

Atech Educator News

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OBD II and Class 2 Communication

When Atech began updating its 1996 OBD II trainer to the 2003 model year, a problem arose that needed to be solved. This new problem was the J1850 Standard for Class 2 Communication which wasn't an issue in the past. That Powertrain Control Module (PCM) didn't need communication messages from other modules on the network bus to begin its job of emissions control. Older PCMs didn't send out communication messages containing data received from its inputs. There weren't any special keys or ignition switches needed to start a vehicle. These were all necessary components that Atech "discovered" in the process of updating the OBD II trainer.

Atech began developing the J1850 Network System Trainer to get a better understanding of the Class 2 Communication between the different modules that are connected to the network bus. This was an essential step in gaining knowledge and understanding of what is needed for the PCM to function correctly prior to beginning its normal OBD II functions. Two of the key modules that the PCM communicates with are the Body Control Module (BCM) and the Instrument Panel Cluster (IPC). Because of their importance, both of these modules were added to the new GM J1850 OBD II System Trainer.

What is the importance of having the BCM and IPC communicate on the Class 2 network with the PCM for an OBD II trainer? First, in order to get the PCM to operate the fuel injectors and start the engine, the BCM has to send a Class 2 message to the PCM regarding the Passlock® Security System. The Passlock® Security System uses a coded cut key with matching coded tumblers and the Passlock® Sensor built into the Ignition Switch.

When the correct key is used to turn the cylinder inside the Ignition Switch, which passes under the Passlock® Sensor, the Passlock® Sensor sends a signal to the BCM. The BCM compares this signal to the previously "learned" signal to check its validity. If the signal is correct, the BCM sends a Class 2 message to the PCM to enable the fuel injectors to start the vehicle. The PCM obviously cannot

operate its OBD II functions without a running engine.

Secondly, the PCM needs to relay data it receives from its inputs to the driver. The IPC displays this information to the driver from the PCM. Older Instrument Panels used to connect directly to the input and output sensors along with the PCM. This resulted in lots of wires being strung out all over the vehicle. Lessening the amount of wiring needed to give the driver this data



greatly reduces the amount of potential problems or faults that can occur. This is where the Class 2 Communication comes in. A single wire is used between the modules to transfer Class 2 messages. Various inputs and outputs such as Engine Coolant Temperature, Fuel Level, Engine Speed (RPM), and Vehicle Speed (MPH), as well as others, are monitored by the PCM. Data collected from these sensors is needed for OBD II and emissions control and to alert or inform the driver of potential vehicle problems or vehicle status. Any information the driver needs is sent out on the Class 2 bus as messages from the PCM. The IPC receives and interprets the messages and displays the information to the driver via its gauges, indicators, and Message Center.

Is Class 2 Communication an essential part of OBD II operation? The answer is yes and no. It is essential for

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operates its OBD II functions without a running engine. The PCM obviously cannot

Engine Data 1	
Vehicle Speed Sensor	63 mph
Engine Run Time	00:05:28
Engine Speed	1736 RPM
Desired Idle Speed	600 RPM
IAC Position	103 Counts
ECT Sensor	212 °F
IAT Sensor	71 °F
MAF Sensor	25.83 g/s
Engine Load	59 %
42 / 43 ▼	
Vehicle Speed Sensor	
Select Items	DTC
Quick Snapshot	More

the PCM to receive the Class 2 Messages from the BCM regarding the Passlock® Security System so it can start and run the engine. Without a running engine there would be no need for OBD II or emissions control. The other essential component of Class 2 Communication that hasn't been discussed is the Scan Tool. When a Scan Tool is connected to the Data Link Connector (DLC) it becomes a module on the network bus. The Scan Tool allows a technician to communicate with the other modules on the bus to retrieve data for troubleshooting and Diagnostic Trouble Codes (DTCs). PCMs will also set DTCs when its OBD II operation detects a problem with the vehicle. Technicians use the Scan Tool to read these codes so they can correctly diagnose and repair a vehicle. What isn't necessarily essential to OBD II is essential to the driver. For example, the driver needs to know how fast he or she is driving. The PCM monitors the Vehicle Speed and sends a status message out on the bus which is picked up by the IPC. The IPC interprets the data in the status message and adjusts the Speedometer gauge accordingly. The same is also done with Engine Speed, which the IPC displays on the Tachometer, Engine Coolant Temperature, displayed on the Temperature gauge, and the Fuel Level, which is displayed on the Fuel gauge. The PCM monitors the Fuel Level for EVAP diagnostics. EVAP Monitoring is also one of the OBD II operations of the PCM. If the PCM doesn't inform the driver of the amount of fuel in the fuel tank, and the driver doesn't know when to refill the tank, will the engine continue to run if the tank is empty? Closed Loop operation is the basis of OBD II operation. Is this an example of Closed Loop operation?

John Cummins, Project Developer

Welcome

David Mitchell



ATech would like to introduce David Mitchell as our new Instructor / Program Developer. He has experience as a Technical Writer, Manager of Fleet Services, Director of Program Development and V.P. of Operations for Melior, Inc. His automotive career includes years as a Service Technician, General Motors Service Representative (Pontiac Motor Division), a GM Training Center instructor, and web-based course developer. We look forward to having David assist us with future projects and feel that he will be an asset to our company.

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11,000

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GM J1850 OBD II Model 2652



The ATech GM J1850 OBD II (model 2652) is designed to teach computer and network controlled automotive powertrain system operation. This trainer allows for instructor demonstration, student hands-on reinforcement and troubleshooting practice. Powered with an internal power supply. 220V/50Hz available. Includes courseware.

Features:

- Performs OBD II Drive Cycle.
- Actual new vehicle components.
- Operated as a stand-alone trainer, or connected to the Electronic Ignition (EI) Trainer (model 1772) via the Interconnect Cable (model 2657) to teach and demonstrate engine and transmission control.
- Intermittent and hard fault codes can be inserted using the built-in keypad, a single computer, or the ATech Network System (ANS).
- Connection to Tech 2™ (not included) via the DLC connector.
- Compatible with ATech's Instructor Management Program (IMP).
- Network and interconnect circuits are protected against over current and polarity reversal.
- Courseware includes: Instructor Guide, Student Manual and Service Manual Information.

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