

# DEVELOP YOUR AUTO – TRUCK - H.D. ELECTRICAL-ELECTRONICS TROUBLESHOOTING SKILLS

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Vince Fischelli / Director of Training Veejer  
Enterprises Inc. / Garland, Texas

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60 Electronics Lessons ON-LINE <https://training.veejer.com>

## **Vehicle Electrical-Electronics Training Programs by Vince Fischelli, Director of Training Veejer Enterprises Inc., Garland Texas, USA**

Every auto – truck – heavy duty technician needs more electrical training. There are many options open to technicians to acquire electrical training, such as, attending a tech school but that isn't always the best option. Some companies provide electrical training that is mostly covering basic electrical-electronics fundamentals and attendees are certified with a written test. Seldom is hands-on training used in the class. Sometimes when technicians attend an electrical class they realize during the class or at the end of the class that it was too basic and a waste of time and money because it was all theory and no hands-on training.

The solution to the training problem is to focus the training on hands-on vehicle electrical-electronic circuit troubleshooting. When a technician begins to work on an electrical-electronic problem in a vehicle he needs to have a step-by-step test procedure ready to go. The test procedure should guide him to find the problem in the vehicle with the troubleshooting skills he developed in the hands-on electrical training program to repair the vehicle.

Our hands-on electrical-electronics troubleshooting training programs emphasize a hands-on approach and avoid excessive electrical theory. Available study time a technician is willing to invest in the educational process should always stress hands-on with just enough electrical theory to help in understanding troubleshoot.

This brochure provides a breakdown of all the training programs written by Vince Fischelli, Director of Training and offered by Veejer Enterprises Inc., Garland Texas. Much of the training involves electrical circuit board troubleshooting trainers that require hands-on circuit testing and troubleshooting procedures to find circuit problems. Once these electrical troubleshooting procedures are understood the technician is guided through a series of hands-on electrical troubleshooting problems.

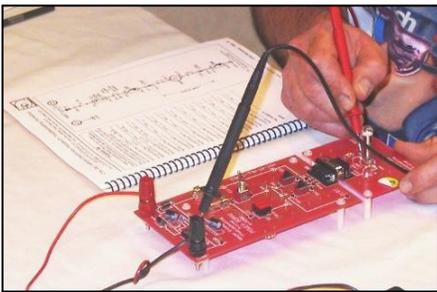
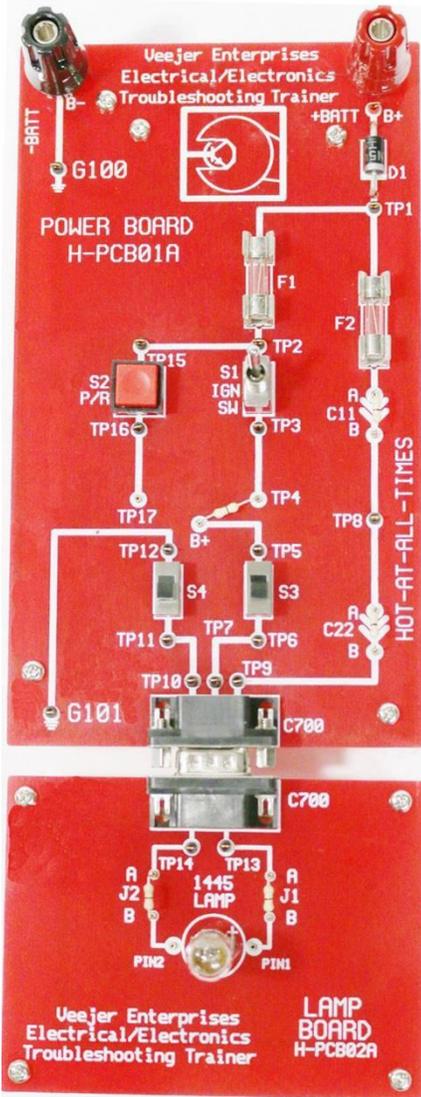
Electrical troubleshooting training is not very effective by just reading about it, watching someone else do it or watching a video. Of course, all these have some value but the point is for a technician to learn how to troubleshoot electrical circuit he has to *hands-on* troubleshoot a faulty electrical circuit many times to learn all the ways an electrical circuit can fail. Repetitious electrical troubleshooting develops troubleshooting skills through hands-on practice that is interesting and always keeps you involved.

Read through this brochure for the details. You will find links to go directly to our web site for additional information and links to purchase any training program.

Visit our main web site at <http://www.veejer.com>

Visit our 60 Lesson web site at <https://training.veejer.com>

Call us at 972.276.9642 if you have any questions. We are here to help you!



## The Starter Kit, H-111A

This is an effective *Hands-On* Electrical Troubleshooting Training Program to teach automotive, H.D. and diesel service technicians how to troubleshoot vehicle electrical and electronic circuits. Learn hands-on electrical troubleshooting with Trainers designed by **Vince Fischelli, Veejer Enterprises Inc.** They are highly effective with lots of hands-on.

