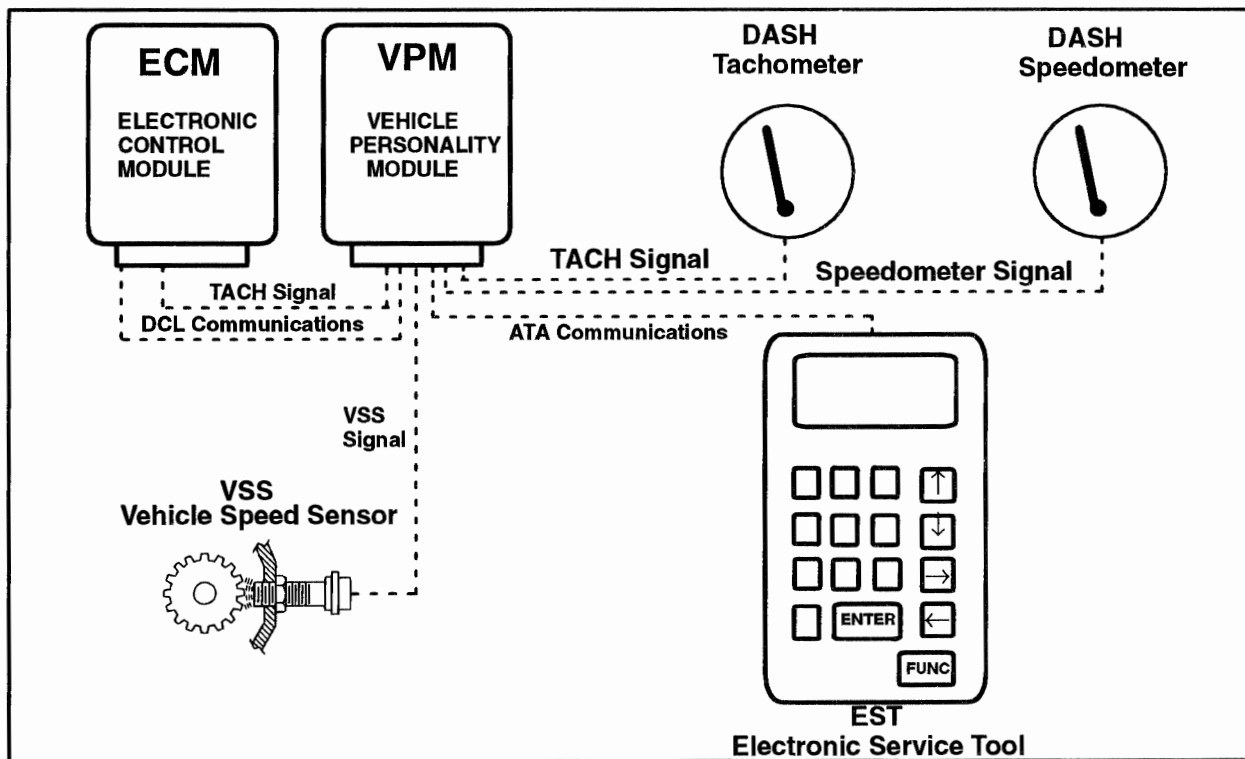


## ELECTRONIC CONTROL SYSTEM DIAGNOSTICS

### VEHICLE PERSONALITY MODULE (VPM)

#### VEHICLE PERSONALITY MODULE



#### CIRCUIT FUNCTIONS

The VPM (Vehicle Personality Module) serves four major functions.

##### **Programming**

- Provides the factory the ability to set Engine Ratings and Horsepower.
- Accommodates field re-programming for changes to tire size, rear axle, transmission changes etc.
- Enables and allows adjustment to "Customer Features" such as cruise control set points, road speed limiting, PTO speeds.

##### **Diagnostics fault retrieval and command of special operator on-demand tests.**

With the use of an EST (Electronic Service Tool) the VPM will allow for:

- Retrieval of continuous fault codes set in either the IDM, ECM and VPM.
- Command of special diagnostic tests such as injector tests, engine running tests, output state and wiggle tests.
- Display of engine and vehicle PID's (parameters) on a real time basis. (eg. coolant temperature, engine speed, cruise control switch position, etc.)

##### **Stores accumulated values/logs engine events**

- Vehicle Miles/Hours/Fuel used

- Logs engine events such as over heat, low oil pressure and over speed conditions.

##### **Drives dash tachometer and speedometer**

- Receives inputs from the ECM and TACH sensor.
- Buffers signals and drives instrument panel TACH and Speedometer gauges
- Communicates vehicle speed to the ECM.

