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1. Safety Precautions and Warnings

To prevent personal injury or damage to vehicles and/or the scan tool, read this instruction manual first and observe the following safety precautions at a minimum whenever working on a vehicle:

- Always perform automotive testing in a safe environment.
- Wear safety eye protection that meets ANSI standards.
- Keep clothing, hair, hands, tools, test equipment, etc. away from all moving or hot engine parts.
- Operate the vehicle in a well ventilated work area: Exhaust gases are poisonous.
- Put blocks in front of the drive wheels and never leave the vehicle unattended while running tests.
- Use extreme caution when working around the ignition coil, distributor cap, ignition wires and spark plugs. These components create hazardous voltages when the engine is running.
- Put the transmission in PARK (for automatic transmission) or NEUTRAL (for manual transmission) and make sure the parking brake is engaged.
- Keep a fire extinguisher suitable for gasoline/chemical/electrical fires nearby.
- Don't connect or disconnect any test equipment while the ignition is on or the engine is running.
- Keep the scan tool dry, clean, free from oil/water or grease. Use a mild detergent on a clean cloth to clean the outside of the scan tool when necessary.

2. General Information

2.1 On-Board Diagnostics (OBD) II

The first generation of On-Board Diagnostics (called OBD I) was developed by the California Air Resources Board (ARB) and implemented in 1988 to monitor some of the emission control components on vehicles. As technology evolved and the desire to improve the On-Board Diagnostic system increased, a new generation of On-Board Diagnostic system was developed. This second generation of On-Board Diagnostic regulations is called "OBD II".

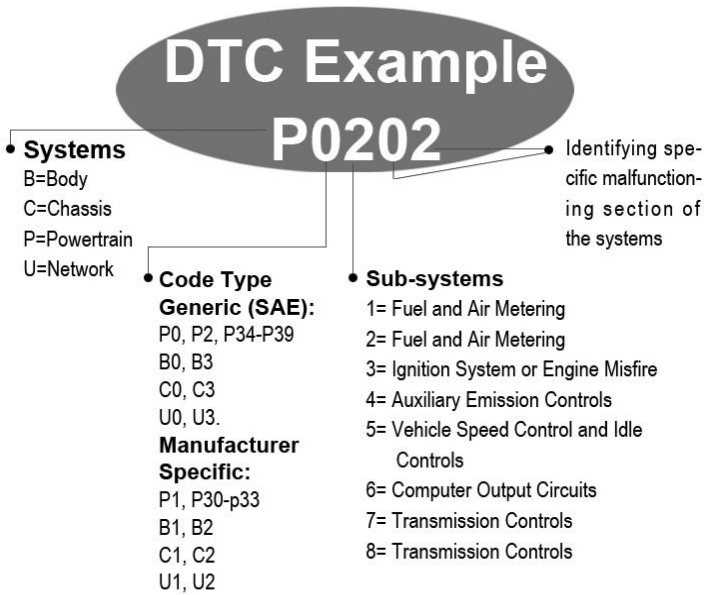
The OBD II system is designed to monitor emission control systems and key engine components by performing either continuous or periodic tests of specific components and vehicle conditions. When a problem is detected, the OBD II system turns on a warning lamp (MIL) on the vehicle instrument panel to alert the driver typically by the phrase of “Check Engine” or “Service Engine Soon”. The system will also store important information about the detected malfunction so that a technician can accurately find and fix the problem. Here below follow three pieces of such valuable information:

1) **Whether the Malfunction Indicator Light (MIL) is commanded 'on' or 'off';**
2) **Which, if any, Diagnostic Trouble Codes (DTCs) are stored;**
3) **Readiness Monitor status.**

2.2 Diagnostic Trouble Codes (DTCs)

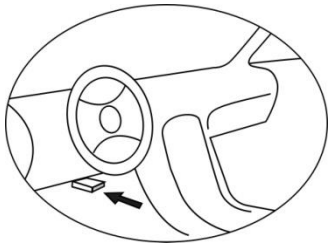
OBD II Diagnostic Trouble Codes are codes that are stored by the on-board computer diagnostic system in response to a problem found in the vehicle. These codes identify a particular problem area and are intended to provide you with a guide as to where a fault might be occurring within a vehicle. OBD II Diagnostic Trouble Codes consists of a five-digit alphanumeric code. The first character, a letter, identifies which control system sets the code. The other four characters, all numbers, provide additional information on where the

DTC originated and the operating conditions that caused it to set. Here below is an example to illustrate the structure of the digits:



2.3 Location of the Data Link Connector (DLC)

The DLC (Data Link Connector or Diagnostic Link Connector) is the standardized 16-cavity connector where diagnostic scan tools interface with the vehicle's on-board computer. The DLC is usually located 12 inches from the center of the instrument panel (dash), under or around the driver's side for most vehicles. If Data Link Connector is not located under dashboard, a label should be there telling location. For some Asian and European vehicles, the DLC is located behind the ashtray and the ashtray must be removed to access the connector. If the DLC cannot be found, refer to the vehicle's service manual for the location.



2.4 OBD II Readiness Monitors

An important part of a vehicle's OBD II system is the Readiness Monitors, which are indicators used to find out if all of the emissions components have been evaluated by the OBD II system. They are running periodic tests on specific systems and components to ensure that they are performing within allowable limits.

Currently, there are eleven OBD II Readiness Monitors (or I/M Monitors) defined by the U.S. Environmental Protection Agency (EPA). Not all monitors are supported by all vehicles and the exact number of monitors in any vehicle depends on the motor vehicle manufacturer's emissions control strategy.

Continuous Monitors -- Some of the vehicle components or systems are continuously tested by the vehicle's OBD II system, while others are tested only under specific vehicle operating conditions. The continuously monitored components listed below are always ready:

1）Misfire

2）Fuel System

3）Comprehensive Components (CCM)

Once the vehicle is running, the OBD II system is continuously checking the above components, monitoring key engine sensors, watching for engine misfire, and monitoring fuel demands.

Non-Continuous Monitors -- Unlike the continuous monitors, many emissions and engine system components require the vehicle to be operated under specific conditions before the monitor is ready. These

monitors are termed non-continuous monitors. For different ignition type engines, the available monitors are different too.

The following monitors are to be used for spark ignition (Gasoline) engines only:

1) **EGR System**
2) **O2 Sensors**
3) **Catalyst**
4) **Evaporative System**
5) **O2 Sensor Heater**
6) **Secondary Air**
7) **Heated Catalyst**

The following monitors are to be used for compression ignition (Diesel) engines only:

1) **EGR System**
2) **NMHC Catalyst**
3) **NOx Aftertreatment**
4) **Boost Pressure System**
5) **Exhaust Gas Sensor**
6) **PM Filter**

2.5 OBD II Monitor Readiness Status

OBD II systems must indicate whether or not the vehicle's PCM's monitor system has completed testing on each component. Components that have been tested will be reported as "Ready", or "Complete", meaning they have been tested by the OBD II system. The purpose of recording readiness status is to allow inspectors to determine if the vehicle's OBD II system has tested all the components and/or systems.

The power-train control module (PCM) sets a monitor to "Ready" or "Complete" after an appropriate drive cycle has been performed. The

drive cycle that enables a monitor and sets readiness codes to “Ready” varies for each individual monitor. Once a monitor is set as “Ready” or “Complete”, it will remain in this state. A number of factors, including erasing of diagnostic trouble codes (DTCs) with a scan tool or a disconnected battery, can result in Readiness Monitors being set to “Not Ready”. Since the three continuous monitors are constantly evaluating, they will be reported as “Ready” all of the time. If testing of a particular supported non-continuous monitor has not been completed, the monitor status will be reported as “Not Complete” or “Not Ready.”

In order for the OBD monitor system to become ready, the vehicle should be driven under a variety of normal operating conditions. These operating conditions may include a mix of highway driving and stop and go, city type driving, and at least one overnight-off period. For specific information on getting your vehicle’s OBD monitor system ready, please consult your vehicle owner’s manual.

2.6 OBD II Definitions

Power-train Control Module (PCM) -- OBD II terminology for the on-board computer that controls engine and drive train.

Malfunction Indicator Light (MIL) -- Malfunction Indicator Light (Service Engine Soon, Check Engine) is a term used for the light on the instrument panel. It is to alert the driver and/or the repair technician that there is a problem with one or more of vehicle's systems and may cause emissions to exceed federal standards. If the MIL illuminates with a steady light, it indicates that a problem has been detected and the vehicle should be serviced as soon as possible. Under certain conditions, the dashboard light will blink or flash. This indicates a severe problem and flashing is intended to discourage vehicle operation. The vehicle onboard diagnostic system can not turn the MIL off until necessary repairs are completed or the condition no longer exists.

DTC -- Diagnostic Trouble Codes (DTC) that identify which section of the emission control system has malfunctioned.

Enabling Criteria -- Also termed Enabling Conditions. They are the vehicle-specific events or conditions that must occur within the engine before the various monitors will set, or run. Some monitors require the vehicle to follow a prescribed "drive cycle" routine as part of the enabling criteria. Drive cycles vary among vehicles and for each monitor in any particular vehicle.

OBD II Drive Cycle -- A specific mode of vehicle operation that provides conditions required to set all the readiness monitors applicable to the vehicle to the "ready" condition. The purpose of completing an OBD II drive cycle is to force the vehicle to run its onboard diagnostics. Some form of a drive cycle needs to be performed after DTCs have been erased from the PCM's memory or after the battery has been disconnected. Running through a vehicle's complete drive cycle will "set" the readiness monitors so that future faults can be detected. Drive cycles vary depending on the vehicle and the monitor that needs to be reset. For vehicle specific drive cycle, consult the vehicle's Owner's Manual.

Freeze Frame Data -- When an emissions related fault occurs, the OBD II system not only sets a code but also records a snapshot of the vehicle operating parameters to help in identifying the problem. This set of values is referred to as Freeze Frame Data and may include important engine parameters such as engine RPM, vehicle speed, air flow, engine load, fuel pressure, fuel trim value, engine coolant temperature, ignition timing advance, or closed loop status.

2.7 OBD II Modes of Operation

Here is a basic introduction to the OBD II communication protocol.

Mode byte: The first byte in the stream is the mode number. There are 10 modes for diagnostic requests. The first byte in the response data bytes is this same number plus 64. For example, a mode 1 request would have the first data byte = 1, and the response would have the first data byte = 65. Here is a brief description of the modes:

Mode $01 – Identifies the Powertrain information and shows current data available to the scan tool. This data includes: DTC set,

status of on-board tests, and vehicle data such as engine RPM, temperatures, ignition advance, speed, air flow rates, and closed loop status for fuel system.

Mode $02 – Displays Freeze Frame data. Same data as in mode 1, but it was captured and stored when a malfunction occurred and a DTC was set. Some of the PIDs for mode one are not implemented in this mode.

Mode $03 – Displays the type of powertrain or emission related DTCs stored by a 5 digit code identifying the faults. There may be more than one response message if there are more trouble codes than will fit in the data bytes of the response message, or if there are more than one ECU computer responding.