These Troubleshooting Trainers, begin with **H-111A** at the left and are fully constructed circuit boards that simulate live vehicle circuits. Using the **Technician Workbook, H-WB111A**, a technician is guided through a series of step-by-step circuit voltage tests, voltage drop tests and resistance measurements to learn how to test a live vehicle circuit using a DMM. This focuses electrical training time on actual testing of circuits rather than consuming valuable training time building circuits to test. Technicians do not build circuits in the service bay, they troubleshoot circuits. That is what this training program teaches you to do. Once a technician understands essential circuit measurement skills using a DMM, **Instructor Guide, H-IG111A**, guides someone to easily insert electrical problems on the under-side of the circuit boards for you. Then you troubleshoot from the top of the circuit boards while documenting your troubleshooting steps in the Workbook to compare with the answers provided in the instructor guide.

Problems are inserted in seconds at various points in the voltage side or the ground side of the circuit to keep you busy practicing troubleshooting. By removing a wire jumper on the bottom, an open circuit is created at some point in the circuit. By inserting a fixed carbon resistor (supplied in resistor bag) a voltage drop problem is created. Inserting wire jumpers at various points create shorts to ground. You will learn to successfully troubleshoot live electrical-electronic circuits by doing it rather than watching someone else do it, just reading or talking about it. To successfully troubleshoot electrical problems, you have to do it over and over, until you get it right. Then, vehicle electrical-electronic circuit troubleshooting becomes second nature. **The Starter Kit, H-111A** contains 32 individual electrical troubleshooting problems with open circuits, voltage drops and shorts to ground so you can practice hands-on troubleshooting a live circuit.

This method of hands-on electrical training develops your self-confidence and convinces you that you can successfully troubleshoot electrical circuit problems. The benefits of this electrical troubleshooting training will last for the rest of your career. It's a great

hands-on way to master electrical troubleshooting skills. You can become confident electrical circuit troubleshooters who will not troubleshoot by changing parts but by testing a vehicle circuit with a DMM to identify a problem. The technician at the left is troubleshooting a problem and recording troubleshooting steps with DMM readings in the workbook to be reviewed later.

**Starter Kit, H-111A**, contains a **Power Board, H-PCB01A** and **Lamp Board, H-PCB02A** that snap together; a DC Power Supply, **H-PS01** and a bag of fixed resistors for inserting voltage drop problems. One copy of Technician Workbook **H-WB111A** and Instructor Guide **H-IG111A** are included in a handy flip-top box.

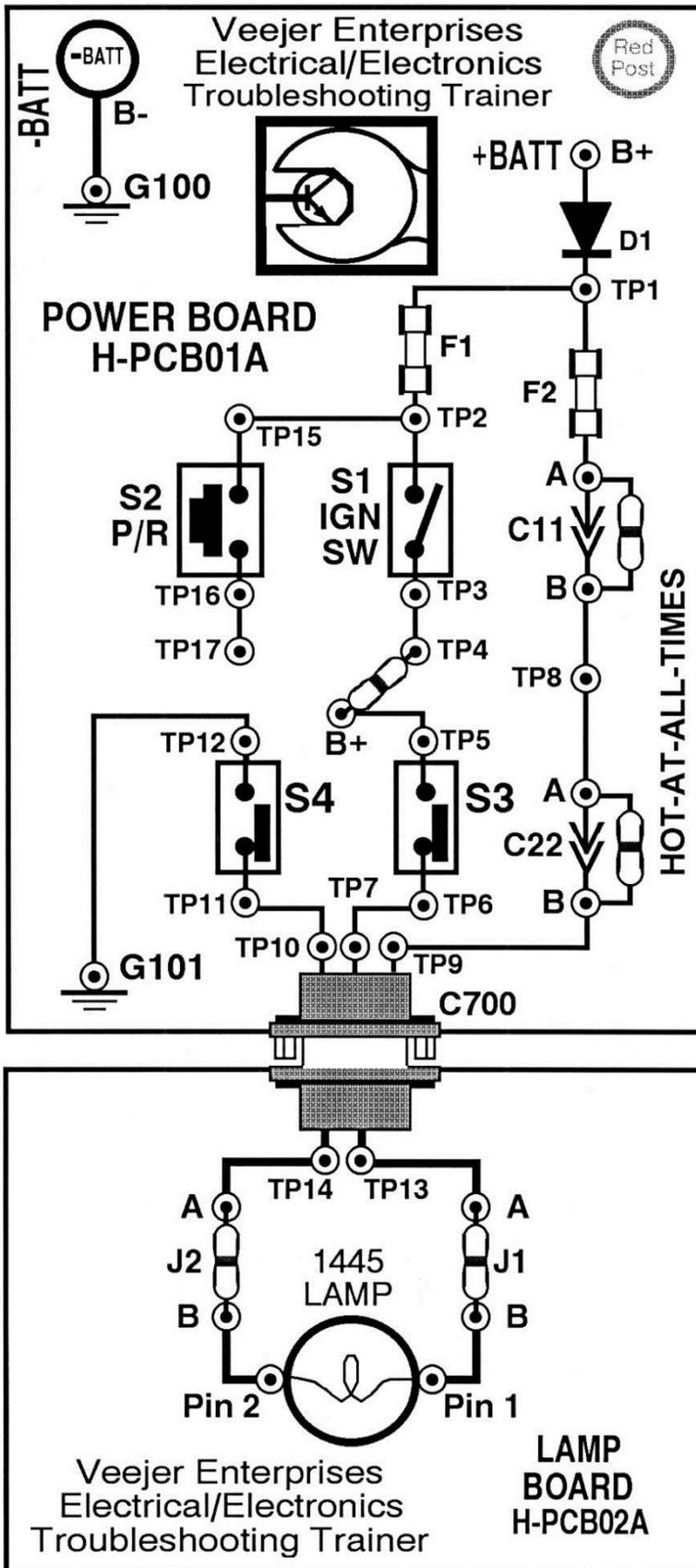
**H-111A Starter Kit is \$269.00 each plus shipping** (Price may change without notice)

