Shelton State Community College will receive sealed bids in its Purchasing Office until 4/17/2013 at 2:00 PM for the items described in the bid invitation. Bids will be publicly opened and read aloud in the Volkert Conference Room, Room #3605A.

SUBMIT BID PROPOSAL TO:

Bid Number 12-13-SS
Attention: Judy Johnson
Shelton State Community College
9500 Old Greensboro Road
Tuscaloosa, AL 35405

Page  Contents
2-3  General Conditions and Instructions to Bidders
4-5  Specifications
6    Bid Proposal Form
7    Bid Certificate
8-9  State of Alabama Disclosure Statement
10-73 Attachment

"No Bid" Responses Are Requested
GENERAL CONDITIONS AND INSTRUCTIONS TO BIDDERS

1. All bids are to be in sealed envelopes with the above bid number and opening on the outside of the envelope. All forms should be completed and included in the sealed envelope. Mark your bid to the attention of Judy Johnson, Purchasing Officer.

2. Only written modifications to proposals will be accepted.

3. Bidders may submit proposals on any one or all items listed. However, the College reserves the right to select and purchase individual items.

4. All bid prices are to be quoted F.O.B. Shelton State Community College, Tuscaloosa, Alabama.

5. The College reserves the right to accept or reject any bid or part thereof and waive informalities that may be deemed in the best interest of the College.

6. References in the specifications to name brands, catalogue numbers, etc., are for identification purposes only and in no way are intended to eliminate or discourage the offering of substitute items which equal the specifications.

7. If quotations are offered on substitute items, the bidder must include catalogues/brochures with complete descriptions and manufacturers' specifications.

8. Guarantees/warranties are to be furnished by the vendor as provided by the manufacturer.

9. Bid prices are not to include tax. Tax exemption certificates furnished upon request.

10. All items are to be free from defects in material and workmanship. If items are defective or damaged or do not meet the specifications, they are to be replaced immediately by the vendor at no additional cost to the college.

11. Quantities listed on the specifications sheet are believed to be correct. However, the college reserves the right to alter or vary the quantities for a period of ninety (90) days from the bid opening.
12. No payments on partial shipments will be made until all items have been received in good condition.

13. No bid may be withdrawn after the scheduled closing time for receipts of bids for a period of thirty (30) days.

14. Any and all damages caused to the College by the successful bidder will be repaired promptly at no cost to the College.

15. This proposal is to be made without connection with any other person, company, or parties making a bid or proposal and is to be in all respects fair and in good faith, without collusion or fraud.

16. The contractor must comply with all federal, state, county and city laws regarding license fees and agreements.

17. The contractor must comply with Alabama Act 2011-535 and agrees to submit an Affidavit of Alabama Immigration Law Compliance as well as an E-Verify Memorandum of Understanding.

18. Nonresident Bidder Information: Act Number 2001-637 of the 2001 Alabama Legislature, which became effective on May 21, 2001, and is codified as Code of Alabama, Section 39-3-5, provides as follows:

Section 1: In the letting of public contracts in which any state, county or municipal funds are utilized, except those contracts funded in whole or in part with funds received from a federal agency, preferences shall be given to resident contractors, and a non resident bidder domiciled in a state having laws granting preference to local contractors shall be awarded Alabama public contracts only on the same basis as the nonresident bidder’s state awards contract to Alabama contractors bidding under similar circumstances; and resident contractors in Alabama, as defined in Section 39-2-12, be they corporate, individuals or partnerships, are to be granted preference over nonresidents in awarding of contracts in the same manner and to the same extent as provided by the laws of the state domicile of the nonresident.

Section 2: A summary of this law shall be made a part of the advertised specifications of all projects affected by this law.
SPECIFICATIONS

Please bid on the items listed on pages 4-5, or equivalent, for Shelton State Community College.

Charges for postage/handling/delivery should be included in the bid price.

Shelton State reserves the right to purchase any additional quantity of the above referenced item for a period of at least three hundred sixty-five days (one year) following the bid opening date.

If you have general bid questions, please contact Judy Johnson at 205.391.2238.

For questions regarding the bid specifications, please contact Jason Moore at 205.391-5809.

CERTIFICATION PURSUANT TO ACT NUM. 2006-557

ALABAMA LAW (SECTION 41-4-116, CODE OF ALABAMA 1975) PROVIDES THAT EVERY BID SUBMITTED AND CONTRACT EXECUTED SHALL CONTAIN A CERTIFICATION THAT THE VENDOR, CONTRACTOR, AND ALL OF ITS AFFILIATES THAT MAKE SALES FOR DELIVERY INTO ALABAMA OR LEASES FOR USE IN ALABAMA ARE REGISTERED, COLLECTING, AND REMITTING ALABAMA STATE AND LOCAL SALES, USE AND/OR LEASE TAX ON ALL TAXABLE SALES AND LEASES INTO ALABAMA. BY SUBMITTING THIS BID, THE BIDDER IS HEREBY CERTIFYING THAT THEY ARE IN FULL COMPLIANCE WITH ACT NO. 2006-557. THEY ARE NOT BARRED FROM BIDDING OR ENTERING INTO A CONTRACT PURSUANT TO 41-4-116, AND ACKNOWLEDGES THAT THE AWARDING AUTHORITY MAY DECLARE THE CONTRACT VOID IF THE CERTIFICATION IS FALSE.
PLEASE SEE ATTACHED FOR BID SPECIFICATIONS
SHELTON STATE
COMMUNITY COLLEGE
9500 OLD GREENSBORO RD.
TUSCALOOSA, AL 35405
BID INVITATION

BID SPECIFICATIONS

12-13-SS
BID PROPOSAL FORM

Proposal of ________________________________
(Company Name)

of ________________________________________
(City and State)

Hereinafter, called "Bidder," a corporation, organized and existing under the laws of the
State of ____________________, a partnership, or an individual doing business as:

________________________________________

TO: Shelton State Community College
9500 Old Greensboro Rd.
Tuscaloosa, AL 35405
Attn: Judy Johnson

Bid Price $______________________________

Federal Identification # ___________________
I hereby affirm I have not been in any agreement or collusion among bidders or prospective bidders in restraint of freedom of competition, by agreement to bid at a fixed price or to refrain from bidding, or otherwise.

________________________
Firm or Company Name

________________________
Address

________________________
City, State and Zip Code

________________________
Telephone Number

________________________
Fax Number

________________________
Name of Company Representative
(Please Print)

________________________
Signature of Company Representative

BID CERTIFICATE MUST BE NOTARIZED

Sworn and subscribed before me this the _________ day of ________________, 20___.

________________________
Notary Public

________________________
Date my commission expires

PLACE NOTARY SEAL HERE
STATE OF ALABAMA
Disclosure Statement
(Required by Act 2001-955)

ENTITY COMPLETING FORM

ADDRESS

CITY, STATE, ZIP

STATE AGENCY/DEPARTMENT THAT WILL RECEIVE GOODS, SERVICES, OR IS RESPONSIBLE FOR GRANT AWARD

ADDRESS

CITY, STATE, ZIP

TELEPHONE NUMBER

This form is provided with:
☐ Contract ☐ Proposal ☐ Request for Proposal ☐ Invitation to Bid ☐ Grant Proposal

Have you or any of your partners, divisions, or any related business units previously performed work or provided goods to any State Agency/Department in the current or last fiscal year?
☐ Yes ☐ No

If yes, identify below the State Agency/Department that received the goods or services, the type(s) of goods or services previously provided, and the amount received for the provision of such goods or services.

<table>
<thead>
<tr>
<th>STATE AGENCY/DEPARTMENT</th>
<th>TYPE OF GOODS/SERVICES</th>
<th>AMOUNT RECEIVED</th>
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</table>

Have you or any of your partners, divisions, or any related business units previously applied and received any grants from any State Agency/Department in the current or last fiscal year?
☐ Yes ☐ No

If yes, identify the State Agency/Department that awarded the grant, the date such grant was awarded, and the amount of the grant.

<table>
<thead>
<tr>
<th>STATE AGENCY/DEPARTMENT</th>
<th>DATE GRANT AWARDED</th>
<th>AMOUNT OF GRANT</th>
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</table>

1. List below the name(s) and address(es) of all public officials/public employees with whom you, members of your immediate family, or any of your employees have a family relationship and who may directly personally benefit financially from the proposed transaction. Identify the State Department/Agency for which the public officials/public employees work. (Attach additional sheets if necessary.)

<table>
<thead>
<tr>
<th>NAME OF PUBLIC OFFICIAL/EMPLOYEE</th>
<th>ADDRESS</th>
<th>STATE DEPARTMENT/AGENCY</th>
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</tbody>
</table>

Page 8
2. List below the name(s) and address(es) of all family members of public officials/public employees with whom you, members of your immediate family, or any of your employees have a family relationship and who may directly personally benefit financially from the proposed transaction. Identify the public officials/public employees and State Department/Agency for which the public officials/public employees work. (Attach additional sheets if necessary.)

<table>
<thead>
<tr>
<th>NAME OF FAMILY MEMBER</th>
<th>ADDRESS</th>
<th>NAME OF PUBLIC OFFICIAL/PUBLIC EMPLOYEE</th>
<th>STATE DEPARTMENT/AGENCY WHERE EMPLOYED</th>
</tr>
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</tbody>
</table>

If you identified individuals in items one and/or two above, describe in detail below the direct financial benefit to be gained by the public officials, public employees, and/or their family members as the result of the contract, proposal, request for proposal, invitation to bid, or grant proposal. (Attach additional sheets if necessary.)

Describe in detail below any indirect financial benefits to be gained by any public official, public employee, and/or family members of the public official or public employee as the result of the contract, proposal, request for proposal, invitation to bid, or grant proposal. (Attach additional sheets if necessary.)

List below the name(s) and address(es) of all paid consultants and/or lobbyists utilized to obtain the contract, proposal, request for proposal, invitation to bid, or grant proposal:

<table>
<thead>
<tr>
<th>NAME OF PAID CONSULTANT/LOBBYIST</th>
<th>ADDRESS</th>
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<tbody>
<tr>
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</table>

By signing below, I certify under oath and penalty of perjury that all statements on or attached to this form are true and correct to the best of my knowledge. I further understand that a civil penalty of ten percent (10%) of the amount of the transaction, not to exceed $10,000.00, is applied for knowingly providing incorrect or misleading information.

Signature
Date

Notary's Signature
Date
Date Notary Expires

Act 2001-955 requires the disclosure statement to be completed and filed with all proposals, bids, contracts, or grant proposals to the State of Alabama in excess of $5,000.
**Automotive Instructional Trainers Specifications**

The automotive instructional trainers shall be bid as a single package because each trainer is a component of an instructional system and it is important that each unit is compatible. The vendor is responsible for all shipping, rigging, lifting, installation, setup, and training.

The following is a summary of the items and quantities to be bid. The pages following contain details about each piece of equipment.