Mode $04 – Used to clear DTCs and Freeze Frame data. This clears all diagnostic trouble codes that may be set including freeze frame data and readiness monitors.

Mode $05 – Displays oxygen sensor test results. This mode displays the oxygen sensor monitor screen and the test results gathered about the oxygen sensor.

There are ten numbers available for diagnostics:

1. $01 Rich-to-Lean O2 sensor threshold voltage.
2. $02 Lean-to-Rich O2 sensor threshold voltage.
3. $03 Low sensor voltage threshold for switch time measurement.
4. $04 High sensor voltage threshold for switch time measurement.
5. $05 Rich-to-Lean switch time in ms.
6. $06 Lean-to-Rich switch time in ms.
7. $07 Minimum voltage for test.
8. $08 Maximum voltage for test.
9. $09 Time between voltage transitions in ms.

Mode $06 – Non-continuously Monitored Systems test results. There are typically a minimum value, a maximum value, and a current value for each non-continuous monitor. This data is optional, and it is defined by a given vehicle maker if it's used.

Mode $07 – A request for DTCs (pending) from Continuously Monitored Systems after a single driving cycle has been performed to determine if repair has fixed a problem. This is used by service technicians to verify repair was performed properly and after clearing diagnostic trouble codes.

Mode $08 – This special Control Mode requests control of the on-board system, test, or component bi-directionally (where applicable). This mode is manufacturer specific.

Mode $09 – Reports vehicle information. This information includes vehicle VIN number and calibration information stored in the vehicle ECUs.

Mode $0A – Requests Emission-Related Diagnostic Trouble Codes with Permanent Status. This mode is required for all emissions-related DTCs. The presence of permanent DTCs at an inspection without the MIL illuminated is an indication that a proper repair was not verified by the on-board monitoring system.

3. Using the Scan Tool

3.1 Tool Description



1) **OBD II CONNECTOR** – Connects the scan tool to the vehicle's Data Link Connector (DLC).

2) **LCD DISPLAY** – Displays menus and test results.

3) ✓ **GREEN LED** – Indicates that engine systems are running normally (The number of monitors on the vehicle which are active and performing their diagnostic testing is in the allowed limit, and no DTCs are present).

4) **YELLOW LED** – Indicates there is a possible problem. A "Pending" DTC is present and/or some of the vehicle's emission monitors have not run their diagnostic testing.

5) **RED LED** – Indicates there is a problem in one or more of the vehicle's systems. The red LED is also used to show that DTCs are present. DTCs are shown on the Scan Tool's display. In this case, the MIL on the vehicle's instrument panel will light steady on.

6) **ONE-CLICK I/M READINESS KEY** – Quick-checks State Emissions readiness and drive cycle verification.

7) **ESC BUTTON** – Cancels a selection (or action) from a menu or returns to the previous screen.

8) **LEFT SCROLL BUTTON** – When look up DTC definitions, moves to previous character and views additional information on previous screens if DTC definition covers more than one screen; deselect all marked PID data when viewing or recording customized live data list; views previous frames of recorded data when playing back live data. It is also used to update DTC library when pressed.

9) **HELP BUTTON** – Provides help information and Code Breaker function.

10) **UP SCROLL BUTTON** – Moves up through menu and submenu items in menu mode. When more than one screen of data is retrieved, moves up through the current screen to the previous screens for additional data.

11) **OK BUTTON** – Confirms a selection (or action) from a menu.

12) **RIGHT SCROLL BUTTON** – When look up DTC definitions, moves to next character and view additional information on next screens if DTC definition covers more than one screen; selects/deselects PID data when viewing or

recording customized live data list, and views next frames of data when playing back live data.

13)  **DOWN SCROLL BUTTON** – Moves down through menu and submenu items in menu mode. When more than one screen of data is retrieved, moves down through the current screen to next screens for additional data.

14) **USB CONNECTOR** – Connects the scan tool to the PC for printing and upgrading.

3.2 Specifications

1) Display: TFT color display (320 x 240 dpi)
2) Operating Temperature: 0°C to 60°C (32°F to 140°F)
3) Storage Temperature: -20°C to 70°C (-4°F to 158°F)
4) External Power: 8.0 to 18.0 V power provided via vehicle battery
5) Dimensions:

Length	Width	Height
199 mm (7.83”)	104.5 mm (4.11”)	37.5 mm (1.48”)

6) Weight: 0.28kg (without wire) 0.484kg (with wire)

3.3 Accessories Included

1) **User’s Manual** -- Instructions on tool operations.
2) **CD** -- Includes user’s manual, MaxiLink update software, and etc.
3) **OBD2 Cable** -- Provides power to tool and communicates between tool and vehicle.
4) **USB Cable** -- Used to upgrade the scan tool, and to print retrieved data.
5) **Protective Nylon Case** – A nylon case to store the tool when not in use.

3.4 Navigation Characters

Characters used to help navigate the scan tool are:

1) **"$"** -- Identifies the control module number from which data is retrieved. Indicates the Test ID in On-Board Mon. Test.
2) **"?"** -- Indicates help or code breaker information is available.
3) **"G"** -- Indicates graphic viewing is available.

3.5 Keyboard

No solvents such as alcohol are allowed to clean the keypad or display. Use a mild nonabrasive detergent and a soft cotton cloth. Do not soak the keypad as the keypad is not waterproof.

3.6 Power

The scan tool is powered via the vehicle Data Link Connector (DLC). Just follow the steps below to turn on the scan tool:

1) Connect the OBD II Cable to scan tool.
2) Find DLC on vehicle.

- ***A plastic DLC cover may be found for some vehicles and you need to remove it before plugging the OBD2 cable.***

3) Plug OBD II cable to the vehicle's DLC.

3.7 DTC Lookup

The **DTC Lookup** function is used to search for definitions of DTCs stored in the DTC library and for code breaker information.

1) From **Main Screen** (Figure 3.1), use the **UP/DOWN** scroll button and **LEFT/RIGHT** scroll button to select **DTC Lookup** and press the **OK** button.

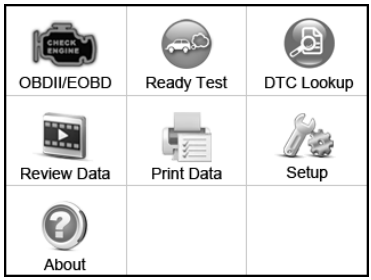


Figure 3.1

2) From **DTC Lookup** screen, use the **LEFT/RIGHT** button to move to the desired character, use the **UP/DOWN** button to change selected digit/character and press the **OK** button to confirm. (Figure 3.2)

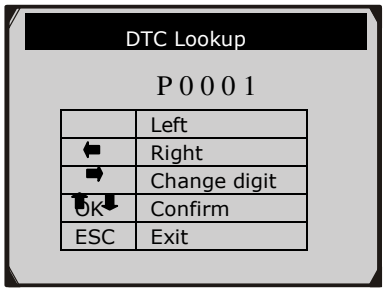


Figure 3.2

3) View the DTC definition on screen. When DTC definition covers more than one screen, use the **LEFT/RIGHT** button or **UP/DOWN** button to view additional information on previous/next screens.

- For manufacturer specific codes, you need to select a vehicle make on an additional screen to look for DTC definitions.
- If definition could not be found (SAE or Manufacturer Specific), the scan tool displays "**Please refer to vehicle service manual!**"

- For code breaker information, you need to press the "**?**" **Help** button.

In the **Code Breaker** screen, there are three options to assist user to understand DTC more: **System Description** and **Quick Check** to read detailed description of DTCs, **General Notes** to view helpful repair information of DTCs.

4) To view previous or next DTC in the built-in DTC library, use the **LEFT/RIGHT** button.

5) To enter another DTC, press the **ESC** button to return to previous screen.

6) To exit to **Main Screen**, press the **ESC** button.

3.8 System Setup

The scan tool allows you to make the following adjustments and settings:

1) **Language:** Selects the desired language.
2) **Configure Monitors**: Sets the monitors you want to test.
3) **Unit of measure:** Sets the unit of measure to English or Metric.
4) **Key Beep Set:** Turns on/off beep.
5) **Status Beep Set:** Turns on/off the I/M Readiness Status beep.
6) **Tool Self-test:** Checks if the LCD display, LED lamps and keyboard are working normally.
7) **Update Mode:** Accesses the Update Mode.

- ***Settings of the unit will remain until change to the existing settings is made.***

To enter the Setup menu

From the **Main Screen:** Use the **UP/DOWN** scroll button and **LEFT/RIGHT** scroll button to select **Setup**, and press the **OK** button. Follow the instructions to make adjustments and settings as described in the above setup options. (Figure 3.3)

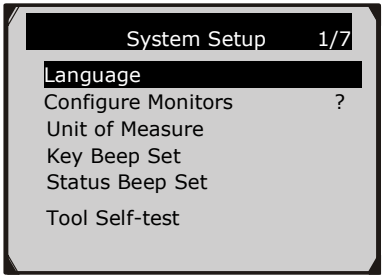


Figure 3.3

Language Setup

- ***English is the default language.***

1) From **System Setup** screen, use the **UP/DOWN** scroll button to select **Language**, and press the **OK** button.
2) Use the **UP/DOWN** scroll button to select the desired language and press the **OK** button to save your selection and return to previous screen.

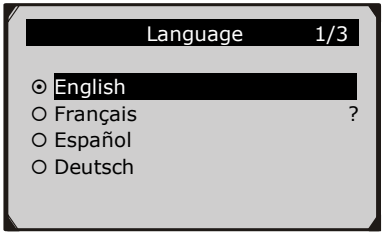


Figure 3.4

Configure Monitors

From **System Setup** screen, use the **UP/DOWN** scroll button to select **Configure Monitors**, and press the **OK** button. (Figure 3.5)

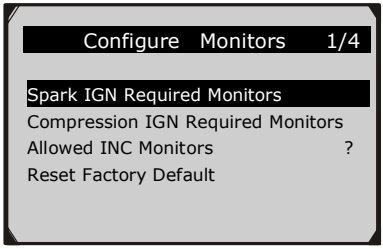


Figure 3.5

In this menu, you could configure the monitors required to test spark ignition and compression ignition, the number of monitors to pass diagnosis, and restore the default settings.

1) Spark IGN Required Monitors

From **Configure Monitors** screen, use the **UP/DOWN** scroll button to select **Spark IGN Required Monitors**, and press the **OK** button.

The monitors for spark ignition engines list as below:

Spark IGN Required Monitors			
√	MIS	√	EVAP
√	FUEL	√	AIR
√	CCM	√	O2S
√	CAT	√	HTR
√	HCAT	√	EGR

2) Compression IGN Required Monitors

From **Configure Monitors** screen, use the **UP/DOWN** scroll button to select **Compression IGN Required Monitors**, and press the **OK** button.

The monitors for compression ignition engines list as below:

Compression IGN Required Monitors			
√	MIS	√	BP
√	FUEL	√	EGS

Compression IGN Required Monitors			
√	MIS	√	BP
√	CCM	√	PM
√	HCCAT	√	EGR
√	NCAT		

3) Allowed INC Monitors

From **Configure Monitors** screen, use the **UP/DOWN** scroll button to select **Allowed INC Monitors**, and press the **OK** button.