Buy now at [http://www.veejer.com/start\\_kit.html](http://www.veejer.com/start_kit.html)

Call 972.276.9642 if you have questions.

Visit our "Technician's Web Page" at <http://www.veejer.com/technician.html>

Use our handy web site shopping cart to order. We ship the next working day.



## Starter Kit H-111A

This is the schematic of the Power Board and Lamp Board connected together.

Learn hands-on testing and troubleshooting of a live circuit to develop essential vehicle electrical circuit troubleshooting skills.

Actual size:  
10 in. long  
4 in. wide

Read our web page for Technicians at:

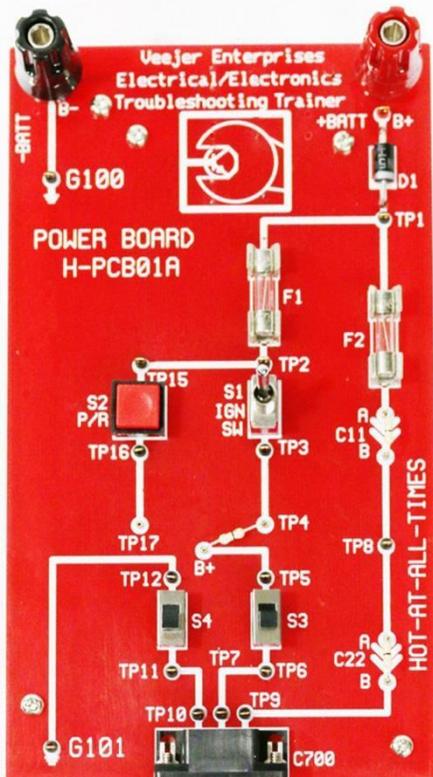
[www.veejer.com/techncians](http://www.veejer.com/techncians)

The H-PS01 Power Supply is 117 VAC. We have power supplies for 220 VAC (UK & Euro).  
Call 972.276.9642 if you have questions.

Buy now at our H-111A Starter Kit web page at [http://www.veejer.com/start\\_kit.html](http://www.veejer.com/start_kit.html)

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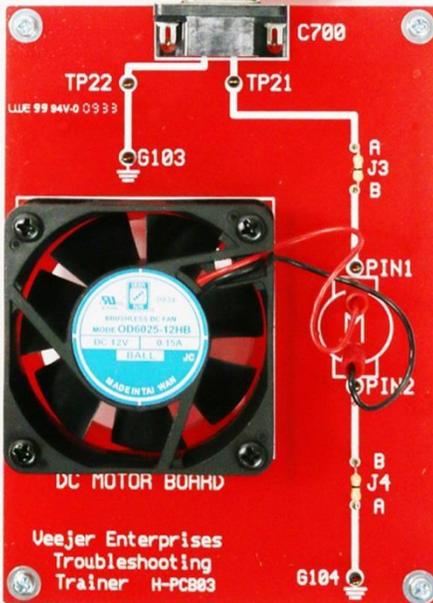
## DC Motor Circuit Troubleshooting Trainer, H-113



Add this **H-113(S)** DC motor circuit board to the Starter Kit's Power Board and continue developing electrical-electronics troubleshooting skills by learning to troubleshoot brushless DC Motor circuits and brush-type DC Motor circuits. The **DC Motor Board Kit Part Number is H-113**. This module consists of a **DC Motor Circuit Board Troubleshooting Trainer, Part Number H-PCB03**. Once the DC Motor circuit board is connected to the Power Board, as shown at the left, you are ready to immediately explore through hands-on exercises the testing and troubleshooting of live DC Motor circuits.

