Data Link Communications Description and Operation

Circuit Description

The communication among modules is performed through the class 2 and high speed GMLAN serial data circuits. The modules that need real time communication are attached to the high speed GMLAN network. The body control module (BCM) is the gateway between the networks. The purpose of the gateway is to transfer information from one network to another. The gateway will interact with each network according to that network's transmission model. Refer to Body Control System Description and Operation for more information about the gateway.

Data Link Connector (DLC)

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

- Scan tool power battery positive voltage at terminal 16
- Scan tool power ground at terminal 4
- Common signal ground at terminal 5
- Class 2 signal at terminal 2
- High speed GMLAN serial data bus (+) at terminal 6
- High speed GMLAN serial data bus (−) at terminal 14

High Speed GMLAN Circuit Description

The data link connector (DLC) allows a scan tool to communicate with the high speed GMLAN serial data circuit. The serial data is transmitted on 2 twisted wires that allow speed up to 500 Kbps. The twisted pair is terminated with two 120 Ω resistors, one is internal to the engine control module (ECM) and the other is internal to the body control module (BCM). The resistors are used to reduce noise on the high speed GMLAN bus during normal vehicle operation. The high speed GMLAN is a differential bus. The high speed GMLAN serial data bus (+) and high speed GMLAN serial data (−) are driven to opposite extremes from a rest or idle level. The idle level which is approximately 2.5 volts is considered a recessive transmitted data and is interpreted as a logic 1. Driving the lines to their extremes adds 1 volt to high speed GMLAN serial data bus (+) and subtracts 1 volt from high speed GMLAN serial data bus (−) wire. This dominant state is interpreted as a logic 0. GMLAN network management supports selective start up and is based on virtual networks. A virtual network is a collection of signals started in response to a vehicle event. The starting of a virtual network signifies that a particular aspect of the vehicle functionality has been requested. A virtual network is supported by virtual devices which represents a collection of signals owned by a single physical device. So, any physical device can have one or more virtual devices. The signal supervision is the process of determining whether an expected signal is being received or not. Failsofting is the ability to substitute a signal with a default value or a default algorithm, in the absence of a valid signal. Some messages are also interpreted as a "heartbeat" of a virtual device. If such a signal is lost, the application will set a no communication code against the respective virtual device. This code is mapped on the Tech 2 screen as a code against the physical device. Note that a loss of serial data DTC does not normally represent a failure of the module that set it.

The interaction between high speed GMLAN and class 2 is assured by BCM, which is the gateway. Any message from the class 2 modules to the high speed GMLAN modules is

translated by BCM without carrying the original transmitter ID. Therefore the GMLAN modules consider the BCM as being the originator of all class 2 messages that they receive. The GMLAN serial data communications circuit on this vehicle is in a linear topology. The following modules are connected to the link, in order from DLC to the end of the linear configuration:

- The body control module (BCM)
- The communication interface module (OnStar®)
- The electronic suspension control (ESC) module
- The transmission control module (TCM)
- The electronic brake control module (EBCM)
- The engine control module (ECM)

Class 2 Circuit Description

The data link connector (DLC) allows a scan tool to communicate with the class 2 serial data circuit. Class 2 serial data is transmitted on a single wire at an average of 10.4 Kbps. The bus is active at 7 volts nominal and inactive at ground potential. When the ignition switch is in RUN, each module communicating on the class 2 serial data line sends a state of health (SOH) message every 2 seconds to ensure that the module is operating properly. When a module stops communicating on the class 2 serial data line, for example if the module loses power or ground, the SOH message it normally sends on the data line every 2 seconds disappears. Other modules on the class 2 serial data line, which expect to receive that SOH message, detect its absence; those modules in turn set an internal DTC associated with the loss of SOH of the non-communicating module. The DTC is unique to the module which is not communicating, for example, when the body control module (BCM) SOH message disappears, several modules set DTC U1064. Note that a loss of serial data DTC does not normally represent a failure of the module that set it.

The BCM emulates the GMLAN modules on the class 2, embedding the original transmitter ID in GMLAN messages to class 2. Therefore the class 2 modules can set specific non communications DTCs against GMLAN modules.

The class 2 serial data communications circuit on this vehicle is in a star configuration. The star has 2 splice packs, located as follows:

- The splice pack SP205 is located under the left side of the instrument panel, near the data link connector.
- The splice pack SP208 is located under the right side of the instrument panel.

The following modules communicate on the class 2 serial data circuit:

- The splice pack SP205 attaches to:
  - The driver door module (DDM)
  - The driver door switch (DDS)
  - The driver position module (DPM)
  - The head up display (HUD)
  - The instrument panel cluster (IPC)
  - The inflatable restraint sensing and diagnostic module (SDM)
  - The steering column lock control module (SCLCM)
- The splice pack SP208 attaches to:

– The body control module (BCM)
– The communication interface module (OnStar®)
– The digital radio receiver (DRR)
– The folding top controller (FTC)
– The HVAC control module
– The passenger door module (PDM)
– The radio
– The remote control lock door receiver (RCDLR)