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1973
12-bit engine-control microprocessor (Toshiba)
~ Integrated Circuit ~

In 1970, clean air act commonly known Muskie Act was enacted in the United States, and automobile manufacturers began to promote the development of electronic engine control technology in order cope with this situation. In 1971, Toshiba joined in Ford's Electronic Engine Control (EEC) project and developed the world's first 12-bit microprocessor in 1973. The 12bit specification was determined by the precision required for analog signals in engine control, and it was a state-of-the-art product at the time when Intel's 8-bit microprocessor appeared.

This microprocessor system was configured with 12-bit common bus as the core of the architecture, and 128 × 4-bit RAM, 512 × 4-bit EPROM, 512 × 4-bit ROM, memory control chip, I/O control chip, 12-bit bidirectional bus drivers, general-purpose 418-bit registers, and 8-bit interrupt latch chips were developed. In terms of architecture, the microprogram control method was adopted for the first time as a semiconductor microprocessor. The CPU chip TLCS-12 adopted a silicon gate 6μm process, and it had about 2800 gates and the chip size was 5.5 mm x 5.9 mm.

The 12-bit CPU, RAM, EPROM, ROM, memory control chip, I/O control chip, and other components were delivered as EEC modules, but mass production actually started in April 1977 after road running tests by vehicle.

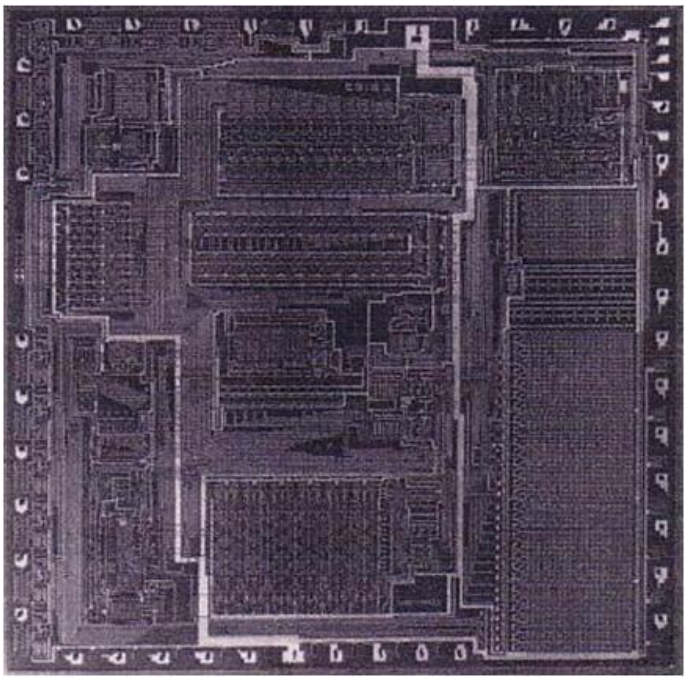

Fig.1 CPU chip of the 12-bit microprocessor (By courtesy of Toshiba)

Fig.2　TLCS-12 Controller LSI Chip Set
(By courtesy of Chip Museum)

【References】

[1] Keiji Namoto et al., “The 12-Bit Parallel Microcomputer ‘LCS-12’,” Nikkei Electronics, pp. 50–76, August 13, 1973 issue (Japanese)

[2] Semiconductor History Museum of Japan, Mr. Shimura's Essays, Part 2, "18) The First Japanese Microprocessor was Toshiba’s 12 bit MPU"
https://www.shmj.or.jp/shimura/shimura_E/ssis_shimura2_18E.html

[3] Akira Takeishi, Seigo Ito, “Toshiba: Development of Microcomputer for Automotive Engine Control,” Hitotsubashi Business Review, Winter 2007, Vol. 55, No. 3 (Japanese)

Version 2026/11/1