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drum/Disc Brake Trainer (4 Wheel)</td>
<td>1</td>
</tr>
<tr>
<td>Injector/Fuel Pump System Trainer</td>
<td>1</td>
</tr>
<tr>
<td>Starting System Trainer - J1850</td>
<td>1</td>
</tr>
<tr>
<td>Charging System Trainer – Faulted/J1850</td>
<td>1</td>
</tr>
<tr>
<td>Lighting System Trainer – Faulted</td>
<td>1</td>
</tr>
<tr>
<td>Instrument Panel System Trainer – J1850</td>
<td>1</td>
</tr>
<tr>
<td>Wiper/Washer Trainer – J1850</td>
<td>1</td>
</tr>
<tr>
<td>Power Window System Trainer – J1850</td>
<td>1</td>
</tr>
<tr>
<td>Power Door Lock System Trainer – Faulted</td>
<td>1</td>
</tr>
<tr>
<td>Power Seat Trainer - J1850</td>
<td>1</td>
</tr>
<tr>
<td>Troubleshooting Fault Board</td>
<td>10</td>
</tr>
<tr>
<td>Troubleshooting Trainer with Storage Case</td>
<td>10</td>
</tr>
<tr>
<td>Interactive Keypad</td>
<td>1</td>
</tr>
<tr>
<td>Automotive Electricity Course Board</td>
<td>10</td>
</tr>
<tr>
<td>Automotive Electricity - Computer Based Instruction</td>
<td>1</td>
</tr>
<tr>
<td>Automotive Electronics Course board W/Courseware</td>
<td>10</td>
</tr>
<tr>
<td>Automotive Computer Concepts</td>
<td>1</td>
</tr>
<tr>
<td>Engine Performance Troubleshooting Trainer</td>
<td>1</td>
</tr>
<tr>
<td>Engine Control Fundamentals – Computer Based Instruction</td>
<td>1</td>
</tr>
</tbody>
</table>
Engine Control Systems Operation – Computer Based Instruction 1

Engine Control Diagnostic Fundamentals – Computer Based Instruction 1

Engine Control System Troubleshooting 1

Networking System 1
DRUM/DISC BRAKE TRAINER (4 WHEEL)

This trainer to be part of a Brake Systems program to present the live operation and study of Hydraulic Brake Systems. The program to provide courseware for use by students and instructors.

Quantity

1

Construction

The trainer frame to be constructed of 2” x 2” square steel tubing. The trainer to be bench mountable.

Components

The trainer to use actual new vehicle components.

To Include:

- Rear Drum Brake Assemblies (2)
- Front Disc Brake Assemblies (2)
- Master Cylinder
- Vacuum Booster
- Combination Valve
- Parking Brake Cable
- Brake Switch
- Brake Warning Light
- Stop Light
- Pressure Gauges (4)
- Power Supply Posts
- Parking Brake Switch

Trainer Operation

The trainer to feature actual front and rear brake operation, including power brakes (vacuum boost) and parking brake. The trainer to feature operational Brake Warning Light and Stop Light. The trainer to include hydraulic pressure gauges to monitor front and rear hydraulic fluid pressure.

System Diagnostics

The trainer to provide an advanced level of instruction by duplicating actual on-vehicle troubleshooting procedures. The trainer to be capable of actual service manual test procedures, including:

- Bleeding Brakes
- Hydraulic Pressure Tests
- Inspection of Brake Components
- Removal and Replacement of Brake Components
- Assembly and Disassembly of Brake Components
Power Requirements

To include a 3Amp, single phase, 60HZ power supply. To be a filtered and regulated power source with fused protection. To have a power cord for a North America (Nema 5-15) 110VAC/15Amp electrical outlet. Current Draw = .5Amps.

Operations Manual

To provide instructor with Trainer Orientation, Start-up Procedures, Equipment Operation, Maintenance and Service Information.

Drum/Disc Brake Courseware

All items to be a complete courseware package and to include a photocopy site license to allow distribution of student manual. Courseware presented in Adobe PDF file format on CD-ROM.

Student Manual

The courseware to include a Student Manual containing worksheets written specifically for use with the Brake System Trainer, Reference Book, and Service Manual Information.

The units of instruction to be based on NATEF tasks. The Brake Program Activities to include:

1. Program Overview
2. Hydraulics Theory & Operation
3. Master Cylinder
4. Brake Fluid, Lines and Hoses
5. Hydraulic Valves
6. Bleeding Brakes
7. Drum Brake Operation & Components
8. Drum Brake Inspection & Service
9. Wheel Cylinder Service
10. Troubleshooting Drum Brake Problems
11. Disc Brake Operation & Components
12. Disc Brake Inspection & Service
13. Caliper Assemblies
14. Troubleshooting Disc Brake Problems
15. Power Assist Units
16. Power Booster Diagnosis & Repair
17. Wheel Bearings
18. Parking Brake Service
19. Electrical Component Service

NATEF Task Record Keeping Sheets

The courseware to include NATEF Task Record Keeping Sheets to facilitate the instructor in recording the progress of each student as NATEF tasks are completed.

Instructor Guide

The courseware to include an Instructor Guide to assist in management of the program material. The Instructor Guide to provide product information and answers.

Service Manual Information

The courseware to include the appropriate manufacturer’s Service Manual Information. The Service Manual Information to be used during student activities and system diagnosis.

Should be an ATEC model 400-4W or equivalent.
**INJECTOR/FUEL PUMP SYSTEM TRAINER**

This trainer to present the “real-world” operation and study of Fuel Injection theory. The program will provide an operational view for the student into the study of the fuel injection system. The program to provide courseware for use by students and instructors.

**Quantity**

1

**Construction**

The trainer cabinet is constructed of laminated plywood. The front panel is Lexan with 2nd surface graphics.

**Components**

The trainer used actual vehicle components and connectors.

To Include:

- Fuel Injector w/ Terminal Test Points
- Fuel Pump w/ Terminal Test Points
- Fuel Pump Relay w/ Terminal Test Points
- Fuel Pressure Regulator
- Transparent Fuel Tank
- Digital RPM Display
- System Power w/ LED Indicator

All automotive components to be new stock purchased directly from a manufacturer authorized dealer.

**Trainer Operation**

The trainer uses the Fuel Pump Relay, Fuel Pump and the Injector used in GM vehicles. These components are electrically connected and respond as if they were in an automobile. The trainer displays actual fuel injector operation and allows for speeds that range from 200 to 5140 RPM.

The Injector/Fuel Pump Systems Trainer to be capable of:

**Injector Control:**

- Realistic Electronic Control of the Fuel Injector
- Realistic Injector Pulse Width based on Engine RPM

**Fuel Delivery:**

- Actual Relay and Fuel Pump Control based on switched inputs
- Actual adjustable Fuel Pump Pressure Regulator
- 15 Second control to test fuel delivery
System Diagnostics

To provide an advanced level of instruction by duplicating actual operation of the basic fuel injector system. Students are offered a realistic troubleshooting experience.

Test Procedures

The trainer is capable of GM recommended test procedures as presented in the service manuals.

Test Switches and Connections:

Supplied on the front panel of the trainer are On/Off toggle switches that will disconnect automotive components (Relay, Fuel Pump) so that isolated testing can occur. It has a 15-second enable switch and a push button start switch, which allows fuel delivery for a 15-second time interval. Also provided are tip jack connections by which component terminals can be easily checked.

Power Requirements

To include an internally mounted switching power supply. Input voltage to the power supply is switchable between 115VAC/60Hz and 230VAC/50Hz via a slider switch located on the power supply. To be a filtered and regulated power source with fused protection. To have a power cord for a North America (NEMA 5-15) 110VAC/15Amp electrical outlet. A power switch with indicator light to control the power supply. Current Draw = 1.7Amps.

Operations Manual

To provide instructor with Trainer Orientation, Start-up Procedures, Equipment Operation, Maintenance and Service Information.

Injector/Fuel Pump System Courseware

All items to be a complete courseware package and to include a photocopy site license to allow distribution of student manual. Courseware presented in Adobe PDF file format on CD-ROM.

Student Manual

The student materials are to include worksheets written specifically for use with the Injector/Fuel Pump System Trainer and Reference Book.

The units of instruction to be based on NATEF tasks. The Injector/Fuel Pump Program Activities to include:

1. Program Overview
2. Emissions
3. Throttle Body Injection (TBI)
4. Multi-Port Fuel Injection
5. Injector Control
6. Control System Inputs
7. Fuel Delivery Systems
NATEF Task Record Keeping Sheets

The courseware to include NATEF Task Record Keeping Sheets to facilitate the instructor in recording the progress of each student as NATEF tasks are completed.

Instructor Guide

To assist the instructor’s management of the program material. To include product information and answers.

Should be an ATEC model 670 or equivalent
STARTING SYSTEM TRAINER - J1850

This trainer is part of an electrical systems program to present the live operation and study of Starter Motor Systems. The program provides courseware for use by students and instructors.

Quantity

1

Construction

The trainer is constructed of laminated plywood with a front panel of Lexan and 2nd surface graphics. The supporting legs are made from square steel tubing.

Components

This trainer uses actual new-model vehicle components and connectors.

Features Include:
- Starter Motor
- Starter Solenoid
- Starter Solenoid Disable Switch
- Trans Internal Mode Switch
- Crank Relay
- Ignition Switch
- Measurement Tip Jacks
- Power Supply Post
- Fuse Block

Trainer Operation

This trainer features actual Starting System operation.

System Diagnostics

The trainer provides an advanced level of instruction by duplicating actual on-vehicle troubleshooting procedures. It uses actual vehicle wire colors to be compatible with wiring diagrams. The trainer is capable of actual service manual test procedures.

Fault Insertion

Faults can be inserted via keypad, local computer, or network system. The Software interface allows hard and intermittent faults to be entered by selecting from a pictorial schematic. Software interface faults can be entered randomly or as specified by the instructor.
Faults:

<table>
<thead>
<tr>
<th>Fault #</th>
<th>Description</th>
<th>Fault</th>
<th>CKT# or Circuit#</th>
<th>Wire Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ignition Switch Power</td>
<td>Open</td>
<td>042</td>
<td>RED</td>
</tr>
<tr>
<td>2</td>
<td>Trans Range Switch Signal P</td>
<td>Open</td>
<td>776</td>
<td>WHT</td>
</tr>
<tr>
<td>3</td>
<td>Starter Enable Relay Control</td>
<td>High Resistance</td>
<td>625</td>
<td>YEL/BLK</td>
</tr>
<tr>
<td>4</td>
<td>Crank Relay Power</td>
<td>Open</td>
<td>239</td>
<td>PNK</td>
</tr>
<tr>
<td>5</td>
<td>Ignition Switch Start Circuit</td>
<td>Open</td>
<td>806</td>
<td>PPL</td>
</tr>
<tr>
<td>6</td>
<td>Trans Range Switch Signal C</td>
<td>Short To Ground</td>
<td>773</td>
<td>GRY</td>
</tr>
</tbody>
</table>

**Fault Insertion Via Keypad**

Realistic fault codes can be inserted via the keypad to provide troubleshooting practice.

**Fault Insertion Via Local Computer**

Faults are entered via the serial communications port of a single computer using a software interface (installed on the computer hard drive). A proprietary serial cable for connecting to the computer is included.

**Fault Insertion Via Network System**

The network system is a 16-port serial hub with standard CAT5 cable. It requires an Ethernet connection from the serial hub to LAN. Software interface can be installed on any LAN computer.

**Power Requirements**

Requires 12VDC automotive battery (not included).

To include an internally mounted power supply. Input voltage to the power supply is 115VAC/60Hz. To be a filtered and regulated power source with fused protection. To have a power cord for a North American (NEMA 5-15) 100VAC/15Amp electrical outlet. A power switch with indicator light to control the power supply. Current Draw = .5Amps.

**Operations Manual**

The Ops Manual provides the instructor with Trainer Orientation, Start-up Procedures, Equipment Operation, Maintenance and Service Information.

