9620 Global OBD II Scan Tool

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Vehicle Service Information

The following is a list of publishers who have manuals containing electronic engine control diagnostic information. Some manuals may be available at auto part stores or local public libraries. For others, write for availability and pricing, specifying the make, model and year of vehicle.

Service Manuals:

Chilton Book Company
Chilton Way
Radnor, PA 19089

Haynes Publications
861 Lawrence Drive
Newbury Park, CA 91320

Cordura Publications
Mitchell Manuals, Inc.
Post Office Box 26260
San Diego, CA 92126

Motor's Auto Repair Manual
Hearst Company
250 W 55th Street
New York, NY 10019

Manufacturer Service Manuals:

General Motors:
Buick, Cadillac, Chevrolet, GEO, GMC, Oldsmobile, & Pontiac
Helm Incorporated
Post Office Box 07130
Detroit, MI 48207

Saturn
Adistra Corporation
c/o Saturn Publications
101 Union St.
Post Office Box 1000
Plymouth, MI 48170

Ford Motor Company:
Ford, Lincoln, & Mercury
Ford Publication Department
Helm Incorporated
Post Office Box 07150
Detroit, MI 48207

Chrysler Corporation:
Chrysler, Plymouth, & Dodge
Chrysler Motors Service Training
26001 Lawrence Avenue
Center Line, MI 48015

Suitable manuals have titles, such as:
- "Electronic Engine Controls"
- "Fuel Injection and Feedback Carburetors"
- "Fuel Injection and Electronic Engine Controls"
- "Emissions Control Manual"
    . . . or similar titles

Safety Precautions

General Safety Guidelines to Follow When Working on Vehicles

To prevent accidents that could result in serious injury and/or damage to vehicle or test equipment, carefully follow these safety rules and test procedures at all times when working on vehicles:

- Always wear approved eye protection.
- Always operate the vehicle in a well-ventilated area. Do not inhale exhaust gases — they are very poisonous!
- Always keep yourself, tools and test equipment away from all moving or hot engine parts.
- Always make sure the vehicle is in **Park** (Automatic transmission) or **neutral** (manual transmission) and that the **parking brake is firmly set.** Block the drive wheels.
- Never lay tools on vehicle battery. You may short the terminals together causing harm to yourself, the tools or the battery.
- Never use scan tool if its internal circuitry has been exposed to any liquids.
- Never smoke or have open flames near vehicle. Vapors from gasoline and/or charging battery are highly flammable and explosive.
- Never leave vehicle unattended while running tests.
- Always keep a fire extinguisher suitable for gasoline/electrical/chemical fires handy.
- Always use extreme caution when working around the ignition coil, distributor cap, ignition wires, and spark plugs. These components contain **high voltage** when the engine is running.
- When performing a road test, **never** operate the scan tool alone while driving the vehicle. **Always** have one person drive the vehicle while an assistant operates the tester.
- Always turn ignition key OFF when connecting or disconnecting electrical components, unless otherwise instructed.
- Always follow vehicle manufacturer's warnings, cautions and service procedures.

WARNING!:

Some vehicles are equipped with safety air bags. You must follow vehicle service manual cautions when working around the air bag components or wiring. If the cautions are not followed, the air bag may open up unexpectedly, resulting in personal injury. Note that the air bag can still open up several minutes after the ignition key is off (or even if the vehicle battery is disconnected) because of a special energy reserve module.

Section 1:   Vehicle Computer Systems

1.1 Introduction

This section describes the engine computer control system, types of sensors and how the computer controls engine fuel delivery, idle speed and timing. Additional information may be found in the technical support books at your local library or auto parts store. The more known about the computer system, the easier the problem can be diagnosed.

Computer controls were originally installed on vehicles to meet federal government regulations for lower emission levels and improved fuel economy. This began in the early 1980's when basic mechanical systems were no longer able to accurately control key engine parameters. A computer could be programmed to control the engine under various operating conditions, making the engine more reliable. While these early systems were very limited in scope of their diagnostics, providing only 10-14 trouble codes, they did help guide the vehicle repair process.

In 1994, manufacturers began equipping vehicles with a new class of computer technology which puts more processing power under dash than ever before. It is called On-Board Diagnostics version II, or OBD II. It is required on all vehicles sold in the US beginning January 1, 1996 (though most domestic manufacturers introduced it earlier than required), and offers increased system monitoring and diagnostic information. This new system stores a library of more than 650 general trouble codes and another approximately 400 manufacturer-specific codes, all of which can be accessed with the scan tool. These codes cover Body Systems (B-Codes), Chassis Systems (C-Codes), Communications Codes (U-Codes), and Powertrain Systems (P-Codes). Now, basic terms are standardized and all generic codes will share a common format and terminology that manufacturers and the Society of Automotive Engineers (SAE) designed.

The OBD II Professional Scan Tool performs OBD II functions on ALL makes of OBD II compliant vehicles from 1996 and up.

1.1.1   What The Computer Controls

The main control areas of the vehicle computer are fuel delivery, idle speed, spark advance, and emissions controls. Some on-board computers may also control the transmission, brakes, and suspension systems as well.

1.1.2   What Has Not Changed

A computer-controlled engine is very similar to the older, non-computerized engine. It is still an internal combustion engine with pistons, spark plugs, valves, and camshaft(s). The ignition, charging, starting, and exhaust systems are very similar as well. Test and repair of these systems are the same as before. The technical manuals for these components provide instruction on how to perform the tests. Additionally, compression gauges, vacuum pumps, engine analyzers, and timing lights will continue to be used.

1.1.3   Computer Control System

The vehicle on-board computer, or Powertrain Control Module (PCM), is the "heart" of the system. It is sealed in a metal box and connected to the rest of the engine by a wiring harness. The PCM is commonly located in the passenger compartment, behind the dashboard (kick panel position), although some manufacturers locate the PCM in the engine compartment. The PCM is programmed by the factory. The program is a complex list of lookup tables and instructions telling the computer how to control the engine based on various driving conditions. It does this using sensors to monitor what is happening and then provide feedback through a network of switches and actuators throughout the vehicle.

1.2 Data Link Connector and Location

The scan tool communicates with the vehicle PCM via a data link connector (DLC) – also referred to as a J1962 connector. The term J1962 is taken from physical and electrical specification number assigned by SAE (Society of Automotive Engineers). A standardized DLC means all compliant vehicles will use the same DLC with the generic link information available on the same pins regardless of vehicle make or model. In addition to the connector definitions, is a guideline on where the connector is to be located in the vehicle. This guideline states that the DLC should be located under the dashboard on the driver side of the vehicle. However, not all OBD II DLCs are located under the dash on the driver side. If required, refer to vehicle service documentation for the DLC location.
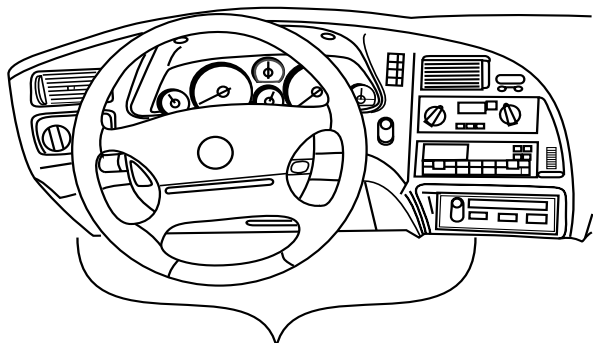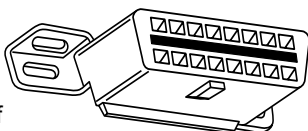
DLC Location

1.3 OBD II Scan Tool Hookup

The OBD II cable attached to the scan tool fits the OBD II DLC. Because the OBD II J1962 connector contains dedicated pins for power and ground, only a single cable connection is required for both scan tool power and PCM communication.

Connect the scan tool to the DLC. This connection will provide power for the scan tool. The DLC maintains power even when the ignition is turned off. Therefore, connection to the battery is not required.

When the scan tool powers up, a series of screens are displayed. The screens start with a "Welcome" screen and end with a "Key Button Help" screen.

```
    Welcome To
 The Global OBDII
    SCANTOOL
```

```
Press HELP For Key    ▓
Button Information

Press ENTER To Cont
```

The screens between the "Welcome" screen and the "Key Button Help" screen are for tool self-tests and software ID. Refer to this software ID when contacting the Actron technical support line with a problem. To review the key button definitions, push the (HELP) key; otherwise, press ENTER to continue.

The scan tool requires a minimum of 8 volts to power up. If a problem occurs with power-up, review **Section 4: Help and Troubleshooting Tips**.

1.3.1 Keyboard

The scan tool software was designed for ease of use in navigating through operational menus. Simply follow instructions that match keyboard symbols.

Keyboard Functions

The scan tool uses 8 keys to navigate through the software-user interface:

- **ENTER** – Used to select or answer a software request.
- **HELP** – Used to request help when the (▥) symbol is displayed in the lower right hand corner of the display.
- **BACK** – Used to move one screen back in scan tool flow.
- **ARROWS**
  - **UP/DOWN** – Used to move the solid cursor (▶) in the direction of the arrow or scroll the data list in scan direction you want to move the list.
  - **LEFT/RIGHT** – Used to select and deselect items in custom lists. This key is also used to answer questions by selecting yes or no.
- **ON/OFF** – Used to turn scan tool ON and OFF when not powered by vehicle. Momentarily press and release button when turning ON to allow boot process.

1.3.2 Display

The scan tool has a 4 line x 20 character backlit Liquid Crystal Display (LCD) for easy viewing. The backlighting is disabled when the scan tool is powered by its internal batteries. This gives the user a large viewing area to display most Help and Instructional messages. It puts more

```
OBDII Function List  ▥
 3)Erase Codes       ▦
 4)View Data         ▦
▶5)View Freeze Data
```

information on the display instead of having to refer to printed materials. Again the display will support a number of helpful characters that will prompt the user through test routines. These characters are shown below:
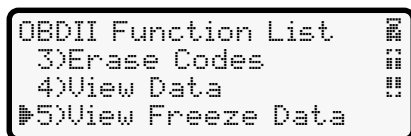
- ▥   Question Mark in lower right corner means there is **help** available for this screen or current selectable item.
- ▶   Pointer (cursor) is used to indicate current selectable choice.
- ▦   Down Arrow indicates there is additional information on the **next** screen.
- ▦   Up Arrow indicates there is additional information on **previous** screen.
- ✦   Diamond to the left of item indicates it is selected.

