Microprocessors Program Model H-CAI-M

The Hampden H-CAI-M Kit enables students to develop an understanding of microprocessors technology and related applications. Complete resources for the quick assembly and disassembly of simple breadboard experiments included. (No Soldering Required)

A Student Workbook guides students in the connection of circuits, making measurements and observations, and arriving at conclusions. All experiments are performed at low voltage levels. Each concept is presented simply with easy-to-follow circuit diagrams.

Description

This kit provides all necessary components and breadboarding apparatus required to complete the topics covered in Gilmore’s Microprocessors: Principles & Applications.

The Activities Manual for Microprocessors provides the basis of coverage for basic digital architecture and related components, logic circuit analysis, microprocessor instruction, troubleshooting and systems development.

Each component is permanently secured to its own sturdy plastic base—Velcro® backed for fast and easy assembly of circuits on the supplied Velcro work board. This “Velcro” attachment system has become the preferred method for laboratory circuit assembly due to its simplicity, ease of use and durability.

All components are secured to Velcro-covered sliding trays. All kits can be ordered as drawer storage kits using the supplied glue-on tray support panels (two per drawer) or with heavy-duty lockable cabinets (Specify -D or -C).

Hardware Features
- Lockable Storage & Carrying Case
- Neat Work Areas
- Ease of Circuit Assembly & Disassembly
- Individually Mounted Components
- Low Voltage

Courseware Features
- Background Theory
- Easy to Follow Sequence
- Experiments and Tests

All Hampden units are available for operation at any voltage or frequency.
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Topics

What is the Microprocessor?
- What is a Microprocessor?
- What is a Microcomputer?
- What is the Power of a Microprocessor?

The Decimal and Binary Number Systems
- The Decimal Number System
- The Binary Number System
- Binary-to-Decimal Conversion
- Decimal-to-Binary Conversion
- The Hexadecimal Number System
- Decimal and Hexadecimal Conversions

Processor Arithmetic
- Binary Addition & Subtraction
- Two's Complement Numbers
- Binary Multiplication & Division
- Multiple-Precision Arithmetic
- Floating-Point Arithmetic

Basic Microprocessor Architectural Concepts
- What is the Microprocessor's Architecture?
- Word Lengths
- Addressable Memory
- The Microprocessor's Speed
- Microprocessor Architectural Characteristics
- The Microprocessor's Registers
- The Microprocessor's Instructions
- Memory Addressing Architecture
- The Microprocessor's Support Circuits
- Microprocessor Development/Maintenance

Inside the Microprocessor
- Block Diagram and Programming Model
- The ALU & Microprocessor's Registers
- Microprocessor's General-Purpose Registers
- The Microprocessor's Control Logic
- The Microprocessor's Internal Data Bus

Introduction to Microprocessor Instructions
- What is an Instruction Set
- Mnemonics
- Microprocessor's Basic Instruction Types
- The Microprocessor's Addressing Modes

Communicating with the Microprocessor
- The Need for Microprocessor I/O
- Connecting the I/O Port to Microprocessor Polling and Interrupts

Two 8-bit Microprocessors:
The Z80 & 6802
- An Introduction to 8-Bit Microprocessors
- A Programming Model for the Z80
- The Z80 8-Bit Registers & Z80 Hardware
- The Z80 Block Diagram and Instruction Set
- A Programming Model for the 6802
- The 6802 Instruction Set & Hardware

A Single-Chip Microprocessor
- Introduction to Microcontrollers
- 8051 Architecture and Programming Model
- Other Microcontrollers in the 8051 Family

Two Advanced Microprocessors
- Introduction to the Intel X86
- Programming Model for the X86
- X86 Addressing Modes, Instruction Set & Hardware
- Introduction to the Motorola 68XXX
- Programming Model for the 68XXX
- 68XXX Addressing Modes
- 68XXX Instruction Set & Hardware

Memory
- Random-Access Read-Write Memories
- Static and Dynamic Memories
- Two Memory Systems
- ROMS, EPROMS, and EAROMS
- Direct Memory Access
- Paging & Other Memory Tech.

Mass Storage
- Basic Magnetic Storage Techniques
- Tapes and Disks
- Mass Storage Support Electronics
- The Floppy Disk & Winchester-Disk Drive
- Magnetic-Tape & Optical Storage Devices

Microprocessor I/O
- An Introduction to Data Communications
- Parallel I/O & Serial Communications
- Modems & other Input/Output Devices
- Digital-to-Analog & Analog-to-Digital Interfaces
- Special I/O Devices

An Introduction to Programming
- What Is Programming?
- The Programming Process
- The Program's Specifications & Design
- Implementing the Program Design
- The Elements of a Program
- Fundamental Programming Constructs
- Documentation

Operating Systems and System Software
- What Is System Software?
- Operating Systems
- 2 Microcomputer Disk Operating Systems
- Programming Tools
- Programming Languages

Servicing Microprocessor-based Products
- Reviewing Service Procedures
- Finding the Problem
- Troubleshooting Specific Modules
- Troubleshooting the Power Supply & CPU
- Troubleshooting Memory and Mass Storage
- Using Test Equipment

Developing Microprocessor-based Products
- An Introduction to the Design Process
- Preparing the Specification
- Developing, Implementing & Testing a Design
- Regulatory Compliance Testing
- Design Tools for Microprocessor Development

New Developments in Microprocessor Tech.
- Flash Memory
- PCMCIA
- RISC Processors and the PowerPC
- Wireless Communications

Courseware


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