

Digital Equipment Corporation
Maynard, Massachusetts

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MPS10
MICROPROCESSOR
SET

**LOGIC
PRODUCTS**

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PRELIMINARY

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INTRODUCTION

A brief introduction to the "computer-on-a-chip," or "micro-processor," or whatever, is probably in order at this time. It has been extensively discussed in many magazine articles, described and dissected in countless symposiums and seminars; yet a good deal of mystery still surrounds it, and what its role will be in the data processing world.

What is a "microprocessor"

Very briefly, a microprocessor is an assembly of LSI chips put together in a computer-like central processor to implement arithmetic, logic, and input/output functions under program control. The achievement of this type of processing capability was made practical by the development of MOS/LSI circuits which could be deposited on an integrated circuit chip approximately 175 x 175 mils.

The situation described above, i.e., the availability of a computing capability on a single IC chip is the ideal situation and not quite achievable in real life with that single chip.

In the "real world" the above configuration can effect a useful "real-world" interface only if a number of additional IC chips are added. Usually this number approaches 25-40. There is rather a large gap between theory and practice, as many potential users have discovered.

Technology

The most popular current technology appears to be represented by P-channel MOS integrated circuits. This, however, determines that the overall computing speed of the device is relatively slow. The future anticipated use of N-channel MOS and, inevitably, bipolar TTL, will contribute greatly to increased speeds in future devices.

Advantages of microprocessor

- . Makes many new products economically feasible due to its low cost
- . Introduces integral computer architecture into such areas as electronic cash registers, data acquisition terminals, communications systems, traffic light systems, etc.
- . Eliminates the need to design special-purpose logic to solve specific problems
- . Faster product design time
- . Product changes easier to implement
- . Increase in reliability because of fewer interconnects

How does the microcomputer differ from a minicomputer

Although fundamentally identical to all computers, the microprocessor differs appreciably from, for example, minicomputers as we know them today.

The following chart is offered as a general guideline in identifying those gross parameters which separate minicomputers from microprocessors.

	Minicomputer	Microcomputer
CPU	Full instruction set	Reasonably limited instruction set
Memory	Both core and semiconductor available; addressable beyond 16K	Semiconductor only; addressable up to 16K, typically
Software	Complete and comprehensive software package available including, typically, Operating System, Assembler, Editor, Compiler, Utility Packages, full diagnostics	Usually consists of Assembler, Editor, Postprocessor, utilitarian diagnostics; takes advantage of user-developed software
Program Preparation	Can be accomplished on the host machine	Must be accomplished off-line on another machine; (good example of off-line machine is PDP-8)
Price	Medium	Low
Support/Service	Full field service, documentation, warranty	No field service; documentation and warranty exist