The screen at the right shows how some of these symbols will look on your display.

1.3.3 Lists, Menus, and Questions

The scan tool is designed to be as intuitive as possible. Its functions and controls are easy to understand and use. All menu and screen lists operate the same way. Use the UP/DOWN arrow keys to move the cursor to a selection. The ENTER key selects that function or item. The screen examples below show a few selections available on the OBDII Function List.

For example: to read vehicles DTCs, move cursor to **Read Codes** and press ENTER.

To make a different choice, use the DOWN arrow key to move the cursor down to **View Data** and press ENTER. This will select the **View Data** function.

Sometimes, a list will be longer than three or four items, and will not fit on a single screen. In this case, the DOWN arrow symbol (▦) is visible in the last column of the display, indicating that there are more choices on the next screen, as shown below on the left. Use the DOWN arrow key to move the cursor down the list.

At the bottom of the list, there is now only an UP arrow symbol (▨) visible in the last column indicating the last function in the list has been reached. To return to previous screens, press the UP arrow key. The UP/DOWN arrow keys work the same way when scrolling through text such as the Help screen.

The Scan Tool may ask a question which requires a response from user. These will always be YES or NO questions, and are answered with cursor and Arrow keys.

```
OBDII Function List   ▨
▶1)I/M Readiness
 2)Read Codes         ▒
 3)Pending Codes
```

```
OBDII Function List   ▨
 4)View Data          ▒
 5)View Freeze Data   ▒
▶6)Record Data
```

In these screens, brackets ◇ will automatically appear next to default response. To accept default choice, simply press ENTER. Use LEFT/RIGHT arrow key to move brackets to other response and press ENTER.

1.4 Tool Setup

Only functions of the Main Menu that pertain to getting started with scan tool are discussed in the following paragraphs. For all other menu selections available, refer to **Section 4: Help and Troubleshooting Tips**.

Tool Setup is used to change the scan tool default unit settings. To change the scan tool settings, select **Tool Setup** from the MAIN MENU and press the ENTER key.

```
 View Instructions
For Creating Custom
    Data List?
 Yes       <No>
```

NOTE: Settings chosen will remain until 9 volt battery is dead.

1.4.1 Changing Measurement Units

After selecting Tool Setup option, tool setup menu appears. To choose English or Metric measurement units, use UP/DOWN arrows to make selection and press ENTER. The display will look like the following screen:

```
Setup Tool For
▶1)English/Metric
 2)Display Contrast  ▒
 3)Tool Information
```

```
Measurement Units
▶English(Default)
 Metric
```

1.4.2 Changing Display Contrast

From the Tool Setup menu, select **Display Contrast** and press ENTER. Use the UP/DOWN arrow keys as indicated on the screen:

```
Setup Tool For
 1)English/Metric
▶2)Display Contrast
 3)Tool Information
```

```
▨Increase Contrast
▒Decrease Contrast

Press ENTER To Save
```

1.4.3 Displaying Tool Information

From Tool Setup menu, select **Tool Information** and press ENTER. Use UP/DOWN arrow keys to view information. Record information in case the need to contact customer service arises.

```
Setup Tool For
 1)English/Metric
 2)Display Contrast
▶3)Tool Information
```

```
Tool Information:
▶Serial No:    1360447▓
 SW ID:        86E3H▓
 HW Ver:             1
```

1.4.4 Program Mode

Used to update scan tool's software. Instructions will be provided with updates.

1.5 Personal Computer (PC) and Printer Interface

Scan tool is equipped with a standard 9 pin serial interface. Use connection to attach tool to a PC or compatible printer.

- **Personal Computer –**

  Use serial adapter to connect to a PC when updating to current available software. Software updates may be purchased from Actron by calling the toll free number provided.

  Refer to **Section 2.4.13 Print Data** for default serial port settings and to make changes to settings.

- **Printer Connection –**

  Connect a compatible printer cable to the scan tool and Printer using specifications below:

  - If the printer connector is a 25 pin connector or if the gender is not compatible, an adapter will be required.
  - Adapters are available at most local PC stores or electronics outlets.
  - A NULL modem adapter is required to be connected in series with scan tool and printer cable.

1.6 Replacing the Battery

To replace the 9V battery, do the following:

- Remove screw from back of scan tool case.
- Slide battery cover back to disengage hooks.
- Replace 9V battery and place in compartment.
- Slide battery cover up, making sure hooks engage scan tool case.
- Install screw.

1.7 AC Adapter

The AC power adapter powers the tool when you review codes and print off-vehicle and when you update the software vial a personal computer. The Scan tool is equipped to accept any 110 Vac–12 Vdc AC adapter with the following specifications.

- 300 mA minimum unregulated wall power adapter.
- Dimensions - 5.5 mm Outside Diameter, 2.5 mm Inside Diameter.

NEG ⟶ (◉) ⟵ POS

Section 2:   Diagnosing with the Scan Tool

2.1 Preliminary Checks

Before using scan tool, perform a complete visual inspection. Many driveability problems are found by visual inspection, saving time. Check the following items before proceeding with scan tool testing:

1. Has vehicle been serviced recently? Sometimes things get connected in the wrong place, or not at all.

2. Don't take shortcuts. Inspect hoses and wiring which may be difficult to see because of location beneath air cleaner housings, alternators and similar components.

3. Inspect air cleaner and ductwork for defects.

4. Check sensors and actuators for damage.

5. Inspect all vacuum hoses for:

   • Correct routing. Refer to vehicle service manual, or Vehicle Emission Control Information (VECI) decal located in engine compartment.

   • Pinches and kinks.

   • Splits, cuts or breaks.

6. Inspect wiring for:

   • Contact with sharp edges (this happens frequently).

   • Contact with hot surfaces, such as exhaust manifolds.

   • Pinched, burned or chafed insulation.

   • Proper routing and connections.

7. Check electrical connectors for:

   • Corrosion on pins.

   • Bent or damaged pins.

   • Contacts not properly seated in housing.

   • Bad wire crimps to terminals.
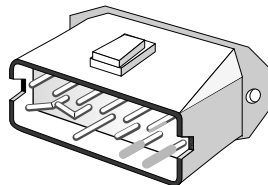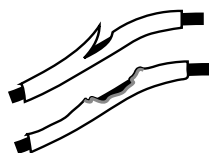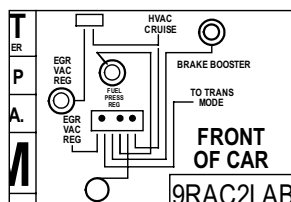
Connector problems are common in engine control system. Inspect for corrosion, bent, pushed out, or over expanded pins.

Note:	Some connectors use special grease on contacts to prevent corrosion. Do not wipe off! Obtain grease, from vehicle dealer. It is a special type for this purpose.

2.2 Connecting the Scan Tool

Remove protective cap from data link connector, if present. Connect scan tool and follow scan tool prompts. Use scan tool 9V battery to do self-tests, review codes, code lookup or print data when connection to vehicle is not required.

When scan tool powers up, a series of screens are displayed. The screen starts with "Welcome" and ends with a "Key Button Help".
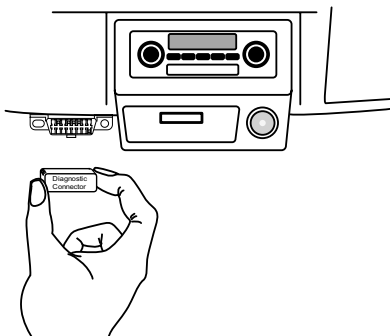
After pressing ENTER from HELP Screen, the Main Menu displays. Select **Vehicle Diagnosis** and press ENTER.

```
MAIN MENU
▶1)Vehicle Diagnosis
 2)Tool Setup
 3)Tool Self Test
```

The scan tool asks to erase data from previous test. Use LEFT/RIGHT arrow keys to select a response and press ENTER.

```
  Erase Data From
  Previous Vehicle
      Test?
  YES       <NO>
```

A message displays Turn Key Off For 10 Seconds, Then Turn Key On and Then Press ENTER.

```
   Turn Key Off
  For 10 Seconds
 Then Turn Key On
 Then Press ENTER
```

2.3 OBD II Functions List

Use UP/DOWN arrow keys to move cursor(▶). Once selection is made, press ENTER. Press and release BACK key to return to OBD II Function List. Pressing BACK key from the OBD II Function List returns scan tool to Main Menu. The first time scan tool communicates with vehicle, the communication type is automatically detected, and is used until scan tool is turned OFF or another vehicle is diagnosed.

```
OBDII Function List
▶1)I/M Readiness
 2)Read Codes
 3)Pending Codes
```

Not every vehicle will have every function listed. If function or part of a function selected is not supported by a vehicle, a message screen informing of this will be shown.

NOTE: If an Operating Error message is displayed, make sure the OBD II J1962 cable is securely attached, and ignition key is ON. Cycle ignition key to OFF for 10 seconds, then ON. This may be required to reset the PCM. If required, select "Yes" to test again. If problem still exists, refer to **Section 4: Help and Troubleshooting Tips**.

2.3.1 I/M Readiness

Purpose of the **I/M Readiness** test is to display current information on emissions-related systems. These systems are required by OBD II regulation to be monitored for emissions testing. OBD II I/M Readiness Monitors are strategies designed to test operations of emission related systems or components. The computer module uses these monitors to check for correct operations of system and components as well as out of range values. The computer module may perform a special test on a system or component to complete the monitor. It may be required to operate vehicle under certain conditions in order to perform an accurate test. If computer module loses power, or codes are erased, monitors may be cleared. The scan tool displays the state of vehicle OBD II Monitors.

To enter I/M Readiness viewing mode, select **I/M Readiness** from OBD II Function List and press ENTER.

