1.1 ELECTRONIC CONTROL MODULE (ECM)/POWERTRAIN CONTROL MODULE (PCM)

ELECTRONIC CONTROL MODULE (ECM)/POWERTRAIN CONTROL MODULE (PCM)

The Electronic Control Module (ECM)/Powertrain Control Module (PCM) (Figure 6C2-1-6, 7), located behind the front left hand cowl panel trim panel, is the control centre of the fuel injection and if fitted, the automatic transmission management systems. It constantly monitors information from various sensors, and controls the systems that affect exhaust emissions and vehicle performance. The ECM/PCM performs the diagnostic function of the system. It can recognise operational problems, alert the driver through a Malfunction Indicator Lamp (MIL) "Check Powertrain" lamp and store a diagnostic code(s) which will identify problem areas to aid the technician in making repairs. Refer Section 2, DIAGNOSIS in this Volume for more information on using the diagnostic functions of the ECM/PCM.

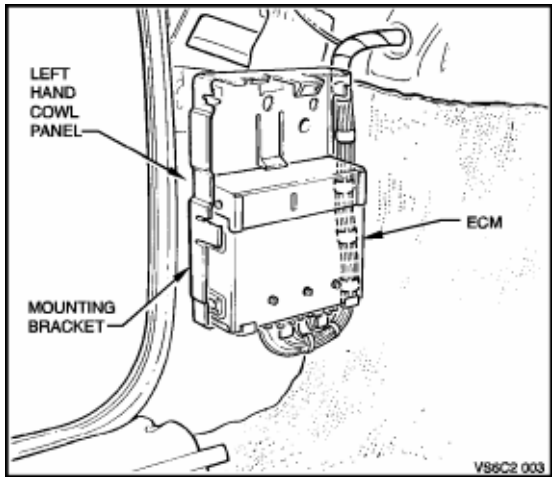

Figure 6C2-1-6 ECM Location - V8 With Manual Transmission

The ECM/PCM supplies either a buffered 5 or 12 volts to power various sensors or switches. This is done through resistances in the ECM/PCM which are so high in value that a test light will not light when connected to the circuit. In some cases, even an ordinary voltmeter will not give an accurate reading because the meter's internal resistance is too low.

A 10 Meg Ohm input impedance digital voltmeter is required to assure accurate voltage readings.

The ECM/PCM controls output circuits such as the Injectors, IAC, and various relays, etc. by controlling the earth circuit through transistors or a device called a "quad-driver" in the ECM/PCM. The two exceptions to this are the fuel pump relay control circuit and if the vehicle has an automatic transmission, the pressure control solenoid (PCS). The fuel pump relay is the only ECM/PCM controlled circuit where the ECM/PCM controls the +12 volts sent to the coil of the relay. The earth side of the fuel pump relay coil is connected to engine earth.

On vehicles with automatic transmission, the PCM supplies current to the PCS and monitors how much current returns to the PCM on a separate terminal.

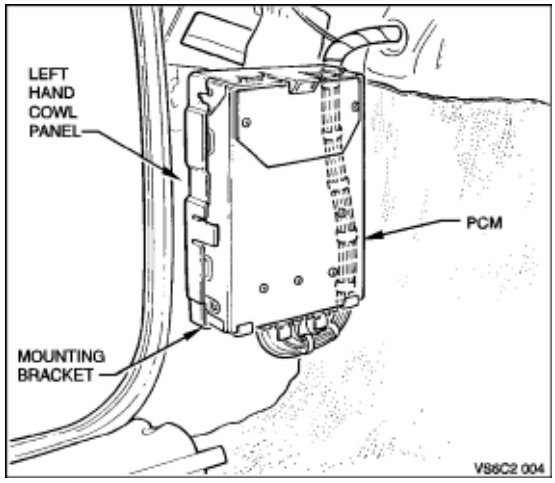

Figure 6C2-1-7 PCM Location - V8 With Automatic Transmission

PROM

To allow one model of ECM/PCM to be used for many different vehicles, a device called a PROM is used (refer Figure 6C2-1-8, 9). The PROM is located inside the ECM/PCM and has information on the vehicle's weight, engine, transmission, axle ratio and several other factors. While one ECM/PCM part number may be used by many different vehicles, a PROM is specific. For this reason, it is very important to check the latest parts catalogue and Service Techline information for the correct part number when replacing a PROM.