**Starting Courseware**

All items are part of a complete courseware package and include a photocopy site license to allow the distribution of student manuals. Courseware is presented in Adobe PDF file format on CD-ROM or USB flash drive.
Student Manual

The courseware includes a Student Manual containing worksheets written specifically for use with the Starting System Trainer, Reference Book, and Service Manual Information.

The units of instruction are based on NATEF tasks. The Battery, Starting, and Charging Activities include:

1. Program Overview
2. Battery Description
3. Battery Diagnosis and Testing
4. Battery Drain Testing
5. Battery Charging/Jump Starting
6. Battery Maintenance
7. Starting System Description & Operation
8. Starting System Diagnosis & Repair
9. Starter Bench Tests/Removal & Installation
10. Charging System Description & Operation
11. Charging System Diagnosis & Repair
12. Generator Bench Tests
13. Generator Service

NATEF Task Record Keeping Sheet

The courseware includes a NATEF Task Record Keeping Sheet to facilitate the instructor in recording the progress of each student as NATEF tasks are completed.

Instructor Guide

The courseware includes an Instructor Guide to assist in management of the program material. The Instructor Guide provides product information and answers to student manual questions.

Service Manual Information

The courseware includes the appropriate manufacturer’s Service Manual Information. The Service Manual Information is to be used during student activities and system diagnosis.

Should be an ATEC model 811FJ or equivalent
This trainer is part of an electrical systems program designed for teaching the operation and troubleshooting of Automotive Charging Systems.

**Quantity**

1

**Construction**

The trainer cabinet is constructed of laminated plywood with a front panel of Lexan and underlying surface graphics.

The supporting T-Bar legs are produced from 1" square steel tubing and powder coated in black (rather than painted) for increased durability and scratch resistance.

**Components**

Charging Systems Trainer uses actual late-model vehicle components, along with other features, including:

- Generator
- Ignition Switch
- 1½ HP Motor w/Belt & Pulleys
- Malfunction Indicator Light (MIL)
- Gen-L Light
- Battery Indicator Light
- OBD II Standard DLC
- 12VDC Fuse Block
- Scan Tool Mode Keypad
- Scan Tool Mode Display
- Connector Tip Jacks
- Wiring Harness
- Power Supply Posts
- Safety Shield around Belt and Pulleys

**Trainer Operation**

The Trainer is an actual PCM-controlled Charging System and is capable of duplicating the operation of the Original Equipment System. It can also connect to, and charge, a 12VDC automotive battery (not included).

**System Diagnostics & Fault Insertion**

This unit provides for an advanced level of instruction by duplicating actual on-vehicle operation and troubleshooting. The system runs actual Service Manual test procedures and all wire colors are consistent with the original vehicle and schematics. It is also scan tool compatible.
In addition to Service Manual tests, faults can also be inserted into this trainer directly via the built-in keypad or remotely from an Instructor’s computer. A separate no-cost software interface, the Instructor’s Management Program (IMP), is included and allows both hard and intermittent faults to be entered.

Courseware

A complete set of courseware materials is included with this unit at no additional cost. The set is provided in Adobe PDF file format on either CD-ROM or USB Flash Drive and includes:

• A Student Manual with activities and Worksheets written specifically for the Charging System Trainer, and based on NATEF required tasks.
• An Instructor’s Guide to assist in managing/facilitating the program material. Instructor Guides provide both product information and correct answers for the Student Manual questions/worksheets
• Original Equipment Manufacturer’s Service Manual Information for use during student activities and system diagnosis.
• An Operations Manual which provides instructors with information on Trainer Orientation, Start-up Procedures, Equipment Operation, Maintenance and Service.
• NATEF Performance Task and Record Keeping Sheets to track and validate the progress of each student as the various tasks are completed
• A Reference Book containing general information on Battery, Starting, & Charging Systems

Power Requirements

This Charging System trainer includes a 1½ HP electrical motor (115VAC/14Amp, single phase, 60HZ) with a power cord for the North American (NEMA 5-15) standard. The motor requires a 110VAC/15Amp electrical outlet. Other electrical needs include:

• A 12VDC automotive battery (not included).
• A 115VAC/60Hz source for the internally mounted power supply. The input voltage for the power supply must be filtered and regulated with fused protection. In addition, its power cord must be compatible with the North American (NEMA 5-15) standard.

Should be an ATEC model 812FJ or equivalent
LIGHTING SYSTEM TRAINER – FAULTED

This trainer to be part of an electrical systems program to present the live operation and study of lighting systems. The program to provide courseware for use by students and instructors.

**Quantity**

1

**Construction**

The trainer cabinet to be constructed of laminated plywood. The front panel to be Lexan with 2nd surface graphics. The supporting legs to be made from square steel tubing.

**Components**

The trainer to use actual new-model vehicle components and connectors. To include:
- Body Control Module
- Head Lamp Switch
- Center High Mounted Stop Lamp (LEDarray)
- OBD-2 Diagnostic Link Connector
- Ambient Light Sensor
- Interconnect for other trainers
- Connector Tip Jacks
- Fuse Panel
- Keypad / Display
- Power Supply Posts

**Trainer Operation**

The trainer to feature actual Lighting System operation. The trainer to be capable of connecting to a 12VDC automotive battery (not included) or power supply (not included).

**System Diagnostics**

The trainer to provide an advanced level of instruction by duplicating actual on-vehicle troubleshooting procedures. The trainer to use actual vehicle wire colors to be compatible with wiring diagrams. The trainer to be capable of actual service manual test procedures.

**Fault Insertion**

Faults to be inserted via keypad, local computer, or network system. Software interface allows hard and intermittent faults to be entered by selecting faults from a pictorial schematic. Software interface faults to be entered randomly or as specified by instructor.

Faults:
<table>
<thead>
<tr>
<th>Fault #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Head lamp input</td>
</tr>
<tr>
<td>2</td>
<td>DRL relay coil</td>
</tr>
<tr>
<td>3</td>
<td>Head lamp relay feed</td>
</tr>
<tr>
<td>4</td>
<td>Relay contact ground</td>
</tr>
<tr>
<td>5</td>
<td>Head lamp relay control</td>
</tr>
<tr>
<td>6</td>
<td>Ambient light sensor</td>
</tr>
<tr>
<td>7</td>
<td>Park lamp signal</td>
</tr>
<tr>
<td>8</td>
<td>Back up lamp relay control</td>
</tr>
<tr>
<td>9</td>
<td>LF turn and park</td>
</tr>
<tr>
<td>10</td>
<td>RH low beam filament</td>
</tr>
<tr>
<td>11</td>
<td>RR turn/stop</td>
</tr>
<tr>
<td>12</td>
<td>LR turn/stop and park Cross</td>
</tr>
<tr>
<td>13</td>
<td>Rear park lamps</td>
</tr>
<tr>
<td>14</td>
<td>Data line</td>
</tr>
<tr>
<td>15</td>
<td>Instrument illumination</td>
</tr>
<tr>
<td>16</td>
<td>Fog and turn lamps</td>
</tr>
</tbody>
</table>

**Fault Insertion Via Keypad**

Realistic faults can be inserted via the keypad to provide troubleshooting practice.

**Fault Insertion Via Local Computer**

Faults to be entered via the serial communications port of a single computer. Faults to be entered using a software interface (installed on the computer hard drive). Includes proprietary serial cable to connect to computer.

**Fault Insertion Via Network System**

Connection to the LAN is achieved with a network System. The network system is a 16-port Serial Hub with standard CAT5 cable. Requires an Ethernet connection from the serial hub to the LAN. Software interface to be installed on any LAN computer.

**Power Requirements**

Requires 12VDC automotive battery (not included) or 12VDC/30Amp power supply (not included). Current Draw = 7 - 9 Amps.

To include an internally mounted power supply. To be a filtered and regulated power source with fused protection. To have a power cord for a North America (Nema 5-15) 110VAC/15Amp electrical outlet. A power switch with indicator light to control the power supply. Current Draw = .3Amps. Optional 220VAC/50Hz power supply available.
Operations Manual

To provide instructor with Trainer Orientation, Start-up Procedures, Equipment Operation, Maintenance and Service Information.

Lighting System Courseware

All items to be a complete courseware package and to include a photocopy site license to allow distribution of student manual. Courseware presented in Adobe PDF file format on CD-ROM.

Student Manual

The courseware to include a Student Manual containing on trainer activities or work sheets written specifically for use with the Lighting System Trainer and Service Manual Information. The units of instruction to be based on NATEF tasks. The Lighting System Activities to include:

1. Program Overview
2. Component Description & Operation
3. System Diagnosis & Testing
4. Develop diagnostic procedures
5. Troubleshooting

NATEF Task Record Keeping Sheet

The courseware to include a NATEF Task Record Keeping Sheet to facilitate the instructor in recording the progress of each student as NATEF tasks are completed.

Instructor Guide

The courseware to include an Instructor Guide to assist in management of the program material. The Instructor Guide to provide product information and answers.

Service Manual Information

The courseware to include the appropriate manufacturer’s Service Manual Information. The Service Manual Information to be used during student activities and system diagnosis.

Should be an ATEC model 821FJ or equivalent.
This trainer is part of an electrical systems program for presenting the live operation and study of Instrument Panel Systems. The program provides courseware for use by students and instructors.

**Quantity**

1

**Construction**

The trainer cabinet is constructed of laminated plywood with a front panel of Lexan with 2nd surface graphics. The supporting legs are made from square steel tubing.

**Components**

The trainer uses actual new-model vehicle components and connectors.

Features Include:
- Body Control Module
- Instrument Panel
- Diagnostic Link Connector
- Interconnect for other trainers
- Connector Tip Jacks
- Fuse Panel
- Keypad / Display
- Power Supply Posts

**Trainer Operation**

The trainer features actual Instrument Panel System operation. It is capable of connecting to a 12VDC automotive battery (not included) or power supply (not included).

**System Diagnostics**

This trainer provides an advanced level of instruction by duplicating actual on-vehicle troubleshooting procedures. Actual vehicle wire colors are used to be compatible with wiring diagrams. The trainer is also capable of actual service manual test procedures.

**Fault Insertion**

Faults can be inserted via keypad, local computer, or network system. A Software interface allows hard and intermittent faults to be entered by selecting from a pictorial schematic. Those faults can be entered either randomly or as specified by an instructor.
Faults:

<table>
<thead>
<tr>
<th>Fault #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ground circuits</td>
</tr>
<tr>
<td>2</td>
<td>IPC power feed</td>
</tr>
<tr>
<td>3</td>
<td>B+ and Ignition 1 feed</td>
</tr>
<tr>
<td>4</td>
<td>Class II data circuit</td>
</tr>
<tr>
<td>5</td>
<td>Turn indicator and illumination</td>
</tr>
<tr>
<td>6</td>
<td>Turn indicators</td>
</tr>
<tr>
<td>7</td>
<td>Class II data BCM/IPC</td>
</tr>
<tr>
<td>8</td>
<td>RH indicator and Ignition</td>
</tr>
</tbody>
</table>

Fault Insertion Via Keypad

Realistic faults can be inserted via the keypad to provide troubleshooting practice.

Fault Insertion Via Local Computer

Faults are entered via the serial communications port of a single computer using a software interface (installed on the computer hard drive). A proprietary serial cable for connecting to a computer is included.

Fault Insertion Via Network System

Connection to the LAN is achieved with a network system. The network system is a 16-port serial hub with standard CAT5 cable. An Ethernet connection is required from the serial hub to the LAN. The Software interface can be installed on any LAN computer.