Emissions tests vary depending on the geographic or regional area in which the vehicle is registered. So the scan tool provides a more flexible way to meet different standards, which allows the user to select 0, 1, 2, or 3 "not complete" monitors in test.

4) Reset Factory Default

From **Configure Monitors** screen, use the **UP/DOWN** scroll button to select **Reset Factory Default**, and press the **OK** button.

It will restore the default configuration settings in the **Configure Monitors** menu, and delete any customized settings. In this case, **Spark IGN Required Monitors** and **Compression IGN Required Monitors** will include all the available monitors, and the **Allowed INC Monitors** will be set to 1.

The tool will display an information message to ask for your confirmation. Select **Yes** to proceed and **No** to exit without change.

Unit of Measure

- ***Metric is the default measurement unit.***

1) From **System Setup** screen, use the **UP/DOWN** scroll button to select **Unit of Measure** and press the **OK** button.

2) From **Unit of Measure** screen, use the **UP/DOWN** scroll button to select the desired unit of measurement. (Figure 3.6)

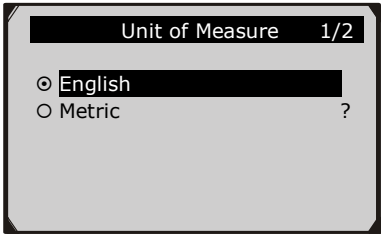


Figure 3.6

3) Press the **OK** button to save your selection and return to previous menu.

Key Beep Set

This function allows you to turn on/off the build-in speaker for key pressing.

- ***The default setting is Beep On.***

1) From **System Setup** screen, use the **UP/DOWN** scroll button to select **Key Beep Set** and press the **OK** button.

2) From **Key Beep Set** menu, use the **UP/DOWN** scroll button to select **Beep ON** or **Beep OFF** to turn on/off the beep.

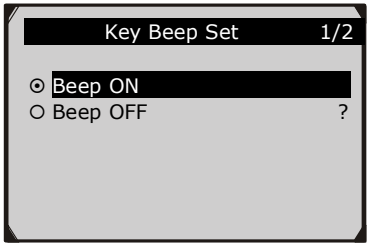


Figure 3.7

3) Press the **OK** button to save your selection and return to previous menu.

Status Beep Set

- ***The default setting is Beep On.***

This function allows you to turn on/off the build-in speaker for the LEDs in diagnostic testing. Different audio tone corresponds to different LED lamp. This function is invaluable when performing diagnostics alone, or working in bright areas where LED illumination alone is not sufficient.

1) From **System Setup** screen, use the **UP/DOWN** scroll button to select **Status Beep Set** and press the **OK** button.

2) From **Status Beep Set** menu, use the **UP/DOWN** scroll button to select **Beep ON** or **Beep OFF** to turn on/off the beep.

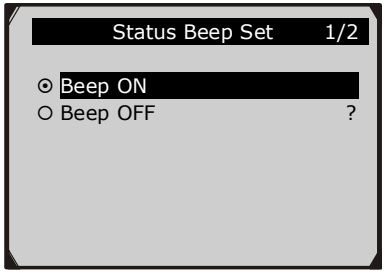


Figure 3.8

3) Press the **OK** button to save your selection and return to previous menu.

Tool Self-test

The Tool Self-test function checks if the display, LED lamps and keyboard are working properly.

A. Display test

The **Display Test** function checks if the LCD display is working normally.

1) From **System Setup** screen, use the **UP/DOWN** scroll button to select **Tool Self-tes**t, and press the **OK** button.

2) Select **Display Test** from **Tool Self-test** menu and press the **OK** button to start test. (Figure 3.9)

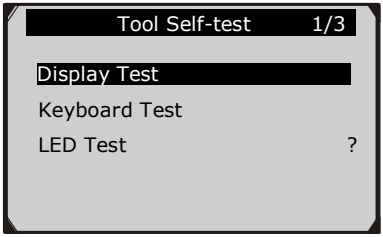


Figure 3.9

3) Look for missing spots in the red, green, blue, black and white LCD display.

4) When completed, press the **ESC** button to exit.

B. Keyboard Test

The **Keyboard Test** function verifies if the keys are functioning properly.

1) Use the **UP/DOWN** scroll button to select **Keyboard Test** from the **Tool Self-test** menu, and then press the **OK** button.

2) Press any key to start test. When you press a key, the key name should be observed on the display. If the key name does not show up, then the key is not functioning properly. (Figure 3.10)

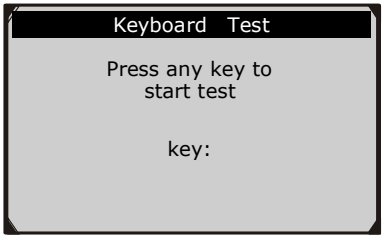


Figure 3.10

3) Double press **ESC** to return to previous menu.

C. LED Test

The **LED Test** function verifies if the I/M Readiness LED indicator lamps are functioning properly.

1) Use the **UP/DOWN** scroll button to select **LED Test** from the **Tool Self-test** menu, and then press the **OK** button.

2) In the **LED Test** menu, use the **UP/DOWN** scroll button to select one or more LED lamps to check. The LED should turn on or off according to the selected commands.

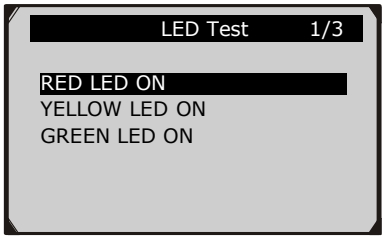


Figure 3.11

3) When completed, press the **ESC** button to exit.

Update Mode

This function allows you to update the scan tool software and DTC library through a computer.

- *To update your scan tool, you need the following items.*

  AutoLink® AL519

  A PC or laptop with USB ports

  A USB cable

1) Download the programs in our website www.autel.com to be updated to your computer.

2) Run the MaxiLinkII Tool Kit in your computer. (Figure 3.12)

3) Connect the scan tool to your computer through the USB cable provided.

4) From **System Setup** screen in scan tool, use the **UP/DOWN** scroll button to select **Update Mode**, and press the **OK** button.

5) Select the programs to be updated in your computer. There are two types of programs: operating system and DTC library. (Figure 3.12)

6) Click **Update** in the MaxiLinkII Tool Kit window to begin updating.

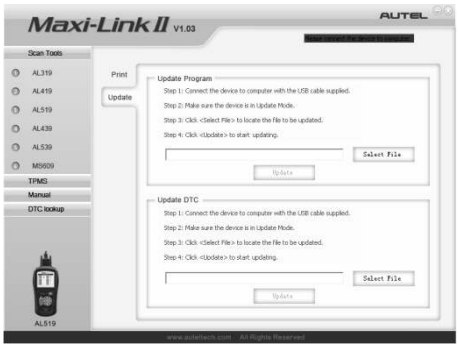


Figure 3.12

7) During the update procedure, the scan tool displays a message "**Update Program. Please wait…**".

8) When the update has finished, the scan tool will display a message "**Program Update has been done**!"

9) Restart the scan tool to finish the whole update.

NOTE: Please select the bin file to update the operating system. After updating the bin file, please choose the aut file to update the DTC library. Both the bin file and DTC file should be updated. Otherwise, the code reader cannot work properly.

When you made a wrong choice and the scan tool is unable to work properly, you may need to update the programs. To hold LEFT scroll button and power on the scan tool, you will enter the Update Mode forcedly. Then follow the update procedure to refresh the program.

3.9 About

The **About** function allows viewing of some important information such as serial number and software version number of the scanner.

1) From **Main Screen** (Figure 3.1), use the **UP/DOWN** scroll button and **LEFT/RIGHT** scroll button to select **About** and press the **OK** button; wait for the **About** screen to appear.

2) View tool information on screen.

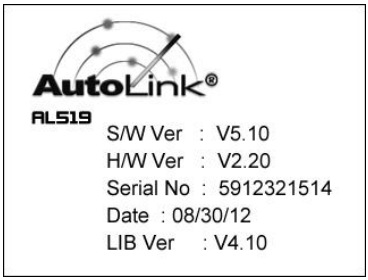


Figure 3.13

3.10 Vehicle Coverage

The AutoLink® AL519 OBDII/EOBD Scanner is specially designed to work with all OBD II compliant vehicles, including those equipped with next-generation protocol -- Control Area Network (CAN). It is required by EPA that all 1996 and newer vehicles (cars and light trucks) sold in the United States must be OBD II compliant and this includes all Domestic, Asian and European vehicles.

A small number of 1994 and 1995 model year gasoline vehicles are OBD II compliant. To verify if a 1994 or 1995 vehicle is OBD II

compliant, check the Vehicle Emissions Control Information (VECI) Label which is located under the hood or by the radiator of most vehicles. If the vehicle is OBD II compliant, the label will designate "OBD II Certified". Additionally, government regulations mandate that all OBD II compliant vehicles must have a "common" sixteen-pin Data Link Connector (DLC).

For your vehicle to be OBD II compliant it must have a 16-pin DLC (Data Link Connector) under the dash and the Vehicle Emission Control Information Label must state that the vehicle is OBD II compliant.

3.11 Product Troubleshooting

This part describes problems that you may encounter while using the scan tool.

Vehicle Linking Error

A communication error occurs if the scan tool fails to communicate with the vehicle's ECU (Engine Control Unit). You need to do the following to check up:

- ✓ Verify that the ignition is ON.
- ✓ Check if the scan tool's OBD II connector is securely connected to the vehicle's DLC.
- ✓ Verify that the vehicle is OBD2 compliant.
- ✓ Turn the ignition off and wait for about 10 seconds. Turn the ignition back to on and continue the testing.
- ✓ Verify the control module is not defective.

Operating Error

If the scan tool freezes, then an exception occurs or the vehicle's ECU (Engine Control Unit) is too slow to respond to requests. You need to do the following to reset the tool:

- ✓ Reset the scan tool.

✓ Turn the ignition off and wait for about 10 seconds. Turn the ignition back to on and continue the testing.

Scan tool doesn't power up

If the scan tool won't power up or operates incorrectly in any other way, you need to do the following to check up:

✓ Check if the scan tool's OBD II connector is securely connected to the vehicle's DLC;

✓ Check if the DLC pins are bent or broken. Clean the DLC pins if necessary.

✓ Check vehicle battery to make sure it is still good with at least 8.0 volts.

LED lamps not working

If you turn on the scan tool and perform the I/M Readiness test but the LED lamps are not working, there may be several possible causes, including bad connection and ignition off. In this case, follow these steps to check the scan tool.

- Make sure the OBD II cable is connected to the DLC securely.
- Verify the ignition key is in the KOER position.
- Run the **LED Test** in the **System Setup** menu. (***see 3.8 System Setup***). If the scan tool did not pass this test, there is a problem with the LED lamp. Please contact Autel Tech Support or your local selling agent.