#### FAULT DETECTION MANAGEMENT

The VPM has the ability to detect internal fault conditions such as incorrect programming, not ever being programmed, wrong configuration of ECM and VPM, corrupted memory and lost memory situations.

External fault conditions, such as loss of DCL/ATA communication, VSS and KAM (Keep Alive Power) circuit faults are covered in previous sections of this manual.

Management of a VPM detected fault will vary with the severity of the fault. The more severe faults will only allow the vehicle to operate in field defaults which will curtail horsepower (normally the lowest horsepower rating available in that engine family) and disable customer features, less severe faults will only log a code.

### PROGRAMMING AND SOFTWARE FAULTS

**FLASH CODE 613**  
**ATA CODE SID 252 FMI 1**  
**VPM: VPM/ECM SW MISMATCH**

**FLASH CODE 614**  
**ATA CODE SID 252 FMI 13**  
**ECM: ECM/VPM SW MISMATCH**

Codes 613 and 614 will only occur when the VPM or ECM has been **changed in the field**. At start-up, the ECM compares software versions in the VPM and ECM. If the versions are not compatible, codes 613 or 614 and 622 will be set. Code 622 indicates Field Defaults are being used and turns ON the Engine Warning Light.

If codes 613 and 614 are active:

1. The ECM and VPM must be software compatible. Whichever component (ECM or VPM) was recently replaced is not the correct part number (has software version that is not compatible with the component (ECM or VPM) that was not changed). Determine correct part number and install.

The component having the most recent software configuration date sets the code (613 or 614).

Example: If the VPM is replaced and the replacement VPM software version is of a later date than the ECM software in the vehicle, the fault code (613) will indicate that the ECM software is not compatible with the VPM.

Example: If the replacement VPM installed had a software date older than the ECM software, the fault code (614) would indicate that the VPM software is not compatible with the ECM.

**FLASH CODE 615**  
**ATA CODE SID 254 FMI 13**  
**ECM: PROGRAMMABLE PARAMETER KAM CORRUPT MEMORY**

At start-up, the ECM performs tests on the KAM memory, where programmable parameter information will be stored when retrieved from the VPM. If the KAM memory test fails (bad memory or corrupt data), then Flash code 615 will be set. The engine

will operate on Field defaults turning ON the Engine Warning Light and setting code 622. If the condition causing code 615 to set is intermittent, and the condition is no longer present, the code will change to inactive status and the engine will operate normally.

Flash Code 615 can also be caused by no or low power to KAM memory at ECM terminal 1 which could cause code 224 to be set.

If code 615 is active:

1. Refer to SECTION 3: KEEP ALIVE MEMORY CIRCUIT.
  - A. If a defect is found in KAM Feed Circuit, correct defect.
  - B. If KAM power is present to ECM terminal 1, and code 615 is active, attempt to clear code 615. If code 615 continues to be set, replace the ECM.

**FLASH CODE 621**  
**ATA CODE SID 253 FMI 1**  
**ECM: ECM USING MANUFACTURING DEFAULTS**

**SYMPTOM:** Engine operates, but limited to 25 HP rating and Engine Warn Light is ON.

If the VPM is not programmed at the factory OR an unprogrammed VPM is installed in the field, then the ECM will select parameter values from the Manufacturing Default list. This list will provide only limited engine horsepower (25 HP). If the condition that caused code 621 to set is intermittent, and the condition is no longer present, the code will change to inactive status and the engine will operate normally.

If code 621 is active:

- A. Program the VPM using established programming procedures included in the Pro-link Manual.

**FLASH CODE 622**  
**ATA CODE SID 253 FMI 0**  
**ECM: ECM USING FIELD DEFAULTS**

**SYMPTOM:** Engine Warning Light ON, customer options disabled (cruise control etc.) and the engine is limited to 175 HP.

## ELECTRONIC CONTROL SYSTEM DIAGNOSTICS

### VEHICLE PERSONALITY MODULE (VPM)

#### PROGRAMMING AND SOFTWARE FAULTS (Continued)

##### FLASH CODE 622

ATA CODE SID 253 FMI 0

ECM: *ECM USING FIELD DEFAULTS*  
(Continued)

When the vehicle is not operating under normal operating conditions, the ECM uses either partial or full field default values stored in ECM memory, instead of programmed values that are stored in VPM memory. When the ECM is using Full Field Default values, code 622 is set. If the condition causing the ECM to operate using field defaults is intermittent, and the condition is no longer present, code 622 will become inactive and normal engine operation will resume.

