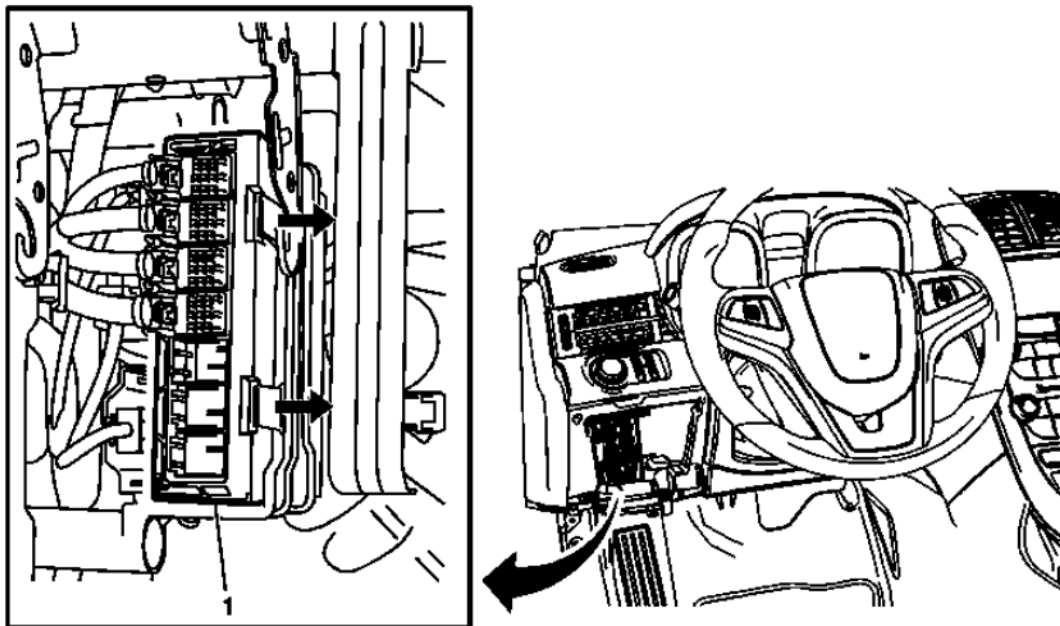


Fig. 12: Body Control Module
 Courtesy of GENERAL MOTORS COMPANY

Body Control Module Replacement

Callout	Component Name
Preliminary Procedure Remove the instrument panel wiring harness junction block. Refer to Instrument Panel Wiring Harness Junction Block Replacement .	
1	Body Control Module Procedure 1. Disconnect the electrical connectors on the body control module. 2. Unsnap to release the module from the bracket. 3. For programming and set up information, refer to Control Module References .