The **DC Motor Workbook H-WB113** walks a technician through the theory, operation and troubleshooting techniques of brushless DC Motor circuits and reviews testing common brush-type DC Motors used as starter motors and a/c-heater blower motor circuits. Extensive instruction of ohmmeter characteristics for testing solid-state components is presented because a brushless DC motor contains an electronic circuit that can be tested with an analog or digital ohmmeter.

After about 30+ pages of self-paced step-by-step instruction, a technician begins troubleshooting **37 individual electrical problems** in the DC Motor circuit. Problems are inserted one at a time in seconds following instructions in the Instructors Guide.



The DC Motor circuit is described as an **engine cooling fan** circuit to add realism to the troubleshooting problems. Circuit electrical problems inserted are open circuits, voltage drops on the voltage-side or the ground-side of the circuit, short-to-ground and short-to-voltage problems. Several problems deal with advanced ground-side failures. Follow these troubleshooting procedures and breeze through ground-side problems in any vehicle circuit.

The troubleshooting problems are described as “engine running too hot” or “engine gradually overheating” due to a failure of the engine cooling fan. One problem **simulates a battery drain problem** because the cooling-fan runs all the time when the ignition switch (on the Power Board) is switched OFF. This adds realism to the electrical troubleshooting problems to help maintain technician's interest and relate the troubleshooting problems to the real world. **Five advanced problems** present additional challenges to a technician who is ready for a higher level of electrical troubleshooting. That's a total of **42 DC Motor Circuit troubleshooting problems**.

**DC Motor Circuit Kit, H-113 contains:** (1 ea.) DC Motor Circuit Board-Part Number **H-PCB03** shown at left connected to the Power Board. Resistor Bag, Part Number H-RB03 for voltage drop problems is included along with one copy of Technician Workbook, **H-WB113** and Instructor Guide, **H-IG113**.

**H-113 Troubleshooting DC Motor Circuits is \$199.00 each plus shipping** (Price may change without notice)

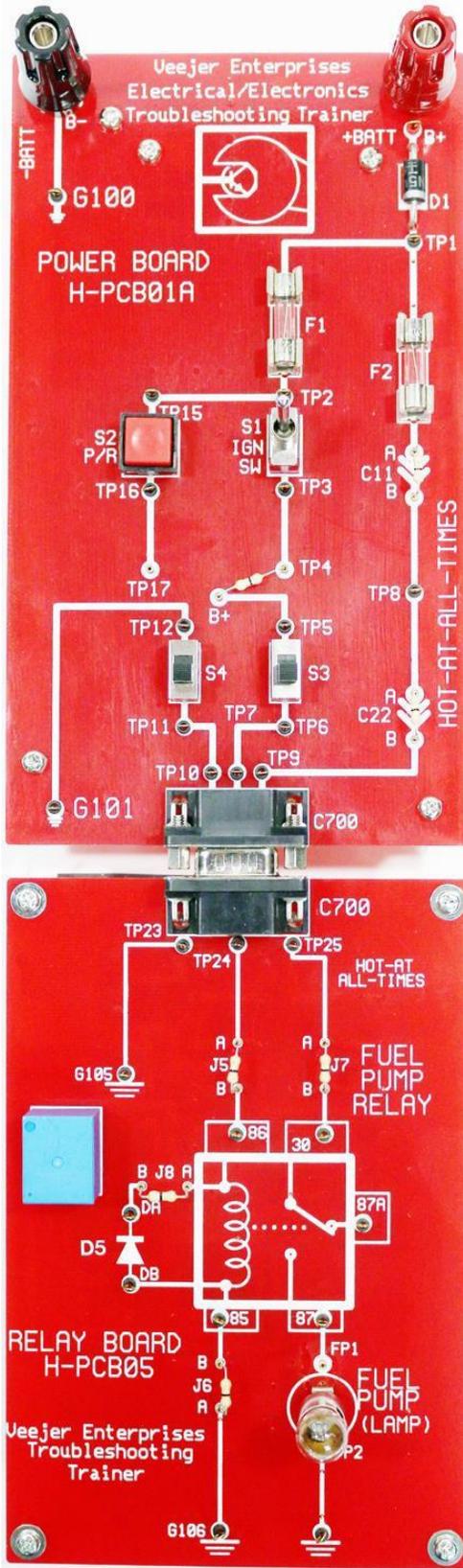
Buy now at [http://www.veejer.com/dc\\_kit.html](http://www.veejer.com/dc_kit.html)

Call 972.276.9642 if you have questions.

Visit our H-113 Web Page” at [http://www.veejer.com/dc\\_kit.html](http://www.veejer.com/dc_kit.html)

Use our handy web site shopping cart to order. We ship the next working day.

## Relay Circuit Troubleshooting Trainer, H-115



Troubleshooting Relays can be a difficult electrical task given all the possibilities of how a relay circuit can fail when replacing a relay does not fix the relay circuit problem. Then it's time to start troubleshooting the relay circuit with a DMM.

