

SELF-DIAGNOSTIC SYSTEMS

General Information

All vehicles covered by this manual have self-diagnostic capabilities. Malfunctions in the engine control system are found through the Self-Test procedure. The vehicles covered by this manual use the Electronic Engine Control-IV (EEC-IV) system, which utilizes a Self-Test divided into 3 specialized tests: Key On Engine Off Self-Test, Engine Running Self-Test and Continuous Self-Test. The Self-Test is not a conclusive test by itself, but is used as a part of a functional Quick Test diagnostic procedure. The computer control module stores the Self-Test program in its permanent memory. When activated, it checks the EEC-IV system by testing its memory integrity and processing capability, then verifies that various sensors and actuators are connected and operating properly. The Key On Engine Off and Engine Running Self-Tests are functional tests which only detect faults present at the time of the Self-Test. Continuous Self-Test is an ongoing test that stores fault information in Keep Alive Memory (KAM) for retrieval at a later time.

Fault information is communicated through the Self-Test service codes. These service codes are 2-digit or 3-digit numbers representing the results of the Self-Test. The service codes are transmitted on the Self-Test output line found in the vehicle Self-Test connector. They are in the form of timed pulses and can be read on a voltmeter, STAR or SUPER STAR II tester and the malfunction indicator light.

Reading Codes

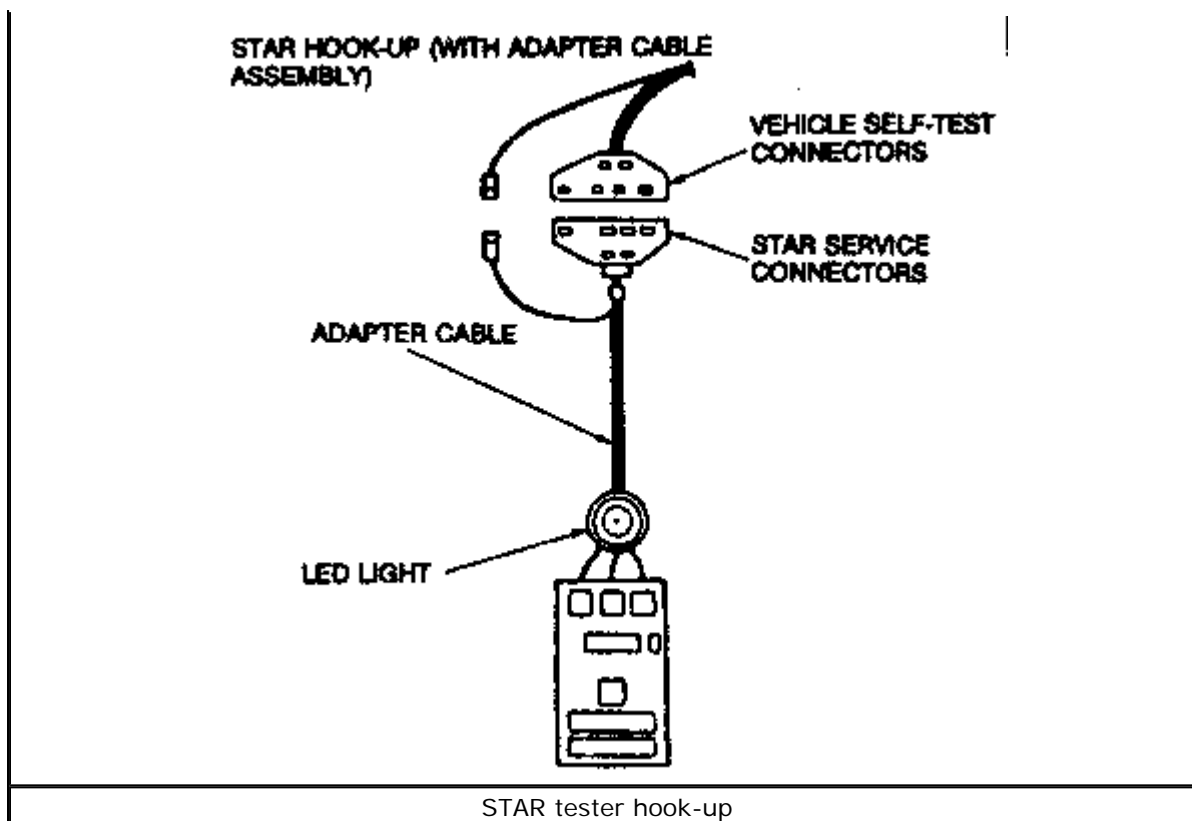
VEHICLE PREPARATION

1. **Apply the parking brake, place the transaxle shift lever firmly into P on automatic transaxle or Neutral on manual transaxles, and block the drive wheels.**
2. **Turn all electrical loads (radio, lights, blower fan, etc.) OFF.**