BODY CONTROL MODULE BRACKET REPLACEMENT

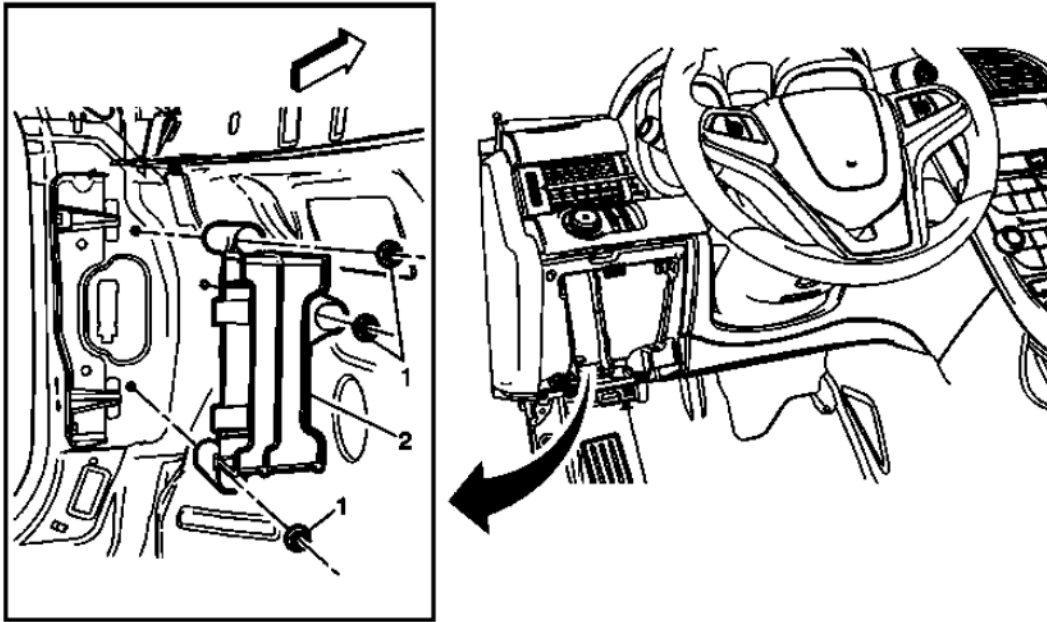


Fig. 13: Body Control Module Bracket
 Courtesy of GENERAL MOTORS COMPANY

Body Control Module Bracket Replacement

Callout	Component Name
Preliminary Procedure Remove the body control module. Refer to Body Control Module Replacement .	
1	Body Control Module Bracket Fastener (Qty: 3) CAUTION: Refer to Fastener Caution . Tighten 9 N.m (80 lb in)
2	Body Control Module Bracket

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

NOTE: This is an overview of different serial data buses used by GM devices to communicate with each others. Use **Data Communication Schematics** to find out which serial data buses are configured for a specific vehicle.

Circuit Description

There are many components in a vehicle that rely on information from other sources, transmit information to other sources, or both. Serial data communication networks provide a reliable, cost effective, way for various components of the vehicle to "talk" to one another and share information.

GM uses a number of different communication buses to insure the timely and efficient exchange of information between devices. When compared to each other, some of these buses are different in nature as far as speed, signal characteristics, and behavior. An example of this is the High Speed GMLAN and Low Speed GMLAN buses.

On the other hand, when other buses are compared to each other they have similar characteristics and simply operate in parallel. In this case they are used to group together components which have high interaction. Examples are the High Speed GMLAN, Powertrain Expansion, and Chassis Expansion buses. This allows them to communicate with each other on a bus with reduced message congestion insuring faster and the more timely exchange of information than if all vehicle devices were on a single bus.

The majority of information that exists within a given network generally stays local; however some information will have to be shared on other networks. Control modules designated as Gateway's perform the function of transferring information between the various buses. A Gateway module is connected to at least 2 buses and will interact with each network according to its message strategy and transmission models.

GMLAN provides the capability for a receiving device to monitor message transmissions from other devices in order to determine if messages of interest are not being received. The primary purpose is to allow reasonable default values to be substituted for the information no longer being received. Additionally, a device may set a Diagnostic Trouble Code to indicate that the device it is expecting information from is no longer communicating.

High Speed GMLAN Circuit Description

A High Speed GMLAN Bus is used where data needs to be exchanged at a high enough rate to minimize the delay between the occurrence of a change in sensor value and the reception of this information by a control device using the information to adjust vehicle system performance.

The High Speed GMLAN serial data network consists of two twisted wires. One signal circuit is identified as GMLAN-High and the other signal circuit is identified as GMLAN-Low. At each end of the data bus there is a 120 ohms termination resistor between the GMLAN-High and GMLAN-Low circuits.

Data symbols (1's and 0's) are transmitted sequentially at a rate of 500 Kbit/s. The data to be transmitted over the bus is represented by the voltage difference between the GMLAN-High signal voltage and the GMLAN-Low signal voltage.

When the two wire bus is at rest the GMLAN-High and GMLAN-Low signal circuits are not being driven and this represents a logic "1". In this state both signal circuits are at the same voltage of 2.5 V. The differential voltage is approximately 0 V.

When a logic "0" is to be transmitted, the GMLAN-High signal circuit is driven higher to about 3.5 V and the GMLAN-Low circuit is driven lower to about 1.5 V. The differential voltage becomes approximately 2.0 (+/- 0.5) V.

Chassis High Speed GMLAN Circuit Description

The GMLAN Chassis Expansion Bus is basically a copy of the High Speed GMLAN Bus except that its use is reserved for chassis components. This implementation splits message congestion between two parallel buses helping to insure timely message transmission and reception. Sometimes communication is required between the Chassis Expansion Bus and the primary High Speed GMLAN Bus. This is accomplished by using the K17 Electronic Brake Control Module (EBCM) as the Gateway module. Since the High Speed GMLAN Chassis Expansion Bus and primary High Speed GMLAN Bus operate in the same manner, the diagnostics for each are similar.