4. Review Data

The Review Data function allows viewing of data from last test recorded by the scan tool.

1) Use the **UP/DOWN** scroll button and **LEFT/RIGHT** scroll button to select **Review Data** from **Main Screen**, and press the **OK** button. (Figure 3.1)

2) Use the **UP/DOWN** scroll button to select the desired item from **Review Data** menu, and press the **OK** button. (Figure 4.1)

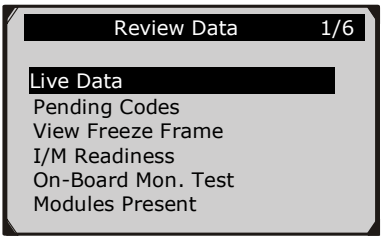


Figure 4.1

- If no data from previously tested vehicle is recorded, only **Modules Present** data containing module ID and protocol type can be reviewed. (Figure 4.2)

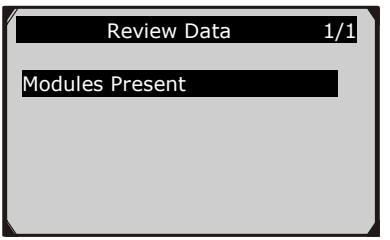


Figure 4.2

- Diagnostics results can be reviewed from this list only when any trouble code is detected in previous tests.

3) Review selected data on screen. (Figure 4.3)

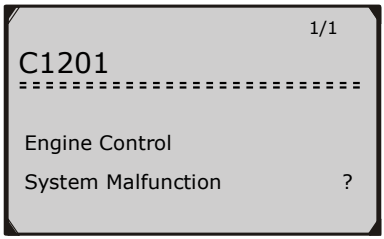


Figure 4.3

***NOTE**: If there is no data stored for selected item, a "Not Supported or Stored No Data!" message shows on the screen.*

5. OBDII Diagnostics

When more than one vehicle control module is detected by the scan tool, you will be prompted to select the module where the data may be retrieved. The most often to be selected are the Power train Control Module [PCM] and Transmission Control Module [TCM].

CAUTION: Don't connect or disconnect any test equipment with ignition on or engine running.

1） Turn the ignition off.

2） Locate the vehicle's 16-pin Data Link Connector (DLC).

3） Plug the scan tool cable connector into the vehicle's DLC.

4） Turn the ignition on. Engine can be off or running.

5） Turn on the scan tool. Use the **UP/DOWN** scroll button to select **OBDII/EOBD** from the **Main Screen** (Figure 3.1).

6） Press the **OK** button to wait for the Menu to appear. A sequence of messages displaying the OBDII protocols will be observed on the display until the vehicle protocol is detected.

- ***If the scan tool fails to communicate with the vehicle's ECU (Engine Control Unit) more than three times, a "LINKING ERROR!" message shows up on the display.***

✓ Verify that the ignition is ON;

✓ Check if the scan tool's OBD II connector is securely connected to the vehicle's DLC;

✓ Verify that the vehicle is OBD2 compliant;

✓ Turn the ignition off and wait for about 10 seconds. Turn the ignition back to on and repeat the procedure from step 5.

- ***If the "LINKING ERROR" message does not go away, then there might be problems for the scan tool to communicate with the vehicle. Contact your local***

distributor or the manufacturer's customer service department for assistance.

7） You will be prompted to erase previously stored data. （Figure 5.1）

- ***Review previously stored data thoroughly before erasing.***

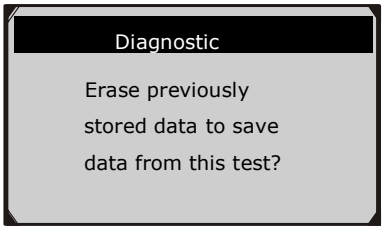


Figure 5.1

- If no data is stored in the scan tool, the above prompt will not show up.

8） If you wish to erase the data, press the **OK** button; if you do not want to erase the data, press **ESC** to exit or use **LEFT/RIGHT** button to select **NO** and press **OK** to continue.

9） View a summary of system status (MIL status, DTC counts, Monitor status) on screen. (Figure 5.2) Wait a few seconds or press any key for **Diagnostic Menu** (Figure 5.4) to come up.

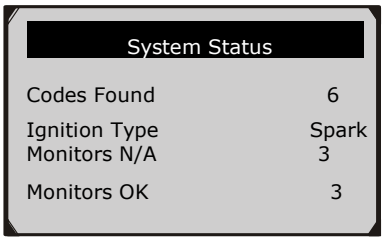


Figure 5.2

- If more than one module is detected, you will be prompted to select a module before testing.

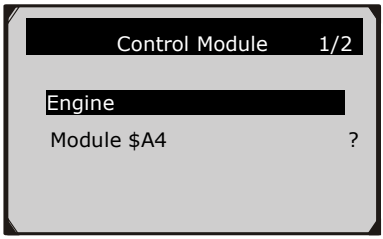


Figure 5.3

- Use the **UP/DOWN** scroll button to select a module and press the **OK** button.

5.1 Reading Codes

- ***Reading Codes can be done with the key on engine off (KOEO) or with the key on engine running (KOER).***
- ***Stored Codes are also known as "hard codes", which are fault codes, or trouble codes that have been stored in the vehicle computer memory because the faults have reoccurred for more than a specified amount of key-cycles. These codes will cause the control module to illuminate the malfunction indicator light (MIL) when emission-related fault occurs.***
- ***Pending Codes are also referred to as "maturing codes" or "continuous monitor codes". They indicate problems that the control module has detected during the current or last driving cycle but are not considered serious yet. Pending Codes will not turn on the malfunction indicator light (MIL). If the fault does not occur within a certain number of warm-up cycles, the code clears from memory.***
- ***Permanent Codes are DTCs that are "confirmed" and are retained in the non-volatile memory of the computer until the***

appropriate monitor for each DTC has determined that the malfunction is no longer present and is not commanding the MIL on. Permanent DTC shall be stored in non-volatile memory and may not be erased by any diagnostic services or by disconnecting power to ECU.

1) Use **UP/DOWN** scroll button to select **Read Codes** from **Diagnostic Menu** and press **OK** button.

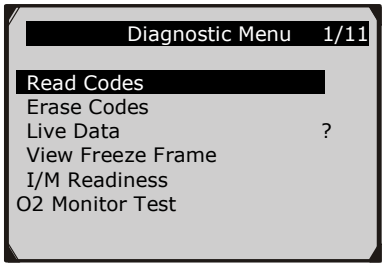


Figure 5.4

2) Use the **UP/DOWN** scroll button to select **Stored Codes** or **Pending Codes** from the **Read Codes** menu and press the **OK** button.

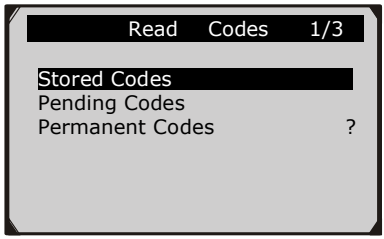


Figure 5.5

- If there is not any Diagnostic Trouble Code, the display indicates "**No (pending) codes are stored in the module!**"

Wait a few seconds or press any key to return to previous screen.

NOTE: Permanent Codes function is available for merely vehicles supporting the CAN protocols.

3) View DTCs and their definitions on screen.

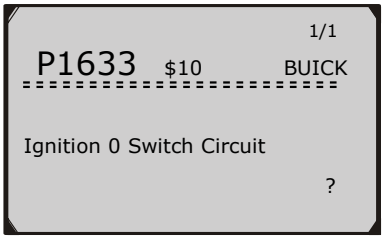


Figure 5.6

4) If more than one DTC is found, use the **LEFT/RIGHT** scroll button to check all the codes.

- If retrieved DTCs contain any manufacturer specific or enhanced codes, a "**Manufacturer specific codes are found! Press any key to select vehicle make!**" message comes up prompting you to select vehicle manufacturer to view DTC definitions. Use **UP/DOWN** scroll button to select manufacturer and then press **OK** button to confirm.

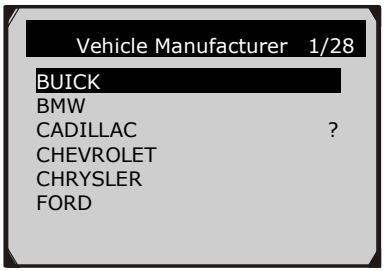


Figure 5.7

- If the manufacturer of your vehicle is not listed, use the **UP/DOWN** scroll button to select **Other** and press the **OK** button.

5.2 Erasing Codes

CAUTION: Erasing the Diagnostic Trouble Codes may allow the scan tool to delete not only the codes from the vehicle's on-board computer, but also "Freeze Frame" data and manufacturer specific enhanced data. Further, the I/M Readiness Monitor Status for all vehicle monitors is reset to Not Ready or Not Complete status. Do not erase the codes before the system has been checked completely by a technician.

NOTE: Erasing codes does not mean that trouble codes in ECU have been eliminated completely. As long as there is fault with the vehicle, the trouble codes keeps on presenting.

- ***This function is performed with key on engine off (KOEO). Do not start the engine.***

1) Use the **UP/DOWN** scroll buttons to select **Erase Codes** from **Diagnostics Menu** and press the **OK** button. (Figure 5.4)
2) A warning message comes up asking for your confirmation.

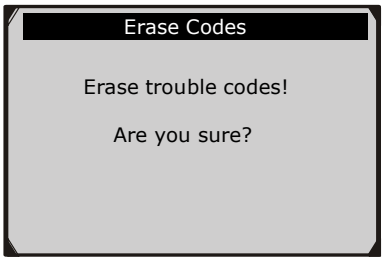


Figure 5.8

- If you do not want to proceed with erasing codes, press **ESC** button or use **LEFT/RIGHT** scroll button to select **NO** to exit. A message of **"Command Cancelled!"** shows up. Wait a few seconds or press any key to return to **Diagnostic Menu**.

3) Press the **OK** button to confirm.

- If the codes are cleared successfully, an "**Erase Done!**" confirmation message shows on the display.

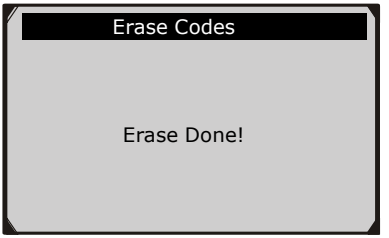


Figure 5.9

- If the codes are not cleared, then an "**Erase Failure. Turn Key on with Engine off!"** message appears.

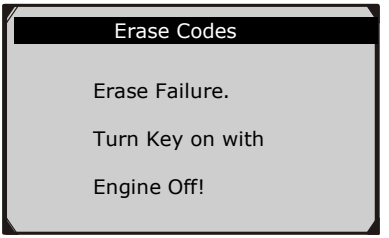


Figure 5.10

4) Press any button to return to **Diagnostic Menu.**

5.3 Live Data

In this function, you can not only read the live data but also record data for later review.

Viewing Data

The View Data function allows viewing of live or real time PID data of vehicle's computer module(s).