A list of On-Board system readiness tests and their status will be displayed. Use vehicle service manuals for more information on emission-related monitors and their status.

```
OBDII Function List
▶1)I/M Readiness
 2)Read Codes
 3)Pending Codes
```

Below are examples of completed versus not completed I/M Readiness screens:

Use the UP/DOWN arrow keys to view monitor list. The monitor list consists of the OBD II monitor name followed by monitor state. A monitor that is not supported by test vehicle

will be followed by "n/a." A monitor that has been completed is followed by "ok." If not

```
On-Board Readiness
Tests Are Complete.

Use !! To View Test
```

```
Not All Supported
On-Board Readiness
Tests Are Complete.
Use !! To View Test
```

completed, "inc" will be displayed. Use the UP/ DOWN arrow keys to scroll through the list.

```
  SINCE  DTCS  CLEARED
Misfire Monitor     ok ▓
Fuel System Mon     inc
Catalyst Mon        n/a
```

NOTE: In addition to displaying the state of the monitor since the last time DTC's were cleared, some vehicles will display the state of the monitors for this drive cycle. Use the LEFT/RIGHT arrows to switch between these screens

```
  This  Driving  Cycle
Misfire  Monitor    n/a
Fuel  System  Mon   ok!!
Catalyst  Mon       inc
```

Press the ENTER key to return to the OBD II Function List.

2.3.2   Read Codes

The **Read Codes** function retrieves Diagnostic Trouble Codes (DTCs) from vehicle's computer modules. This function can be performed with the key on and the engine off or the key on and engine running.

These codes cause the computer to illuminate the Malfunction Indicator Lamp (MIL) when an emission-related or driveability fault occurs. The MIL is also known as the "service engine soon" or "check engine" lamp.

```
OBDII Function List   ▓
 1)I/M Readiness
▶2)Read Codes         !!
 3)Pending Codes
```

Select **Read Codes** and press ENTER. The scan tool retrieves the DTCs stored in the vehicle's computer module(s).

```
System Pass:
No DTCs Found.
Press BACK For
OBDII Function List
```

```
DTCs Found: 2
Use !! To View DTCs
 Write Down Codes
 For Reference.
```

The scan tool displays the DTCs or a message stating SYSTEM PASS: NO CODES FOUND. Press the DOWN arrow key to view the DTCs or press the BACK key to return to the OBDII Function List.

```
Code P0443
EVAP Emission
Control System        !!
Purge Valve C Fault
```

Write down the DTCs for reference, then press BACK to return to the OBDII Function List.

2.3.3   Pending Codes

Pending Codes are also referred as "continuous monitor" and "maturing codes". An intermittent fault causes computer to store a code in memory. If fault does not occur again within 40 warm-up cycles, the code clears from memory. If the fault occurs a specific number of times, the code matures into a DTC. This function can be performed with the key on and engine running or not.

```
OBDII Function List   ▓
 1)I/M Readiness
 2)Read Codes         !!
▶3)Pending Codes
```

Select **Pending Codes** and press ENTER key.

The scan tool displays codes or a message stating SYSTEM PASS NO FAULT DETECTED. Press DOWN arrow key to view DTCs or press BACK key to return to OBDII Function List.

```
System Pass:
No Faults Detected.
Press BACK Key For
Function List
```

```
Codes Found: 2
Use ↕ To View Codes
 Write Down Codes
 For Reference…
```

The codes display in same format as **Read Codes**. The DTC number and computer module that stored it display on first line. Use UP/Down arrow keys to view codes.

```
P0389 Mod#1E 1 of 2
Crankshaft Position
Sensor B           ↕
CKT Intermittent
```

Press BACK to return to OBDII Function List.

2.3.4 Erase Codes

The **Erase Codes** function deletes DTCs from vehicle's computer memory.   Perform this function only after systems have been checked completely and DTCs have been documented. This function should be performed with the key on and the engine off.

After servicing vehicle, delete stored DTCs and verify no codes have been reset. If DTCs return, the problem has not been corrected or other faults are present.

In addition to clearing DTCs, the **Erase Codes** function may also erase Freeze Frame, O2 Sensor Data, System Monitors, and On-Board Monitor test results.

Select **Erase Codes** and press the ENTER key. A message appears asking if you are sure. Press **LEFT ARROW** to move brackets to desired response and press ENTER.

Selecting NO displays a COMMAND CANCELLED message prompting to press ENTER to return back to OBDII Function List. Selecting YES displays a screen prompting to turn ignition key to on and engine off and press ENTER key.

```
OBDII Function List  ▤
▶4)Erase Codes       ∷
  5)View Data        ∷
  6)View Freeze Data
```

```
Erase Diagnostic
Results and Codes?
Are You Sure?
    YES      <NO>
```

The scan tool sends erase command. Press ENTER to continue and return to OBDII Function List.

```
   Command Sent

 Press ENTER To Cont.
```

2.3.5 View Data

The **View Data** function allows viewing of vehicle's Parameter Identification data (PID) in real time. As the computer monitors the vehicle, the information is simultaneously transmitted to scan tool. Apart from **Read Codes**, **View Data** is most useful diagnostic function for isolating cause of a vehicle operation problem. Viewing data is also used for observing sensor data and status of switches, solenoids, and relays.

```
OBDII Function List  ▤
  4)Erase Codes      ∷
▶5)View Data         ∷
  6)View Freeze Data
```

Select **View Data** from OBDII Function List and press ENTER. The scan tool displays a menu with display options.

Use the UP/DOWN arrow keys to select an option and press ENTER.

— Entire Data List

Select **Entire Data List** to display all PIDs supported by vehicle under test.

— Custom Data List

To display only certain PIDs, select **Custom Data List**. The ability to display certain PIDs helps in diagnosing a specific driveability symptom or system.

```
Select Data To View
  Entire Data List
▶Custom Data List
  View Data Setup
```

If choosing to view a **Custom Data List**, the scan tool asks if help is needed to view the instructions. Select desired response and press ENTER.

```
   View Instructions
 For Creating Custom
      Data List?
    YES       <NO>
```

- Use **UP/DOWN** arrow keys to move cursor up and down through list.
- Use **RIGHT** arrow key to select or deselect PIDs. Selected PIDs are marked with ✦ symbol.
- Use **LEFT** arrow key to deselect all marked PIDs.

```
Select Custom List
  ✦ABSLT TPS(%)        ▯
▶✦CALC LOAD(%)         ▯
   COOLANT(°F)
```

- Use the **ENTER** key to link to the vehicle and retrieve the marked PIDs.

When finished selecting PIDs, press ENTER key to begin viewing them.

NOTE:	Refer to **Appendix A** for a complete list of PIDs.

— View Data Setup

View Data Setup allows display of PIDs on one, two, three or four lines. Selecting fewer lines of data provides faster update speeds. The scan tool default is four-line display.

```
Select Display Line
  2 Lines             ▯
  3 Lines
▶4 Lines(Default)
```

When scan tool links to vehicle, PIDs will display. Navigate through PID list with following keys:

- Press **UP/DOWN** arrow keys to scroll Up/Down line-by-line through list.
- Press **LEFT/RIGHT** arrow keys to Page Up/Page Down.
- Press **BACK** key to return to Select Data To View menu.

```
ABSLT TPS(%)        0.0
CALC LOAD(%)        5.3
ENGINE(RPM)($10)  180▯
ENGINE(RPM)($1A)    865
```

The same parameter may appear twice if vehicle is equipped with more than one computer module — Powertrain Control Module (PCM), Transmission Control Module (TCM), etc. The scan tool identifies them by identification names (ID) assigned by manufacturer (i.e. $10, $1A, etc). The computer module ID blinks in parentheses. If one or more modules stops responding, the scan tool displays a message that the module is not responding and asks to continue without it. If NO is selected, scan tool attempts to reestablish communication with that module.

2.3.6 View Freeze Data

When an emission-related fault occurs, certain vehicle conditions are recorded by the on-board computer. This information is referred to as a Freeze Frame data. The information is a "snapshot" of operating conditions at time of a fault. This data can be overwritten by faults with a higher priority.

NOTE: If codes were erased, then freeze frame data may not be stored in vehicle memory.

Select **View Freeze Data** from the OBDII Function List and press ENTER.

```
OBDII Function List  ▤
  4)Erase Codes      ▦
  5)View Data        ▦
▶ 6)View Freeze Data
```

The scan tool links to the vehicle and displays Freeze Frame data. Use UP/DOWN arrow keys to scroll through data.

```
FREEZE FRAME DATA
TROUB CODE      P0443
CALC LOAD(%)    85.6▦
ENGINE(RPM)($10)  1120
```

NOTE: If more than one computer module responds with freeze frame data, then the frame number and module display on the first line. Press the LEFT/Right key to change modules.

```
FRAME 1    Mod $1A
TROUB CODE  P0443
CALC LOAD(%)    85.6▦
ENGINE(RPM)($10)  1120
```

When done, press BACK key to return to OBDII Function List.

2.3.7 O2 Monitor Test

NOTE: **The O2 Monitor Test is NOT AN ON-DEMAND TEST.** O2 sensors are NOT tested when selected via the menu. The O2 sensors are tested when engine operating conditions are within specified limits.

NOTE: If vehicle communicates using a Controller Area Network (CAN), O2 Monitor Tests are NOT supported by vehicle. A message is displayed. See Diagnostic Monitor Test to see O2 Monitor Data.

OBD II regulations require that applicable vehicles monitor and test the oxygen (O2) sensors to determine problems related to fuel and emissions. The **O2 Monitor Test** allows retrieval of completed O2 sensors monitor test results.

O2 sensors are located before (upstream) and after (downstream) catalyst(s). The sensors are named (xy) for their position relative to both cylinder banks and catalysts.

- The O2 sensor for cylinder bank 1 has the prefix **1y** while the O2 sensor for cylinder bank 2 has the prefix **2y**.
- The O2 sensor upstream of the catalyst (closest to the engine) has the suffix x**1** while the O2 sensor downstream of the catalyst has suffix x**2**. If vehicle contains more catalysts, the O2 sensor downstream of the second catalyst has the suffix x**3** and the O2 sensor downstream of the next catalyst has the suffix x**4**.
- For example, **O2S 21** is the upstream O2 sensor for cylinder bank 2.

The following O2 sensor tests are available:

- Rich to Lean sensor threshold voltage
- Lean to Rich sensor threshold voltage
- Low sensor voltage for switch time
- High sensor voltage for switch time
- Rich to Lean sensor switch time
- Lean to Rich sensor switch time
- Minimum sensor voltage test cycle
- Maximum sensor voltage test cycle
- Time between sensor transitions

Select **O2 Monitor Test** from OBDII Function List and press ENTER.

```
OBDII Function List  ▓
▶7)O2 Monitor Test   ▒
 8)Non-Contin Test   ▒
 9)On-Board Systems
```

```
O2 Sensor Tests
▶1) RICH-LN Thresh
 2)LN-RICH Thresh    ▒
 3)Lo V For Switch
```
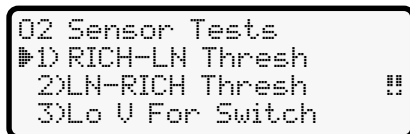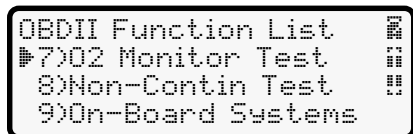
Select desired test from menu and press ENTER. Grouping O2 sensor tests together makes data easier to compare.