Object High Speed GMLAN Circuit Description

The GMLAN Object Bus is basically a copy of the High Speed GMLAN Bus except that its use is reserved for the enhanced safety system. This implementation is used to isolate the heavy communication among the enhanced safety system devices from the other vehicle buses, reducing congestion. The K124 Active Safety

Control Module is connected to the Object Bus as well as the Primary High Speed GMLAN Bus, the Chassis Expansion Bus, and the Low Speed GMLAN Bus. The K124 Active Safety Control Module acts as a Gateway module for all required communication between the Object Bus devices and devices on these other vehicle buses. The GMLAN Object Bus operates in the same manner as the Chassis Expansion and Primary High Speed buses and so the diagnostics are similar. The Object Bus is physically partitioned into a Front Object Bus and a Rear Object Bus with each partition having its own communication enable circuit to activate the partition, but functional operation of both is identical. The Front Object Bus standard devices are the K124 Active Safety Control Module, the K109 Frontview Camera Module, and the B233B Radar Sensor Module - Long Range. The Front Object Bus optional devices are the B233LF Radar Sensor Module - Short Range Left Front and the B233RF Radar Sensor Module - Short Range Right Front. The Rear Object Bus is optional and when present will have the K124 Active Safety Control Module and B233R Radar Sensor Module - Short Range Rear on the bus, and optionally the Radar Sensor Module - Short Range Right Rear. All Object Bus components are powered by the K124 Active Safety Control Module via the communication enable circuits, except the K109 Frontview Camera Module which is powered directly by battery.

Media Oriented Systems Transport (MOST) Circuit Description

The MOST Infotainment network is a dedicated high speed multimedia streaming data bus independent from GMLAN. The MOST bus will be configured in a physical hardwired loop with each device within the bus sends and receives data on an assigned MOST addresses in a set order. Each device on the MOST bus will be required to have twisted pair copper wires (2 transmit TX, 2 receive RX, and 1 electronic control line which is a 12 V wakeup signal line). The A11 Radio is the MOST Master and will monitor the bus for vehicle configuration, Infotainment data messages and errors on the bus. The MOST initialization consists of a short 100 ms low voltage pulse on the electronic control line (or MOST control line) connected to all devices contained on the MOST ring. This wakeup message once received by each device, will first respond with a generic device response. Once these initial responses on the MOST bus are reported successfully without error to the A11 Radio, the second data request will record the MOST device addresses, their functionality requirements and capabilities within. The A11 Radio will learn this information and also record the address node sequence on the MOST bus at this point. This node address list will now be stored within the A11 Radio as the MOST bus configuration (called "Last Working MOST ID of Node 1 - 9" on scan tool data display).

When MOST receive, transmit, or control line faults are detected, transmit/receive messages will not received as expected from the wakeup request. The A11 Radio and the K74 Human Machine Interface Control Module will then perform diagnostics to isolate these MOST faults. If the MOST control line is shorted low to 0 V for excess amount of time, the A11 Radio will set a U2098 DTC and K74 Human Machine Interface Control Module will set a U0029 02 DTC. At this point the MOST bus will be unable to communicate until the shorted MOST control line is repaired.

Once the shorted MOST control line diagnostics pass, the A11 Radio will attempt to resend the initial short pulse attempts up to 3 times on the MOST control line. If the expected responses are not received, the A11 Radio continues into a failure mode setting a U0028 DTC and will continue on to send one 300 ms long pulse, which will enable the furthest upstream transmitting device to become the surrogate MOST Master in this MOST fault/diagnostic mode. When the A11 Radio receives this new MOST Master identity, the surrogate MOST master device can be identified based on scan tool data parameter "Surrogate MOST Master Node Upstream Position". The scan tool should be used to determine the MOST bus configuration and direction by utilizing the "Last Working MOST ID of Node 1 - 9" parameters from the A11 Radio data display. When a fault is present, it will indicate the newly enabled "Surrogate MOST Master Node Upstream Position" from the A11 Radio. This will assist in determining where the MOST bus/control is at fault. The MOST device upstream from

the surrogate MOST master device, transmit, receive, or control lines will be the suspect areas for diagnostics at this point. These faults can be associated with any of the MOST transmit, receive, or control line twisted copper wires or possibly an internal device fault.

The K74 Human Machine Interface Control Module will set a U0029 00 DTC when it diagnoses a MOST bus not communicating properly after one attempt. When the DTC U0029 00 is set by the K74 Human Machine Interface Control Module without the corresponding DTC U0028 from the A11 Radio, it will be an indication of an intermittent wiring/device condition.