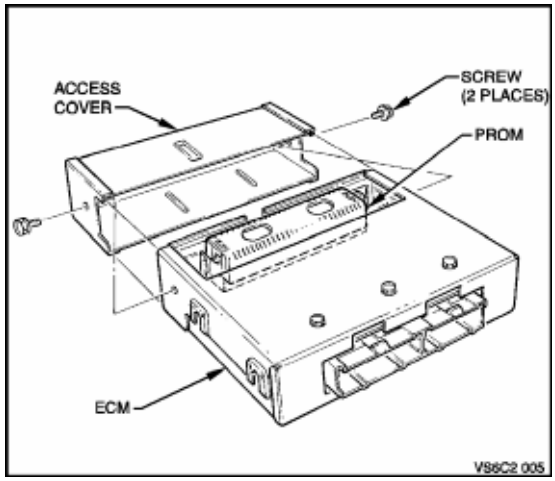

Figure 6C2-1-8 ECM PROM Location

A replacement ECM/PCM (called a controller) is supplied without a PROM. The PROM from the old ECM/PCM must be carefully removed and installed in the new ECM/PCM. For details, refer Section 6C2-3, SERVICE OPERATIONS in this Volume.

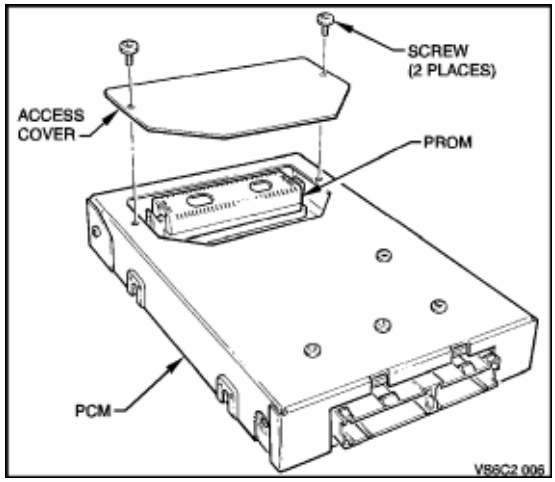

Figure 6C2-1-9 PCM PROM Location

ECM/PCM MEMORY FUNCTIONS

There are five types of memory storage within the ECM/PCM: ROM, RAM, PROM, EPROM and in the PCM only EEPROM.

ROM

Read Only Memory (ROM) is a permanent memory that is physically soldered to the circuit boards within the ECM/PCM. The ROM contains the overall control algorithms. Once the ROM is programmed, it cannot be changed. The ROM memory is non volatile, and does not need power to be retained.

RAM

Random Access Memory (RAM) is the microprocessor "scratch pad." The processor can write into, or read from this memory as needed. This memory is volatile and needs a constant supply of voltage to be retained. If the voltage is lost, the memory is lost.

PROM

The service Programmable Read Only Memory (PROM) is the portion of the ECM/PCM that contains the different engine and transmission calibration information that is specific to year, model and emissions. The PROM is a non volatile memory that is read only by the ECM/PCM.

The PROM is contained within the Memory Calibration assembly and is removable from the ECM/PCM. The PROM should be retained with the vehicle following ECM/PCM replacement.

EPROM

Erasable Programmable Read Only Memory (EPROM) is the portion of the ECM/PCM which means that the program can be erased. This type of memory is used to store the diagnostic trouble codes. This memory is erased by disconnecting the constant battery feed to the ECM/PCM, such as disconnecting the battery.

EEPROM

Electronically Erasable Programmable Read Only Memory (EEPROM) is the portion of the PCM that means the program can only be erased electronically. This type of memory **cannot** be erased by disconnecting the vehicle battery. The only way to erase this type of memory is by a special electronic tool such as the Tech 1 scan tool. DTC history data is stored in EEPROM and will be saved even after the vehicle power supply has been disconnected. For this reason, the only way that the DTC history data can be cleared is with the Tech 1 scan tool.