The **H-115, Relay Circuit Troubleshooting with Trainer, H-PCB05** shown at the left, is connected to the Starter Kit's Power Board. You now study live relay circuits and practice troubleshooting live relay circuit problems.

Multiple hands-on practice exercises are imbedded in the **Relay Circuit Workbook H-WB115** (over 110 pages) with extensive instructions covering relay operation, relay characteristics, and relay circuit troubleshooting. Learn how relays are used in vehicle circuits but more importantly how relay circuits fail and the troubleshooting techniques to find a relay circuit problem residing in the wiring when the relay itself is good. Learn about the **importance of a spike suppression diode** inside a relay and how to test it with an ohmmeter. Learn what works and what doesn't work like the Diode Test.

This troubleshooting training program contains extensive step-by-step instruction and hands-on exercises in relay circuit operation. You will learn to analyze the ways relay circuits fail, measuring voltage, voltage drops, resistance and current in relay circuits to identify relay circuit problems. This is followed by hands-on practice in relay circuit troubleshooting technique as you practice troubleshooting a total of **75 individual live relay circuit problems** to develop your troubleshooting skill and self-confidence. You troubleshoot from the top-side of the PCBs (circuit boards) using designated test points and a DMM. Record troubleshooting progress in your workbook.

The **Relay Instructor Guide, H-IG115**, provides answers to all review exercises and complete instructions for inserting relay circuit problems on the bottom of the Relay Troubleshooting Trainer. Answers to each troubleshooting problem are also included for your guidance.

### Relay Circuit Troubleshooting, H-115 contains the following items:

(1 each) Relay Circuit Board-Part Number **H-PCB05** (shown at the left) connected to the Starter Kit's Power Board,  
(1 each) Resistor Bag H-RB05 and one copy of  
One copy Technician Workbook, Part Number, **H-WB115**(1) one copy of the Instructor Guide, **H-IG115**

**H-115 Troubleshooting Relay Circuits is \$209.00 ea.** (Price may change without notice)

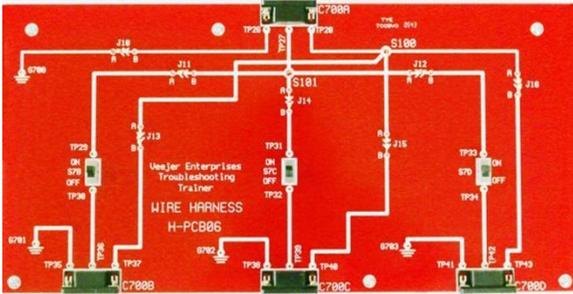
Buy now at our H-115 Troubleshooting Relays web page at <http://www.veejer.com/relay.html>  
Use our handy web site shopping cart to order. We ship the next working day.

Call 972.276.9642 if you have questions.

Visit our we page for Technicians at <http://www.veejer.com/technician.html>

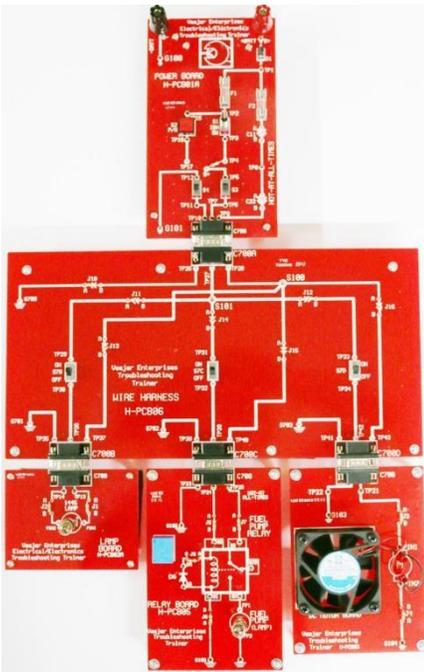
# Wire Harness Troubleshooting Trainer, H-116

Troubleshooting a wire harness can be a difficult task given all the possibilities of how a wire harness can fail with broken wires (open circuits), corroded wires & connections (voltage drops), shorts-to-ground and shorts-to-voltage. No need to replace a wire harness with a problem. Learn to fix the one in the vehicle. This **Wire Harness Troubleshooting Trainer, H-PCB06** shows technicians how to troubleshoot and repair any type of wire harness problem.



