

1.1 POWERTRAIN CONTROL MODULE (PCM)

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The Powertrain Control Module (PCM), located behind the front left hand cowl panel trim panel, is the control centre of the fuel injection and transmission management systems. It constantly monitors information from various sensors, and controls the systems that affect exhaust emissions and vehicle performance. The 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) that will identify problem areas to aid the technician in making repairs. Refer to Section 6C1-2, [DIAGNOSIS](#) in this Volume for more information on using the diagnostic functions of the PCM.

The PCM supplies either a buffered 5 or 12 volts to power various sensors or switches. This is done through resistance's in the 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 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 PCM. The two exceptions to this are the fuel pump relay control circuit and the automatic transmission pressure control solenoid (PCS). The fuel pump relay is the only PCM controlled circuit where the 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. The PCM supplies current to the PCS and monitors how much current returns to the PCM on a separate terminal.

PROM

To allow one model of PCM to be used for many different vehicles, a device called a PROM is used. The PROM is located inside the PCM and has information on the vehicle's weight, engine, transmission, axle ratio and several other factors. While one 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 Bulletins for the correct part number when replacing a PROM.

A replacement PCM (called a controller) is supplied without a PROM. The PROM from the old PCM must be carefully removed and installed in the new PCM. For details refer Section 6C1-3, [SERVICE OPERATIONS](#) in this Volume.

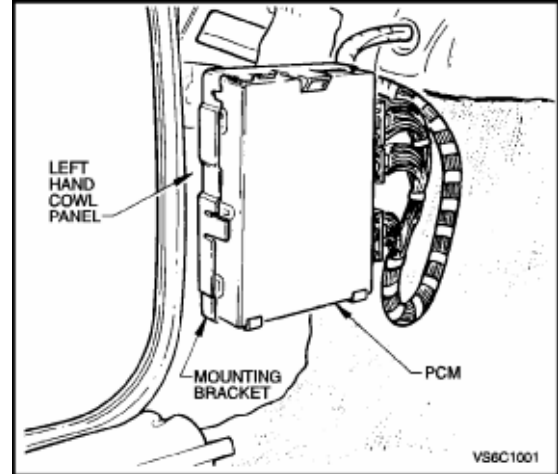


Figure 6C1-1-8 Powertrain Control Module Location

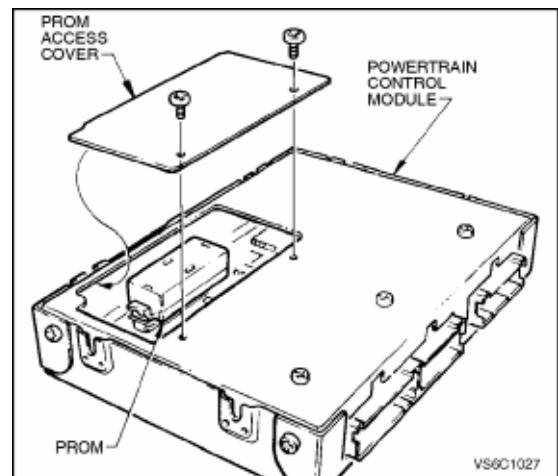


Figure 6C1-1-9 PROM Location

PCM MEMORY FUNCTIONS

There are three types of memory storage within the PCM: RAM, EPROM and EEPROM.

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.

EPROM

Erasable Programmable Read Only Memory (EPROM) is the portion of the PCM which means that the program can be erased. This is also the portion of the PCM that contains software and the different engine and transmission calibration information that is specific to year, model and emissions. This memory is erased by exposing it to high intensity ultra violet radiation for several minutes.

The service Programmable Read Only Memory (PROM) which is used by technicians in the field to update calibrations in the PCM is actually an EPROM. The service PROM is removable from the PCM. The PROM should be retained with the vehicle following PCM replacement.

EEPROM

Electrically 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's battery. The only way to erase this type of memory is by a special electronic tool, such as the Tech 1 scan tool. This type of memory is used to store the Diagnostic Trouble Codes (DTC). DTC history data is stored in EEPROM and will be saved even after the vehicle's battery has been disconnected. For this reason, the only way that the DTC history data can be cleared is with the Tech 1 scan tool.