

H-CAI Electricity and Electronic Kits

Educational Training Equipment for the 21st Century

Bulletin 286-6B

Digital Electronics Program Model H-CAI-DE

The Hampden H-CAI-DE Kit prepares students to design, diagnose and verify standard digital circuits. 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.

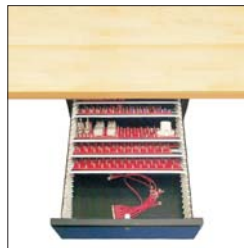
Description

This kit provides all necessary components and breadboarding apparatus required to complete the topics covered in Tokheim's *Digital Electronics*.

The Components are coordinated with Tokheim's *Digital Electronics* text and *Activities Manual for Digital Electronics* book. This modern module provides a concise explanation of TTL circuits. The lab experiments introduced are comprehensive in scope, providing a solid grounding in basic digital theory, circuit simplification and design techniques.

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)



Optional Drawer Storage Available

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 the necessary components & breadboarding apparatus required to complete ►



Tokheim's Digital Electronics



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

Hampden[®]
ENGINEERING CORPORATION

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H-CAI Electricity and Electronic Kits

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Digital Electronics Program

Topics

Digital Electronics

What Is a Digital Circuit?
Why Use Digital Circuits?
Numbers We Use In Digital Electronics

Binary Logic Gates

The AND & OR Gates
The Inverter and Buffer
The NAND & NOR Gates
The Exclusive OR Gate
The NAND Gate as a Universal Gate
Using Inverters to Convert Gates
Practical TTL Logic Gates
Practical CMOS

Using Binary Logic Gates

Logic Gate & Simple Gate
Constructing Circuit from Boolean Expression
Simplifying Boolean
Karnaugh Maps With Variables
A Five-Variable Karnaugh Map
Using Nand Logic
Solving Logic Problems the Easy Way

Courseware

1. Text: *Digital Electronics*, Roger Tokheim
2. Manual: *Activity Manual for Digital Electronics*, Roger Tokheim
3. Manual: *Activity Manual for Digital Electronics, Instructor's Guide*
4. Software: Instructor's Productivity Center, (Optional—Specify Model H-CAI-SL-DE)

IC Specifications and Simple Interfacing

Logic Levels and Noise Margin
MOS and CMOS ICs
Interfacing TTL and CMOS with Switches
Interfacing TTL and LEDs
Interfacing w/ Relays, Motors, and Solenoids

Encoding, Decoding, & 7-segment Displays

Codes
Encoders
Seven-Segment LED Displays
BCD-To-7-Segment Decoder/Drivers Displays
Liquid-Crystal Displays
Using CMOS To Drive An LCD Display
Vacuum Fluorescent Displays
Driving a VF Display

Flip-flops

The R-S Flip-Flop
The Clocked R-S Flip-Flop
The D & J-K Flip-Flop
IC Latches
Triggering Flip-Flops
Schmitt Trigger

Model H-CAI-DE

Counters

Ripple Counters
Synchronous & Down Counters
Self-Stopping Counters
Counters as Frequency Dividers
TTL & CMOS IC Counters
Using a CMOS Counter in Electronic Game

Shift Registers

Serial Load & Parallel Load Shift Registers
A Universal Shift Register
An 8-Bit CMOS Shift Register
Using Shift Registers—Digital Roulette

Arithmetic Circuits

Binary Addition
Half & Full Adders & Three-Bit Adders
Binary Subtraction
Using Adders for Subtraction
Four-Bit Adder/Subtractors
Parallel Adder/Subtractor Systems
Binary Multiplication
2s Complement Notation, Addition, & Subtraction

Memories

Random-Access Memory (RAM)
Static RAM ICs

Programmable Read-Only Memory (PROM)
Magnetic-Core Memory
Computer Bulk Storage Devices
Microcomputer Memory

Digital Systems

Elements of a System
A Digital System on an IC
Microcomputer Operation
Microcomputer Address Decoding
Data Transmission
Detecting Errors in Data Transmissions
Adder/Subtractor System
The Digital Clock
The LSI Digital Clock
A Practical LSI Digital Clock System
The Frequency Counter
An Experimental Frequency Counter
LCD Timer With Alarm

Connecting with Analog Devices

D/A Conversion
Operational Amplifiers
A Basic D/A Converter
Ladder-Type D/A Converters
An A/D Converter & Comparators
An Elementary Digital Voltmeter
Other A/D Converters
A/D Converter Specifications
An A/D Converter IC
Digital Light Meter
Digital Voltmeter

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All tutorial and lab units are coordinated directly to actual student texts & workbooks and provides students with directly related on-screen questions and diagrams to solve. **Order Model H-CAI-SL-DE**

Includes the Following Tools

Glencoe Student Assessment System: Test generator software, computerized testing & classroom administration package

Instrumentation: Realistic software simulations of Hewlett Packard instruments & electronics Workbench® files for projects

Math Tutorials Program: Strengthens students' knowledge of electronics related math.

Circuit Database: Contains all essential circuits from this curricula for use or editing in the Electronics Workbench® program

PowerPoint Plus: Animated PowerPoint slides covering all related text

Circuit Viewer: Selected circuits from curriculum prepared for use directly to computer screen and/or projection device.

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

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