The Wire Harness Troubleshooting Trainer, **H-PCB06** is shown at the left. Learn to troubleshoot wire harness problems when one circuit in an **electrical system** is not functioning correctly. Is it a problem in the wiring on the voltage side? Is it a problem in the wiring on the common ground side? Is it a problem isolated to only one circuit? Are several circuits affected by the same problem? Could it be a problem in a part of the wire harness circuit common to more than one circuit? Answers to these questions and how to troubleshoot these types of wire harness problems are

covered in this Troubleshooting Trainer. **See how one circuit's problem can affect other perfectly good circuits that share parts of the same electrical wiring.**

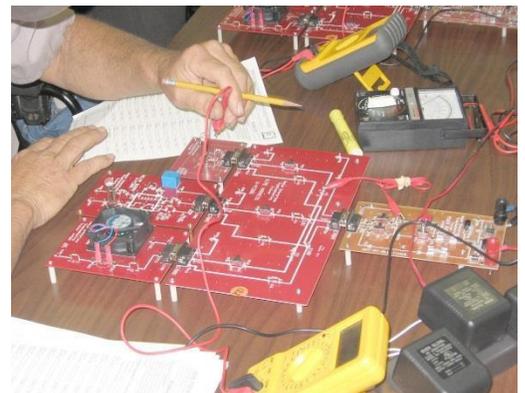


Four troubleshooting trainers are connected together through the Wire Harness Troubleshooting Trainer to create a **Mini-Electrical System** called. The "**M.E.S.**" shown at the left (bottom). Study advanced training in tracing Opens, Voltage Drops, Shorts-to-Ground and Shorts-to-Voltage problems throughout the "M.E.S." After completing all 114-wire harness electrical problems you will never again be stumped by a wire harness problem. Multiple hands-on practice exercises are imbedded in the Home-Study **Technician Workbook H-SM06** text of 100+ pages with extensive instructions and schematic diagrams.

You will learn to analyze the all ways a wire harness fails by measuring voltage, voltage drops, resistance and electron current in circuits to identify wire harness problems. This is followed by hands-on practice in wire harness troubleshooting technique as you practice troubleshooting **114 individual live wire harness problems** to develop troubleshooting skill and self-confidence.

The **Wire Harness Instructor Guide, H-IG06**, provides answers to all review exercises and instructions for inserting wire harness problems on the

bottom of the Wire Harness Troubleshooting Trainer. Answers to each troubleshooting problem are also provided. You troubleshoot from the top-side of the PCB using designated test points and your DMM. Evaluate your troubleshooting progress by comparing your troubleshooting notes with the answers in the Instructor Guide.



Wire Harness Troubleshooting **H-116**, contains these items:

- (1 each) Wire Harness Circuit Board Troubleshooting Trainer, **H-PCB06** and Resistor Bag H-RB06
- (1) one copy of Workbook for technicians, Part Number, **S-SM06** or **H-SM06** or **H-WB116**
- (1) one Instructor Guide, **H-IG06** or **H-IG116** is included.

**116 Wire Harness Troubleshooting is \$375.00 each plus shipping** (Price may change without notice)

Buy now at <http://www.veejer.com/wireharness.html>

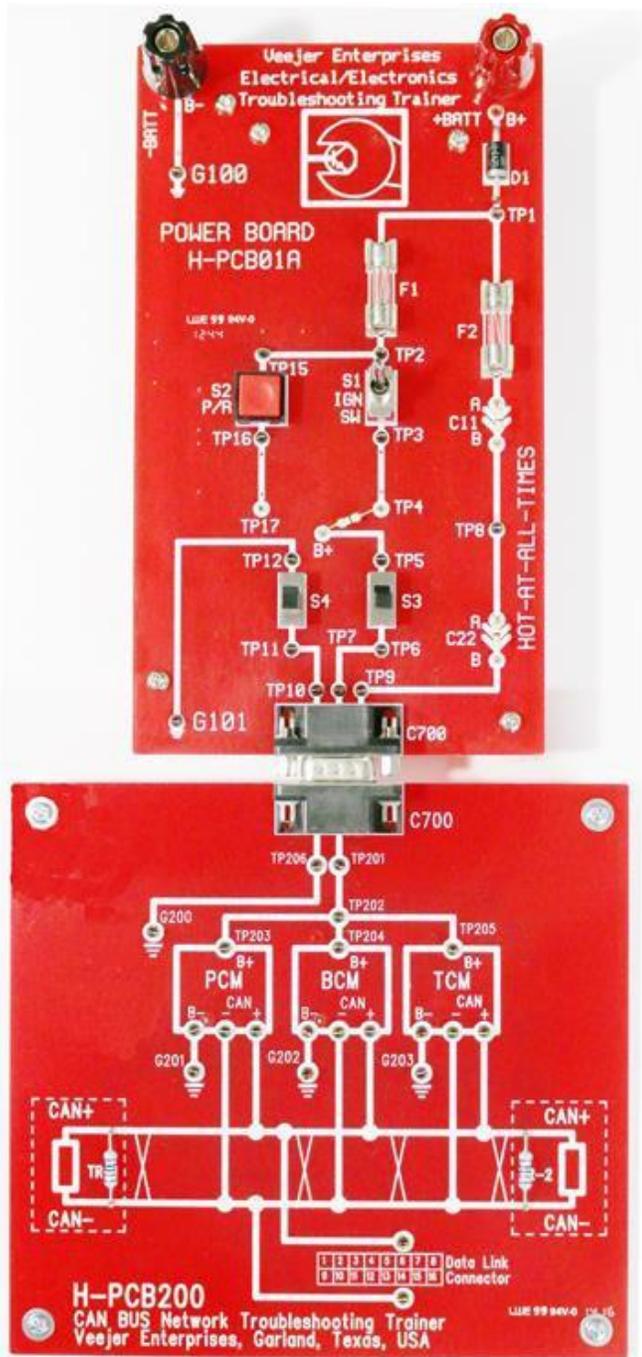
Call 972.276.9642 if you have questions.

