

## Chapter 3: Microprocessor Types and Specifications

### Microprocessors

The brain or engine of the PC is the processor (sometimes called microprocessor), or central processing unit (CPU). The CPU performs the system's calculating and processing. The processor is easily the most expensive single component in the system, costing up to four or more times greater than the motherboard it plugs into. Intel is generally credited with creating the first microprocessor in 1971 with the introduction of a chip called the 4004. Today Intel still has control over the processor market, at least for PC systems. This means that all PC-compatible systems use either Intel processors or Intel-compatible processors from a handful of competitors (such as AMD or Cyrix).

Intel's dominance in the processor market had not always been assured. Although Intel is generally credited with inventing the processor and introducing the first one on the market, by the late 1970s the two most popular processors for PCs were *not* from Intel (although one was a clone of an Intel processor). Personal computers of that time primarily used the Z-80 by Zilog and the 6502 by MOS Technologies. The Z-80 was noted for being an improved and less expensive clone of the Intel 8080 processor, similar to the way companies today such as AMD, Cyrix, IDT, and Rise Technologies have cloned Intel's Pentium processors. In that case though, the clone had become more popular than the original.

Back then I had a system containing both of those processors, consisting of a 1MHz (yes, that's/ as in 1MHz!) 6502-based Apple main system with a Microsoft Softcard (Z-80 card) plugged into one of the slots. The Softcard contained a 2MHz Z-80 processor. This allowed me to run software for both types of processors on the one system. The Z-80 was used in systems of the late 1970s and early 1980s that ran the CP/M operating system, while the 6502 was best known for its use in the early Apple computers (before the Mac).

The fate of both Intel and Microsoft was dramatically changed in 1981 when IBM introduced the IBM PC, which was based on a 4.77MHz Intel 8088 processor running the Microsoft Disk Operating System (MS-DOS) 1.0. Since that fateful decision was made, PC-compatible systems have used a string of Intel or Intel-compatible processors, each new one capable of running the software of the processor before it, from the 8088 to the current Pentium III/Celeron and Athlon/Duron. The following sections cover the different types of processor chips that have been used in personal computers since the first PC was introduced almost two decades ago. These sections provide a great deal of technical detail about these chips and explain why one type of CPU chip can do more work than another in a given period of time.

### Pre-PC Microprocessor History

It is interesting to note that the microprocessor had only existed for 10 years prior to the creation of the PC! The microprocessor was invented by Intel in 1971. The PC was created by IBM in 1981. Now nearly 20 years later, we are still using systems based more or less on the design of that first PC (and mostly backward compatible with it). The processors powering our PCs today are still backward compatible in many ways with the 8088 selected by IBM in 1981.

The story of the development of the first microprocessor, the Intel 4004, can be read in Chapter 1.

# Chapter 3 Microprocessor Types And Specifications

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### **Chapter 3 Microprocessor Types And Specifications:**

Upgrading and Repairing PCs Scott Mueller,2003 This is the newest comprehensive update to the world s 1 guide to PC repair and maintenance World renowned PC hardware expert Scott Mueller has thoroughly updated his legendary Upgrading and Repairing PCs to reflect today s latest PC technologies and added a new DVD with more than two hours of digital video demonstrating PC maintenance and repair which can be watched on either their DVD equipped PCs or any DVD player Mueller presents updated coverage of every significant PC component processors motherboards memory the BIOS IDE and SCSI interfaces drives removable and optical storage video and audio hardware USB FireWire Internet connectivity LANs power supplies even PC cases This book also contains a detailed troubleshooting index designed to help readers rapidly diagnose more than 250 common PC hardware problems as well as an extensive vendor contact guide and a comprehensive PC technical glossary

VLIW Microprocessor Hardware Design Lee Weng Fook,2007-09-18 Acquire the Design Information Methods and Skills Needed to Master the New VLIW Architecture VLIW Microprocessor Hardware Design offers you a complete guide to VLIW hardware design providing state of the art coverage of microarchitectures RTL coding ASIC flow and FPGA flow of design The book also contains a wide range of skills building examples all worked using Verilog that equip you with a practical hands on tutorial for understanding each step in the VLIW microprocessor design process Written by Weng Fook Lee an internationally renowned expert in the field of microprocessor design this cutting edge hardware design tool presents unsurpassed coverage of the latests in VLIW microprocessing Authoritative and comprehensive VLIW Microprocessor Hardware Design features Step by step information on the VLIW hardware design process A wealth of Verilog based designs ASIC and FPGA implementations Expert guidance on the best known methods for RTL coding Over 75 detailed illustrations that clarify each aspect of VLIW design Inside this Complete VLIW Microprocessor Toolkit Introduction Design Methodology RTL Coding Testbenching and Simulation FPGA Implementation Testbenches and Simulation Results Synthesis Results and Gate Level Netlist