Power Requirements

Requires 12VDC automotive battery (not included) or 12VDC/15Amp power supply (not included). Current Draw = 3 - 5 Amps.

To include an internally mounted power supply. To be a filtered and regulated power source with fused protection. To have a power cord for a North America (Nema 5-15) 110VAC/15Amp electrical outlet. A power switch with indicator light to control the power supply. Current Draw = .3Amps. Optional 220VAC/50Hz power supply available.

Operations Manual

The Ops manual provides instructors with Trainer Orientation, Start-up Procedures, Equipment Operation, Maintenance and Service Information.
**Lighting System Courseware**

All items are part of a complete courseware package and include a photocopy site license to allow distribution of student manual. Courseware is presented in Adobe PDF file format on CD-ROM or USB flash drive.

**Student Manual**

The courseware includes a Student Manual containing on-trainer activities or work sheets written specifically for use with the Lighting System Trainer and Service Manual Information.

The units of instruction are based on NATEF tasks. The Lighting System Activities include:

1. Program Overview
2. Component Description & Operation
3. System Diagnosis & Testing
4. Develop diagnostic procedures
5. Troubleshooting

**NATEF Task Record Keeping Sheet**

The courseware includes a NATEF Task Record Keeping Sheet to facilitate the instructor in recording the progress of each student as NATEF tasks are completed.

**Instructor Guide**

The courseware includes an Instructor Guide to assist in management of the program material. The Instructor Guide provides product information and student manual answers.

**Service Manual Information**

The courseware includes the appropriate manufacturer’s Service Manual Information which is to be used during student activities and system diagnosis.

**Should be an ATEC model 822FJ or equivalent**
This trainer is part of an electrical systems program for presenting the live operation and study of intermittent Wiper/Washer Systems. The program provides courseware for use by students and instructors.

**Quantity**

1

**Construction**

The trainer cabinet is constructed of laminated plywood with a front panel of Lexan and 2nd surface graphics. The supporting legs are made from square steel tubing.

**Components**

This trainer uses actual new-model vehicle components and connectors.

Features Include:
- Windshield Wiper System Module
- Windshield Wiper Transmission
- Washer Solvent Container
- Washer Fluid Pump
- Windshield Wiper Washer Switch
- Low Washer Indicator Light
- Connector Tip Jacks
- Fuse Holder
- Keypad / Display
- Power Supply Posts

**Trainer Operation**

This trainer features actual Wiper/Washer operation. It is capable of connecting to a 12VDC automotive battery (not included) or power supply (not included).

**System Diagnostics**

The trainer provides an advanced level of instruction by duplicating actual on-vehicle troubleshooting procedures. Actual vehicle wire colors are used to be compatible with wiring diagrams. The trainer is also capable of actual service manual test procedures.
Fault Insertion

Faults can be inserted via keypad, local computer, or a network system. A software interface allows hard and intermittent faults to be entered by selecting from a pictorial schematic. Software interface faults can be entered randomly or as specified by instructor.

Faults:

<table>
<thead>
<tr>
<th>Fault #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Washer Pump Ground</td>
</tr>
<tr>
<td>02</td>
<td>Wiper Motor Power</td>
</tr>
<tr>
<td>03</td>
<td>Wiper Motor Ground</td>
</tr>
<tr>
<td>04</td>
<td>Fuse Panel Power</td>
</tr>
</tbody>
</table>

Fault Insertion Via Keypad

Realistic faults can be inserted via the keypad to provide troubleshooting practice.

Fault Insertion Via Local Computer

Faults are entered via the serial communications port of a single computer using a software interface (installed on the computer hard drive). A proprietary serial cable for connecting to a computer is included.

Fault Insertion Via Network System

Connection to a LAN is achieved with a network system. The network system is a 16-port serial hub with standard CAT5 cable. An Ethernet connection from the serial hub to the LAN is required. The Software interface can be installed on any LAN computer.

Power Requirements

Requires 12VDC automotive battery (not included) or 12VDC/30Amp power supply (not included). Current Draw = 4.8 Amps.

An internally mounted power supply is included with this trainer. It is a filtered and regulated power source with fused protection. The power cord is for a North America (Nema 5-15) 110VAC/15Amp electrical outlet. A power switch with indicator light to control the power supply.
Current Draw = .3Amps. Optional 220VAC/50Hz power supply available.

Operations Manual

The Ops manual provides instructors with Trainer Orientation, Start-up Procedures, Equipment Operation, Maintenance and Service Information.
Wiper/Washer Courseware

All items are part of a complete courseware package and include a photocopy site license to allow distribution of student manual. Courseware is presented in Adobe PDF file format on CD-ROM or USB flash drive.

Student Manual

The courseware includes a Student Manual containing worksheets written specifically for use with the Wiper/Washer Trainer and Service Manual Information.

The units of instruction are based on NATEF tasks. The Wiper/Washer Activities include:

6. Program Overview  
7. Component Description & Operation  
8. System Diagnosis & Testing  
9. Removal & Installation Procedures  
10. Troubleshooting

NATEF Task Record Keeping Sheet

Courseware also includes a NATEF Task Record Keeping Sheet to assist the instructor in recording the progress of each student as NATEF tasks are completed.

Instructor Guide

This included aids in management of the program material. The Instructor Guide provides product information and student manual answers as well.

Service Manual Information

The courseware includes the appropriate manufacturer’s Service Manual Information for use during student activities and system diagnosis.

Should be an ATEC model 830FJ or equivalent.
POWER WINDOW SYSTEM TRAINER – J1850

This trainer is part of an electrical systems program for presenting the live operation and study of Power Window Systems. The program provides courseware for use by students and instructors.

**Quantity**

1

**Construction**

The trainer cabinet is constructed of laminated plywood while the front panel is Lexan with 2nd surface graphics. The supporting legs are made from square steel tubing.

**Components**

This trainer uses actual new-model vehicle components and connectors.

Features Include:
- Body Control Module
- Window Switches
- Window Motors
- RAP Relay
- Ignition Switch
- Interconnect for other trainers
- Connector Tip Jacks
- Fuse Panel
- Keypad / Display
- Power Supply Posts

**Trainer Operation**

The trainer features actual Power Window System operation. It is connected to either a 12VDC automotive battery (not included) or power supply (not included).

**System Diagnostics**

The trainer provides an advanced level of instruction by duplicating actual on-vehicle troubleshooting procedures. Actual vehicle wire colors are used to be compatible with wiring diagrams. The trainer is also capable of actual service manual test procedures.

**Fault Insertion**

Faults are inserted via keypad, local computer, or network system. A Software interface allows hard and intermittent faults to be entered by selecting from a pictorial schematic. Software interface faults are entered randomly or as specified by an instructor.
Faults:

<table>
<thead>
<tr>
<th>Fault #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Driver Control to Passenger Windows</td>
</tr>
<tr>
<td>2</td>
<td>Fused Power from Circuit Breaker</td>
</tr>
<tr>
<td>3</td>
<td>Driver Window Motor</td>
</tr>
<tr>
<td>4</td>
<td>RAP Relay Coil Supply Voltage</td>
</tr>
<tr>
<td>5</td>
<td>Driver Switch Assembly Ground</td>
</tr>
<tr>
<td>6</td>
<td>Right Rear Window Motor</td>
</tr>
<tr>
<td>7</td>
<td>Left Rear Window Down Ground</td>
</tr>
<tr>
<td>8</td>
<td>Driver Control to Passenger Windows</td>
</tr>
</tbody>
</table>

**Fault Insertion Via Keypad**

Realistic faults can be inserted via the keypad to provide troubleshooting practice.

**Fault Insertion Via Local Computer**

Faults are entered via the serial communications port of a single computer using a software interface (installed on the computer hard drive). A proprietary serial cable for connecting to a computer is also included.

**Fault Insertion Via Network System**

Connection to the LAN is achieved with a network system. The ANS is a 16-port serial hub with standard CAT5 cables. An Ethernet connection from the serial hub to the LAN is required. The Software interface can be installed on any LAN computer.

**Power Requirements**

Requires 12VDC automotive battery (not included) or 12VDC/15Amp power supply (not included). Current Draw = 3 - 5 Amps.

An internally mounted power supply is included with this trainer. It is a filtered and regulated power source with fused protection. The power cord is for a North America (Nema 5-15) 110VAC/15Amp electrical outlet. A power switch with indicator light to control the power supply. Current Draw = .3Amps. Optional 220VAC/50Hz power supply available.

**Operations Manual**

The Ops manual provides instructors with Trainer Orientation, Start-up Procedures, Equipment Operation, Maintenance and Service Information.
Power Window System Courseware

All items are part of a complete courseware package and include a photocopy site license to allow for the distribution of student manuals. Courseware is provided in Adobe PDF file format on CD-ROM or USB flash drive.

Student Manual

The courseware includes a Student Manual containing on-trainer activities and work sheets written specifically for use with the Power Window System Trainer and Service Manual Information.

The units of instruction are based on NATEF tasks. The Power Window System Activities include:

11. Program Overview
12. System Description and Operation
13. System Diagnosis and Repair
14. Removal and Repair
15. Troubleshooting

NATEF Task Record Keeping Sheet

The courseware has a NATEF Task Record Keeping Sheet to aid the instructor in recording the progress of each student as NATEF tasks are completed.

Instructor Guide

This guide is to assist the instructor in management of the program material. It provides product information and answers for the student manuals.

Service Manual Information

The courseware also includes the appropriate manufacturer’s Service Manual Information for use during student activities and system diagnosis.

Should be an ATEC model 840F or equivalent
POWER DOOR LOCK SYSTEM TRAINER – FAULTED

This trainer to be part of an electrical systems program to present the live operation and study of power Door Lock Systems. The program to provide courseware for use by students and instructors.

**Quantity**

1

**Construction**

The trainer cabinet to be constructed of laminated plywood. The front panel to be Lexan with 2nd surface graphics. The supporting legs to be made from square steel tubing.

**Components**

The trainer to use actual new-model vehicle components and connectors. To Include:

- Body Control Module
- Door Lock Switches
- Door Lock Actuators
- Trunk release Actuator
- Remote Door Lock Receiver and Key Fob
- Interconnect for other trainers
- Connector Tip Jacks
- Fuse Panel
- Keypad / Display
- Power Supply Posts

**Trainer Operation**

The trainer to feature actual Power Door Lock System operation. The trainer to be capable of connecting to a 12VDC automotive battery (not included) or power supply (not included).

**System Diagnostics**

The trainer to provide an advanced level of instruction by duplicating actual on-vehicle troubleshooting procedures. The trainer to use actual vehicle wire colors to be compatible with wiring diagrams. The trainer to be capable of actual service manual test procedures.

**Fault Insertion**

Faults to be inserted via keypad, local computer, or a network system. Software interface allows hard and intermittent faults to be entered by selecting faults from a pictorial schematic. Software interface faults to be entered randomly or as specified by instructor.

Faults:

<table>
<thead>
<tr>
<th>Fault #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Door lock cylinder switch</td>
</tr>
<tr>
<td>2</td>
<td>Driver door unlock</td>
</tr>
<tr>
<td>3</td>
<td>RF door lock actuator</td>
</tr>
</tbody>
</table>
4 RF Door lock switch
5 Power supply door lock receiver
6 Driver door lock
7 Serial data door lock receiver

**Fault Insertion Via Keypad**

Realistic faults can be inserted via the keypad to provide troubleshooting practice.

