Intermittent Conditions

Inspections	Action
DEFINITION: The condition is not currently present but is indicated in DTC history. OR There is a customer concern, but the symptom cannot currently be duplicated, if the condition is not DTC related.	
Preliminary	• Refer to Important Preliminary Inspection Before Starting in Symptoms - Engine Controls . • The fault must be present to locate a problem using the DTC table. If a fault is intermittent, the use of DTC tables may result in the replacement of good parts.
Visual/Physical	This step is an important aid for locating a condition without extensive testing. Perform a thorough visual and physical inspection of the following components: • Wiring harness for damage or cuts • A misrouted harness that is too close to high voltage or high current devices such as the following: - Secondary ignition components - Motors - Generators • Vacuum hoses for the following conditions: - Proper routing - Proper connections - Splits in the hose or the connections - Kinks • The control module and body grounds are clean and tight. • Battery connections are clean and tight • Charging system for proper operation--Refer to Charging System Test in Engine Electrical.
Harness/Connector Test	Many intermittent open or shorted circuits come and go with harness and connector movement caused by vibration, engine torque, bumps and rough pavement, etc. Test for this type of condition by performing the applicable procedure from the following list: • Move the related connectors and wiring while monitoring the appropriate scan tool data. • Move the related connectors and wiring with the component commanded ON and OFF, with the scan tool. Observe the components operation. • With the engine running, move the related connectors and

	wiring while monitoring engine operation. If harness or connector movement affects the data displayed, the component and system operation, or the engine operation, inspect and repair the harness or connections as necessary.
Electrical Connections or Wiring	Poor electrical connections and terminal tension or wiring faults cause most intermittents. Perform a careful inspection of the suspected circuit for the following: • Inspect for incorrect mating of the connector halves, or terminals not fully seated in the connector body, backed-out. • Inspect for improperly formed or damaged terminals. Test for incorrect terminal tension. • Inspect for poor terminal to wire connections including terminals crimped over insulation. This requires removing the terminal from the connector body. • Inspect for corrosion or water intrusion. Pierced or damaged insulation can allow moisture to enter the wiring. The conductor can corrode inside the insulation with little visible evidence. Look for swollen and stiff sections of wire in the suspect circuits. • Inspect for wires that are broken inside the insulation. • Inspect the harness for pinched, cut, or rubbed through wiring. • Make sure the wiring does not come in contact with hot exhaust components. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems.
Control Module Power and Grounds	Poor power or ground connections can cause widely varying symptoms. • Test all control module power circuits. Many vehicles have multiple circuits supplying power to the control module. Inspect connections at the control module connectors, fuses, and any intermediate connections between the power source and the control module or component. A test lamp or a DMM may indicate that voltage is present, but neither tests a circuits ability to carry sufficient current. Ensure that the circuit can carry the current necessary to operate the component. Refer to Power Distribution Schematics in Wiring Systems. • Test all control module ground and system ground circuits. The control module may have multiple ground circuits. Other components in the system may have separate grounds that may also need to be tested. Make sure the ground connections are clean and tight at the grounding point. Inspect the connections at the component and in splice packs, where applicable. Ensure that the circuit can carry the current necessary to operate the component.
Temperature Sensitivity	• An intermittent condition may occur only when the component

	is cold, or only when the component is hot. The heat that affects the circuit can be engine generated or due to a poor connection in the circuit or a high electrical load. • Information from the customer may help to determine if the trouble follows a pattern that is temperature related. The Freeze Frame/Failure Records or Snapshot data may help with this type of intermittent condition, where applicable. • If the intermittent is related to heat, review the data for a relationship with the following: - High ambient temperatures - Underhood/engine generated heat - Circuit generated heat due to a poor connection, or high electrical load - Higher than normal load conditions (towing, etc.) • If the intermittent is related to cold, review the data for the following: - Low ambient temperatures--In extremely low temperatures, ice may form in a connection or component. Inspect for water intrusion. - The condition only occurs on a cold start. - The condition goes away when the vehicle warms up.
Electromagnetic Interference (EMI) and Electrical Noise	Some electrical components and circuits are sensitive to electromagnetic interference (EMI) or other types of electrical noise. Inspect for the following conditions: • A misrouted harness that is too close to high voltage and high current devices such as secondary ignition components, motors, generator, etc. These components may induce electrical noise on a circuit that could interfere with normal circuit operation. • Electrical system interference caused by a malfunctioning relay, control module driven solenoid, or switch. They can cause a sharp electrical surge. Normally, the problem will occur when the malfunctioning component is operating. • Incorrect installation of non-factory, aftermarket, add-on accessories such as lights, 2-way radios, amplifiers, electric motors, remote starters, alarm systems, cell phones, etc. • Test for an open diode across the A/C compressor clutch and for other open diodes. Some relays may contain a clamping diode or resistor.
Incorrect Control Module Programming	• There are only a few situations where reprogramming a control module is appropriate: - A new control module is installed. - Revised software/calibration files have been released for this vehicle. **Important:** DO NOT reprogram the control module with the SAME software/calibration files that are already present in the

	control module. This is not an effective repair for any type of driveability problem. • Verify that the control module contains the correct software/calibration. If incorrect programming is found, reprogram the control module with the most current software/calibration. Refer to Service Programming System (SPS) in Programming and Setup.
Duplicating Failure Conditions	If the previous tests were not successful, attempt to duplicate and/or capture the failure conditions. Freeze Frame/Failure Records data, where applicable, contains the conditions that were present when the DTC set. 1. Review and record the Freeze Frame/Failure Records data. 2. Clear any DTCs with a scan tool. 3. Turn OFF the key and wait 15 seconds. 4. Operate the vehicle under the same conditions that were noted in Freeze Frame/Failure Records. The vehicle must also be operating within the Conditions For Running the DTC. Refer to Conditions for Running the DTC in the supporting text of the DTC being diagnosed. 5. Monitor DTC status for the DTC being tested. The scan tool will indicate Ran when the enabling conditions have been satisfied long enough for the DTC to run. The scan tool will also indicate whether the DTC passed or failed. An alternate method is to drive the vehicle with a DMM connected to a suspected circuit. An abnormal reading on the DMM when the problem occurs may help you locate the problem.
Scan Tool Snapshot	The scan tool can be set up to take a snapshot of the parameters available via serial data. The Snapshot function records live data over a period of time. The recorded data can be played back and analyzed. The scan tool can also graph parameters singly or in combinations of parameters for comparison. The snapshot can be triggered manually at the time the symptom is noticed or set up in advance to trigger when a DTC sets. An abnormal value captured in the recorded data may point to a system or component that needs to be investigated further. Refer to the scan tool user instructions for more information on the Snapshot function.