intel®

ADVANCE INFORMATION

I8031/8051
SINGLE-COMPONENT 8-BIT MICROCOMPUTER
INDUSTRIAL

- ■ **8031 - Control Oriented CPU With RAM and I/O**
- ■ **8051 - An 8031 With Factory Mask-Programmable ROM**

- ■ 4K x 8 ROM
- ■ 128 x 8 RAM
- ■ Four 8-Bit Ports, 32 I/O Lines
- ■ Two 16-Bit Timer/Event Counters
- ■ High-Performance Full-Duplex Serial Channel
- ■ External Memory Expandable to 128K
- ■ Compatible with MCS-80™/MCS-85™ Peripherals

- ■ Boolean Processor
- ■ MCS-48® Architecture Enhanced with:
  - ● Non-Paged Jumps
  - ● Direct Addressing
  - ● Four 8-Register Banks
  - ● Stack Depth Up to 128-Bytes
  - ● Multiply, Divide, Subtract, Compare
- ■ Most Instructions Execute in 1 μs
- ■ 4 μs Multiply and Divide

The Intel® 8031/8051 is a stand-alone, high-performance single-chip computer fabricated with Intel's highly-reliable +5 Volt, depletion-load, N-Channel, silicon-gate HMOS technology and packaged in a 40-pin DIP. It provides the hardware features, architectural enhancements and new instructions that are necessary to make it a powerful and cost effective controller for applications requiring up to 64K bytes of program memory and/or up to 64K bytes of data storage.

The 8051 contains a non-volatile 4K x 8 read only program memory; a volatile 128 x 8 read/write data memory, 32 I/O lines; two 16-bit timer/counters; a five-source, two-priority-level, nested interrupt structure; a serial I/O port for either multi-processor communications, I/O expansion, or full duplex UART; and on-chip oscillator and clock circuits. The 8031 is identical, except that it lacks the program memory. For systems that require extra capability, the 8051 can be expanded using standard TTL compatible memories and the byte oriented MCS-80 and MCS-85 peripherals.

The 8051 microcomputer, like its 8048 predecessor, is efficient both as a controller and as an arithmetic processor. The 8051 has extensive facilities for binary and BCD arithmetic and excels in bit-handling capabilities. Efficient use of program memory results from an instruction set consisting of 44% one-byte, 41% two-byte, and 15% three-byte instructions. 58% of the instructions execute in 1 μs, 40% in 2 μs, and multiply and divide require only 4 μs. Among the many instructions added to the standard 8048 instruction set are multiply, divide, subtract and compare.
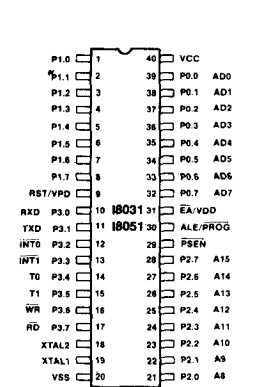

Figure 1. Pin Configuration
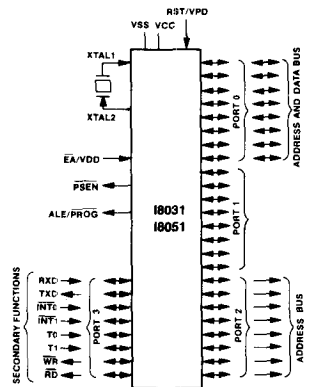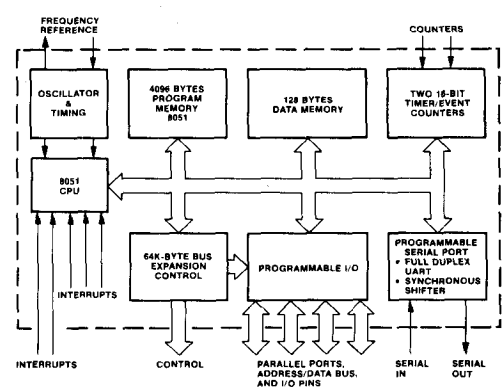
Figure 2. Logic Symbol

Figure 3. Block Diagram

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