Visit our H-116 web page at <http://www.veejer.com/wireharness.html>

Use our handy web site shopping cart to order. We ship the next working day.

# CAN Bus Troubleshooting Trainer H-200

Contact Vince Fischelli, Veejer Enterprises Inc, Garland, Texas 972.276.9642



To learn to repair CAN Bus problems you must have specific electrical troubleshooting skills of CAN Bus wiring network problems as well as the best procedure to troubleshoot the voltage circuits (B+) and ground circuits (B-) supplying the Nodes. This training program provides specific CAN Bus system troubleshooting scenarios. The CAN Bus Trainer, **H-PCB200**, is shown below connected to the Power Board from the Starter Kit, H-111A.

**Many of these CAN Bus failures would be impossible to duplicate on an actual vehicle due to time required to insert problems and the effort and time gaining access to vehicle circuits.**

The H-200 CAN Bus Trainer allows a technician to experience 48 CAN Bus problems with hands-on practice troubleshooting. The CAN Bus workbook, **H-WB200**, breaks down CAN Bus circuit troubleshooting training into **two parts**.

## Part One: CAN Network Wire Failures:

There are 20 common CAN Bus failures inside the 60-ohm network. If network resistance measured at DLC Pins 6 and 14 is 60 ohms, or 120 ohms, what does that indicate? What else could be wrong if 60 ohms is present at the DLC? Several possible network wiring failures could occur when the network resistance is 60 ohms at the DLC. The H-WB200 Workbook explains troubleshooting techniques to identify any network wiring problem **and does not require connection to the Power Board to trouble-shoot these 20 network wiring failures.**

## Part Two: Node Electrical Circuit Failures:

After CAN Bus network wiring is repaired and fully functional, instruction is provided with hands-on testing for Node voltage and ground circuit problems when connected to the Power Board. There are 28 electrical problems relating to voltage and ground circuit problems to Nodes. When a DLC indicates a problem with a Node,

what should be tested first is demonstrated to insure the Node has what it needs to function. The CAN Bus Trainer, H-PCB200, provides hands-on troubleshooting training for Part Two issues but the Trainer must be connected to the Power Board from H-111A.

The CAN Bus Trainer, **H-200** contains one CAN Bus circuit board **H-PCB200** and a Resistor Bag H-RB200. One Technician Workbook **H-WB200** and one Instructor Guide, **H-IG200** is included.

**H-200 CAN Bus Troubleshooting Trainer is \$199.00 plus shipping** (Price may change without notice)

**Call 972.276.9642 if you have questions.**

Visit our CAN Bus Troubleshooting Trainer web page

Buy Now at [http://www.veejer.com/CAN\\_Bus\\_Training\\_Options.html](http://www.veejer.com/CAN_Bus_Training_Options.html)

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Vehicle Electrical  
Troubleshooting  
**SHORTCUTS**

- Batteries
- Cranking Circuits
- Charging Circuits
- Reading Schematics

by Vince Fischelli  
Veejer Enterprises



## The Electrical “How-To-Book”

# “Vehicle Electrical Troubleshooting **SHORTCUTS**”

<http://www.veejer.com/shortcuts.html>

Learn to troubleshoot vehicle electrical systems **On-The-Vehicle** using just a DMM & Current Clamp Solve problems that many technicians often overlook!

- Section 1: Essential Electrical Principles
- Section 2: Working with Digital Multimeters
- Section 3: Understanding How Circuits Work
- Section 4: *Quick* Troubleshooting Battery Circuits
- Section 5: *Quick* Troubleshooting Cranking Circuits
- Section 6: *Quick* Troubleshooting Charging Circuits
- Section 7: Reading Schematic Diagrams

Each Section...

- guides a technician step-by-step through electrical troubleshooting procedures **on-the-vehicle**
- is fully illustrated with schematic diagrams and step-by-step test procedures
- provides worksheets to help a technician learn the correct test procedures **on-the-vehicle**
- provides correct DMM readings so a tech can tell a bad circuit reading from a good one
- has review questions with answers in the back of the book

“**SHORTCUTS**” is Spiral Bound, 250 pages - \$98.00 per copy (plus s/h)

**Also available in a .pdf document.** (Price may change without notice)

Go to “**SHORTCUTS**” web page at <http://www.veejer.com/shortcuts.html>

### Great News for Secondary and Post-Secondary Teachers:

We offer an “**Electrical SHORTCUTS**” Power Point presentation for teachers to use in the classroom. Each section of “**Electrical SHORTCUTS**” has review questions. Each illustration with talking points and review test questions are on an individual slide for classroom discussion.

