

EB-190



The EB-190 Autotronics I board is a comprehensive instructional module designed to teach the fundamental concepts of electrical and electronic components as well as their application in the modern automobile to students in high schools, technical schools and colleges.

The module contains various practical circuits with which the student can perform a number of meaningful experiments, which help reinforce the student's comprehension of the related concepts. The individual circuits and the required test equipment can be quickly wired by connecting the 2-mm jacks associated with the necessary points. Students perform a minimal amount of wiring, thereby increasing the time available for training. Randomly inserted faults modify the circuits under test to provide valuable true-to-life troubleshooting exercises, which develop diagnostic skills.

A comprehensive student experiment manual clearly details the experiment procedure. An optional theory manual provides the necessary theory to help students achieve the experiment objectives. Optional Windows-based, graphics courseware enhances the learning procedure by providing the essential background theory, testing the student's level of competence, providing detailed experiment procedures, evaluating all measurements and answers to questions and testing the student's level of achievement at the end of the experiment. The student may learn in the standalone mode or under CML (Computer Managed Laboratory), which allows the instructor to monitor student and class progress and records pertinent records in a database for future retrieval.

SPECIFICATIONS

EXPERIMENTS COVERED

1. Voltage drop in series circuits

- Understand how resistance in electrical circuits affects the load voltage
- Understand how to use digital multi meter to measure the voltage drop in series circuits

2. Incandescent lamps

- Become familiar with incandescent lamps used in automobiles
- Understand the difference between hot and cold resistance
- Understand what happens when lamps of unequal power ratings are connected in series
- Become familiar how indicator lamps are connected

3. Headlight circuits

- Know how headlight circuits work
- Know what happens when a headlight connection is open

4. Relays - general principles

- Know the advantages of using relays for simple switching applications
- How to use relays for inserting or bypassing elements in electrical circuits
- Measure the relay's pickup and dropout voltage

5. Relays in headlight circuits

- Understand the reason for using relays in headlight circuits
- Use a relay in a high beam low beam selector circuit

6. Relay latching circuits

- Know how simple latching circuits operate

- Know applications of latching techniques in automotive circuits

7. Relay delay circuits

- Know how to delay the activation or deactivation of a relay
- Observe how delay circuits can implement flasher action
- Know how to calculate the switching delay in a RC circuit

8. Stop light circuit

- Become familiar with a typical stop light control and monitoring circuit

9. Capacitor-type flasher relay

- Know the function of a flasher circuit
- Set up and operate a capacitor-type flasher

10. Turn signal indicator

- Understand the function of a turn direction indicator system
- Understand the operation of an integrated circuit-based, turn direction indicator system

11. Hazard warning systems

- Know how hazard warning systems operate

12. Back voltage spike suppression

- Know how diodes are used to suppress high voltage spikes when switching inductive loads

13. Use of diodes in "Headlights on" warning circuits

- Understand the operation of acoustic "lights on" warning circuits

- 14. Use of diode for circuit separation
- Know how diodes are used for isolating circuits in automotive circuits

15. Thermostats in automotive circuits

- Be familiar with the resistance - temperature graph for a thermistor
- Know how thermistors are used in the "internal heating" mode
- Observe the operation of thermistor-based thermometer circuits
- Become familiar with half-bridge, thermistor-based temperature measuring instruments
- Observe how the voltage across a thermistor can be used to indicate temperature changes

16. Thermal switches in automotive circuits

- Know how to measure the opening and closing of a thermal switch
- Know how thermal switches are used in engine coolant temperature control circuits

17. Measure angular displacement with a potentiometer

- Know how potentiometers are used for sensing angular displacement

18. Troubleshooting a turn signal system and a temperature control system

ACCESSORIES

Required Accessories

- EB-2000 workstation
- Digital multi-meter
- DL-20 patch cord kit