Code 622 is an indicator that field defaults are being used. Other codes cause code 622 to be set. The other codes identify the condition that caused the ECM to use field defaults.

If, for any reason, the ECM is unable to download parameter values from the VPM or the parameter values received from the VPM are not valid, then the ECM selects full or partial Field Default parameter values. The Field Default parameter values are stored in the ECM. If no data is available from the VPM, full field defaults are used. If only certain data is corrupt, then partial field defaults may be used.

If code 622 is active:

1. Review other logged codes. The specific values that the ECM is unable to download and/or reason for the communication failure must be determined and corrected. When corrected, the ECM will not use the field default mode of operation.

##### FLASH CODE 623

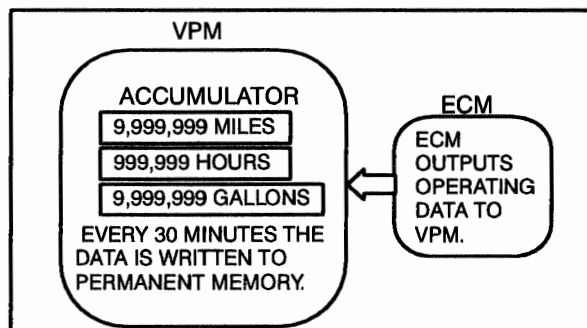
ATA CODE SID 253 FMI 13

ECM: *INVALID EFRC*

This code indicates that the ECM requested, and was unable to get valid Engine Family Rating codes from the VPM. If this occurs, the code 623 is set and the engine operates on Field Defaults causing code 622 to be set. If the condition causing code 623 to set is intermittent, and the condition is no longer present, code 623 will become inactive and normal engine operation will resume.

If code 623 is active, reprogram the VPM with the proper engine family data.

#### VPM FUEL/HOUR METER AND ODOMETER FAULTS



#### DESCRIPTION

The VPM (Vehicle Personality Module) records total engine hours (to 999,999 hours), total vehicle miles (to 9,999,999 miles) and total fuel used (to 9,999,999 gallons). While the vehicle is operating, the information is temporarily stored and every 30 minutes the information (new total hours, miles and gallons) is written to EEPROM memory locations in the VPM as new totals.

The accumulator totals (engine hours, vehicle miles and total fuel used) can be read using the ProLink EST. Accumulator information may be useful for maintenance purposes.

#### VPM DIAGNOSTICS

If the VPM attempts to write the latest total (for any of the three totals) to one of eight EEPROM locations in the VPM and the memory location is defective, then the VPM sets Flash Code (634, 635 or 641) and selects another memory location to store the information. Flash Code 645 may also be set.

If the VPM can't find a serviceable memory location to write the data, then Flash Code 642, 643 or 644 will be set.

##### FLASH CODE 634

ATA CODE PID 250 FMI 2

VPM: *FUEL METER MEMORY*  
*LOCATION ERROR*

Flash code 634 indicates the first attempt to write the fuel totals encountered a defective memory location. The fuel totals logged may be inaccurate although the error will not be more than 1/2 hour use of fuel.

If the fuel meter totals are used for vehicle maintenance or otherwise essential to vehicle operation, the VPM should be replaced. **The next read/write error will result in all of the fuel meter data being lost.**

**VEHICLE PERSONALITY MODULE (VPM)****VPM FUEL/HOUR METER AND ODOMETER FAULTS (Continued)**

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**FLASH CODE 635  
ATA CODE PID 247 FMI 2  
VPM: HOUR METER MEMORY LOCATION  
ERROR**

Flash code 635 indicates the first attempt to write the engine hour totals encountered a defective memory location. The engine totals logged may be inaccurate although the error will not be more than one half an hour.

If the hour meter totals are used for vehicle maintenance or otherwise essential to vehicle operation, the VPM should be replaced. **The next read/write error will result in the hour meter data being lost.**

**FLASH CODE 641  
ATA CODE PID 245 FMI 2  
VPM: ODOMETER MEMORY LOCATION  
ERROR**

Flash code 641 indicates the first attempt to write the vehicle total miles encountered a defective memory location. The total vehicle miles logged may be inaccurate, although the error will not be more than 30 miles.

If the odometer totals are used for vehicle maintenance or otherwise essential to vehicle operation, the VPM should be replaced. **The next read/write error will result in the odometer data being lost.**

**FLASH CODE 642  
ATA CODE PID 250 FMI 12  
VPM: FAULTY FUEL METER**

Flash code 642 indicates the write cycle of the EEPROM memory locations in the VPM have been exceeded. The fuel meter totals have been lost.