**Mike Meyers' A+ Guide to Managing and Troubleshooting PCs Lab Manual, Second Edition** Mike Meyers,2007-05-23 Practice the IT Skills Essential for Your Success 60 lab exercises challenge you to solve problems based on realistic case studies Step by step scenarios require you to think critically Lab analysis tests measure your understanding of lab results Key term quizzes help build your vocabulary In this lab manual you ll practice Working with CPUs RAM and motherboards Installing partitioning and formatting hard drives Working with portable PCs PDAs and wireless technologies Installing upgrading and troubleshooting Windows 2000 Professional and Windows XP Installing sound and video cards Managing printers and connecting to networks Implementing security measures Preparing for safety and environmental issues Establishing good communication skills and adhering to privacy policies

An Introduction to the Intel Family of Microprocessors James L. Antonakos,1996 Fuelled by example and application this text takes readers on an in depth hands on exploration of the hardware and software giving equal treatment

to both of the Intel 8088 microprocessor After examining more than 60 different applications Antonakos guides readers through the construction and programming of their own 8088 based computer This edition expands coverage to include completely new topics while it updates treatments of existing topics in an overall effort to allow greater access to the power of the personal computer

**Microprocessor-based Design** Michael Slater,1989 *PC Secrets* Caroline M. Halliday,1996  
Design of Microprocessor-based Systems Nikitas A. Alexandridis,1993 *I860 Microprocessor Family Programmer's Reference Manual* Intel Corporation,1991

**Practical Hardware Details for 8080, 8085, Z80, and 6800 Microprocessor Systems** James Coffron,1981 *The Intel Microprocessor Family* James L. Antonakos,2007 Readers will be able to build and program their own 8088 single board computer by applying the interfacing concepts and techniques presented in this book Coverage begins with the software architecture of the 80x86 family including the software model instruction set and flags and addressing modes Abundant examples illustrate basic programming concepts such as the use of data structures numeric conversion string handling and arithmetic Hardware details of the entire 80x86 family are then examined from pin and signal descriptions to memory and input output system design Advanced topics including protected mode WIN32 and Linux programming and MMX technology are also introduced

High-level Synthesis of Microprocessors Using Instruction Frequency Statistics William Read Bush,1991 Fundamentals of Digital Logic and Microcomputer Design Mohamed Rafiquzzaman,1999 The Z80 Microprocessor Ramesh S. Gaonkar,1988

**Digital Electronics with Microprocessor Applications** Alan C. Dixon,James L. Antonakos,1987 A textbook for courses in digital electronics and microprocessors offered in departments of electrical engineering technology or computer science The book covers the basics of digital logic design and the design of microprocessor based systems Also covered are computer fundamentals and microprocessor hardware and software 8085 with many programming examples The text describes most important available microprocessors with laboratory exercises instructional objectives and self evaluation questions

Fujitsu Scientific & Technical Journal ,1987 *Microcomputers in Engineering and Science* J. Ffynlo Craine,Graham R. Martin,1985 *Data Processing Digest* ,1988

**Software Design for Microprocessors** John G. Wester,William D. Simpson,1976 Basic concepts How to build software Support and documentation for software Mechanics of programming Microprocessor sample design problems Number systems and binary arithmetic Boolean algebra Tables and data Flow chart symbols Various Texas Instruments publications

Microprocessor System Development Alain Amghar,1990 *The Intel Microprocessors* Barry B. Brey,2006

**KEY BENEFIT** Updated and current this book provides a comprehensive view of programming and interfacing of the Intel family of microprocessors from the 8088 through the latest Pentium 4 microprocessor

**KEY TOPICS** Organized in an orderly and manageable format it offers over 200 programming examples using the Microsoft Macro Assembler program and provides a thorough description of each Intel family members memory systems and various I O systems

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