**Call 972.276.9642 if you have any questions.**

Visit our “**Technician’s**” web page at <http://www.veejer.com/technician.html>

Visit our “**Shop Owners/Fleet Manager**” web page at  
<http://www.veejer.com/shopowners.html>

Visit our “**Teachers**” web page at <http://www.veejer.com/teachers.html>

# FIRST THINGS FIRST

Two laminated versions available: one battery or two battery 12-14V electrical systems  
Visit our **FIRST THINGS FIRST** web page <http://www.veejer.com/first.html>



## **FIRST THINGS FIRST-Pro**

Covers single battery electrical systems 12-14V  
Guides a technician through testing the primary electrical system consisting of a single battery, engine and accessory grounds and the complete charging system. There are 14 test steps that can be performed in less than 5 minutes. Includes testing the new “Smart Charging Systems.”

In the picture on the left technicians are practicing using **FIRST THINGS FIRST-Pro** to gain experience performing the tests so they can complete the test procedure in less than 5 minutes and certify the primary electrical system (battery, major grounds and charging system) are functioning properly.

## **FIRST THINGS FIRST-2**

This version covers a dual battery electrical system 12-14V



Guides a technician through testing the primary electrical system consisting of the dual batteries connected in parallel, engine and accessory grounds and the complete charging system. There are 18 test steps that can be performed in less than 5 minutes. Includes testing the new “Smart Charging Systems.”

Technicians on the left of are performing **FIRST THINGS FIRST-2** on fleet vehicles with a **dual battery electrical system**. With a little practice they can perform the entire test procedure in less than 5 minutes and verify both batteries are good, the engine and accessory grounds are good and the charging system is performing properly. Any electrical problem in this area of the vehicle will affect every electrical

circuit on the vehicle. The problem is not resolved by troubleshooting an individual vehicle circuit that isn't working correctly if the problem is in the primary electrical system consisting of dual batteries, two major grounds and the charging system is over looked. **FIX IT FIRST!**

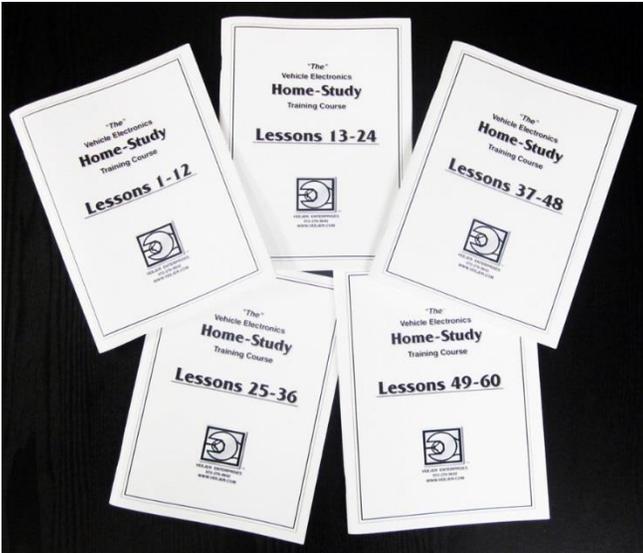
**FIRST THINGS FIRST-Pro \$89.00 - FIRST THINGS FIRST-2 \$99.00**

(Price may change without notice)

Visit the **FIRST THINGS FIRST** web page <http://www.veejer.com/first.html>

Call us at 972.276.9642 if you have any questions!

# 60 Lesson Vehicle Electronics Training Course



Lessons start at the beginning of basic electronics with the study of how electrons behave and continue through troubleshooting on-board vehicle computer control circuits. Electronic circuit operating characteristics are covered and most importantly how electronic circuits fail and the correct troubleshooting procedures to follow to identify the problem.

A Review Test follows every fourth lesson. Printed version in booklets of 12 lessons each with review tests are shown at the left. Study on-line see below!

Each booklet of 12 lessons is \$69.00 in USA (\$79.00 Intn'l orders) plus shipping (Price may change without notice)

60 printed lessons \$299.00 plus 2-day shipping to US Zip codes. (about \$15.00)  
\$334.00 International orders (plus international shipping)

**NOW!!!**

## Study the 60 Lessons On-line in both English and Spanish

Go to our new web site dedicated to the 60 lessons: <https://training.veejer.com>  
**No shipping charges.** Register on this web site with a credit card and gain **lifetime access** to the 60 lessons. **Print your own lessons** or study on your computer screen, iPhone or iPad.  
One-time fee of \$249.00 for life-time access on-line.

Visit our 3 dedicated web pages that explain how our training programs can help.

Visit our "**Technician's**" web page at <http://www.veejer.com/technician.html>

Visit our "**Shop Owners/Fleet Managers**" web page at <http://www.veejer.com/shopowners.html>

Visit our "**Teachers**" web page at <http://www.veejer.com/teachers.html>

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