1) To view live data, use the **UP/DOWN** scroll button to select **Live Data** from **Diagnostic Menu** and press the **OK** button. (Figure 5.4)

2) Wait a few seconds while the scan tool validates the PID MAP. (Figure 5.11)

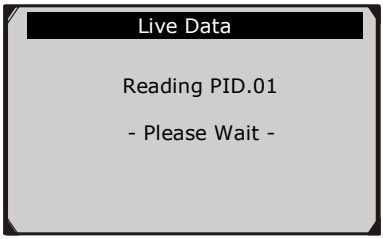


Figure 5.11

3) Use the **UP/DOWN** scroll button to select **View Data** from **Live Data** menu and press the **OK** button.

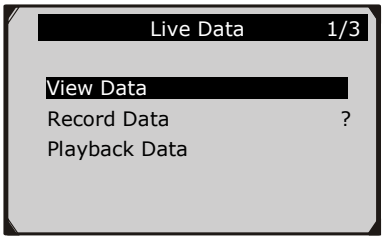


Figure 5.12

Viewing Complete Data Set

1) To view complete set of data, use **UP/DOWN** scroll button to select **Complete Data Set** from **View Data** menu and press the **OK** button.

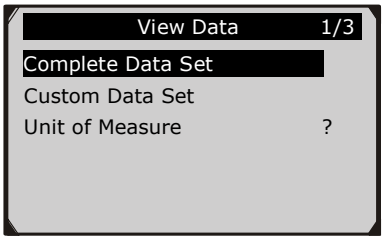


Figure 5.13

2) View live PIDs on the screen. Use the **UP/DOWN** scroll button for more PIDs if additional information is available on more than one page.

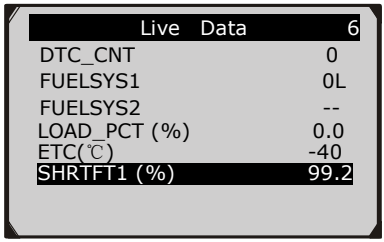


Figure 5.14

- The number "x" to the right of the screen indicates sequence of the highlighted item.
- To view full name of the highlighted PID, press the ? button.
- If the "**G**" icon appears when a PID is highlighted, graphic information is available. Press **OK** to view graph.

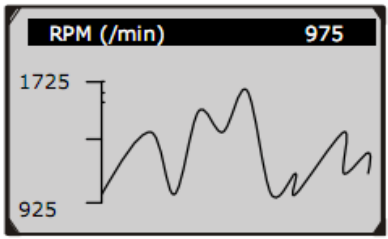


Figure 5.15

3) Press the **ESC** button to return to previous menu.

Viewing Custom Data Set

1) To view customized PID data, use the **UP/DOWN** scroll button to select **Custom Data Set** from **View Data** menu and press the **OK** button. (Figure 5.13)

2) Observe on-screen instructions.

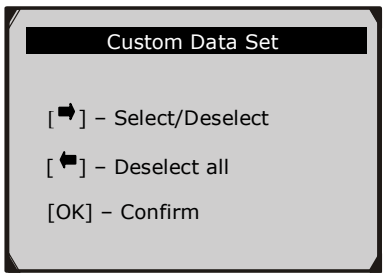


Figure 5.16

3) Use the **RIGHT** button to deselect/select data parameters, and use the **UP/DOWN** scroll button to move up and down. Selected parameters are marked with solid squares.

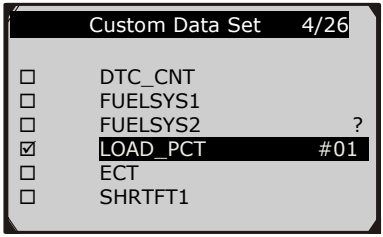


Figure 5.17

- The number "x" to the upper right corner of the screen indicates sequence of highlighted item; and "#x" are the order that the parameters are selected and will be displayed.

- If you want to deselect all marked items or select all items, press the **LEFT** button. A message comes up to ask for your confirmation.

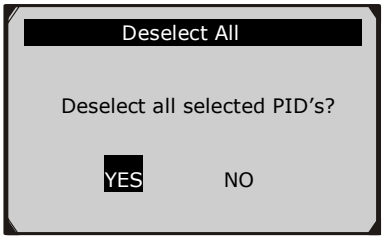


Figure 5.18

- If you decide to deselect these items, press **OK;** if you decide not to, press **ESC** or use the **LEFT/RIGHT** scroll button to select **NO** to continue PID selections.

4) Press the **OK** button to view selected PIDs on screen.

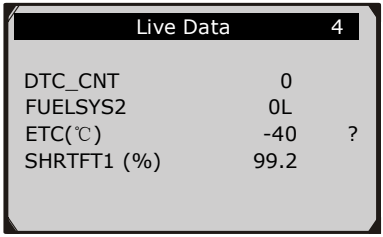


Figure 5.19

5) Use the **ESC** button to return to previous menu.

Recording Data

The Record Data function allows recording vehicle modules' Parameter Identification (PID) data to help diagnose intermittent vehicle problems. A recording includes 5 frames of live data before trigger event and several frames after trigger event.

There are two trigger modes used to record data:

A. Manual Trigger - allows user to press the **OK** button to start recording.

B. DTC Trigger - automatically records PID data when a fault that causes a DTC to set is detected by vehicle.

CAUTION: DO NOT try to drive and operate the scan tool at the same time! Always have another person operate the scan tool while driving.

To record live data, use the **UP/DOWN** scroll button to select **Record Data** from **Live Data** menu and press the **OK** button. (Figure 5.12)

Recording Complete Data Set

1) To record complete set of live data, use the **UP/DOWN** scroll button to select **Complete Data Set** from **Record Data** menu and press the **OK** button.

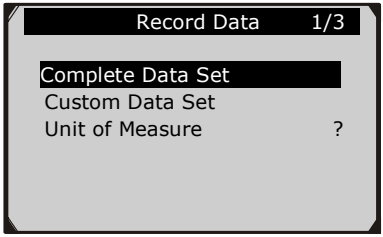


Figure 5.20

2) Use the **UP/DOWN** scroll button to select a trigger mode and press the **OK** button.

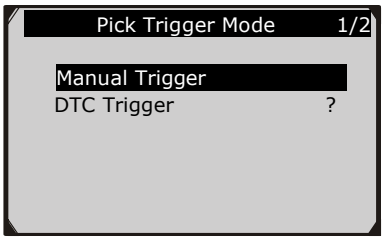


Figure 5.21

- If data from previously tested vehicle is not erased, data from current test will be stored in a temporary cache.

3) Use the **UP/DOWN** scroll button to select a memory location and press the **OK** button.

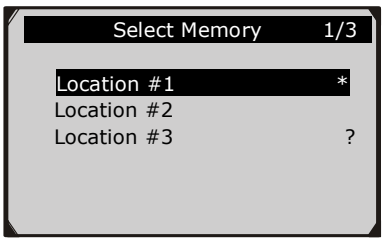


Figure 5.22

- The asterisk (*) icon on the screen indicates that there is a previous recording in the memory location.
- If you select a location marked with an asterisk (*) icon, a message prompting to overwrite old recording displays.

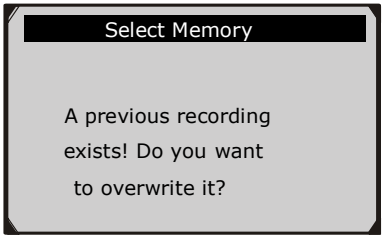


Figure 5.23

- If you wish to proceed with overwriting the old recording, press the **OK** button; if you do not wish to overwrite it, use the **LEFT/RIGHT** button to select **NO** or press the **ESC** button to pick another memory location.

4) Observe on-screen instructions.

- If **Manual Trigger** is selected, following screen shows:



Figure 5.24

- If **DTC Trigger** is selected, following screen shows:

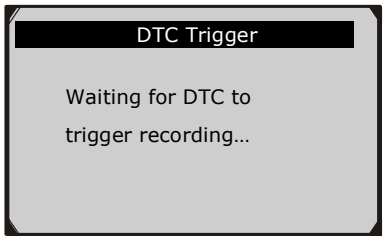


Figure 5.25

5) Wait for DTC to trigger recording or press **OK** to start recording. (Figure 5.26)

◆ ***Drive till a DTC is detected when DTC Trigger is selected. If no DTCs are detected, press ESC to exit recording.***

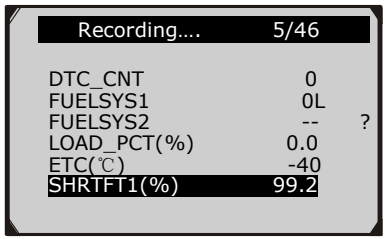


Figure 5.26

- The number "x/x..." to the upper right corner of the screen indicates the maximum frames that can be recorded and the number of recorded frames.

6) The scan tool keeps recording PID data until user presses the **ESC** button, selected memory location is full, or it completes recording. A message prompting to playback data shows on the screen.

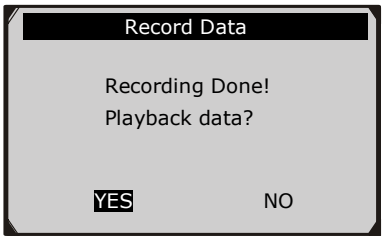


Figure 5.27

- If you wish to playback recorded data, press the **OK** button; if you do not wish to playback, press the **ESC** button, or use **LEFT/RIGHT** button to select **NO** and press the **OK** button to return to **Record Data** menu.

Recording Custom Data Set

1) To record customized data, use the **UP/DOWN** scroll button to select **Custom Data Set** from **Record Data** menu and press the **OK** button. (Figure 5.20)
2) Observe on-screen instructions. (Figure 5.16). Press the **OK** button to continue; press the **ESC** button, or use **LEFT/RIGHT** button to select **NO** and press the **OK** button to return to **Record Data** menu.
3) Use the **RIGHT** button select/deselect data parameters. Selected parameters are marked with solid squares. Press the **OK** button to confirm. (Figure 5.17)
   - If you wish to deselect all marked items, press **LEFT** button.
   - A message comes up to ask for your confirmation.(Figure 5.18)
   - If you decide to deselect these items, press **OK**; if you decide not to, press the **ESC** button, or use the **UP/DOWN** button to select **NO** and press **OK** to continue PID selections.
4) Use the **UP/DOWN** scroll button to select a trigger mode and press the **OK** button.(Figure 5.21)

- If data from previously tested vehicle is not erased, data from current test will be stored in temporary cache.

5) Use the **UP/DOWN** scroll button to select a memory location and press the **OK** button.(Figure 5.22)
   - The asterisk (*) icon on the screen indicates that there is a previous recording in the memory location.
   - If you select a location marked with an asterisk (*) icon, a message prompting to overwrite old recording is displayed.(Figure 5.23)
   - If you do not wish to proceed with overwriting old recording, press the **OK** button; if you do not wish to overwrite it, press the **ESC** button, or use the **LEFT/RIGHT** button to select **NO** and press **OK** to pick another memory location.
6) Observe on-screen instructions.
   - If **Manual Trigger** is selected, following screen shows: (Figure 5.24)
   - If **DTC Trigger** is selected, following screen shows: (Figure 5.25)
7) Wait for DTC to trigger recording or press **OK** to start recording. (Figure 5.26)
8) The scan tool keep recording PID data until user presses **ESC** button, the selected memory location is full, or it completes recording. A message prompting to playback data shows on the screen. (Figure 5.27)
   - If you wish to playback recorded data, press the **OK** button; if you do not wish to playback, press the **ECS** button, or use the **LEFT/RIGHT** button to select **NO** and press the **OK** button to return to **Record Data** menu.