The O2 sensors located upstream (before cata-
lyst) may perform differently than the ones
located downstream (after the catalyst).

```
Low Volts for Switch
O2S 1-1(V)          1.15
O2S 1-2(V)          ---▒
O2S 2-1(V)          1.28
```
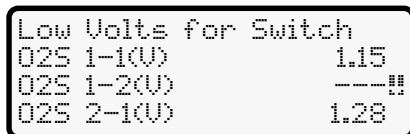
Oxygen sensor tests not supported by the vehicle display three dashes as the value.

Press the BACK key to return to the O2 Sensor Tests menu or press ENTER to return to the OBDII Function List.

2.3.8   Diagnostic Monitor Tests

The Diagnostic Monitor Test function is different for Non-CAN and CAN vehicles.

Non-CAN vehicles **Diagnostic Monitor Tests** receives test results for emission-related powertrain components and systems not continuously monitored.

CAN vehicles **Diagnostic Monitor Tests** receives test results for emission-related powertrain components and systems that are or are not continuously monitored.

The **Diagnostic Monitor Test** function is useful after servicing or after erasing the vehicle's memory. Test results do not necessarily indicate a faulty component or system.

Vehicle manufacturer is responsible for assigning test and component IDs

Select **Diagnostic Monitor Test** from the OBDII Function List and press ENTER. A list of tests applicable to the vehicle are displayed. Select a test and press ENTER.

```
OBDII Function List  ▓
 7)O2 Monitor Test   ▒
▶8)Diag Mon Test     ▒
 9)On-Board Systems
```

```
Non-Cont Tests Avail
▶$01
 $03                 ▒
 $05
```

NON-CAN VEHICLE

```
Diag Mon Data Avail
▶ O2 Sensor B1S1
  Catalyst B1        ▒
  EVAP (0.090)
```
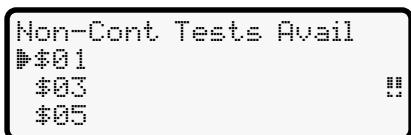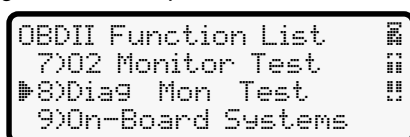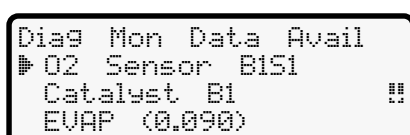
CAN VEHICLE

Applicable tests are displayed . Select a test and press ENTER.

Requested test results are displayed on Scan Tool

```
Diag Mon Data Avail
$01
$05                     ::
$10                      ▲
```

NON-CAN VEHICLES

```
Diag Mon Data Avail
  O2 Sensor B1S1
Catalyst B1            ::
EVAP (0.090)            ▲
```

CAN VEHICLES

On *Non-CAN vehicles* Scan Tool displays:
On the 1st line is where the test data (test ID) came from.
On the 2nd line is the test heading.
On the 3rd and 4th line is the test measurement (MEAS), specification value (SPEC) and status (STS). Measurements and Specification values are hexadecimal numbers (i.e., $1A, $FE, $11.)

On *CAN vehicles* Scan Tool displays:
On the 1st line is where the monitor test data came from. ($00) represents the source module id from where the data originated.
On the 2nd line is the test performed. The test performed can be $## if test is not defined. Refer to vehicle service manual for details.
On the 3rd line are the measured value and units in (Volts, Amps, Seconds, etc.) and status of monitor test data.
On the 4th line, the minimum and maximum limits are shown for the monitor test data.
If additional tests are present, use the up and down arrow to view test results.

Refer to appropriate vehicle service manual for test IDs and definitions.

Press BACK key to return to the *Diag Mon Test* menu or press ENTER key to return to OBDII Function List*.

2.3.9 On-Board Systems

This test allows scan tool to control operation of vehicle components, tests or systems. Some manufacturers do not allow tools to control vehicle systems. A vehicle not supporting an on-board system is identified by a message displayed when selected.

NOTE:	Refer to vehicle service manual for on-board systems instructions.

Select **On-Board Systems** from OBDII Function List and press ENTER. A list of on-board systems and components available for testing display on screen.

```
OBDII Function List  ▓
 7)O2 Monitor Test   ::
 8)Non-Contin Test   ::
▶9)On-Board Systems
```

Select a test and press ENTER to activate test.
The manufacturer is responsible for determining criteria to automatically stop test. Refer to appropriate vehicle service manual.

2.3.10 Record Data

Record Data function records PIDs while vehicle is parked or being driven. This function is mainly used for diagnosing intermittent driveability problems that cannot be isolated by any other method. The scan tool can maintain only one recording at a time. Be sure to thoroughly review old recording before erasing.

Select **Record Data** from OBDII Function List and press ENTER. Follow all instructions on display.

```
OBDII Function List  ▓
▶10)Record Data      ::
 11)Vehicle Info     ::
 12)Modules Present
```

If a recording currently exists in memory, a message prompting to erase data is displayed.

```
Cannot Record. Old
Recording Filled Up
Memory. Erase Old?
  <YES>      NO
```

Note: Make sure to review old recorded data before erasing

Scan tool retrieves a list of supported PIDs. After list is generated, scan tool prompts to select type of data to view. Refer to **View Data** described earlier in this section to setup Entire or Custom Data Lists.

On next screen, select a method to trigger a recording. **Manual Trigger** allows technician to use ENTER key. **Trigger On Codes** automatically triggers when a DTC is indicated by vehicle.

```
 Pick Trigger Method
▶1)Manual Trigger
  2)Trigger On Codes
```

Once trigger method is selected, scan tool will begin recording data when trigger event occurs — either a DTC occurs or ENTER key is pressed. The time is recorded and data from the last five frames is saved. Data will continue to be saved until either the record memory is full or the technician presses ENTER.

Press ENTER and the scan tool establishes a communication link with the vehicle.

If **Manual Trigger** is selected, scan tool initializes by recording first five frames. When done, press ENTER. If **Trigger On Codes** was selected, then scan tool triggers when a DTC is stored in vehicle. Press BACK key twice to return to OBDII Function List.

WARNING!

TWO PEOPLE SHOULD BE IN VEHICLE WHEN DRIVING ON ROAD, ONE TO DRIVE AND THE OTHER TO ATTEND TO THE EQUIPMENT.

Scan tool recording times vary. A recording consists of 5 frames of data prior to trigger and several frames after trigger. Amount of PIDs recorded determine number of frames.

After a recording, scan tool displays a prompt to playback recording. Answer YES to display recorded data or NO to return to OBDII Function List.

```
   Playback Data?


  <Yes>        No
```

2.3.11 Vehicle Info

Vehicle Info function enables scan tool to request vehicle's VIN number and calibration ID(s) which uniquely identifies software version in vehicle control module(s).

This function applies to Model Year 2000 and later OBD II compliant vehicles. The scan tool cannot verify if data returned is correct for scanned vehicle. This information is provided by vehicle manufacturer. The Vehicle Info test must be completed with the key in the ON position and the Engine OFF.

Calibration Verification Numbers (CVNs) are calculated values required by OBD II regulations with the vehicle engine off. CVNs are reported to determine if emission-related calibrations have been altered. Multiple CVNs may be reported for a control module. The calculation may take several minutes first time the CVNs are requested.

Select **Vehicle Info** from OBD II Function List and press ENTER.

If the message INVALID displays on screen, then data returned is incorrect, or not formatted in accordance with OBD II specification.

```
OBDII Function List   ▤
 10)Record Data       ▥
▶11)Vehicle Info      ▥
 12)Modules Present
```

Scan tool displays VIN, Calibration ID, and CVNs if supported by vehicle. In example screens, MOD $10 returned data. Use UP/DOWN arrow keys to scroll . CVNs are shown as a hexadecimal number.

```
VIN # 1 MOD $10
1F1FS11P0S2100001
                        ⠿
```

Press BACK or ENTER to return to OBDII Function List.

2.3.12 Modules Present

OBD II information may be provided by a single module or many separate modules. The scan tool identifies module IDs and communication type for OBD II modules in vehicle.

```
OBDII Function List  ▓
 10)Record Data       ⠿
 11)Vehicle Info      ⠿
▶12)Modules Present
```

Select **Modules Present** from OBDII Function List and press ENTER.

When selecting this function, scan tool checks for an established communication link. If

```
No Link Established
Controller List
Not Available
```

```
ID   Protocols
$10  ISO*
$18  ISO*            ⠿
$1A  ISO*
```

no link is made, a message displays stating so. If link was successful, module(s) and communication type(s) display on screen.

2.3.13 Review Data

Review Data function allows review of information stored in scan tool's memory. The scan tool does not require power from vehicle to perform this function. Internal battery power can be used.

```
OBDII Function List  ▓
▶13)Review Data       ⠿
 14)Print Data
 15)Code Lookup
```

```
Review Data
 5)O2 Monitor         ⠿
 6)Non-Continuous     ⠿
▶7)Playback
```

Select **Review Data** from OBDII Function List and press ENTER. Only one function, **Playback**, needs detailed instructions.

— Playback

Playback function is used to play back a recording. This function is very similar to **View Data**. The only difference is **View Data** is real time viewing of PIDs, while **Playback** is a viewing of previously recorded PIDs.

To play back recorded PIDs, select **Playback** and press ENTER key.

```
    No Recording Is
    Present. Please
    Make Recording
        First.
```

```
MIL STATUS        ON
CALC LOAD(%)      5.3
ENGINE(RPM)($10)  180⠿
FRAME:1   TM: 4.4
```

The scan tool informs if a recording does not exist. Otherwise, scan tool plays back **Entire Data List** or **Custom Data List**, depending on how data was recorded.

The screen is composed of three lines of data and one line for the frame number and timestamp (in seconds). Negative frames and timestamps indicate data recorded before the trigger event. Positive frames and timestamps indicate data recorded after the trigger event.