**Fault Insertion Via Local Computer**

Faults to be entered via the serial communications port of a single computer. Faults to be entered using a software interface (installed on the computer hard drive). Includes proprietary serial cable to connect to computer.

**Fault Insertion Via Network System**

Connection to the LAN is achieved with a network system. The network system is a 16-port Serial Hub with standard CAT5 cable. Requires an Ethernet connection from the serial hub to the LAN. Software interface to be installed on any LAN computer.

**Power Requirements**

Requires 12VDC automotive battery (not included) or 12VDC/15Amp power supply (not included). Current Draw = 3 - 5 Amps.

To include an internally mounted power supply. To be a filtered and regulated power source with fused protection. To have a power cord for a North America (Nema 5-15) 110VAC/15Amp electrical outlet. A power switch with indicator light to control the power supply. Current Draw = .3Amps. Optional 220VAC/50Hz power supply available.

**Operations Manual**

To provide instructor with Trainer Orientation, Start-up Procedures, Equipment Operation, Maintenance and Service Information.

**Lighting System Courseware**

All items to be a complete courseware package and to include a photocopy site license to allow distribution of student manual. Courseware presented in Adobe PDF file format on CD-Rom.

**Student Manual**

The courseware to include a Student Manual containing on trainer activities or work sheets written specifically for use with the Lighting System Trainer and Service Manual Information.

The units of instruction to be based on NATEF tasks. The Lighting System Activities to include:
1. Program Overview
2. Component Description & Operation
3. System Diagnosis & Testing
4. Develop diagnostic procedures
5. Troubleshooting
NATEF Task Record Keeping Sheet

The courseware to include a NATEF Task Record Keeping Sheet to facilitate the instructor in recording the progress of each student as NATEF tasks are completed.

Instructor Guide

The courseware to include an Instructor Guide to assist in management of the program material. The Instructor Guide to provide product information and answers.

Service Manual Information

The courseware to include the appropriate manufacturer's Service Manual Information. The Service Manual Information to be used during student activities and system diagnosis.

Should be an ATEC model 850FJ or equivalent
This trainer is part of an electrical systems program for presenting the live operation and study of Power Seat Systems. The program provides courseware for use by students and instructors.

**Quantity**

1

**Construction**

The trainer is constructed of laminated plywood with a front panel of Lexan and 2nd surface graphics. The supporting legs are made of square steel tubing.

**Components**

The trainer uses actual new-model vehicle components and connectors.

Features Include:

- Complete Power Seat Adjuster Assembly including 3 Motors
- Power Seat Switch w/Motor Control
- 30 Amp Circuit Breaker
- Wiring Harness
- Connector Tip Jacks
- Keypad / Display
- Power Supply Posts

**Trainer Operation**

This trainer features actual Power Seat Motor operation. It is connected to a 12VDC automotive battery (not included) or power supply (not included).

**System Diagnostics**

The trainer provides an advanced level of instruction by duplicating actual on-vehicle troubleshooting procedures. Actual vehicle wire colors are used to be compatible with wiring diagrams. The trainer is also capable of actual service manual test procedures.

**Fault Insertion**

Faults are inserted via keypad, local computer, or network system. A Software interface allows hard and intermittent faults to be entered by selecting from a pictorial schematic. Software interface faults can be entered randomly or as specified by an instructor.

Faults:

<table>
<thead>
<tr>
<th>Fault #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Rear Height Motor Down Circuit</td>
</tr>
<tr>
<td>02</td>
<td>Power Seat Power</td>
</tr>
<tr>
<td>03</td>
<td>Front Height Motor Up Circuit</td>
</tr>
<tr>
<td>----</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>04</td>
<td>Forward-Back Motor Forward Circuit</td>
</tr>
</tbody>
</table>

**Fault Insertion Via Keypad**

Realistic faults can be inserted via the keypad to provide troubleshooting practice.

**Fault Insertion Via Local Computer**

Faults can be entered via the serial communications port of a single computer using a software interface (installed on the computer hard drive). A proprietary serial cable is included for connecting to a computer.

**Fault Insertion Via Network System**

Connection to a LAN is achieved with a network system. The network system is a 16-port serial hub using standard CAT5 cable. An Ethernet connection is required from the serial hub to the LAN. The Software interface can be installed on any LAN computer.

**Power Requirements**

A 12VDC automotive battery (not included) or 12VDC/25Amp power supply (not included) is required.

An internally mounted power supply is included. It is a filtered and regulated power source with fused protection. The power cord is for a North America (Nema 5-15) 110VAC/15Amp electrical outlet. A power switch with indicator light to control the power supply. Current Draw = .5 Amps.

Optional 220VAC/50Hz power supply available.

**Operations Manual**

The Ops manual provides instructors with Trainer Orientation, Start-up Procedures, Equipment Operation, Maintenance and Service Information.

**Power Seat Courseware**

All items are part of a complete courseware package and include a photocopy site license to allow for the distribution of student manuals. Courseware is provided in Adobe PDF file format on CD-ROM or USB flash drive.

**Student Manual**

The courseware includes a Student Manual containing worksheets written specifically for use with the Power Seat Trainer, Reference Book, and Service Manual Information.

The units of instruction are based on NATEF tasks. The Power Seat Program Activities include:
1. Program Overview
2. Description and Operation
3. System Diagnosis and Testing
4. Removal and Installation
5. Troubleshooting

**NATEF Task Record Keeping Sheet**

The courseware includes a NATEF Task Record Keeping Sheet to aid the instructor in recording the progress of each student as NATEF tasks are completed.

**Instructor Guide**

This guide is to assist in managing the program material. The Instructor Guide also provides product information and student manual answers.

**Service Manual Information**

The courseware also includes the appropriate manufacturer’s Service Manual Information for use during student activities and system diagnosis.

**Should be an ATEC model 860FJ or equivalent**
TROUBLESHOOTING FAULT BOARD

Printed circuit fault board mounted internally in the Troubleshooting Trainer workstation. To be required for trainer fault insertion using either the Interactive Keypad or Computer Based Instruction.

Quantity

10

Microcomputer based fault insertion offers up to 21 faults with serial connection to external keypad or an IBM Based Computer.

Should be an ATEC model 1800FB or equivalent.
**TROUBLESHOOTING TRAINER WITH STORAGE CASE**

To be a workstation capable of supporting the following courses:

1. Automotive Electricity Course board  
2. Automotive Electronics Course board  
3. Automotive Sensors & Actuators Course board  
4. Automotive Computer Concepts Course board  
5. TP/MAP Component Board

**Quantity**

10

**Construction**

The workstation to be a bench top unit constructed of durable plastic to allow easy convenient classroom/lab setup. The top panel to be metal with laminated graphics.

**Components**

This equipment to be a portable, self-contained unit.

To Include:

- Built-In 12 Volt DC Power Supply  
- Master On/Off Switch & Power Terminals  
- Fused Protection  
- Power ON Indicator  
- Digital Multimeter with Test Leads  
- Circuit Breaker Protection for Meter  
- Course Board Connector  
- Fault Board Connector (Internal)  
- RS-232 Connector  
- Keypad Network Interface Jack  
- Hook-up Wire, 22 gauge solid in 5 colors  
- Wire Strippers  
- 9-Volt Battery (for meter)

**Trainer Operation**

The workstation to provide a 12 Volt power source for the course boards. To be a modular design to allow easy insertion of course boards. To provide a Digital Multimeter for electrical measurements.
**Built-In Multimeter**

The workstation to include a Digital Multimeter and Test Leads. The Digital Multimeter to include circuit breaker protection, to be capable of withstanding an accidental current overload without damage. The On-Trainer Digital Multimeter is scaled to simplify current, voltage, and resistance measurements and calculations.

**Power Requirements**

The trainer to include a 12VDC internal power supply. To have a power cord for a North America (Nema 5-15) 110VAC/15Amp electrical outlet. To include a master ON/OFF switch, power terminals, and fused protection. Current Draw = .5Amps.

**Carrying Case**

The workstation to include a convenient carrying case. The case to be constructed of durable plastic. The case to be able to accommodate a workstation, optional keypad, and four course boards.

**Should be an model 1801B or equivalent.**
INTERACTIVE KEYPAD

To be a keypad and display terminal capable of interfacing with the Troubleshooting Trainer Workstation and Fault Board.

To provide student interaction during electrical/electronic troubleshooting of “hidden” faults and student testing. To allow instructor retrieval of test scores/times and insertion of specific faults.

To be capable of interfacing with Computer Concepts Course board and TP/MAP Component Board. To provide a means of data entry, student prompts, and operational display.

**Quantity**

1

**Construction**

The keypad to be constructed of durable plastic. To be supported by two rubber feet.

**Components**

To include:

- 12 Digit Keypad (0 thru 9, *, #)
- 2 x 24 character LCD matrix display
- RS-232 Interface Jack

**Interface Cable**

To include a RS-232 cable to interconnect the troubleshooting workstation and keypad terminal.

**Student Manual Sheets**

To include troubleshooting worksheets and keypad orientation for the following:

- Automotive Electricity Courseboard
- Automotive Electronics Courseboard W/Courseware

**Instructor Guide Sheets**

To include guide sheets with Interactive Keypad (1802) information for the instructor.

**Should be an ATEC model 1802 or equivalent.**
AUTOMOTIVE ELECTRICITY COURSE BOARD

To offer students the hands-on study of basic automotive electricity. To include a Course Board, Student Manual, and Instructor Guide. To include an on-site copy license for copying instructional materials for use in the classroom.

Quantity

10

Course Board

The Automotive Electricity Course board to feature real fixed components and wire terminals. The board to include printed circuitry designed to support optional fault insertion when used with the Troubleshooting Trainer and Fault Board.

The Components to Include:

- Resetting Circuit Breaker
- Push Switch (2)
- Multi-position Switch
- Relay
- Toggle Switch
- Fixed Resistors (5)
- Horn (Buzzer)
- High Power Bulbs (2)
- Lower Power Bulbs (2)
- Motor
- Common Ground
- Connection Terminals
- Test Light

Courseware

All items to be a complete courseware package and to include a photocopy site license to allow distribution of student manual. Courseware presented in Adobe PDF file format on CD-ROM.

Student Manual

The Student Manual to be 26 hands-on activities with trainer, troubleshooting, and in-shop worksheets. Activities to be based on circuits found on vehicles and to provide on-car worksheets for the transfer of knowledge from the trainer to real vehicles.

The Activities to Include:

Unit I – Introduction to Electricity
- Series Circuit – use of Voltmeter
- Parallel Circuit – use of Ammeter
- Series-Parallel Circuits – use of Ohmmeter

Unit II – Electrical Behavior
- Series Circuits 1, 2, 3, and 4
- Parallel Circuits 1, 2, 3, and 4
- Series-Parallel Circuits 1, 2, and 3
Unit III – Use of Troubleshooting Equipment/Automotive Circuits
  • Truck Release Circuit
  • Horn Circuit
  • Back Up Lamp Circuit
  • Tail Light & Brake Light Circuit
  • Starter Motor Circuit
  • Turn Signal Circuit

Unit IV – Use of Service Manual Schematics/Automotive Circuits
  • Ignition Key Warning Circuit
  • Electric Cooling Fan Circuit
  • Brake Warning Circuit
  • Heater Blower Circuit
  • Headlight Circuit
  • Dome Light Circuit

**NATEF Task Record Keeping Sheet**

The courseware to include a NATEF Task Record Keeping Sheet to facilitate the instructor in recording the progress of each student as NATEF tasks are completed.