If the fuel meter totals are used for vehicle maintenance or otherwise essential to vehicle operation, the VPM should be replaced.

**FLASH CODE 643  
ATA CODE PID 247 FMI 12  
VPM: FAULTY HOUR METER**

Flash code 643 indicates the write cycle of the EEPROM memory locations in the VPM have been exceeded. The hour meter totals have been lost.

If the hour meter totals are used for vehicle maintenance or otherwise essential to vehicle operation, the VPM should be replaced.

**FLASH CODE 644  
ATA CODE PID 245 FMI 12  
VPM: FAULTY ODOMETER**

Flash code 644 indicates the write cycle of the EEPROM memory locations in the VPM have been exceeded. The Odometer totals have been lost.

If the odometer totals are used for vehicle maintenance or otherwise essential to vehicle operation, the VPM should be replaced.

**VPM MEMORY FAULTS****FLASH CODE 645  
ATA CODE SID 253 FMI 7  
VPM: RAW EEPROM MEMORY LOCATION  
ERROR**

Code 645 requires no action. Flash code 645 indicates an error was detected during a read or write attempt at one of the EEPROM memory locations in the VPM. The code is informational and will be logged as an inactive code. Code 645 will be logged along with another code which specifies what system or feature is affected.

If the error was in the VPM accumulators (total miles, fuel used or engine hour totals) a 634, 635, 641, 642, 643 or 645 will be logged. **Refer to VPM Fuel Meter, Hour Meter and Odometer in this section for a discussion of these codes.**

If the EEPROM memory location failure was storing information from one of the data lists stored in the VPM (Short List, High Priority List or Low Priority List), one of several fault codes (223, 235, 623, 624, 633, 651, 652, or 653) discussed in this section would be set because corrupt data would be read by the ECM. If for example, the ECM attempted to read the Short List and the data was bad, Flash Code 653 would be set.

**FLASH CODE 651  
ATA CODE SID 253 FMI 10  
VPM: FEATURE MEMORY LIST CORRUPTED**

If the VPM detects an error with the Feature List, code 651 will be set.

**SYMPTOMS:** Engine runs on partial defaults, but Engine Warning Light is not turned on. Vehicle features such as cruise control, remote PTO and optional engine protection system are disabled.

## ELECTRONIC CONTROL SYSTEM DIAGNOSTICS

### VEHICLE PERSONALITY MODULE (VPM)

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#### VPM MEMORY FAULTS (Continued)

**FLASH CODE 651****ATA CODE SID 253 FMI 10****VPM: FEATURE MEMORY LIST CORRUPTED  
(Continued)**

If code 651 is active:

1. Recycle the VPM. With the key ON, pull fuse F4 (H1 with FBC) and then reinstall the fuse.
  - A. If code 651 is inactive, end the test.
  - B. If code 651 still is active after resetting the VPM, reprogram the VPM.
  - C. If code 651 still is active after reprogramming the VPM, replace the VPM.

**FLASH CODE 652****ATA CODE SID 253 FMI 2****VPM: ENGINE/FUEL MEMORY LIST  
CORRUPTED**

**SYMPTOMS:** Engine runs on field defaults, setting code 622 and Engine Warning Light is turned ON.

This code can be set if the VPM detects an error in the engine-fuel list.

If code 652 is active:

1. Recycle the VPM. With the key ON, pull fuse F4 (H1 with FBC) and then reinstall the fuse.
  - A. If code 652 is inactive, end test.
  - B. If code 652 is still active, replace the VPM.

**FLASH CODE 653****ATA CODE SID 253 FMI 12****VPM: ENGINE RATING MEMORY LIST  
CORRUPTED**

**SYMPTOMS:** Engine runs on field defaults, with Engine Warning Light turned ON.

This code can be set if the VPM detects an error in the engine rating list.

If code 653 is active:

1. Recycle the VPM. With the key ON pull fuse F4 (H1 with FBC) and then reinstall the fuse.
  - A. If code 653 is inactive, end test.
  - B. If code 653 is still active, replace the VPM.

**FLASH CODE 654****ATA CODE SID 252 FMI 12****VPM: WATCHDOG TIME-OUT FAULT**

If a VPM software fault is detected, code 654 will be set, then the VPM will reset. The driver will likely not notice the reset, but the code will be logged as an inactive code following the reset for informational purposes.

If code 621 is active:

- A. Program the VPM using established programming procedures included in the Pro-link Manual.