Playback Data

The Playback Data function allows viewing of previously stored PID data.

1) To playback recorded data, use the **UP/DOWN** scroll button to select **Playback Data** from **Live Data** menu and press the **OK** button. (Figure 5.12)

- You are also allowed to playback recorded data immediately after recording.

2) Use the **UP/DOWN** button to select the memory location marked with an asterisk (*) icon.

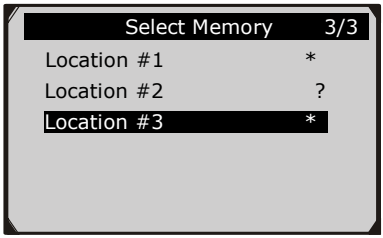


Figure 5.28

- If there is no recording in selected location, a message "**Not Supported or Stored No Data**" displays on the screen.

3) Use the **UP/DOWN** button to view recorded PIDs of each frame.

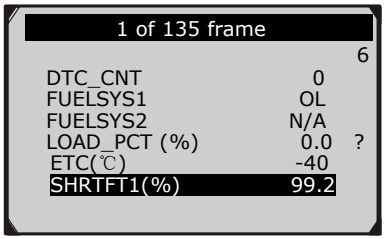


Figure 5.29

4) Use the **LEFT/RIGHT** button to view PIDs of next or previous frames.

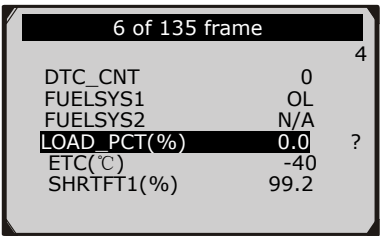


Figure 5.30

5.4 Viewing Freeze Frame Data

Freeze Frame Data allows the technician to view the vehicle's operating parameters at the moment a DTC (Diagnostic Trouble Code) is detected. For example, the parameters may include engine speed (RPM), engine coolant temperature (ECT), or vehicle speed sensor (VSS) etc. This information will aid the technician by allowing the parameters to be duplicated for diagnostic and repair purposes.

1) To view freeze frame data, use the **UP/DOWN** scroll button to select **View Freeze Frame** from **Diagnostic Menu** and press the **OK** button. (Figure 5.4)
2) Wait a few seconds while the scan tool validates the PID MAP.
3) If retrieved information covers more than one screen, use the **DOWN** scroll button, as necessary, until all the data have been shown up.

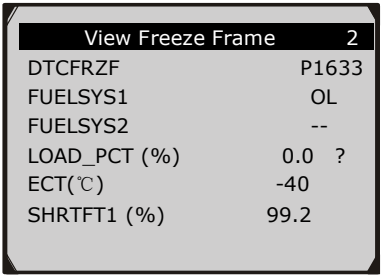


Figure 5.31

- If there is no freeze frame data available, an advisory message "**No freeze frame data stored!**" shows on the display.

4) If you want to view full name of a PID, use the **UP/DOWN** scroll button to select the PID, and press the **HELP** button.

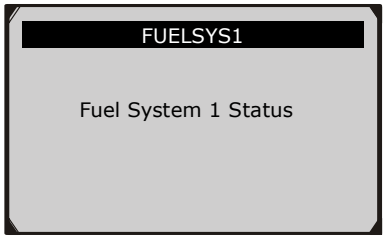


Figure 5.32

5) Press **ESC** button to return to previous screen.

5.5 Retrieving I/M Readiness Status

I/M Readiness function is used to check the operations of the Emission System on OBD2 compliant vehicles. It is an excellent function to use prior to having a vehicle inspected for compliance to a state emissions program.

CAUTION - by clearing trouble codes you also clear the readiness status for the individual emission system readiness tests. In order to reset these monitors, the vehicle must be driven through a complete drive cycle with no trouble codes in memory. Times for reset vary depending on vehicle.

Some latest vehicle models may support two types of **I/M Readiness** tests:

A. ***Since DTCs Cleared*** - indicates status of the monitors since the DTCs are erased.

B. ***This Drive Cycle*** - indicates status of monitors since the beginning of the current drive cycle.

An I/M Readiness Status result of "NO" does not necessarily indicate that the vehicle being tested will fail the state I/M inspection. For some states, one or more such monitors may be allowed to be "Not Ready" to pass the emissions inspection.

- **"OK"** -- Indicates that a particular monitor being checked has completed its diagnostic testing.
- **"INC"** -- Indicates that a particular monitor being checked has not completed its diagnostic testing.
- **"N/A"** -- The monitor is not supported on that vehicle.

There are two ways to retrieve I/M readiness status.

A. Retrieve I/M Readiness status with One-Click I/M Readiness Key

By simply pressing the **One-Click I/M Readiness Key,** you can retrieve the I/M readiness status. The screen will show as below. (Figure 5.33) According to different readiness status, the color LEDs will illuminate and different audio tones will be heard.

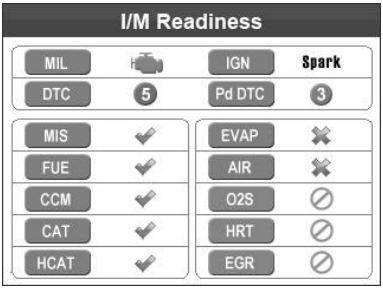


Figure 5.33

"**OK**" -- Indicates that a particular monitor being checked has completed its diagnostic testing.

"**INC**" -- Indicates that a particular monitor being checked has not completed its diagnostic testing.

 "**N/A**" -- The monitor is not supported on the vehicle.

The green, yellow and red LEDs provide a quick way to help you determine if a vehicle is ready for an Emission Test.

The LED and audio tone indications are interpreted as below:

LED Interpretation

1) **GREEN LED** – Indicates that engine systems are "OK" and operating normally (the number of Monitors supported by the vehicle which have run and performed their self-diagnostic testing is in the allowed limit. MIL is off.).There are no stored and pending DTCs. The vehicle is ready for an Emissions Test, and there is a good possibility that it can be certified.

2) **YELLOW LED** – With MIL off, there may be three possible conditions to cause the yellow LED to light.

   - ✧ If a "Stored" Diagnostic Trouble Code is causing the Yellow LED to light, it is still possible that the vehicle will be allowed to be tested for emissions and certified.
   - ✧ If a "Pending" Diagnostic Trouble Code is causing the Yellow LED to light, it is still possible that the vehicle will be allowed to be tested for emissions and certified.
   - ✧ If the illumination of the Yellow LED is being caused by monitors that have not completed their diagnostic testing, then the issue of the vehicle being ready for an Emissions Test depends on the emissions regulations and laws of your local area.

***NOTE**: From the code retrieval procedure, determine the status of each Monitor. Take this information to an emissions professional to determine (based on your test results) if your vehicle is ready for an Emissions Test.*

3) **RED LED** – Indicates there is a problem with one or more of the vehicle's system. A vehicle displaying a red LED is

definitely not ready for an Emissions Test. The red LED is also an indication that there are DTCs present. The MIL lamp on the vehicle's instrument panel will light steady. The problem that is causing the red LED to light must be repaired before an Emissions Test can be performed. It is also suggested that the vehicle be inspected/repaired before driving the vehicle further.

If the RED LED was obtained, there is a definite problem present in the system(s). In these cases, you have the following options:

- ✧ Repair the vehicle yourself. If you are going to perform the repairs yourself, proceed by reading the vehicle service manual and following all its procedures and recommendations.
- ✧ Take the vehicle to a professional to have it serviced. The problem(s) causing the red LED to light must be repaired before the vehicle is ready for an Emissions Test.

Audio Tone Interpretation

The audio tone is configured according to the I/M Readiness Status. This function is invaluable when performing diagnostics and driving at the same time , or working in bright areas where LED illumination alone is not sufficient.

Different audio tone with different LED light indicates different I/M Readiness Status.

LED Light	Audio Tone	Beep Interval
Green LED	Two long beeps	5 seconds
Yellow LED	short, long, short beep	5 seconds
Red LED	Four short beeps	5 seconds

After you have read the information, press **ESC** to exit. The other buttons are disabled to prevent misoperation.

B. Retrieve I/M Readiness status in typical way

1) Use the **UP/DOWN** scroll button to select **I/M Readiness** from **Diagnostic Menu** and press **OK** button. (Figure 5.4)

2) Wait a few seconds while the scan tool validates the PID MAP.

3) If the vehicle supports both types of tests, then both types will be shown on the screen for selection.

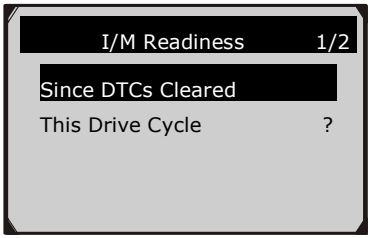


Figure 5.34

4) Use the **UP/DOWN** scroll button, as necessary, to view the status of the MIL light (**ON** or **OFF**) and the following monitors.

For spark ignition engines:

- **MIS --** Misfire Monitor
- **FUEL --** Fuel System Monitor
- **CCM --** Comprehensive Component Monitor
- **EGR** – EGR System Monitor
- **O2S --** O2 Sensors Monitor
- **CAT --** Catalyst Monitor
- **EVAP --** Evaporative System Monitor
- **HTR --** O2 Sensor Heater Monitor
- **AIR --** Secondary Air Monitor
- **HCAT --** Heated Catalyst Monitor

For compression ignition engines:

- **MIS --** Misfire Monitor
- **FUEL --** Fuel System Monitor
- **CCM --** Comprehensive Component Monitor
- **EGR** – EGR System Monitor
- **HCCAT --** NMHC Catalyst Monitor
- **NCAT --** NOx Aftertreatment Monitor
- **BP --** Boost Pressure System Monitor
- **EGS --** Exhaust Gas Sensor Monitor
- **PM --** PM Filter Monitor

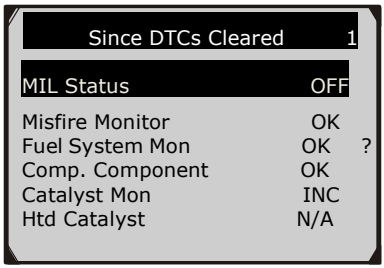


Figure 5.35

5) If the vehicle supports readiness test of "**This Drive Cycle**", a screen of the following displays:

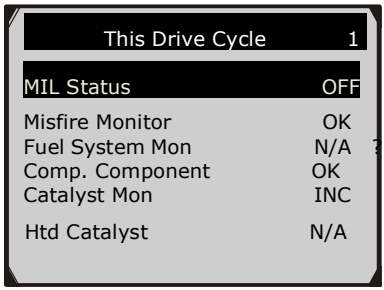


Figure 5.36

6) The LEDs and audio tone corresponding to different monitor status will be activated as below.