**Instructor Guide**

To assist the instructor in program management with: course outline, activity worksheets, worksheet answers, program tests, test answers and other instructor only information.

**Should be an ATEC model 1810A or equivalent**
AUTOMOTIVE ELECTRICITY - COMPUTER BASED INSTRUCTION

This course uses the discovery method of instruction. It presents one simple concept in an animated sequence. The student discovers answers to the following questions from information in the animated sequence. Circuit construction is used to reinforce the concepts and develop troubleshooting skills. Faulting of the 1801B unit is now under control of the personal computer. The PC connects through either serial port to the 1801B base unit. The program will not operate without an 1801B connected to the computer. This software includes an on-site copy license.

Quantity

1

Activities

This program consists of 16 activities with an average of 12 parts per activity. Over 60 animation sequences are used in the Instruction section. Also included is a practice troubleshooting section and an exam section. The program requires a minimum of 20 instruction hours for the instruction section. If the troubleshooting practice and the exam section are included, the program time will be approximately 40 hours.

Activities:

1. Electrical Components
2. Voltage & Voltmeter, Series Circuit, Current & Ammeter, Ohmmeter
3. Electrical Faults: Open, High resistance & Short to Ground, Fault Troubleshoot
4. Ohm’s Law: Parallel Circuit
5. Relay: Truck Release Circuit, Test Light
6. Horn Circuit: Relay #2, Jumper Wire
7. Back Up Light Circuit, Switches, Resetting-type Circuit
8. Tail Light & Brake Light Circuit
9. Starter Motor Circuit
10. Turn Signal Circuit
11. Ignition Key Warning Circuits
12. Electric Cooling Fan Circuit
13. Brake Warning Circuit
14. Heater Blower Circuit
15. Head Light Circuit
16. Dome Light Circuit

Instructor Guide

To assist the instructor in classroom management and offer operating instructions for the computer functions.
System Requirements

The program requires, at a minimum, the following system configurations:

1. Pentium 300MHz, Personal Computer. or better
2. 32 MB of memory (RAM), or more
3. 10 MB of free disk space on the hard disk (C-drive) to run from CD-ROM drive 90 MB of free disk space on the hard disk for installed version
4. Super VGA video card with 512K video memory - recommend 1MB video memory (must be capable of displaying 640 x 480 pixel screen resolution with 256 colors)
5. Floppy drive - 3.5"
6. 12X CD-ROM drive, or better
7. Mouse
8. Windows XP, 2000, 98
9. Available Serial Port (Com 1 or 2)

* Each 1801B Troubleshooting trainer requires a CBI cable (RS-232, DB25 to DB9) to interconnect the troubleshooting and computer serial port.

Should be an ATEC model 1810W or equivalent.
AUTOMOTIVE ELECTRONICS COURSEBOARD W/COURSEWARE

To offer students the hands-on study of basic automotive electronics. To include a Courseboard, Student Manual, and Instructor Guide. To include an on-site copy license for copying instructional materials for use in the classroom.

**Quantity**

10

**Courseboard**

The Automotive Electronics Courseboard to feature real fixed components and wire terminals. The board to include printed circuitry designed to support optional fault insertion when used with the Troubleshooting Workstation and Fault Board.

The Components to Include:

- Resetting Circuit Breaker
- Variable Resistor (Potentiometer)
- Relay
- Toggle Switch
- Photo Resistor
- Diodes (4)
- Zener Diode
- LED
- Transistor (3)
- Capacitors (2)
- Light Bulb
- Resistor (4)
- Common Ground
- Connection Terminals

**Courseware**

All items to be a complete courseware package and to include a photocopy site license to allow distribution of student manual. Courseware presented in Adobe PDF file format on CD-ROM.

**Student Manual**

The Student Manual to be 16 hands-on activities with trainer, troubleshooting, and in-shop worksheets. Activities to be based on circuits found on vehicles and to provide in-shop worksheets for the transfer of knowledge from the trainer to real vehicles.

The Activities to Include:

Unit I – Introduction to Electronics
- Electricity to Electronics
- The Digital Multi-Meter
- Why Use a DMM?

Unit II – Introduction to Semi-Conductors/Diodes
- Diode Behavior
- Diode Troubleshooting
• The Diode as a Rectifier
• The Light Emitting Diode (LED)
• The Clamping Diode
• The Zener Diode

Unit III – Transistor Circuits
• The Transistor Circuit
• The Amplifier
• Transistor Troubleshooting
• Combining Transistors

Unit IV – More Electronics
• The Capacitor
• The Photo Resistor
• Combined Electronics

**NATEF Task Record Keeping Sheet**

The courseware to include a NATEF Task Record Keeping Sheet to facilitate the instructor in recording the progress of each student as NATEF tasks are completed.

**Instructor Guide**

To assist the instructor in program management with: course outline, activity worksheets, worksheet answers, program tests, test answers and other instructor only information.

*Should be an ATEC model 1820A or equivalent.*
AUTOMOTIVE ELECTRONICS - COMPUTER BASED INSTRUCTION

This course uses the discovery method of instruction. It presents one simple concept in an animated sequence. The student discovers answers to the following questions from information in the animated sequence. Circuit construction is used to reinforce the concepts and develop troubleshooting skills. Faulting is under control of the personal computer. The PC connects through either serial port to the Troubleshooting Trainer base unit and will not operate without a Troubleshooting Trainer connected to the computer. This software should include an on-site copy license.

Quantity
1

Activities

The program consists of 13 activities with an average of 11 parts per activity. Over 40 animation sequences are used in the Instruction section. Also included is a practice troubleshooting section and an exam section. The program requires a minimum of 16 instruction hours for the instruction section. If the troubleshooting practice and the exam section are included, the program time will be approximately 25 hours.

Activities:

17. Polarity
18. Digital Multi-Meter & Scientific Notation
19. Diode: P-N Junction, Turn-On Voltage
20. Direct Current (DC), Alternating Current (AC), & Rectification: Half-Wave & Full-Wave
21. Light Emitting Diode (LED)
22. Induction & Clamping
23. Zener Diode & Voltage Regulation
24. Transistors: PNP/NPN, Rheostat
25. Transistor Troubleshooting
26. Amplification & Darlington Pair
27. Capacitors, Noise, & Filtering
28. Photoresistor
29. Combined Electronics

Instructor Guide

To assist the instructor in classroom management and offer operating instructions for the computer functions.
**System Requirements**

The program requires, at a minimum, the following system configurations:

10. Pentium 300MHz, Personal Computer, or better  
11. 32 MB of memory (RAM), or more  
12. 10 MB of free disk space on the hard disk (C-drive) to run from CD-ROM drive -  
    90 MB of free disk space on the hard disk for installed version  
13. Super VGA video card with 512K video memory - recommend 1MB video memory  
    (must be capable of displaying 640 x 480 pixel screen resolution with 256 colors)  
14. Floppy drive - 3.5"  
15. 12X CD-ROM drive, or better  
16. Mouse  
17. Windows XP, 2000, 98  
18. Available Serial Port (Com 1 or 2)

**Should be an ATEC model 1820W or equivalent**
AUTOMOTIVE SENSORS AND ACTUATORS COURSEBOARD

To offer students the hands-on study of automotive input (sensing) and output (actuator) devices. To include a course board. The program to provide courseware for use by students and instructors.

Quantity

1

Course board

The course board to include electronic components mounted on a PC board with wire connection terminals.

The Components to Include:

Circuit Protection:
• Circuit Breaker

Control Module Components:
• Voltage Regulator
• Current Limiting Resistor
• Voltage Monitor

Sensors:
• Thermistor
• Potentiometer
• Switch
• Magnetic Pickup (Variable Reluctance Sensor)
• Hall Effect Sensor
• Optical Sensor

Actuators:
• DC Motor
• Stepper Motor
• Relay
• Solenoid

Conductor Path:
• Common Ground
• Hook-up wire, 22 Gauge

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**Student Activities**

The Activities to Include:

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Agenda</th>
<th>Activity</th>
<th>Description</th>
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<td>Frequency to Voltage</td>
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<td>Sampling Time</td>
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<td>Relay vs. Transistor Switching</td>
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<td>Injector Pulse Width Control</td>
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Advanced Electricity/Electronics Courseware

All items to be a complete courseware package and to include a photocopy site license to allow distribution of student manual. Courseware presented in Adobe PDF file format on CD-ROM.

Student Manual

The courseware to include a Student Manual containing worksheets written specifically for use with the Automotive Sensors and Actuators Courseboard, and Automotive Computer Concepts Courseboard.

NATEF Task Record Keeping Sheet

The courseware to include a NATEF Task Record Keeping Sheet to facilitate the instructor in recording the progress of each student as NATEF tasks are completed.

Instructor Guide

The courseware to include an Instructor Guide to assist in management of the program material. The Instructor Guide to provide product information and answers.

Should be an ATEC model 1830 or equivalent
AUTOMOTIVE COMPUTER CONCEPTS

To offer students the hands-on study of automotive computer concepts. The program to provide courseware Advanced Electricity/Electronics Courseware for use by students and instructors.

Quantity

1

Computer Concepts Course Board

The course board to include electronic computer components mounted on a PC board with indicator LED’s and probe points.

The Components to Include:

Regulated 5 Volt Supply:
• Voltage Regulator

Input Signal Processing:
• Analog to Digital Converter
• Frequency to Voltage Converter

Computer:
• Microprocessor (CPU)/Memory Chip

• Data Buss W/8 Led (8-Bit Binary)
• Data Buss 2 Digit Display (Hexadecimal)

• Address Buss W/8 Leds (8-Bit Binary)
• Address Buss 2 Digit Display (Hexadecimal)

• Control Buss W/2 Leds
• Serial Port (Interface With Model 1802 Keypad)

• Serial Multiplex Line (1 Led)

• External Address 100 (2 Leds)
• External Address 110 (2 Leds)

• Diagnostic Light

Output Signal Processing:
• Digital to Analog Converter
• OP-Amp
• Stepper Motor Drive Chip
• Drive Transistor
**Keypad Interface**

The Courseboard to interface with the Interactive Keypad. The interface to use a RS-232 connector. The Keypad to provide student observations and prompts. For example, students can control the computer processing sequences in slow motion using the keypad. Students can also observe output state changes. Such as voltage levels or percent duty cycle, with input signal variations.

**Student Activities**

The Activities to Include:

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<th>Lesson</th>
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Advanced Electricity/Electronics Courseware

All items to be a complete courseware package and to include a photocopy site license to allow distribution of student manual. Courseware presented in Adobe PDF file format on CD-Rom.

Student Manual

The courseware to include a Student Manual containing worksheets written specifically for use with the Automotive Sensors and Actuators course board, and Automotive Computer Concepts course board.

NATEF Task Record Keeping Sheet

The courseware to include a NATEF Task Record Keeping Sheet to facilitate the instructor in recording the progress of each student as NATEF tasks are completed.

Instructor Guide

The courseware to include an Instructor Guide to assist in management of the program material. The Instructor Guide to provide product information and answers.

Should be an ATEC model 1840 or equivalent
ENGINE PERFORMANCE TROUBLESHOOTING TRAINER

To be a workstation capable of supporting the following Computer Based Instructional Courses:

- Engine Control Fundamentals
- Engine Control Systems Operation
- Diagnostic Fundamentals

Quantity

1

Construction

The workstation to be a bench-top unit constructed of powder coated metal to allow easy convenient classroom/lab setup. The top panel to be white acrylic with four color laminated graphics.

