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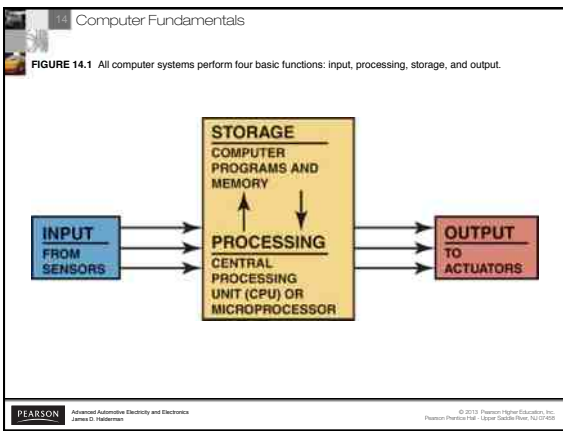
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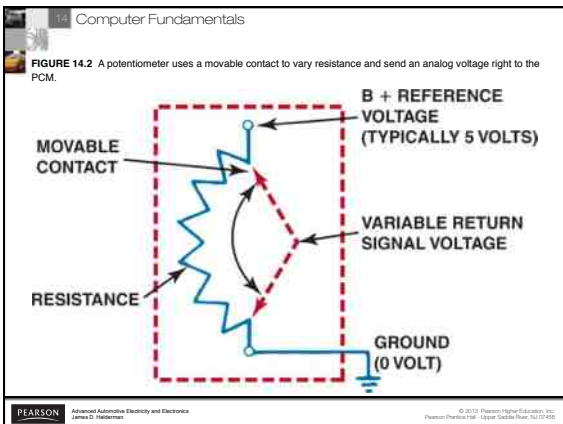
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14 Computer Fundamentals

**NOTE:** If the computer needs to be replaced, the PROM or calibration module must be removed from the defective unit and installed in the replacement computer. Since the mid-1990s, PCMs do not have removable calibration PROMs, and must be programmed or *flashed* using a scan tool before being put into service.

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14 Computer Fundamentals

**FIGURE 14.6** The clock generator produces a series of pulses that are used by the microprocessor and other components to stay in step with each other at a steady rate.



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14 Computer Fundamentals

**FIGURE 14.7** This powertrain control module (PCM) is located under the hood on this Chevrolet pickup truck.



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14 Computer Fundamentals

**FIGURE 14.8** This PCM on a Chrysler vehicle can only be seen by hoisting the vehicle, because it is located next to the radiator and in the airflow to help keep it cool.



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14 Computer Fundamentals

**FREQUENTLY ASKED QUESTION**

**What is a Binary System?**

In a digital computer the signals are simple high-low, yes-no, on-off signals. The digital signal voltage is limited to two voltage levels: high voltage and low voltage. Since there is no stepped range of voltage or current in between, a digital binary signal is a "square wave." The signal is called "digital" because the on and off signals are processed by the computer as the digits or numbers 0 and 1. The number system containing only these two digits is called the **binary system**. Any number or letter from any number system or language alphabet can be translated into a combination of binary 0s and 1s for the digital computer. A digital computer changes the analog input signals (voltage) to digital bits (binary digits) of information through an analog-to-digital (AD) converter circuit. The binary digital number is used by the computer in its calculations or logic networks. Output signals usually are digital signals that turn system actuators on and off.

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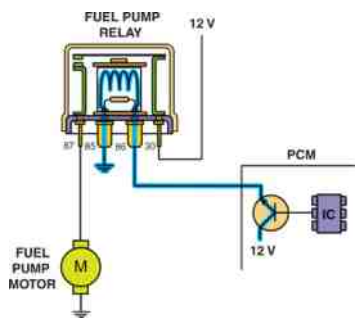
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14 Computer Fundamentals

**FIGURE 14.9** A typical output driver. In this case, the PCM applies voltage to the fuel pump relay coil to energize the fuel pump.



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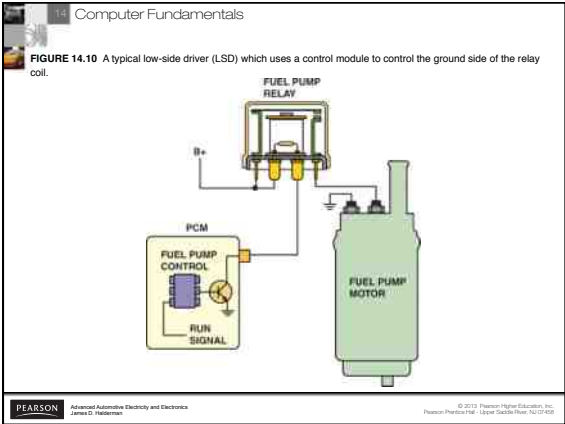
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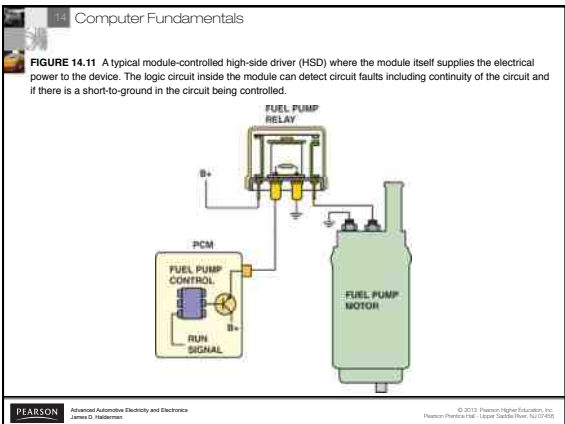
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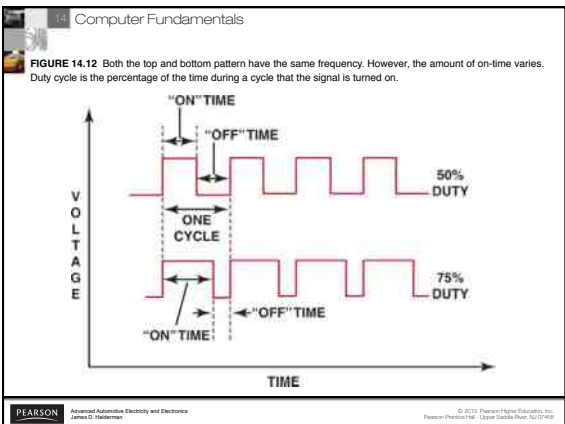
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