

Toyota's New Single-Chip Microcomputer Based Engine and Transmission Control System

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ABSTRACT

Toyota succeeded in the fall of 1984 in manufacturing a complex engine and transmission control system using a newly developed single-chip microcomputer. This microcomputer, equipped with an 8K-byte ROM (Read Only Memory) and a 256-byte RAM (Random Access Memory), a powerful real time processing function, and a high-speed optimum instruction set, is better suited for automobiles. Application of the latest CMOS technology has enabled lower power consumption and improved noise immunity. The new system, which includes a new function; the electronic spark advance with knock control in addition to the conventional sophisticated system, has greatly improved the performance and driveability of vehicles. The newly designed electronic control unit (ECU) has been greatly improved in reliability and has not changed in its size with the adoption of the highly integrated new micro-computer, which is due to the fact that it uses fewer LSIs (Large Scale Integrated circuits) than the conventional ECU, although it includes the great additional function.

tem with newly developed knock control which has incorporated the above mentioned single-chip microcomputer.

OUTLINE OF THE SYSTEM

This system has been adopted in the '85 model Cefica Supra and Cressida with a 2.8 liter 6-cylinder DOHC engine. This system is equipped with the knock control function in addition to the multiple control functions adopted from the '83 model such as fuel injection, electronic spark advance, EGR (exhaust gas recirculation), idle speed control, self-diagnosis, self-adaptive control, backup circuit for CPU failure, and a complex control which works together with an electronic controlled transmission (ECT) system. The system schematic is shown in Figure 1.

The knock control function makes it possible to maintain the optimum ignition timing control under condition without being limited by the situations which often induce knocking, or by the lowest octane commercial gasoline.

KNOCK CONTROL SYSTEM