Components

The equipment to be a portable, self-contained unit.

The Workstation to Include:

- Master ON/OFF Switch
- Fused Protection
- Power ON Indicator
- Handle & Feet
- Interface Connector
- Interface Cable
- Meter Probes

Operation

This Workstation to Provide:

- Simulated Component Troubleshooting Operation
- Simulated Digital Multi-meter functions
- Simulated Car Computer Harness Connections
- Simulation of Selected Car Operation Controls

Simulated Car Operation Controls

The Workstation to Include:

- Switch to simulate a key in the ignition position
- Push buttons to simulate a key in the start position & the brake being applied
- Position switch to simulate the car transmission gear selection
- A control knob to simulate the car accelerator pedal
Simulated Diagnostics

The Workstation to Include:

- Test leads & multi-meter selection knob
- Switch to simulate connecting & disconnecting the car harness
- Probe points for systems harness & component connectors
- Indicator (LED) to simulate Malfunction Indicator Lamp (MIL)

Interface Cable

To include and RS-232 cable to interconnect the troubleshooting workstation and Personal Computer (25-pin female connector to a 25-pin female connector, approximately 6 feet in length).

Power Requirements

The trainer to include a 12VDC internal power supply. To have a power cord for a North America (Nema 5-15) 110VAC/15Amp/60Hz electrical outlet. To include a master ON/OFF switch and fused protection. Current Draw = .5Amps.

Accessories

This workstation to include Meter Probes and Interface Cable.

Should be an ATEC model 3601 or equivalent
ENGINE CONTROL FUNDAMENTALS - COMPUTER BASED INSTRUCTION

The Engine Control Fundamentals is a computer based program that deals with the basic concepts of engine controls. This course uses the discovery method of instruction. It presents one simple concept in an animated sequence. The student will be required to answer quiz questions using information gained from these animated sequences. The PC connects through a serial port to the Workstation. The program will not operate without an Engine Performance Troubleshooting Trainer connected to the computer.

**Quantity**

1

**Activities**

The program consists of 21 activities. Over 60 animation sequences are used in the Instruction section. Also included are activities that lead the student through specific diagnostic tasks on the workstation. The course contains 5 quizzes and a final exam. The program requires a minimum of 10 instruction hours to complete the course.

Activities:

1. Four Stroke Engine
2. Fuel System
3. Fuel Pump
4. Fuel Filter
5. Fuel Rail
6. Fuel Pressure Regulator
7. Fuel Injector
8. Fuel System Firing
9. Crankshaft Sensor
10. Camshaft Sensor
11. Powertrain Control Module
12. Intake Air Temperature
14. Throttle Position Sensor
15. Manifold Absolute Pressure Sensor
16. Vehicle Speed Sensor
17. Heated Exhaust Gas Oxygen Sensor
18. Coolant Temperature Sensor
19. Engine Knock Sensor
20. Idle Air Control Valve
21. Torque Converter Clutch Solenoid

**Operations**

It is recommended that the Instructor install the program on each computer that will be used for training prior to student use. In order for the student to use the program, the Engine Performance Troubleshooting Trainer must be connected to the computer and the student must be entered into the Instructor Management Program (model IMP). Student records can be stored via LAN network or a student disk. The instructor prepares the student record through the IMP in the “Central Records” directory (either on the LAN server or instructor’s computer). The IMP initializes the student record by assigning an I.D. number and a password for the student to operate the program on the student computer. The student’s performance record is recorded to Central Records or student disk as the student proceeds through the program. For the Instructor to upload the student record from the student disk into the Central Records, the student disk must
be placed in a floppy drive on the instructor’s computer and the IMP must be executed. Through menu selections the data from the student disk can be transferred and displayed. The disk can then be returned to the student for future use.

**Instructor Guide**

To assist the instructor in classroom management and offer operating instructions for the computer functions.

**System Requirements**

The program requires, at a minimum, the following system configurations:

19. Personal Computer - Pentium 100 MHz or better
20. 16 MB of memory (RAM)
21. 10 MB of free disk space on the hard disk (C drive) to run from CD Rom drive, 3610 - 75 MB, 3620 - 230 MB, 3630 - 130 MB
22. Floppy drive - 3.5” or Network drive
23. CD Rom drive
24. Mouse
26. Available Serial Port

**Should be an ATEC model 3610 or equivalent**
ENGINE CONTROL SYSTEMS OPERATION - COMPUTER BASED INSTRUCTION

The Engine Control Systems Operation is a computer based program that deals with the basic concepts of engine control operation. This course uses the discovery method of instruction. It presents one simple concept in an animated sequence. The student will be required to answer quiz questions using information gained from these animated sequences. The PC connects through a serial port to the Workstation. The program will not operate without an Engine Performance Troubleshooting Trainer connected to the computer.

Quantity

1

Activities

The program consists of 14 activities. Over 60 animation sequences are used in the Instruction section. Also included are activities that lead the student through specific diagnostic tasks on the workstation. The course contains 5 quizzes and a final exam. The program requires a minimum of 10 instruction hours to complete the course.

Activities:

1. Combustion
2. TPS & Intake Air
3. MAF & Intake Air
4. Fuel Injector Pulse Width (FIPW)
5. Oxygen Sensor & Closed Loop
6. Crank Sensor & Spark Timing
7. Spark Advance & Knock Sensor
8. Cam Sensor & Injector Firing
9. IAT & FIPW
10. ECT, Cooling Fan & IAC
11. Transmission: VSS, TCC & Shift Solenoids
12. EGR System
13. EVAP System
14. SAI/R System

Operations

It is recommended that the Instructor install the program on each computer that will be used for training prior to student use. In order for the student to use the program, the Engine Performance Troubleshooting Trainer must be connected to the computer and the student must be entered into the Instructor Management Program (model IMP). Student records can be stored via LAN network or a student disk. The instructor prepares the student record through the IMP in the “Central Records” directory (either on the LAN server or instructor’s computer). The IMP initializes the student record by assigning an I.D. number and a password for the student to operate the program on the student computer. The student’s performance record is recorded to Central Records or student disk as the student proceeds through the program. For the Instructor to upload the student record from the student disk into the Central Records, the student disk must be placed in a floppy drive on the instructor’s computer and the IMP must be executed. Through menu selections the data from the student disk can be transferred and displayed. The disk can then be returned to the student for future use.
Instructor Guide

To assist the instructor in classroom management and offer operating instructions for the computer functions.

System Requirements

The program requires, at a minimum, the following system configurations:

27. Personal Computer - Pentium 100 MHz or better
28. 16 MB of memory (RAM)
29. 10 MB of free disk space on the hard disk (C drive) to run from CD Rom drive,
   3610 - 75 MB, 3620 - 230 MB, 3630 - 130 MB
30. Floppy drive - 3.5” or Network drive
31. CD Rom drive
32. Mouse
33. Windows XP, Windows 2000, or Windows 98
34. Available Serial Port

Should be an ATEC model 3620 or equivalent
ENGINE CONTROL DIAGNOSTIC FUNDAMENTALS – COMPUTER BASED INSTRUCTION

The Engine Control Diagnostic Fundamentals is a computer based program that deals with the basic concepts of troubleshooting engine control components. This course uses the discovery method of instruction. It presents one simple concept in an animated sequence. The student will be required to answer quiz questions using information gained from these animated sequences. The PC connects through a serial port to the Workstation. The program will not operate without an Engine Performance Troubleshooting Trainer connected to the computer.

Quantity

1

Activities

The program consists of 16 activities. Over 45 animation sequences are used in the Instruction section. Also included are activities that lead the student through specific troubleshooting techniques (such as performing a voltage drop test) on the workstation. The course contains 5 quizzes and a final exam. The program also contains a troubleshooting section that will insert random faults into engine control circuits to be diagnosed by using the workstation. The program requires a minimum of 10 instruction hours to complete the course.

Activities:

1. Circuit Elements
2. Digital Multi-meter (DMM)
3. Metric Prefixes
4. Principle of Electrical Circuits: Current
5. Principle of Electrical Circuits: Voltage
   a. Diagnostic: measuring Voltage
   b. Diagnostic: measuring High & Low Side Switching
6. Principle of Electrical Circuits: Resistance
   a. Diagnostic: measuring Resistance
7. Principle of Electrical Circuits: Ohm’s Law
8. Series Circuit Characteristics
9. Parallel Circuit Characteristics
10. Series/Parallel Circuit Characteristics
11. Electrical Circuit Faults: Open Circuit
    a. Diagnostic: open circuit – continuity check
    b. Diagnostic: open circuit – voltage check
12. Electrical Circuit Faults: High Resistance
    a. Diagnostic: high resistance circuit
13. Electrical Circuit Faults: Short to Ground
    a. Diagnostic: short to ground – continuity check w/ground
    b. Diagnostic: short to ground – voltage check
14. Electrical Circuit Faults: Short to Voltage
    a. Diagnostic: short to voltage – voltage check
b. Using Shop Manuals 
c. Diagnostic: using shop manuals  

15. Basic Troubleshooting Procedures  
a. Diagnostic: using troubleshooting procedures  

Operations  

It is recommended that the Instructor install the program on each computer that will be used for training prior to student use. In order for the student to use the program, the Engine Performance Troubleshooting Trainer must be connected to the computer and the student must be entered into the Instructor Management Program (model IMP). Student records can be stored via LAN network or a student disk. The instructor prepares the student record through the IMP in the “Central Records” directory (either on the LAN server or instructor’s computer). The IMP initializes the student record by assigning an I.D. number and a password for the student to operate the program on the student computer. The student’s performance record is recorded to Central Records or student disk as the student proceeds through the program. For the Instructor to upload the student record from the student disk into the Central Records, the student disk must be placed in a floppy drive on the instructor’s computer and the IMP must be executed. Through menu selections the data from the student disk can be transferred and displayed. The disk can then be returned to the student for future use.  

Instructor Guide  

To assist the instructor in classroom management and offer operating instructions for the computer functions.  

System Requirements  

The program requires, at a minimum, the following system configurations:

- Personal Computer - Pentium 100 MHz or better
- 16 MB of memory (RAM)
- 10 MB of free disk space on the hard disk (C-drive) to run from CD-ROM drive,
- 3610 – 75 MB, 3620 – 230 MB, 3630 – 130 MB Floppy drive – 3.5” or Network drive
- CD-ROM drive
- Mouse
- Windows XP, Windows 2000, or Windows 98
- Available Serial Port

Should be an ATEC model 3630 or equivalent
ENGINE CONTROL SYSTEM TROUBLESHOOTING

The Engine Control System Troubleshooting is a software program based on the Engine Control computer based instruction program that deals with the basic concepts of troubleshooting engine control components.

Quantity

1

Activities

The program consists of a troubleshooting section that will insert random faults into engine control circuits to be diagnosed. There are 5 circuits to troubleshoot. Each circuit has about 13 possible faults consisting of open circuit, high resistance, short to ground, short to voltage and shorted component.

Circuits:

1. Fuel Pump Circuit
2. Engine Cooling Temperature Sensor Circuit
3. Throttle Position Sensor Circuit
4. Intake Air Temperature Sensor Circuit
5. Fuel Injector Circuit

Operations

It is recommended that the Instructor install the program on each computer that will be used for training prior to student use. The program can either operate in random mode where the faults would be selected randomly for each circuit chosen. Or the Instructor can select a set of faults from various circuits to be activate when the student next running the program.