- Use UP/DOWN arrow keys to scroll through the recorded PID data of each frame. The end of the list is reached when only the (up) icon is visible.
- Use the LEFT/RIGHT arrow keys to scroll back and forth through the frames. The LEFT key advances to the next frame, "wrapping around" to earliest frame when the final frame is reached. The RIGHT arrow key goes back to the previous frame, again "wrapping around" to the final frame.
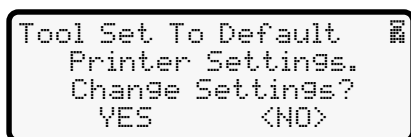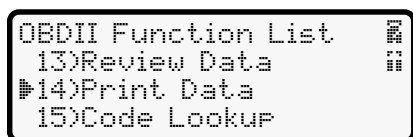
Different vehicles communicate at different speeds and support a different number of PIDs. Therefore, the maximum number of frames that can be recorded will vary.

Some vehicles wait a long period of time to store a trouble code after the driveability problem occurs. If you selected "Trigger On Codes" when you made your recording, you might not see any drastic change in data parameters before and after the trigger point. In cases like this, the user can manually trigger the recording when the symptom is observed.

When done, press BACK to return to Review Data or to the OBDII Function List.

2.3.14 Print Data

This function allows you to print the diagnostic information stored in the scan tool. The scan tool's internal battery power can be used to print data.

```
OBDII Function List  ▤
  13)Review Data      ▥
▶14)Print Data
  15)Code Lookup
```

```
Tool Set To Default  ▤
     Printer Settings.
     Change Settings?
     YES        <NO>
```

Select **Print Data** and press the ENTER key. The scan tool informs you of the printer settings (Custom or Default), then asks if you wish to change them. If settings are not changed, then skip the next section and continue with on the next page.

Changing the Printer Settings

NOTE: The default values are designated on the display with the word (Default) next to the option. Refer to the printer manual for the settings.

After selecting YES and pressing ENTER, the first item to change is the Baud Rate. Use the UP/DOWN arrow keys to select an option and press the ENTER key.

```
Select Baud Rate
▶9600(Default)
  1200             ▥
  2400
```

Press ENTER when the Select Data Bits screen displays. There is nothing to select.

```
Select Data Bits
▶8 (Default)
```

In the Select Stop Bits screen, select 1 BIT or 2 BITS and press ENTER.

```
Select Stop Bits
  1 Bit(Default)
▶2 Bits
```

Next, select the parity and press ENTER.

```
Select Parity
▶None (Default)
  Odd
  Even
```

Finally, select the printer speed, FAST or SLOW, and press ENTER.

```
Printer
▶Fast (Default)
  Slow
```

Now that the printer settings are changed, it is time to verify the settings. Press the ENTER key to print the ASCII character set.

```
The ASCII Character
Set Will Be Printed
Once
Press ENTER To Cont.
```

Follow the instructions displayed on the screens.

```
Make Sure Printer
Is Turned On, Online
& Connected To Tool.
Press ENTER To Cont.
```

If the printout is OK, press ENTER. Refer to the settings in the printer manual if the printout is not OK.

```
    Is Printout OK?


  <YES>       NO
```

Printing Data (except Playback)

Next, select the data to be printed and press ENTER. The scan tool displays the menu of those functions that store data and can be printed.

```
Select Print Data
  1)I/M Readiness
▶2)DTC (Codes)      ⠿
  3)Pending Codes
```

Make sure the printer is turned on, on-line and connected.

When the selected data does not exist in the scan tool's memory, a message informs you to run the function. If the selected data is stored in the scan tool, the data automatically transmits to the printer.

Press ENTER to return to the Select Print Data screen. Either select another item to print or press BACK to return to the OBDII Function List.

Printing Playback Data

When printing playback data, the Start Frame and End Frame need to be defined.

After selecting **Playback** and pressing ENTER, the Start Frame screen shows the earliest possible frame. Use the (⠿) or (⠿) to change the frame number and then press ENTER.

```
Select Print Data
  5)O2 Monitor       ⠿
  6)Non-Continuous   ⠿
▶7)Playback
```
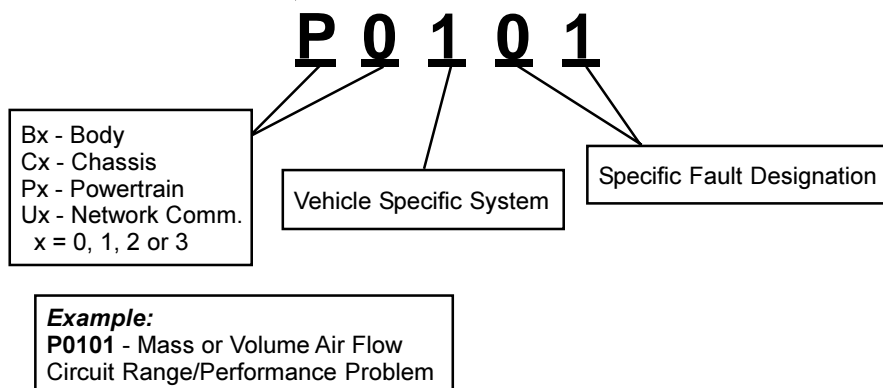
Next, the End Frame screen displays the latest possible frame. Use the Scroll Wheel to change the frame number and then press ENTER.

The scan tool starts transmitting to the printer, frame-by-frame. After all the frames have been sent, press ENTER to return to the Select Print Data screen. Press the BACK key to return to the OBDII Function List.

Section 3:   Diagnostic Trouble Codes (DTC)

3.1 DTC Format

Diagnostic Trouble Codes (DTCs) consist of a five-digit alphanumeric code. The DTC format and types are shown below. When the on-board computer recognizes and identifies a problem, a DTC for that fault is stored in memory. These codes are intended to help you determine the root cause of a problem.

P 0 1 0 1

Bx - Body
Cx - Chassis
Px - Powertrain
Ux - Network Comm.
 x = 0, 1, 2 or 3

Vehicle Specific System

Specific Fault Designation

Example:
P0101 - Mass or Volume Air Flow Circuit Range/Performance Problem

Powertrain Codes
P0xxx - *Generic (SAE)*
P1xxx - *Manufacturer Specific*
P2xxx - *Generic (SAE)*
P30xx-P33xx - *Manufacturer Specific*
P34xx-P39xx - *Generic (SAE)*

Chassis Codes
C0xxx - *Generic (SAE)*
C1xxx - *Manufacturer Specific*
C2xxx - *Manufacturer Specific*
C3xxx - *Generic (SAE)*

Body Codes
B0xxx - *Generic (SAE)*
B1xxx - *Manufacturer Specific*
B2xxx - *Manufacturer Specific*
B3xxx - *Generic (SAE)*

Network Communication Codes
U0xxx - *Generic (SAE)*
U1xxx - *Manufacturer Specific*
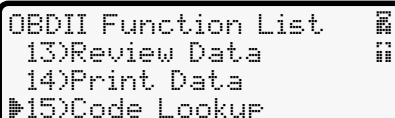**U2xxx** - *Manufacturer Specific*
U3xxx - *Generic (SAE)*

J2012 and ISO 15031-6 are standards for all DTCs, established by SAE, International Organization for Standardization (ISO) and other governing bodies. Codes and definitions assigned by this specification are known as Generic OBD II codes. OBD II requires compliance with standards, and has made it standard for all cars, light trucks, APVs, MPVs, and SUVs sold in U.S. Codes not reserved by SAE are reserved for manufacturer and referred to as Manufacturer Specific.

Periodically, new DTCs are defined and approved by SAE, ISO and other governing bodies. The scan tool software will be periodically updated to reflect these changes. For more information regarding DTC updates, please call our Technical Support line at **1-800-228-7667** (8:00 – 6:00 EST Monday – Friday).

3.2 Code Lookup

Code Lookup is used to look up definitions of Diagnostic Trouble Codes (DTCs) stored in the scan tool. The scan tool does not require power from the vehicle to perform this function. Internal battery power can be used.

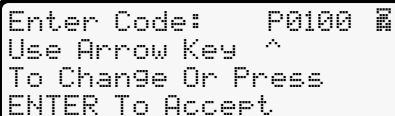To look up DTC definitions, select **Code Lookup** from the OBDII Function List and press ENTER.

```
OBDII Function List
 13)Review Data
 14)Print Data
▶15)Code Lookup
```
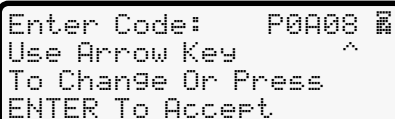
NOTE: When entering codes, only one character can be changed at a time.

To enter a code:

- Use the LEFT/RIGHT arrow keys to move the ⌃ symbol under the character that needs to be changed. The cursor moves to the right and wraps around to the beginning when the end is reached.
- Use the UP/DOWN arrow keys to change the selected character.
- Press the ENTER key to display the definition.

```
Enter Code:   P0100
Use Arrow Key  ^
To Change Or Press
ENTER To Accept
```
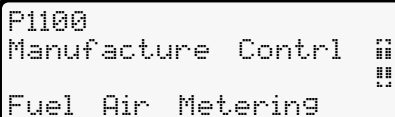
```
Enter Code:   P0A08
Use Arrow Key     ^
To Change Or Press
ENTER To Accept
```

After entering the code and pressing ENTER, the code and definition display.

```
P0A08
DC/DC Converter
Status Circuit
```

If the DTC is manufacturer specific or does not exist for the vehicle, some information can be determined based on the range of the DTC (see page 24)

```
P1100
Manufacture  Contrl

Fuel  Air  Metering
```

In the definition screen, pressing the (▯) or (▯) arrow key increments/decrements the code and its definition. Undefined codes are skipped.

Press the BACK key to return to the Enter Code screen. Press the BACK key again to return to the OBDII Function List.

NOTE: Refer to an appropriate vehicle service manual for manufacturer specific codes.

3.3 Diagnostic Trouble Code Ranges

Within each general category, the Diagnostic Trouble Codes are assigned to specific ranges that cover certain vehicle systems. When displaying manufacturer-specific (or non-global), the assigned Diagnostic Trouble Codes displays the definition.