LED Light	Audio Tone	Beep Interval
Green LED	Two long beeps	2 minutes
Yellow LED	short, long, short beep	2 minutes
Red LED	Four short beeps	2 minutes

7) Use the **UP/DOWN** scroll button for more PIDs if additional information is available on more than one page. Or use the **LEFT/RIGHT** scroll button to view PIDs in the previous/next page.

8) Press the **ESC** button to return to **Diagnostic Menu.**

5.6 O2 Monitor Test

OBD2 regulations set by SAE require that relevant vehicles monitor and tests on the oxygen (O2) sensors to identify problems related to fuel efficiency and vehicle emissions. These tests are not on-demand tests and they are done automatically when engine operating conditions are within specified limits. These test results are saved in the on-board computer's memory.

The O2 Monitor Test function allows retrieval and viewing of O2 sensor monitor test results for the most recently performed tests from the vehicle's on-board computer.

The O2 Monitor Test function is not supported by vehicles which communicate using a controller area network (CAN). For O2 Monitor Test results of CAN-equipped vehicles, see *5.7 "On-Board Monitor Test".*

1) Use the **UP/DOWN** scroll button to select **O2 Monitor Test** from **Diagnostic Menu** and press **OK** button. (Figure 5.4)

2) Wait a few seconds while the scan tool validates the PID MAP.

3) Use the **UP/DOWN** scroll button to select O2 sensor from **O2 Monitor Test** menu and press **OK** button.

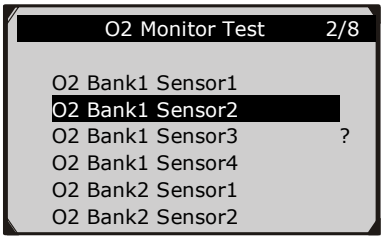


Figure 5.37

- If the vehicle does not support the mode, an advisory message will be displayed on the screen.

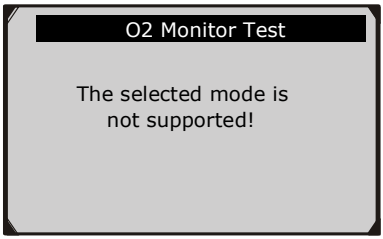


Figure 5.38

4) View test results of selected O2 sensor.

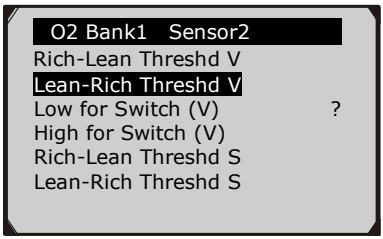


Figure 5.39

5) Use the **UP/DOWN** scroll button to view more screens of data if additional information is available in more than one page.

6) Press the **ESC** button to return to the previous menu.

5.7 On-Board Monitor Test

The On-Board Monitor Test is useful after servicing or after erasing a vehicle's control module memory. The On-Board Monitor Test for non-CAN-equipped vehicles retrieves and displays test results for emission-related power train components and systems that are not continuously monitored. The On-Board Monitor Test for CAN-equipped vehicles retrieves and displays test results for emission-related power train components and systems that are and are not continuously monitored.

The scan tool allows access to the results of on-board diagnostic monitoring tests for specific components/systems. The vehicle manufacturer is responsible for assigning "Manufacturer Defined Test IDs" and Component IDs for tests of different systems and components. The advanced feature of this scan tool enables you to read the definition of an On-Board Diagnostic Monitor ID.

NOTE: The scan tool will display a Test definition only if this test definition is present in the vehicle's computer memory. If no such definition is present, the scan tool will just display the Test IDs.

In this test, there are typically a minimum value, a maximum value, and a current value for each monitor. By comparing the current value with the minimum and maximum value, the scan tool will determine if it is OK.

1) Use the **UP/DOWN** scroll button to select **On-Board Mon. Test** from **Diagnostic Menu** and press the **OK** button. (Figure 5.4)

2) Wait a few seconds while the scan tool validates the PID MAP.

3) The scan tool will prompt you to select the vehicle make.

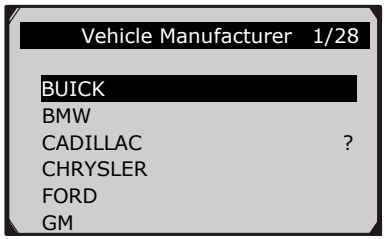


Figure 5.40

4) After you select the vehicle manufacturer, the scan tool shows the On-Board Monitors test results for specific monitored systems.

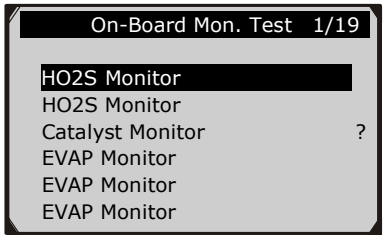


Figure 5.41

5) From **On-Board Mon. Test** menu, use the **UP/DOWN** scroll button to select a test to view and press the **OK** button. Or, use the **LEFT/RIGHT** scroll button to view previous/next screen of test items.

- If the vehicle under test does not support the mode, an advisory message will be displayed on the screen.

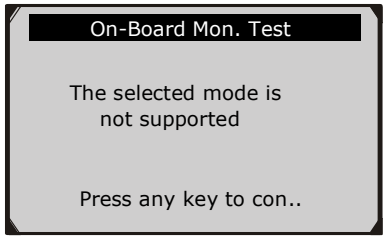


Figure 5.42

- For CAN-equipped vehicles, test selections can be as below:

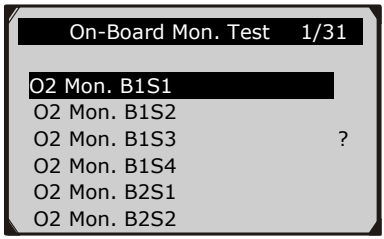


Figure 5.43

6) Use the **UP/DOWN** scroll button to select the desired monitor from **On-Board Mon. Test** menu and press the **OK** button.

7) View test data on screen.

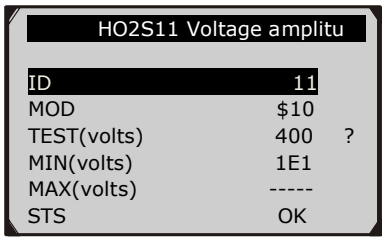


Figure 5.44

NOTE: If the On-Board Monitor Test failed, this monitor item will be red color. Just by the text color you may easily find out which system is at fault.

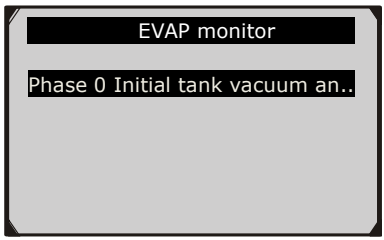


Figure 5.45

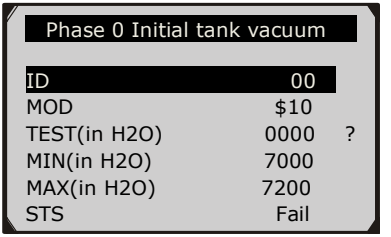


Figure 5.46

8) Press **ESC** button to return to the previous menus.

5.8 Component Test

The Component Test function allows initiating a leak test for the vehicle's EVAP system. The scan tool itself does not perform the leak test, but commands the vehicle's on-board computer to start the test. Different vehicle manufacturers might have different criteria and methods for stopping the test once it has been started. Before starting the Component Test, refer to the vehicle service manual for instructions to stop the test.

1) Use the **UP/DOWN** scroll button to select **Component Test** from **Diagnostic Menu** and press the **OK** button. (Figure 5.4)
2) Wait for the scan tool to display the **Component Test** menu.

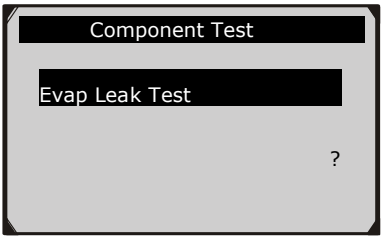


Figure 5.47

3) If the test has been initiated by the vehicle, a confirmation message will be displayed on the screen.

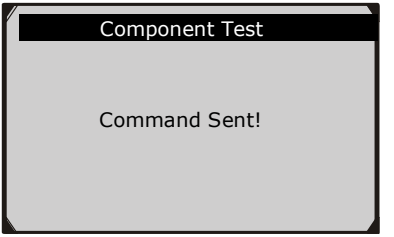


Figure 5.48

- Some vehicles do not allow scan tools to control vehicle systems or components. If the vehicle under test does not support the EVAP Leak Test, an advisory message is displayed on the screen.

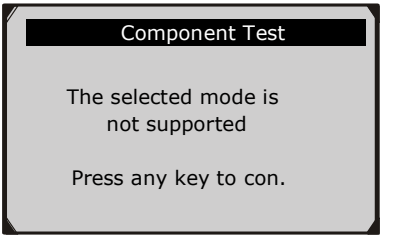


Figure 5.49

4) Wait a few seconds or press any key to return to previous screen.

5.9 Viewing Vehicle Information

The Vehicle Info. function enables retrieval of Vehicle Identification No. (VIN), Calibration ID Nos. (CINs), Calibration Verification Nos. (CVNs) and In-use Performance Tracking on 2000 and newer vehicles that support Mode 9.

1) Use **UP/DOWN** scroll button to select **Vehicle Info.** from the **Diagnostic Menu** and press **OK** button. (Figure 5.4)

2) An advisory message comes up to remind you. Wait a few seconds or press any key to continue.

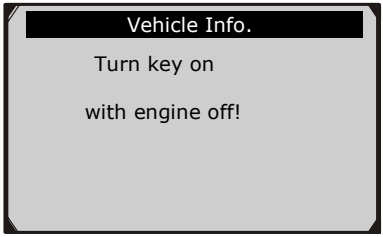


Figure 5.50

3) Wait a few seconds while the scan tool reads vehicle information.

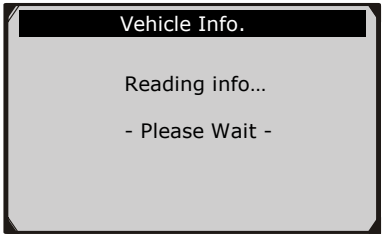


Figure 5.51

- If the vehicle does not support this mode, a message shows on the display warning that the mode is not supported.

4) From **Vehicle Info.** Menu, use the **UP/DOWN** scroll button to select an available item to view and press the **OK** button.

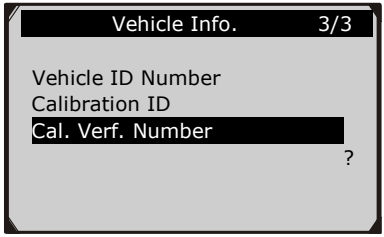


Figure 5.52

5) View retrieved vehicle information on screen.