Operations Manual

To assist the instructor with installation of software and offer operating instructions for the computer functions.

System Requirements

The program requires, at a minimum, the following system configurations:

35. Personal Computer - Pentium III, 500 MHz or better
36. 256 MB of memory (RAM)
37. 15 MB of free disk space on the hard disk (C-drive)
38. CD-ROM drive, 12X or better.
39. Mouse
40. Windows XP, Windows 2000, or Windows 98

Should be an ATEC model 3631 or equivalent
J1850 Network Trainer

This trainer to be part of a complete program to present the “real world” operation and study of automotive vehicle network operation. The trainer presents an actual J1850 automotive network with components from a late model GM vehicle. This program provides courseware for use by students and instructors.

Quantity

1

Construction

The trainer cabinet to be constructed of laminated plywood. The front panel to be lexan with 2\textsuperscript{nd} surface graphics.

Components

Note: On-trainer component labeling reflects new industry standardization according to SAE specification J1930.

The trainer to use actual vehicle components, additional components, and connectors.

To Include:

- Powertrain Control Module (PCM)
- Radio Module
- Instrument Panel Cluster
- Vehicle Communication Interface Module
- Ignition Module
- On Star Keypad
- Right Front Speaker
- Left Front Speaker
- Adjustable Coolant Temperature (ECT) Input
- Adjustable Vehicle Speed Sensor (VSS) Input
- Adjustable Fuel Level Sensor (FLS) Input
- Transaxle Range Switch
- Headlight Switch
- Left and Right Low Beam Headlights
- Left and Right High Beam Headlights
- Left and Right Rear Turn Signal Lights
- Left and Right Front Marker Lights
- Interior Lights
- Trunk Light and Switch
- Four Way Flasher Switch
- Cellular Antenna
- AM FM Antenna
- Door Lock Switch
- Remote Control Door Lock Receiver
- Remote Control Door Lock Transmitter
- Door Lock Actuator
- PCM Connector Tip Jacks
- Radio Module Connector Tip Jacks
- Body Control Module Connector Tip Jacks
- Ignition Module Connector Tip Jacks
- Vehicle Comm. Module Conn. Tip Jacks
- IPC Connector Tip Jacks
- Left and Right Tail Lights
- On Star Keypad Connector Tip Jacks
- 12 Volt Fuse Block
- System Power
- System Ground
- OBD II Standard DLC

All automotive components to be new stock purchased directly from a manufacturer authorized dealer.
**Trainer Operation**

The trainer to use an actual “out of vehicle” OBD II Powertrain Control Module, Body Control Module, Instrument Panel Cluster Module, Radio Module, Vehicle Communication Interface Control Module and Ignition Module which responds and operates as in the automobile. The J1850 Network Trainer Demonstration Board to be capable of:

**Body Control Module:**
- Vehicle Interior Light Operation
- Vehicle Exterior Light Operation
- Four Way Flasher Operation
- Door Lock Actuator Operation
- Sending and Receiving J1850 Messages
- On Board Diagnostics

**Powertrain Control Module:**
- Receive Vehicle Speed Input
- Receive Engine Coolant Temperature Input
- Receive Fuel Level Input
- Receive Transaxle Range Switch Input
- Send and Receive J1850 Messages
- Onboard Diagnostics

**Instrument Panel Cluster Module:**
- Operate All Lights
- Operate Fuel Level Gauge
- Operate Engine Temperature Gauge
- Operate Vehicle Speed Gauge
- Operate Odometer
- Display Transaxle Range Display
- Display Messages on Driver Info Center
- Send and Receive J1850 Messages
- Onboard Diagnostics

**Vehicle Communication Interface Module:**
- Communicate with OnStar
- Voice Recognition
- Send and Receive J1850 Messages
- Onboard Diagnostics

**Radio Module:**
- Receive FM and AM Signals
- Play CD and/or Cassette
- Receive Personal Preference Programming
- Send and Receive J1850 Messages
- Onboard Diagnostics

**Ignition Module**
- Power Up all Modules
- Send Power Mode Signals
- Off, Accessories, Run, Start
- Send Passlock Messages
Network Demonstrations

- Reading and Clearing DTCs
- Driver Info Center Warning Message Display
- Instrument Panel Cluster Response to J1850 Messaging
- Radio Module Response to J1850 Messaging
- Diagnostic Circuit Check
- Power Mode Test
- On Star Operations
- Theater Lighting effects
- Body Control Module operation
- Remote Lock Operation
- Vehicle Speed Messaging
- Engine Temperature Messaging
- Fuel Level Messaging
- Gear Selection Messaging
- Reading all Module Pids
- Scan Tool Output Operations
- J1850 Network Faults
- J1850 Network Electrical Troubleshooting

System Diagnostics

To provide an advanced level of instruction by duplicating actual on-vehicle problems. Students are offered a realistic troubleshooting experience using the Tech 2 Scan Tool (not included).

Test Procedures

The procedures used to diagnose trainer faults to be the same as performed on a vehicle. Students can make use of manufacturer diagnostic charts and other information presented in service manuals.

The system controller to perform self-diagnosis and display trouble codes. The trainer to be capable of being studied and tested using actual service test equipment such as digital meters, oscilloscopes and Tech 2 scan tool.

FAULT INSERTION

Faults to be inserted via keypad, local computer or Network System. Software interface allows hard and intermittent faults to be entered by selecting faults from a pictorial schematic. Software interface faults to be entered randomly or as specified by instructor.

Faults:

<table>
<thead>
<tr>
<th>Fault #</th>
<th>Description</th>
<th>Fault</th>
<th>CKT#</th>
<th>Wire Color</th>
</tr>
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<tbody>
<tr>
<td>01</td>
<td>Security System Sensor Signal</td>
<td>Open</td>
<td>836</td>
<td>YEL</td>
</tr>
<tr>
<td>02</td>
<td>OnStar Keypad Signal</td>
<td>Short to Voltage</td>
<td>514</td>
<td>DK GRN/WHT</td>
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<tr>
<td>03</td>
<td>Ignition 0 Signal</td>
<td>Open</td>
<td>150</td>
<td>PPL</td>
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<tr>
<td></td>
<td>Radio B+</td>
<td>Open</td>
<td>640</td>
<td>ORN</td>
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<tr>
<td>05</td>
<td>Class 2 Bus - PCM</td>
<td>Open</td>
<td>149</td>
<td>DK GRN</td>
</tr>
<tr>
<td>06</td>
<td>Class 2 Bus - BCM</td>
<td>High Resistance</td>
<td>137</td>
<td>LT GRN</td>
</tr>
</tbody>
</table>

**Fault Insertion Via Keypad**

Realistic faults can be inserted via the keypad to provide troubleshooting practice.

**Fault Insertion Via Local Computer**

Faults to be entered via the serial communications port of a single computer. Faults to be entered using a software interface (installed on the computer hard drive). Includes proprietary serial cable to connect to computer.

**Fault Insertion Via Atech Network System (Ans)**

Connection to the LAN is achieved with an optional Network System. The NS is a 16-port Serial Hub with standard CAT5 cable. Requires an Ethernet connection from the serial hub to the LAN. Software interface to be installed on any LAN computer.

**Power Requirements**

To include an internally mounted switching power supply. Input voltage to the power supply is switchable between 115VAC/60Hz and 230VAC/50Hz via a slider switch located on the power supply. To be a filtered and regulated power source with fused protection. To have a power cord for a North America (Nema 5-15) 110VAC/15Amp electrical outlet. A power switch with indicator light to control the power supply. Current Draw = 1.7 Amps.

Optional 220VAC/50Hz configuration available.

**Operations Manual**

To provide instructor with Trainer Orientation, Start-Up Procedures, Equipment Operation, Maintenance and Service Information.

**Network System Courseware**

All items to be a complete courseware package and to include a photocopy site license to allow distribution of student manual. Courseware presented in Adobe PDF file format on CD-Rom.

**Student Manual**

The courseware to include a Student Manual containing worksheets written specifically for use with the J1850 Network Trainer and Service Manual Information.

The units of instruction to be based on NATEF tasks. The J1850 Network Trainer Program Activities to include:
1. J1850 Network Automotive Computers
2. J1850 Network Check Module Operation on the Buss
3. Observe J1850 Network Operation / Coolant Temperature
4. Observe J1850 Network Operation / Vehicle Speed Signal
5. Observe J1850 Network Operation / Fuel Level Input
6. Scan Tool Control of Instrument Panel Cluster
7. Scan Tool Control of Personal Options
8. Scan Tool Control of Body Operations
9. Scan Tool Reading Codes and Data
10. Diagnostics of J1850 Network Communication Faults / Open
11. Diagnostics of J1850 Network Communication Faults / Theft Deterrent System
12. Diagnostics of J1850 Network Communication Faults
13. Diagnostics of J1850 Network Communication Faults / On Trainer Worksheet

NATEF Task Record Keeping Sheets

The courseware to include NATEF Task Record Keeping Sheets to facilitate the instructor in recording the progress of each student as NATEF tasks are completed.

Instructor Guide

The courseware to include an Instructor Guide to assist in management of the program material. The Instructor Guide to include product information and answers.

Service Manual Information

The courseware to include the appropriate manufacturer’s Service Manual Information. The Service Manual Information to be used during student activities and system diagnosis.

Accessories

To Include:
- Heavy duty custom fitted vinyl cover, providing trainer protection when not in use.

Should be an ATEC model 3801 or equivalent
NETWORKING SYSTEM

Networking system to provide an interface between instructor program and trainer for fault insertion and record keeping. Up to 16 trainers can be controlled at once.

Quantity

1

Components

The ANS components to include:

- 16-port Serial Hub
- LAN Interconnect cable (for connection to Local Area Network) or crossover cable (for connection without Local Area Network).
- (16) Trainer to Serial Hub interconnect cables
- Serial Hub installation CD.
- Troubleshooting Network Manager Software

Operation

The ANS allows for fault insertion to multiple trainers from the instructor’s computer via the Local Area Network or crossover cable. Fault insertion and student record keeping is accomplished using the Troubleshooting Network Manager software application.

Compatible Trainers

- 1810W Automotive Electricity
- 1820W Automotive Electronics
- 3610 Engine Control Fundamentals
- 3620 Engine Control Systems Operations
- 3630 Engine Control Diagnostic Fundamentals
- 310F Cooling Fan
- 320F Blower Motor
- 700F Distributor Ignition
- 811F Starting System
- 812F Charging System
- 821F Lighting System
- 822F Instrument Panel
- 830F Interval Wiper/Washer
- 832F Horn/Alarm
- 840F Power Windows
- 850F Power Door Locks
- 860F Power Seat
- 870F Audio
- 1551 GM SIR Dual Air Bag
- 1711F GM Direct Ignition System Faulted
- 1771F C31 System Faulted
- 1771SF C31 Suitcase Faulted
- 1791F EDIS-V Faulted
- 18002TT SET Troubleshooting Trainer

System Requirements

The ANS requires one computer running Windows XP, 2000 or NT. Troubleshooting Network Manager Software requires Windows 2000, NT, 98, or 95

Should be an ATEC model ANS or equivalent
Other:

- The vendor is to provide shipping and rigging.
- The vendor will provide set up and training on all equipment and related materials.
- Prices will be good for 365 days
- All equipment, materials and supplies should be ATEC or equivalents.
12-13-SS

April 17, 2013

SUMMARY SHEET

<table>
<thead>
<tr>
<th>VENDOR</th>
<th>BID PRICE</th>
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