Lower	Upper	Assigned DTC System
P0000	P00FF	Fuel and air metering and auxiliary emission controls
P0100	P02FF	Fuel and air metering
P0300	P03FF	Ignition system or misfire
P0400	P04FF	Auxiliary emission controls
P0500	P05FF	Vehicle speed, idle control, and auxiliary inputs
P0600	P06FF	Computer and auxiliary outputs
P0700	P09FF	Transmission
P0A00	P0AFF	Hybrid Propulsion
P1000	P10FF	Manufacturer controlled fuel, air metering and auxiliary emission controls
P1100	P12FF	Manufacturer controlled fuel and air metering
P1300	P13FF	Manufacturer controlled ignition system or misfire
P1400	P14FF	Manufacturer controlled auxiliary emission controls
P1500	P15FF	Manufacturer controlled vehicle speed, idle control, and auxiliary inputs
P1600	P16FF	Manufacturer controlled computer and auxiliary outputs
P1700	P19FF	Manufacturer controlled transmission
P2000	P22FF	Fuel and air metering and auxiliary emission controls
P2300	P23FF	Ignition system or misfire
P2400	P24FF	Auxiliary Emissions Controls
P2500	P25FF	Auxiliary Inputs
P2600	P26FF	Computer and Auxiliary Outputs
P2700	P27FF	Transmission
P2900	P32FF	Fuel and air metering and auxiliary emission controls
P3300	P33FF	Ignition system or misfire
P3400	P34FF	Cylinder deactivation
U0000	U00FF	Network electrical
U0100	U02FF	Network communication
U0300	U03FF	Network software
U0400	U04FF	Network data

Section 4:   Help and Troubleshooting Tips

4.1 How to Use Help

The tester contains Help for specific screens, functions, and error messages. Help is available when Help symbol (▓) appears in upper right-hand corner of display.

```
Operating Error.    ▓
Check Connections!
    Try Again?
<Yes>        No
```

To enter Help, press HELP key. Help screens are in CAPITAL LETTERS to remind viewing Help screens, not screens associated with a function. If Help message is longer than one screen, then use UP and DOWN arrow keys to page through message. The symbols (!! and ⅱ) indicate the direction available.

```
SCANTOOL CAN NOT
COMMUNICATE WITH
VEHICLE. CHECK THE    !!
FOLLOWING:
```

```
1.IGNITION KEY ON?
2.HOOKUP TO VEHICLE    ⅱ
TEST CONNECTOR OK?    !!
3.EMISSIONS LABEL
```

To exit Help and return to the screen you where Help was entered, press the BACK key.

4.2 Scan Tool Problems

If scan tool fails to power up, link to vehicle, pass Tool Self-Tests, or function properly, then try following Troubleshooting Tips. If these tips fail to resolve problem, contact Actron Technical Support at **1-800-228-7667** (8:00 - 6:00 EST Monday - Friday). Be prepared to provide scan tool's Software ID.

### 4.2.1   Scan Tool does not power up:

- Check OBD II connector for power and ground. If no power, check fuse if applicable.
- Verify vehicle's battery is at least 8 volts.
- Unplug and plug back in the Data Link Connector (DLC) to verify connector is properly seated to vehicle connector.
- If scan tool is being powered from an AC/DC 110V to 12V adapter, make sure AC outlet has power.

4.2.2   Scan Tool does not "Link" with vehicle:

- Make sure cable is correctly connected to DLC. Unplug the DLC adapter from vehicle and plug back to verify connection.
- Verify ignition key is ON — not in ACCESSORIES position.
- Cycle ignition key OFF for 10 seconds, then ON to reset PCM.
- Inspect DLC adapter and computer module connectors for cracked, bent, corroded or recessed pins, and for any substance that could prevent a good electrical connection.
- In vehicle, verify continuity exists between DLC and computer module. In extreme cases, broken wire(s) may exist.
- Check vehicle computer module for a blown fuse. Refer to vehicle service manual for fuse location.
- Make sure computer module is grounded to vehicle. If the computer module is grounded to vehicle, then thoroughly clean connection and apply a conductive grease to mating surfaces.
- The vehicle computer module may be defective. Refer to applicable vehicle service manual for test procedures and diagnostic flowcharts.

4.2.3 One or more modules drops the communication link:

When the OBD II System Tester initially links to the vehicle, it builds a list of all OBD II compliant computer modules. If in the course of scanning the vehicle, a module drops the link, a message will display.

```
Module ($41) Has        ▓
Stopped Responding.
Continue Without It?
    (YES)       NO
```
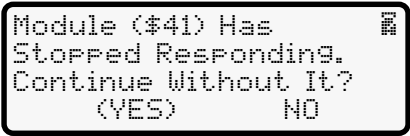
Answering YES will continue operation without the lost module. Answering NO will try to restore the communication links to get all modules back to an active status.

4.2.4 Keyboard does not function properly:

- Perform Keyboard Test by entering Self-Test and select Keyboard Test function.
- If the keyboard test shows nothing and you still experience the problem, then contact Actron Technical Support.
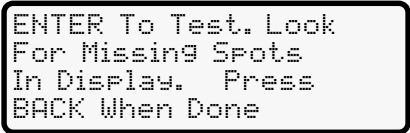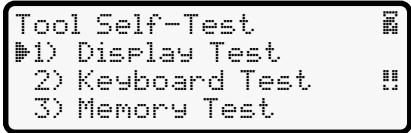
4.3 Tool Self-Tests

Tool Self-Tests are used to test the operation of the display, keyboard, internal memory, and printer connection (if applicable).
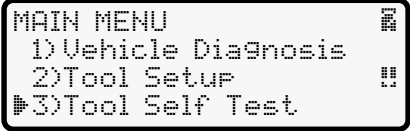
The **Tool Self-Test** menu is accessed from the MAIN MENU. Use the UP/DOWN arrow keys to select the test and then press the ENTER key.

```
MAIN MENU               ▓
 1)Vehicle Diagnosis
 2)Tool Setup           ▓
▶3)Tool Self Test
```

4.3.1 Display Test

Select **Display Test** and press the ENTER key. Press ENTER to begin test.

```
Tool Self-Test          ▓
▶1) Display Test
 2) Keyboard Test       ▓
 3) Memory Test
```

```
ENTER To Test. Look
For Missing Spots
In Display.   Press
BACK When Done
```

Display Test will fill every pixel of display. Look for pixels that are not black. Press BACK key to exit to Tool Self-Test menu. Press BACK key again to display the MAIN MENU.
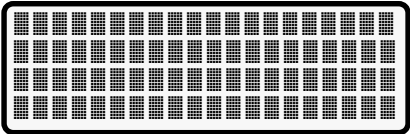
4.3.2 Keyboard Test

Keyboard Test checks operation of keys. Select **Keyboard Test** from Self-Test menu and press ENTER key. Test screen with instructions is displayed:

```
Tool Self-Test          ▓
 1) Display Test
▶2) Keyboard Test       ▓
 3) Memory Test
```

```
Push Button To Test
Key And Display Name
   Key:
BAC When Done
```
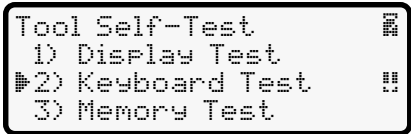
Each time a key is pressed , key's name should appear on display. For example, if UP arrow is pressed, screen will display "Key: UP ARROW." If name is not displayed, key is not working.

```
Push Button To Test
Key And Display Name
   Key: UP ARROW
BAC When Done
```

NOTE: When BACK key is pressed, OBD II System Tester returns to Self-Test Menu, If not then BACK key is not working.

4.3.3 Memory Test

Perform the **Memory Test** if the scan tool has trouble displaying code definitions or performing functions that use internal memory. Select **Memory Test** from the Tool Self-Test menu and press the ENTER key.

```
Tool Self-Test
 1) Display Test
 2) Keyboard Test
▶3) Memory Test
```

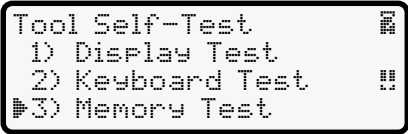The test begins immediately and displays a message "Memory Test" followed by periods as internal memory is tested.

```
Memory Test . . . .
. . . . . . .
```

When done, a message displays indicating whether the test passed or failed. Press ENTER to return to the Tool Self-Test menu.

```
Memory Test Passed!

Press ENTER To Cont
```

```
Memory Test Failed
SW ID = F1E8

Press ENTER To Cont
```

4.3.4 Printer Test

If you cannot print from the scan tool, select **Printer Test** and press the ENTER key. Refer to section **"Changing the Printer Settings"** on page 20.

```
Tool Self-Test
 2) Keyboard Test
 3) Memory Test
▶  4) Printer Test
```
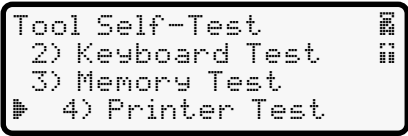
4.4 Technical Support

1-800-228-7667 (8:00 - 6:00 EST Monday - Friday). Be prepared to provide the scan tool's Software ID.

Appendix A: Global OBD II PID List & Definitions

All parameter identification data (PID) listed was verified on actual vehicles to guarantee accuracy. Definitions used to describe all PIDs were obtained from reliable sources and are accurate at time of printing. It is possible that some newer vehicles may contain different data different from that listed. In these cases, refer to an applicable vehicle service manual.

Data Parameter List Format

The PID list is organized in alphabetical order — the same way the scan tool does. For each PID, the type of reading are provided. Remember to always refer to a vehicle service manual for detailed diagnostic procedures for troubleshooting incorrect PID readings.

Types of Data Parameters

INPUT: These data parameters are obtained from sensor outputs. Sensor outputs are <u>inputs</u> to vehicle's computer module(s). For example, if an Oxygen Sensor was generating a 400mV signal, then the scan tool displays O2S (v) 0.40.

OUTPUT: These data parameters are <u>outputs</u> or commands that come directly from computer module(s). For example; the ignition spark advance is controlled by PCM, on most vehicles, monitoring this PID shows spark output from PCM. The scan tool would display IGN ADV(°) 10.

CALCULATED: These data parameters are <u>calculated</u> after analyzing various inputs to the vehicle's computer module(s). For example, the engine load. The PCM calculates this from sensor inputs and displays it in a percentage.

PCM VALUE: Is information that is stored in the computer module(s) memory and determined to be useful to service technician. An example of this is TROUBLE CODE value, the DTC that caused a freeze frame capture.

