H-CAI Electricity and Electronic Kits

Educational Training Equipment for the 21st Century

Bulletin 286-4D

Electronics Program Model H-CAI-EL

The Hampden H-CAI-EL Kit prepares students to diagnose, repair, verify, and install electronic circuits and systems as well as providing a practical foundation for analog 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 ***Schuler's Electronics: Principles & Applications***.

The Activities Manual for Electronics provides the basis of

coverage for semiconductors, op amps, linear integrated circuits and switching power supplies. Also included is new information on transistors as switches, switch mode amplifiers, direct digital synthesis, and digital signal processing.

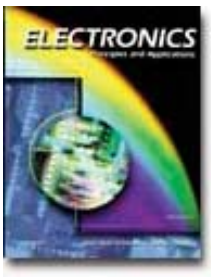
Each component is permanently secured to its own sturdy plastic base—Velcro® backed for fast and easy assembly of circuits on the supplied Velcro work board. This "Velcro" attachment system has become the preferred method for laboratory circuit assembly due to its simplicity, ease of use and durability.

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

All the necessary components & breadboarding apparatus required to complete ▸



Schuler's Electronics: Principles & Applications

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

Hampden® ENGINEERING CORPORATION

060515

P.O. Box 563, East Longmeadow, MA 01028 • Tel 413-525-3981 • Fax 413-525-4741 • E-mail sales@hampden.com **800-253-2133**

Electronics Program Model H-CAI-EL

Topics

Introduction
A Brief History
Digital or Analog
Analog Functions
Circuits woth Both DC and AC
Trends in Electronics

Semiconductors
Conductors and Insulators
Semiconductors
N-type Semiconductors
P-type Semiconductors
Majority and Minority Carriers
Other Materials
Band Gaps

Diodes
The PN Junction
Characteristic Curves of Diodes
Diode Lead Identification
Diode Types and Applications
Photovoltaic Energy Sources

Power Supplies
The Power-Supply System
Rectification
Full-Wave Rectification
Conversion of RMS Values to Average Values
Filters
Voltage Multipliers
Ripple and Regulation
Zener Regulators
Troubleshooting
Replacement Parts

Transistors
Amplification
Transistors
Characteristic Curves
Transistor Data
Transistor Testing
Other Transistor Types
Transistors as Switches

Introduction to Small-Signal Amplifiers
Measuring Gain
Common-Emitter Amplifier
Stabilizing the Amplifier
Other Configurations
Simulation and Models

More About Small-Signal Amplifiers
Amplifier Coupling
Voltage Gain in Couples Stages
Field-Effect Transistor Amplifiers (FET)
Negative Feedback
Frequency Response
Positive Feedback

Large-Signal Amplifiers
Amplifier Class
Class A Power Amplifiers
Class B Power Amplifiers
Class AB Power Amplifiers
Class C Power Amplifiers
Switch -Mode Amplifiers

Operational Amplifiers
The Differential Amplifier
Differential Amplifier Analysis
Operational Amplifiers
Setting Op-Amp Gain
Frequency Effects in Op Amps
Op-Amp Applications
Comparitors

Troubleshooting
Preliminary Checks
No Output
Reduced Output
Distortion and Noise
Intermittents
Operational Amplifiers
Automated Testing

Oscillators
Oscillator Characteristics
RC Circuits
LC Circuits
Crystal Circuits
Relaxation Oscillators
Undesired Oscillatiors
Oscillator Troubleshooting
Direct Digital Synthesis
DDS Troubleshooting

Communications
Modulation and Demodulation
Simple Receivers
Superheterodyne Receivers
Frequency Modulation and Single Sideband
Wireless Data
Troubleshooting

Integrated Circuits
Introduction
Fabrication
The 555 Timer
Analog ICs
Mixed-Signal ICs
Troubleshooting

Electronic Control Devices and Circuits
Introduction
The Silicon-Controlled Rectifier
Full-Wave Devices
Feedback in Control Circuitry
Managing Energy
Troubleshooting Electronic Control Circuits

Regulated Power Supplies
Open-Loop Voltage Regulation
Closed-Loop Voltage Regulation
Current and Voltage Limiting
Switch-Mode Regulators
Troubleshooting Regulated Power Supplies

Digital Signal Processing
Overview of DSP Systems
Moving-Average FIlters
Fourier Theory
Digital Filter Design
Other DSP Applications
Limitations of DSP
DSP Troubleshooting

Solder and the Soldering Process

Thermionic Devices

Renewable Energy Sources and Technologies

Courseware

Text: ***Electronics: Principles & Applications***, Charles Schuler
Manual: ***Experiment Manual for Electronics***, Charles Schuler

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