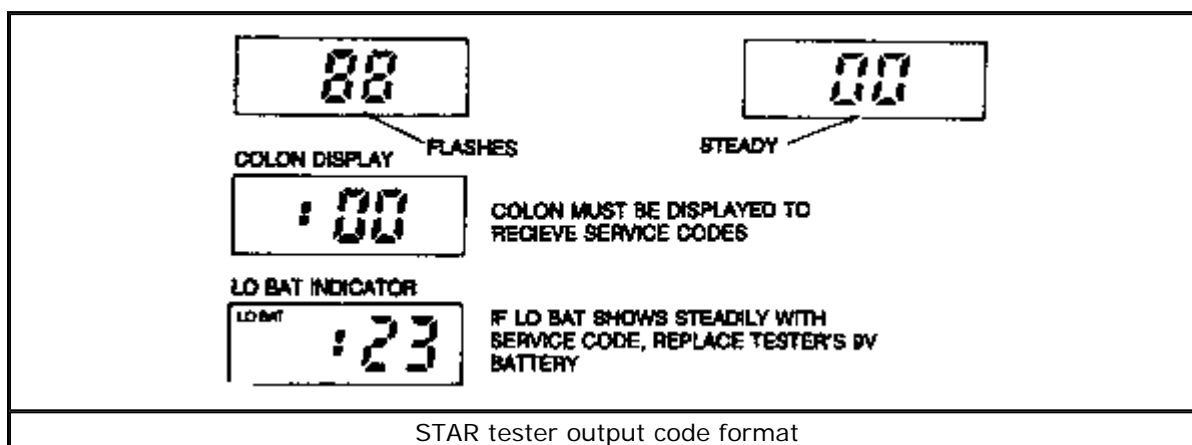
USING THE STAR OR SUPER STAR II TESTER

The STAR tester cannot be used to read 3-digit service codes. If the STAR tester is used on a 3-digit service code application, the display will be blank. The SUPER STAR II tester must be used to read 3-digit service codes.

After hooking up the STAR tester and turning on its power switch, the tester will run a display check and the numerals **88** will begin to flash in the display window. A steady **00** will then appear, indicating that the STAR tester is ready. To receive service codes, press the button on the front of the STAR tester. The button will latch down and a colon will appear in the display window in front of the **00** numerals. The colon must be displayed to receive the service codes.



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If it is desired to clear the display window during the Self-Test, turn **OFF** the vehicle's engine, press the tester's button once to unlatch it, then press the button again to latch down the button.

Connect the STAR or SUPER STAR II tester as follows:

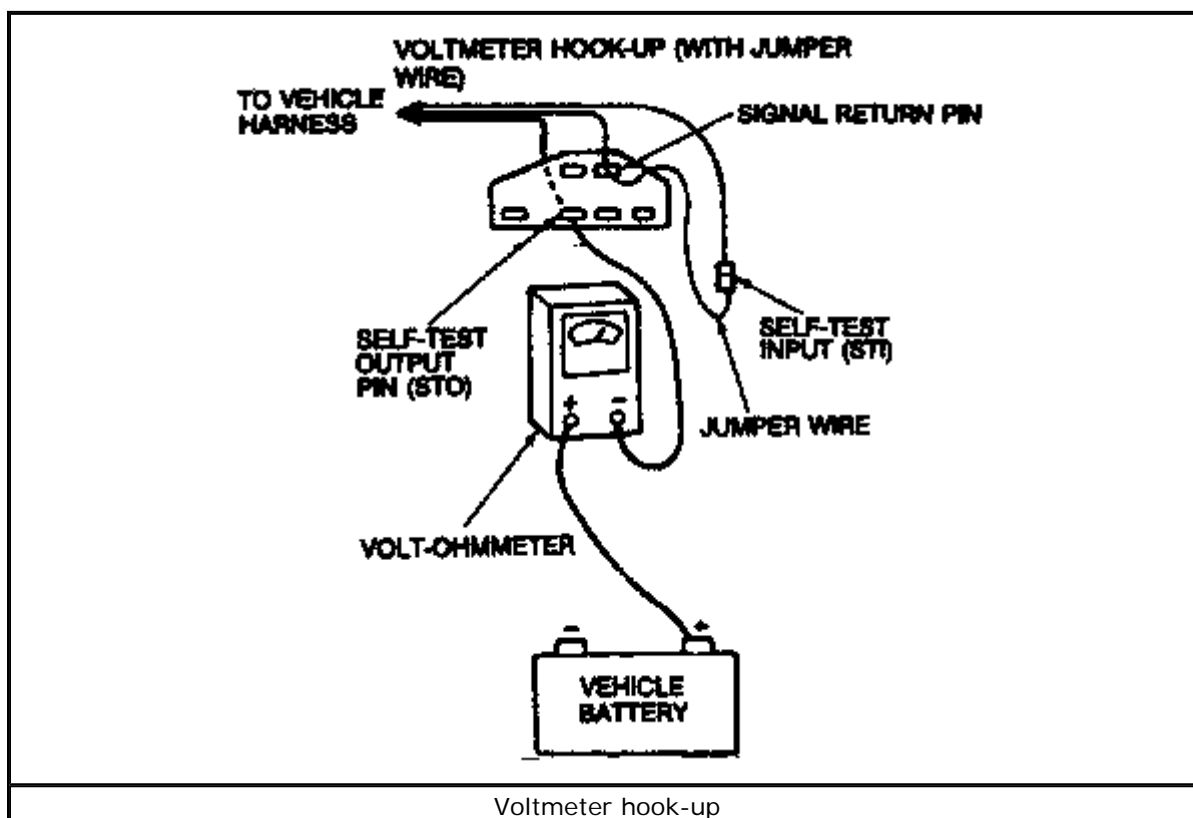
1. Turn the ignition **OFF**.
2. Connect the color coded adapter cable to the STAR tester.
3. Connect the adapter cable leads to the proper Self-Test connectors.
4. Ground the adapter cable for vehicles using the SUPER STAR II tester.
5. Slide the SUPER STAR II tester switch to the MECS or EEC-IV position, according to the vehicle system.

USING THE ANALOG VOLTMETER

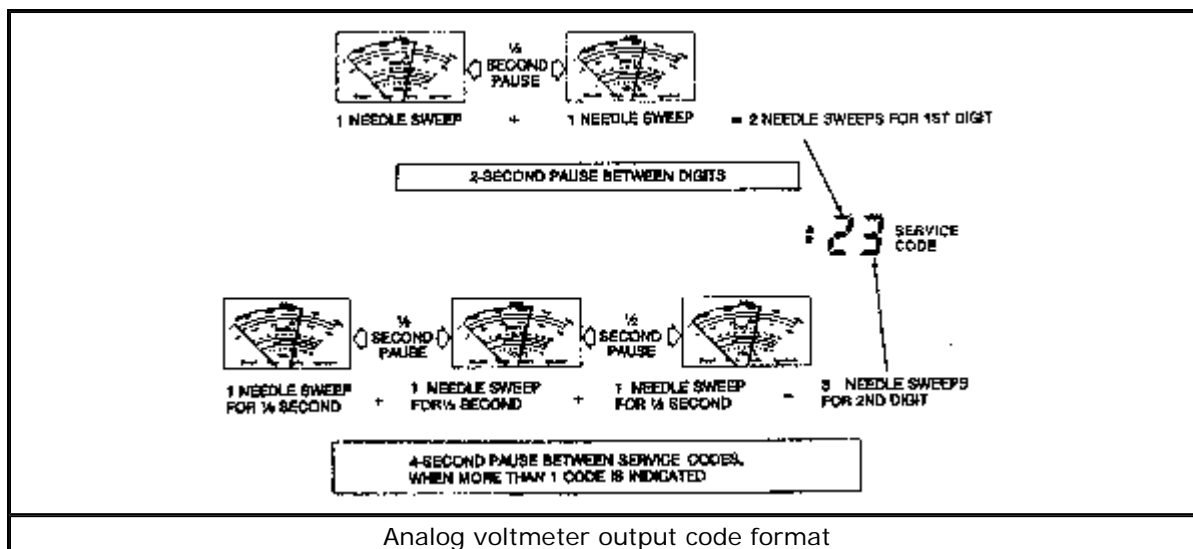
Service codes will be represented by pulsing or sweeping movements of the voltmeter's needle across the dial face of the voltmeter. Therefore, a single digit number of 3 will be reported by 3 needle sweeps. However, a service code is represented by a 2-digit or 3-digit number, such as 23. As a result, the Self-Test service code of 23 will appear on the voltmeter as 2 needle sweeps, then after a 2 second pause, the needle will sweep 3 times.