NOTE: Several different causes can have the same parameter indication. For information on diagnostics consult vehicle service manuals.

DATA PARAMETER LIST

ABS FRP (0 - 655350kPA) or (0 - 95050.5PSI)
Absolute Fuel Rail Pressure is the fuel pressure at the engine when reading in reference to atmospheric pressure.

ABS LOAD (0 - 100%)
Absolute Load Value is the normal value of air mass per intake stroke displayed as a percent.

ABSLT TPS (0 - 100%)
Absolute Throttle Position represents normal distance throttle is opened.

ACC POS D,E or F (0 - 100%)
Accelerator Pedal Position represents normal distance gas pedal is pressed.

BARO PRESS (0 - 255kPA) or (0 - 36.9PSI)
Barometric Pressure is normally received from a dedicated barometer, manifold absolute pressure sensor and other inputs during certain modes of driving.

NOTE: The Baro Press may not be the same as some weather services   Barometric Pressure due to being read at sea level.

CALC LOAD (0 - 100%)
Calculated LOAD Value indicates load on engine.

CAT TEMPxy (-40°C - 6513.5°C) or (-40 - 9999.9F)
Catalyst Temperature Bank shall display catalyst substrate temperature for bank catalyst, if used by control module strategy for on board diagnostics monitoring, bank, sensor catalyst or temperature sensor.

CLR DST (0km-65,535km) or (0- 40,722miles)
Distance Since Cleared Diagnostic Codes is distance since diagnostic trouble codes were erased.

CLR TIM (0 - 65535 min or 1092.25 hours)
Time Since Cleared Diagnostic Code is time since diagnostic trouble codes were erased.

CMD EQ RATxy (0 - 1.99)
Commanded Equivalence Ratio is the ratio of the air/fuel mixture.

NOTE:	The CMD EQ RAT will read 1.0 while in a closed loop of fuel

COOLANT (-40 - 215°C)or(°F)
Engine Coolant Temperature displays engine coolant temperature from engine coolant temperature or cylinder head temperature sensor.

NOTE:	The coolant on many diesels may use Engine Oil Temperature instead.

EGR CMD (0 - 100%)
Commanded Exhaust Gas Recirculation is the percentage of exhaust gas being recirculated.

EGR ERR (-100 - 99.22%)
Exhaust Gas Recirculation Error will show the error from changing from one condition to another.

ENG RUN (0 - 65,535sec.)
Time since Engine Start is the time the engine is running.

NOTE:	ENG RUN stops when engine stalls or engine is turned off for any reason.

ENGINE (0 - 16383.75 RPM)
Engine Revolutions Per Minute (RPM) is the speed engine is running.

EQ RATxy
O2 Sensor Equivalence Ratio for Bank x Sensor y.

EVAP REQ (0-100%)
Commanded Evaporative Purge is the position evaporative purge control valve is open in percentage.

EVAP VP (-8192PA - 8191PA) OR (-32.8878 - 32.8838 H2O)
Evaporative Emissions System Vapor Pressure is pressure in the fuel tank

FUEL LVL (0 - 100%)
Fuel Level Input is the percentage of fuel with 0% equaling tank is full and 100% when tank is empty.

FUEL PRES (0 - 765kPa) or (0 - 110psi)
Fuel Rail Pressure is the fuel pressure at the engine in respect to atmospheric pressure.

FUEL SYS (OPEN or CLSD)
Fuel System Status show loop status of fuel system banks.

OPEN: Computer module is operating in Open Loop control strategy. The vehicle has not yet satisfied conditions for the computer module to go to closed loop.

CLSD: Computer module currently functioning in Closed loop control strategy, using O2 sensor(s) as feedback for fuel control.

OPEN1: Open Loop control strategy is being used by the PCM due to driving conditions – power enrichment and deceleration enrichment.

OPEN2: Computer module is operating in Open Loop control strategy due to detected system fault. Certain actuator or sensor faults are usually the cause.

CLSD1: Closed Loop control is current storage being used by PCM, but a fault with at least one O2 sensor has been detected. The control system may be using single O2 for fuel control calculations.

IAT TEMP (-40 - 215°C) or (-40 - 419°F)
Intake Air Temperature is a measure of intake air temperature to determine correct air/fuel ratios and spark timing operations.

IGN ADV (-64 - 63.5°)
Ignition Timing Advance for cylinder is a signal of how much spark advance to add to base engine timing (expressed in crankshaft degrees).

LT FL FTRM (-100 - 99.22%)
Long Term Fuel Trim Bank is the fuel mixture adjustment in a range with midpoint being 0.

NOTE: Positive reading indicates module commanded a long-term rich mixture correction in response to a lean operating condition. A negative reading indicates module has commanded a long-term lean mixture in response to a rich operating condition.

MAF (0 - 655.35 g/s) or (0 - 86.5lb/min)
Mass Air Flow is the air flow rate the sensor sends to the computer module indicating mass of air entering engine.

MAP (0 - 255kPa) or (Hg)
Intake Manifold Absolute Pressure displays manifold pressure.

MIL DIST (0 - 65535km) or (0 - 40,722miles)
Distance Traveled while Malfunction Indicator Lamp is Active is a counter that displays distance traveled since "Check Engine or Service Engine Soon" light came on.

MIL STAT (ON or OFF)
Monitor Status Data Trouble Code state that module is commanding the Malfunction Indicator Lamp (MIL) to be ON if problem exists.

MIL TIME (0 - 65535min) or (0 - 1092.25Hrs)
The distance traveled since the MIL (Check Engine or Service Engine Soon light) came on.

O2Sxy (0 - 1.275V)
Oxygen Sensor Output Voltage is the voltage generated from the oxygen sensor to increase and decrease the amount of exhaust gas.

O2Sxy (-128 - 127.996mA)
Oxygen Sensor Output Current is used for linear or wide ratio oxygen sensors to increase and decrease the amount of exhaust gas

OBD2 STAT (CA, OBDI, US, NONE, EU and/or JA)
On Board Diagnostic shows what vehicle was made for.

> Data Parameters:
>
> **CA** - Indicates test vehicle meets California on board diagnostic ARB requirements
>
> **OBD I** - Indicates test vehicle does not meet OBDII requirements.
>
> **US** - Indicates test vehicle meets Federal EPA requirements.
>
> **NONE** - Indicates test vehicle is not on board diagnostic compliant.
>
> **EU** - Indicates test vehicle meets European on board diagnostic requirement.
>
> **JA** - Indicates test vehicle meets Japanese on board diagnostic requirement. Outside *Air Temperature* gives temperature outside.

NOTE: The Data Parameters can be used with each other for example CA/US

OUTSID AIR (-40 - 215°C) or (-40 - 419°F)
Outside Air Temperature gives temperature outside.

PTO STATUS (OFF or ON)
Power Take Off Status allows module to keep track of Power at Take-Off.

REL FRP (0 - 5177.27kPa) or (750.9PSI)
Relative Fuel Rail Pressure (Vacuum) is the fuel rail pressure at engine.

REL TPS (0 - 100%)

Relative Throttle Position is relative throttle position at normal position.

SECOND AIR (AIR_STAT: UPS, DNS or OFF)

Commanded Secondary Air Status is on newer vehicles and actuators to control pollution control.

UPS - UP STREAM module is demanding that secondary air be added at exhaust manifolds

DNS - DOWN STREAM module is demanding secondary air be added at catalytic converter

OFF - Module is demanding no secondary air to be added.

ST FTRMxy (-100 - 99.22%)

Short-term Fuel Trim Bank calculated value represents the short-term relation of fuel metering on a fuel-injected engine.

NOTE:	Short-term Fuel Trim calculated value that has a positive percentage is a rich fuel trim and if a negative percentage is present the fuel trim is lean.

ST FLTRMx (-100 - 99.2%)

Short-term Fuel Trim value represents the short-term relation of fuel metering on a fuel-injected engine.

NOTE:	Short-term Fuel Trim value with a positive percentage is a rich fuel trim and if a negative percentage is present the fuel trim is lean.

THR POS (0 - 100%)

Absolute Throttle Position is the position the throttle is located. The more the throttle is closed the less percent shown.

THROT CMD (0 - 100%)

Commanded Throttle Actuator Control is the position of the throttle. If throttle is closed the percent will be 0 and if wide open 100%.

TRIPS SNC CLR (0 - 255)

Number of warm-ups since diagnostic trouble codes cleared. Warm-up is when temperature of coolant rises to at least 22°C (40°F) from engine starting and reaching a minimum temperature of 70°C (160°F). If a diesel engine the engine minimum temperature is 60°C (140°F.)

NOTE:	If there is more than 255 that the engine warms up the TRIPS SNC CLR will remain at 255.

TROUB CODE (00 00 - FF FF)

Trouble Code Parameter will give the diagnostic trouble code that caused a freeze frame capture. This information is helpful in diagnosing the cause of a driveability. If no freeze frame data has been captured this PID will be zero.

VEH SPEED (0 - 255K/h) or (0 - 158mph)

Vehicle Speed shows the speed the vehicle is going.

VPWR (0 - 65.535V)

Control Module Voltage is the power input to the control module.

NOTE:	42-volt vehicles may utilize multiple voltages for different systems on the vehicle. VPWR may be significantly different than battery voltage.

Appendix B: Glossary & Definitions

A/C:
Air Conditioning.

A/F:
Air/Fuel ratio. The proportion of air and fuel delivered to the cylinder for combustion. For example, an A/F ratio of 14:1 denotes 14 times as much air as fuel in the mixture. A typical ideal A/F ratio is 14.7:1.

AC Clutch Relay:
The PCM uses this relay to energize the A/C clutch, turning the A/C system on or off.

AC Pressure Sensor:
Measures air conditioning refrigerant pressure and sends a voltage signal to the PCM.

AC Pressure Switch:
A mechanical switch connected to the A/C refrigerant line. The switch is activated (sending a signal to the PCM) when the A/C refrigerant pressure becomes too low.

Actuator:
Actuators such as relays, solenoids, and motors allow the PCM to control the operation of vehicle systems.

Air Injection Reaction (AIR) System:
An emission control system operated by the PCM. During cold starts, an air pump injects outside air into the exhaust manifold to help burn hot exhaust gases. This reduces pollution and speeds warm-up of oxygen sensors and catalytic converters. After the engine is warm, the air will either be "dumped" back to the atmosphere (or into the air cleaner assembly) or sent to the catalytic converter.