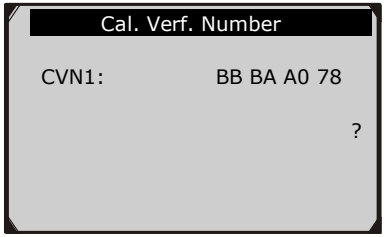


Figure 5.53

6) Press the **ESC** button to return to previous menu.

5.10 Modules Present

The Modules Present function allows viewing of the module IDs and communication protocols for OBD2 modules in the vehicle.

1) Use the **UP/DOWN** scroll button to select **Modules Present** from **Diagnostic Menu** and press **OK** button. (Figure 5.4)
2) View modules present with their IDs and communication protocols.

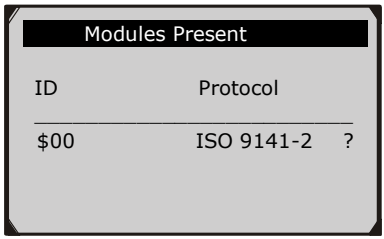


Figure 5.54

3) Press the **ESC** button to return to previous menu

5.11 Code Breaker

Code breaker function is used to provide descriptions of DTCs and helpful tips to deal with DTCs. It is useful for technicians to find the root cause of trouble code faster, saving diagnosis and repair time.

1) Repeat steps in the **Read Codes** section to identify DTCs. (Figure 5.55)

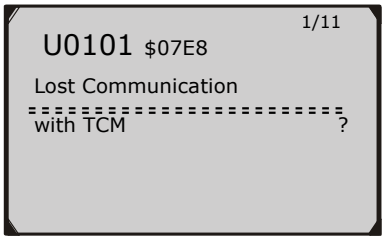


Figure 5.55

1) Press the ⓘ **Help** button to display **Code Breaker** menu.

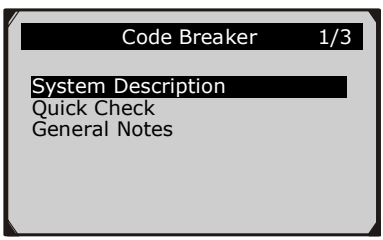


Figure 5.56

2) Click on **System Description** and **Quick Check** to read the code information, symptoms, specifications, data/sensor information, etc.

3) Click on **General Notes** to view helpful repair information of DTCs.

4) To return to previous screen, press **ESC** button.

6. Ready Test

This function can be used as a convenient readiness test tool by automotive technicians to determine if the tested vehicle is ready for an emission test. By visual and audible indication, you will learn a vehicle's monitors readiness.

6.1 General Information

Repairs to the emissions-control systems of a 1996 or newer vehicle cause the vehicle's computer (ECU) memory to be cleared. The vehicle must go through a drive cycle to allow the ECU to perform a series of tests to ensure that the repair was successful, and before a state mandated emissions test can be conducted. But how will you know when it is ready?

With this scan tool, you don't have to drive around endlessly and continuously coming back to the repair shop for retest if all required tests by the ECU are completed. And you could also do a quick check of the vehicle to determine if it is ready to receive an emission test without the hassle of connecting your vehicle to the analyzer or having to use a complicated scan tool.

In the following cases, this function is especially useful.

- You bought a used car and the check engine light had been cleared to mask potential problems.
- You disconnected the battery for tune-ups and other engine repairs, dead battery replacement, car radio installation and car alarm installation.
- You used a scan tool to clear the DTCs.
- Your car has been sent to repair.

6.2 Ready Test Application

The purpose of this function is to indicate which of the vehicle's monitors have run and completed their diagnosis and testing, and

which ones have not yet run and completed testing and diagnosis of their designated sections of the vehicle's emission system. All data shows on one screen, which provides a simple profile of vehicle at a glance, saving diagnosis time and improving technician productivity.

- Use the **UP/DOWN** scroll button and **LEFT/RIGHT** scroll button to select **Ready Test** from **Main Screen** (Figure 6.1), and press the **OK** button.

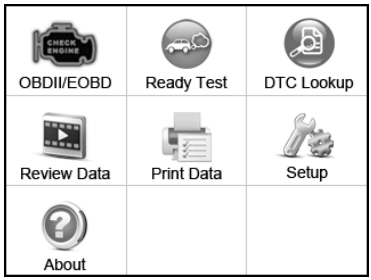


Figure 6.1

As post-repair diagnostic tool

This function can be used (after the vehicle has done any emission-related repairs) to confirm that the repair has been performed successfully.

After repairs, some drive cycles are required to reset the monitoring systems. Drive cycles vary among vehicles and for each monitor in any particular vehicle.

Use the following procedure to check if the repair has been done correctly:

1) Connect the scan tool to the vehicle's DLC and erase the DTC(s) from the vehicle's computer memory. (***see 5.2 Erasing Codes***)

2) After the erase procedure is performed, status of most monitors will be changed. Leave the scan tool connected to the vehicle, and select **Ready Test** from **Main Screen.**

3) Keep on driving the car till the scan tool notifies you safely with color LEDs and audible tone that the drive cycle has been completed and the vehicle is ready, eliminating drive cycle guesswork and confirming readiness status.

4) If the GREEN LED lights and two long beeps are heard, your vehicle is ready and the repair work is confirmed.

5) If the RED LED lights, your vehicle is not ready and the repair work is unsuccessful.

As pre-check diagnostic tool

Prior to having a vehicle inspected for compliance to a state emissions test, you could use this function to check the readiness status first by yourself.

1) While the scan tool is connected to the vehicle, select **Ready Test** from **Main Screen**. Drive the car till the scan tool notifies you safely with color LEDs and audible tone if your vehicle is ready to conduct state emission test.

2) If the GREEN LED lights and two long beeps are heard, your vehicle is ready and there is a good possibility that it can be certified.

3) If the RED LED lights, your vehicle is not ready and must be repaired before an emissions test can be performed.

IMPORTANT: If you are driving the vehicle to perform a drive cycle ALONE, please set the Status Beep On (see 3.8 System Setup). By listening to the beep, you will learn when the monitors have run and completed the diagnostic testing. NEVER try to drive and operate the scan tool at the same time!

NOTE: This function reads off the real time data of emission-related monitoring systems readiness status. Once the scan tool has finished other operations, for example, clearing trouble

codes, the I/M Readiness Monitor Status program resets status of all the monitors to "INC" condition. In order to set these monitors to a Ready status, the vehicle must be driven through a complete drive cycle. Times for reset vary depending on vehicle. Please refer to your vehicle's service manual for drive cycle information.

NOTE: In this function, only ESC button is available. The other buttons are disabled to prevent misoperation.

6.3 LED and Tone Interpretation

Select **Ready Test** from the **Main Screen** and the screen shows as below, including applicable monitors status, MIL state, Ignition type, DTCs (stored one and pending one).

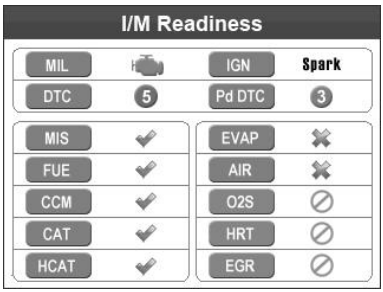


Figure 6.2

If the scan tool is idle, it will show the result immediately. If it is busy, it will wait till the current procedure finished. After viewing the status, press **ESC** button to exit.

"**OK**" -- Indicates that a particular monitor being checked has completed its diagnostic testing.

"**INC**" -- Indicates that a particular monitor being checked has not completed its diagnostic testing.

"**N/A**" -- The monitor is not supported on the vehicle.

The LED and audio tone indications are interpreted as below:

LED Interpretation

The green and red LEDs provide an easy way to check if emission-related monitoring systems complete their self-diagnostic testing.

1) **GREEN LED** – Your vehicle is **Ready**. Indicates that engine systems are "OK" and operating normally (the number of Monitors supported by the vehicle which have run and performed their self-diagnostic testing is in the allowed limit).

2) **RED LED** –Your vehicle is **Not Ready**. Indicates that the number of Monitors supported by the vehicle which have run and performed their self-diagnostic testing is out of the allowed limit.

Audio Tone Interpretation

The audio tone could be configured according to the I/M Readiness Status. This function is invaluable when performing diagnostics and driving at the same time, or working in bright areas where LED illumination alone is not sufficient.

LED Light	Audio Tone	Beep Interval
Green LED	Two long beeps	2 minutes
Red LED	No beep	

7. Print Data

The Print Data function allows printing out diagnostic data recorded by the scan tool or customized test reports.

- ***To print out retrieved data, you need the following tools:***

AutoLink® AL519 scan tool

A PC or laptop with USB ports

A USB cable

1) Install Maxi-LinkII applications through the included CD, or downloading the applications from our website: www.autel.com or our distributors' site.
2) Connect the scanner to computer with the USB cable supplied.
3) Run Maxi-LinkII Tool Kit in your computer.



Figure 7.1

4) Use the **UP/DOWN** scroll button to select **Print Data** from **Main Menu** in the scan tool, and press the **OK** button. (Figure 3.1)
5) Use the **UP/DOWN** scroll button to select the desired item to print from **Print Data** menu.

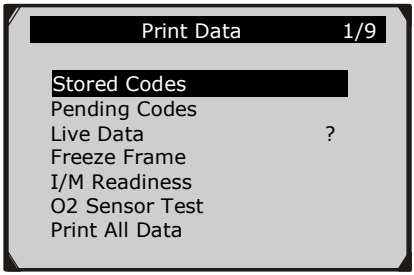


Figure 7.2

- To print all retrieved data, use the **UP/DOWN** scroll button to select **Print All Data** from **Print Data** menu.

6) Press the **OK** button to upload data to the computer.

7) In the Maxi-Link Tool Kit, you could edit, delete, copy and print the data in the textbox by selecting the icons on the upper right of window.

 Print data.

 Delete data.

 Copy data.

 Edit data.

***NOTE**: Data stored in a language different from current system settings of the scan tool will not be printable. Please adjust language settings before printing. A reminder would pop up under such circumstances.*

8. Warranty and Service

8.1 Limited One Year Warranty

Autel warrants to its customers that this product will be free from all defects in materials and workmanship for a period of one (1) year from the date of the original purchase, subject to the following terms and conditions:

1) The sole responsibility of Autel under the Warranty is limited to either the repair or, at the option of Autel, replacement of the scan tool at no charge with Proof of Purchase. The sales receipt may be used for this purpose.

2) This warranty does not apply to damages caused by improper use, accident, flood, lightning, or if the product was altered or repaired by anyone other than the Manufacturer's Service Center.

3) Autel shall not be liable for any incidental or consequential damages arising from the use, misuse, or mounting of the scan tool. Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

4) All information in this manual is based on the latest information available at the time of publication and no warranty can be made for its accuracy or completeness. Autel reserves the right to make changes at any time without notice.

8.2 Service Procedures

If you have any questions, please contact your local store, distributor or visit our website at www.autel.com.

If it becomes necessary to return the scan tool for repair, contact your local distributor for more information.