CAN Graphical Interface (CGI) Circuit Description

This bus is used by the Entertainment sub-system to transfer high-rate display graphics between the A11 Radio and the P17 Info Display Module and/or Radio/HVAC Control. The electrical characteristics of the CAN Graphical Interface (CGI) Bus are very similar to the High Speed GMLAN Bus. The message strategy and construction of messages are different however. Sometimes communication is required between the CAN Graphical Interface Bus and the Low Speed GMLAN Bus. This is accomplished by using the A11 Radio as the Gateway module. Since the CAN Graphical Interface Bus and primary High Speed GMLAN Bus have similar electrical characteristics, the diagnostics for each are similar.

In the case where the P17 Info Display Module and Radio/HVAC Control are separate devices the P17 Info Display Module is responsible for passing information between the A11 Radio and the Radio/HVAC Control. The A11 Radio interfaces only with the P17 Info Display Module and the P17 Info Display Module then communicates with the Radio/HVAC Control through a Local Interconnect Network (LIN) interface.

A bus wake up signal will be generated by the A11 Radio or by the P17 Info Display Module when the system functionality is required. The communication function of the CAN Graphical Interface shall be enabled or disabled based on the voltage level of the Center Stack Wake. The network will stay awake as long as the circuit voltage is driven low, to less than 1.5 V. Communications are disabled with a high circuit voltage around 5.0 V.

The A11 Radio can execute a warm reset of the P17 Info Display Module if the P17 Info Display Module fails to respond to the A11 Radio's request. The Center Stack Reset is a low-asserted pull down output (less than 1.5 V) from the A11 Radio to the P17 Info Display Module and has the same electrical characteristics as those for the Center Stack Wake signal defined above.

Mid Speed GMLAN Circuit Description

The Mid Speed GMLAN Bus is very similar to the High Speed GMLAN Bus except that it uses a slower transmission rate of 125 Kbit/s. This bus is intended for use where the system response time demands that a large amount of data be transmitted in a relatively short amount of time, such as updating a graphics display. As such it has usually been used for infotainment applications. Sometimes communication is required between the Low Speed GMLAN Bus and the Mid Speed GMLAN Bus. This is accomplished by using the A11 Radio as the Gateway module. Since the Mid Speed GMLAN Bus and primary High Speed GMLAN Bus operate in a similar manner, the diagnostics for each are similar.

Low Speed GMLAN Circuit Description

Low Speed GMLAN Bus is used in applications where a high data rate is not required which allows for the use

of less complex components. It is typically used for operator controlled functions where the response time requirements are slower than those required for dynamic vehicle control.

The Low Speed GMLAN Serial Data Network consists of a single wire, ground referenced bus with high side voltage drive. During on road vehicle operation data symbols (1's and 0's) are transmitted sequentially at the normal rate of 33.3 Kbit/s. For component programming only, a special high speed data mode of 83.3 Kbit/s may be used.

Unlike the high speed dual wire networks, the single wire low speed network does not use terminating resistors at either end of the network.

The data symbols to be transmitted over the bus are represented by different voltage signals on the bus. When the Low Speed GMLAN Bus is at rest and is not being driven, there is a low signal voltage of approximately 0.2 V. This represents a logic "1". When a logic "0" is to be transmitted, the signal voltage is driven higher to around 4.0 V or higher.

Local Interconnect Network (LIN) Circuit Description

The Local Interconnect Network (LIN) Bus consists of a single wire with a transmission rate of 10.417 Kbit/s. This bus is used to exchange information between a master control module and other smart devices which provide supporting functionality. This type of configuration does not require the capacity or speed of either a High Speed GMLAN Bus or Low Speed GMLAN Bus and is thus relatively simpler.

The data symbols (1's and 0's) to be transmitted are represented by different voltage levels on the communication bus. When the LIN Bus is at rest and is not being driven, the signal is in a high voltage state of approximately V_{batt} . This represents a logic "1". When a logic "0" is to be transmitted, the signal voltage is driven low to about ground (0.0 V).

Communication Enable Circuit Description

Devices on High Speed GMLAN Bus enable or disable communication based on the voltage level of the communication enable circuit. When the circuit voltage is high (around 12 V), communications are enabled. When the circuit is low, communications are disabled.

Data Link Connector (DLC)

The X84 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 2 Class 2 communications terminal
- Pin 3 Mid speed GMLAN serial bus (+) terminal or Object high 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 7 Keyword communications terminal

- Pin 11 Mid speed GMLAN serial bus (-) terminal or Object high 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 device that could be optioned into the vehicle. If an option is not installed on the vehicle, the scan tool will display No Comm (or Not Connected) for that optional device. In order to avert misdiagnoses of No Communication with a specific device, refer to **Data Link References** for a list of devices, the buses they communicate with, and the RPO codes for a specific device.