Bank 1:
The standard way of referring to the bank of cylinders containing cylinder #1. In-line engines have only one bank of cylinders. Most commonly used to identify the location of oxygen sensors. See **O2S**, **Sensor 1**, **Sensor 2**.

Bank 2:
The standard way of referring to the bank of cylinders opposite cylinder #1. Found on V-6, V-8, V-10, etc. and horizontally opposed engines. Most commonly used to identify the location of oxygen sensors. See **O2S**, **Sensor 1**, **Sensor 2**.

BARO:
Barometric Pressure Sensor. See **MAP Sensor**.

Boost Control Solenoid:
A solenoid that is energized by the PCM, in order to control supercharger boost pressure.

Brake Switch Signal:
An input signal to the PCM indicating that the brake pedal is being pressed. This signal is typically used to disengage Cruise Control systems and Torque Converter Clutch (TCC) solenoids. See also **TCC**.

CAM:
Camshaft Position Sensor. Sends a frequency signal to the PCM in order to synchronize fuel injector and spark plug firing.

CARB:
California Air Resources Board. Governing body for emissions control in California.

Ckt:
Circuit

CKP REF:
Crankshaft Position Reference.

Closed Loop (CL):
A feedback system that uses the O2 Sensor(s) to monitor the results of combustion. Based on the signal(s) from the O2 sensor(s), the PCM modifies the air/fuel mixture to maintain optimum performance with lowest emissions. In closed loop mode, the PCM can "fine tune" control of a system to achieve an exact result.

CO:
Carbon Monoxide

Continuous Memory Codes:
See **Pending Codes**.

CPS:
Crankshaft Position Sensor. Sends a frequency signal to the PCM. It is used to reference fuel injector operation and synchronize spark plug firing on distributorless ignition systems (DIS).

CTS:
Coolant Temperature Sensor. A resistance sensor that sends a voltage signal to the PCM indicating the temperature of the coolant. This signal tells the PCM whether the engine is "cold" or "warm".

Data Link Connector (DLC):
Connector providing access and/or control of the vehicle information, operating conditions, and diagnostic information. Vehicles with OBD II use a 16-pin connector located in the passenger compartment.

Data Stream:
The actual data communications sent from the vehicle's PCM to the data connector.

DEPS:
Digital Engine Position Sensor.

Detonation:
See **Knock**.

DTC:
Diagnostic Trouble Code. An alphanumeric identifier for a fault condition identified by the On Board Diagnostic System.

DI/DIS:
Direct Ignition/Distributorless Ignition System. A system that produces the ignition spark without the use of a distributor.

Duty Cycle:
A term applied to signals that switch between "on" and "off". Duty cycle is the percentage of time the signal is "on". For example, if the signal is "on" only one fourth of the time, then the duty cycle is 25%. The PCM uses duty cycle type signals to maintain precise control of an actuator.

ECT:
Engine Coolant Temperature sensor. See **CTS**.

EFI:
Electronic Fuel Injection. Any system where a computer controls fuel delivery to the engine by using fuel injectors.

EGR:
Exhaust Gas Recirculation. The PCM uses the EGR system to recirculate exhaust gases back into the intake manifold to reduce emissions. EGR Recirculation is used only during warm engine cruise conditions. EGR flow at other times can cause stalling or no starts.

EPA:
Environmental Protection Agency.

ESC:
Electronic Spark Control. An ignition system function that warns the PCM when "knock" is detected. The PCM will then retard spark timing to eliminate the knocking condition.

EST:
Electronic Spark Timing. An ignition system that allows the PCM to control spark advance timing. The PCM determines optimum spark timing from sensor information — engine speed, throttle position, coolant temperature, engine load, vehicle speed, Park/Neutral switch position, and knock sensor condition.

EVAP:
Evaporative Emissions System.

Freeze Frame:
A block of memory containing the vehicle operating conditions for a specific time.

Ground (GND):
An electrical conductor used as a common return for an electric circuit(s) and with a relative zero potential (voltage).

Hall Effect Sensor:
Any of a type of sensor utilizing a permanent magnet and a transistorized Hall Effect switch. Hall Effect type sensors may be used to measure speed and position of the crankshaft or camshaft — for spark timing and fuel injector control.

HO2S:
Heated Oxygen Sensor. See **O2S**.

IAC:
Idle Air Control. A device mounted on the throttle body which adjusts the amount of air bypassing a closed throttle so that the PCM can control idle speed.

ICM:
Ignition Control Module.

I/M:
Inspection and Maintenance. An emission control program.

ISC:
Idle Speed Control. A small electric motor mounted on the throttle body and controlled by the PCM. The PCM can control idle speed by commanding the ISC to adjust its position.

ISO:
International Organization of Standardization.

Knock:
Uncontrolled ignition of the air/fuel mixture in the cylinder. Also referred to as detonation or ping. Knock indicates extreme cylinder pressures or "hotspots" which are causing the air/fuel mixture to detonate prematurely.

Knock Sensor (KS):
Used to detect engine detonation or "knock." The sensor contains a piezoelectric element and is threaded into the engine block. Special construction makes the element sensitive only to engine vibrations associated with detonation.

KOEO:
Key On — Engine Off.

KOER:
Key On — Engine Running.

LCD:
Liquid Crystal Display.

LT:
Long Term fuel trim.

M/T:
Manual transmission or manual transaxle.

MAF:
Mass Air Flow Sensor. Measures the amount and density of air entering the engine and sends a frequency or voltage signal to the PCM. The PCM uses this signal in its fuel delivery calculations.

MAP:
Manifold Absolute Pressure Sensor. Measures intake manifold vacuum or pressure and sends a frequency or voltage signal (depending on sensor type) to the PCM. This gives the PCM information on engine load for control of fuel delivery, spark advance, and EGR flow.

MAT:
Manifold Air Temperature sensor. A resistance sensor in the intake manifold that sends a voltage signal to the PCM indicating the temperature of the incoming air. The PCM uses this signal for fuel delivery calculations.

MIL:
Malfunction Indicator Lamp. The MIL is most commonly known as the "Check Engine" or "Service Engine Soon" light. A required on-board indicator to alert the driver of an emission-related malfunction.

Monitor:
A test performed by the on-board computer to verify proper operation of emission related systems or components.

MPFI or MFI:
Multi-Port Fuel Injection. MPFI is a fuel injection system using one (or more) injector(s) for each cylinder. The injectors are mounted in the intake manifold, and fired in groups rather than individually.

NOx:
Oxides of Nitrogen. A pollutant. The EGR system injects exhaust gases into the intake manifold to reduce these gases at the tailpipe.

O2S:
Oxygen Sensor. Generates a voltage of 0.6 to 1.1 volts when the exhaust gas is rich (low oxygen content). The voltage changes to 0.4 volts or less when the exhaust gas is lean (high oxygen content). This sensor only operates after it reaches a temperature of approximately 349°C (660°F). O2 sensors are usually found both upstream and downstream of the catalytic converter. The PCM uses these sensors to fine tune the air-fuel ratio and to monitor the efficiency of the catalytic converter. See **Bank 1**, **Bank 2**, **Sensor 1**, **Sensor 2**.

ODM:
Output Device Monitor.

OBD II:
On-Board Diagnostics, Second Generation. OBD II is a U.S. Government-mandated standard requiring all cars and light trucks to have a common data connector, location, communication protocol, DTCs and code definitions.

Sensor:
Any device that reports information to the PCM. The job of the sensor is to convert a parameter such as engine temperature into an electrical signal that the PCM can understand.

Sensor 1:
A standard term used to identify the location of oxygen sensors. Sensor 1 is located upstream of the catalytic converter. See **O2S**, **Bank 1**, **Bank 2**.

Sensor 2:
A standard term used to identify the location of oxygen sensors. Sensor 2 is located downstream of the catalytic converter. See **O2S**, **Bank 1**, **Bank 2**.

Solenoid:
A device consisting of an electrical coil which when energized, produces a magnetic field in a plunger, which is pulled to a central position. A solenoid may be used as an actuator in a valve or switch.

SFI or SEFI:
Sequential Fuel Injection or Sequential Electronic Fuel Injection. A fuel injection system that uses one or more injectors for each cylinder. The injectors are mounted in the intake manifold and are fired individually.

ST:
Short Term fuel trim.

TBI:
Throttle Body Injection. A fuel injection system having one or more injectors mounted in a centrally located throttle body, as opposed to positioning the injectors close to an intake valve port. TBI is also called Central Fuel Injection (CFI) in some vehicles.

TDC:
Top Dead Center. When a piston is at its uppermost position in the cylinder.

Throttle Body:
A device which performs the same function as a carburetor in a fuel injection system. On a throttle body injection (TBI) system, the throttle body is both the air door and the location of the fuel injectors. On port fuel injection systems (PFI, MPFI, SFI, etc.), the throttle body is simply an air door. Fuel is not added until the injectors at each intake port are activated. In each case, the throttle body is attached to the accelerator pedal.

TPS:
Throttle Position Sensor. Potentiometer-type sensor connected to the throttle shaft. Its voltage signal output increases as the throttle is opened. The PCM uses this signal to control many systems such as idle speed, spark advance, fuel delivery, etc.

TTS:
Transmission Temperature Sensor. A resistance sensor mounted in the transmission housing in contact with the transmission fluid. It sends a voltage signal to the PCM indicating the temperature of the transmission.

VECI:
Vehicle Emission Control Information. A decal located in the engine compartment containing information about the emission control systems found on the vehicle. The VECI is the authoritative source for determining whether a vehicle is OBD II-compliant.

VIN:
Vehicle Identification Number. This is the factory-assigned vehicle serial number. This number is stamped on a number of locations throughout the vehicle, but the most prominent location is on top of the dashboard on the driver's side, visible from outside the car. The VIN includes information about the car, including where it was built, body and engine codes, options, and a sequential build number.

VSS:
Vehicle Speed Sensor. Sends a frequency signal to the PCM. The frequency increases as the vehicle moves faster to give the PCM vehicle speed information used to determine shift points, engine load, and cruise control functions.

WOT:
Wide-Open Throttle. The vehicle operating condition brought about when the throttle is completely (or nearly) open. The PCM will typically deliver extra fuel to the engine and de-energize the A/C compressor at this time for acceleration purposes. The PCM uses a switch or the Throttle Position Sensor to identify the WOT condition.