Connect the analog voltmeter as follows:

1. Turn the ignition OFF.



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2. Set the voltmeter on a DC voltage range to read from 0-20 volts.
3. On all EEC-IV vehicles, connect the voltmeter from the battery positive post to the Self-Test Output (STO) pin of the large Self-Test connector. On all other vehicles, connect the positive voltmeter lead to the EEC STO line and the negative lead to engine ground, then jumper the EEC Self-Test Input (STI) to ground.

USING THE MALFUNCTION INDICATOR LIGHT (MIL)

During the Self-Test, a service code is reported by the malfunction indicator light. It will represent itself as a flash on the CHECK ENGINE or SERVICE ENGINE SOON light on the dash panel. A single digit number of 3 will be reported by 3 flashes. However, a service code is represented by a 2-digit or 3-digit number, such as 23. As a result, the Self-Test service code of 23 will appear on the MIL light as 2 flashes, then, after a 2 second pause, the light will flash 3 times.

KEY ON ENGINE OFF SELF-TEST

Start the engine and let it run until it reaches normal operating temperature. Turn the engine **OFF** and activate the Self-Test.

1. If using the STAR tester, proceed as follows:
 1. Latch the center button in the down position.
 2. Place the ignition key in the ON position.
 3. Record all service codes displayed.
2. If using the SUPER STAR II tester, proceed as follows:
 1. Latch the center button in the TEST position.
 2. Turn the ignition key ON.
 3. Turn the tester ON ; the tester will sound and 888 will be displayed for 2 seconds.
 4. Unlatch and relatch the center test button. After all codes are received, unlatch the center button to review all codes retained in tester memory. The SUPER STAR II tester has a mode switch. The tester will only display 3-digit service codes in fast code mode. If slow code mode is used on 3-digit service code applications, the display will be blank.
3. If using the analog voltmeter, jumper the Self-Test Input (STI) to the Signal Return (SIG RTN) at the Self-Test connectors, then, turn the ignition key and the voltmeter ON. Observe the needle for any code indications and record.
4. If using the malfunction indicator light; connect the jumper wire from STI to the SIG RTN at the Self-Test connectors and turn the ignition switch ON. Service codes will be flashed on the MIL.

ENGINE RUNNING SELF-TEST

1. Deactivate the Self-Test.
2. Start and run the engine at 2000 rpm for 2 minutes.
3. Turn the engine OFF and wait 10 seconds.
4. Activate the Self-Test.

5. Start the engine.
6. Record all service codes displayed.

Engine identification codes are issued at the beginning of the Engine Running Self-Test and are 1-digit numbers represented by the number of pulses sent out. The engine identification code is equal to $\frac{1}{2}$ the number of engine cylinders. Two pulses equals 4 cylinders. The identification codes are used to verify that the proper processor is installed and that the Self-Test has been entered.

Clearing Codes

CONTINUOUS MEMORY

Do not disconnect the battery to clear continuous memory codes. This will erase the Keep Alive Memory (KAM) information which may cause a driveability concern.

1. Run the Key On Engine Off Self-Test.
2. When the service codes begin to be displayed, deactivate the Self-Test as follows:
 1. STAR tester: unlatch the center button to the UP position.
 2. Analog voltmeter and MIL: remove the jumper wire from between the Self-Test Input (STI) connector and the signal return pin of the Self-Test connector.
 3. The continuous memory codes will be erased from the ECU memory.

KEEP ALIVE MEMORY (KAM)

The computer control module stores information regarding vehicle operating conditions and uses this information to compensate for component tolerances. Whenever an emission related component is replaced, the Keep Alive Memory (KAM) should be cleared to erase the information stored by the control module from the original component.

To clear KAM, disconnect the negative battery cable for at least five minutes. After the KAM has been cleared, the vehicle may exhibit certain driveability concerns. If this is the case, it will be necessary to drive the vehicle at least 10 miles (16 km) for the computer to relearn the values for optimum driveability and performance.