

# H-CAI Electricity and Electronic Kits

Educational Training Equipment for the 21st Century

Bulletin 286-4B

## 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

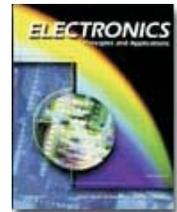
### Hardware Features

- 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 ►



**Schuler's *Electronics: Principles & Applications***



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

**Hampden**  
ENGINEERING CORPORATION

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## Electronics Program Model H-CAI-EL

### Topics

#### Semiconductors

Conductors  
Semiconductors  
N-type Semiconductors  
P-type Semiconductors  
Majority and Minority Carriers

#### Junction Diodes

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

#### 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

#### Junction Transistors

Amplification  
Transistors  
Characteristic Curves  
Transistor Data  
Transistor Testing  
Other Transistor Types

#### Introduction to Small-signal Amplifiers

Measuring Gain  
Common-Emitter Amplifier  
Stabilizing the Amplifier  
Other Configurations  
Amplifier Coupling  
Voltage Gain in Coupled Stages  
Field-Effect Transistor Amplifiers  
Negative Feedback

#### Large-signal Amplifiers

Amplifier Class  
Class A Power Amplifiers  
Class B Power Amplifiers  
Class AB Power Amplifiers  
Class C Power Amplifiers

#### Operational Amplifiers

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

#### Amplifier Troubleshooting

Preliminary Checks  
No Output  
Reduced Output  
Distortion and Noise  
Intermittents  
Operational Amplifiers

#### Oscillators

Oscillator Characteristics  
RC Circuits  
LC Circuits  
Crystal Circuits  
Relaxation Oscillators  
Undesired Oscillations  
Oscillator Troubleshooting

#### Radio Receivers

Modulation and Demodulation  
Simple Receivers  
Superheterodyne Receivers  
Frequency Modulation and Single Sideband  
Receiver Troubleshooting

#### Linear Integrated Circuits

Introduction  
Fabrication  
The 555 Timer  
Other Applications  
Troubleshooting

#### Electronic Control Devices and Circuits

Introduction  
The Silicon-Controlled Rectifier  
Full-Wave Devices  
Feedback in Control Circuitry  
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

### Courseware

1. Text: *Electronics: Principles & Applications*, Charles Schuler
2. Manual: *Activity Manual for Electronics*, Charles Schuler
3. Manual: *Activity Manual for Electronics, Instructor's Guide*
4. Software: Instructor's Productivity Center, (Optional—Specify Model H-CAI-SL-EL)

## Instructor's Productivity Center from Glencoe McGraw-Hill

### Revolutionize Your Classroom with Instructor's Productivity Center Software

Consists of a complete set of powerful teaching and testing software tools. All programs are designed specifically to match and enhance this curriculum. Highly recommended as a comprehensive, multi-level, instructional tool. Helps students to work independently and at their own speed, while also freeing the instructor to provide specific guidance wherever needed.



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-EL**

### 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.

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