

# AutoTeacher News

News and How-to Articles for Automotive Teachers  
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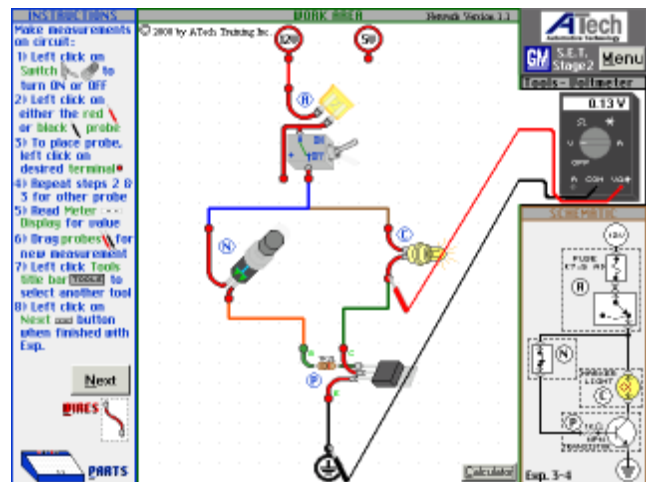


General Motors SET Program

ATech developed the hardware shown above for the General Motors Specialized Electronic Training Program approximately ten years ago. For those instructors who like teaching Automotive Electricity / Electronics using actual vehicle components, this unit has become the industry standard. It is being used by General Motors, Saturn, John Deere, Caterpillar, ASEP Schools, and is also the platform for the AYES Program's Electrical/Electronic section.

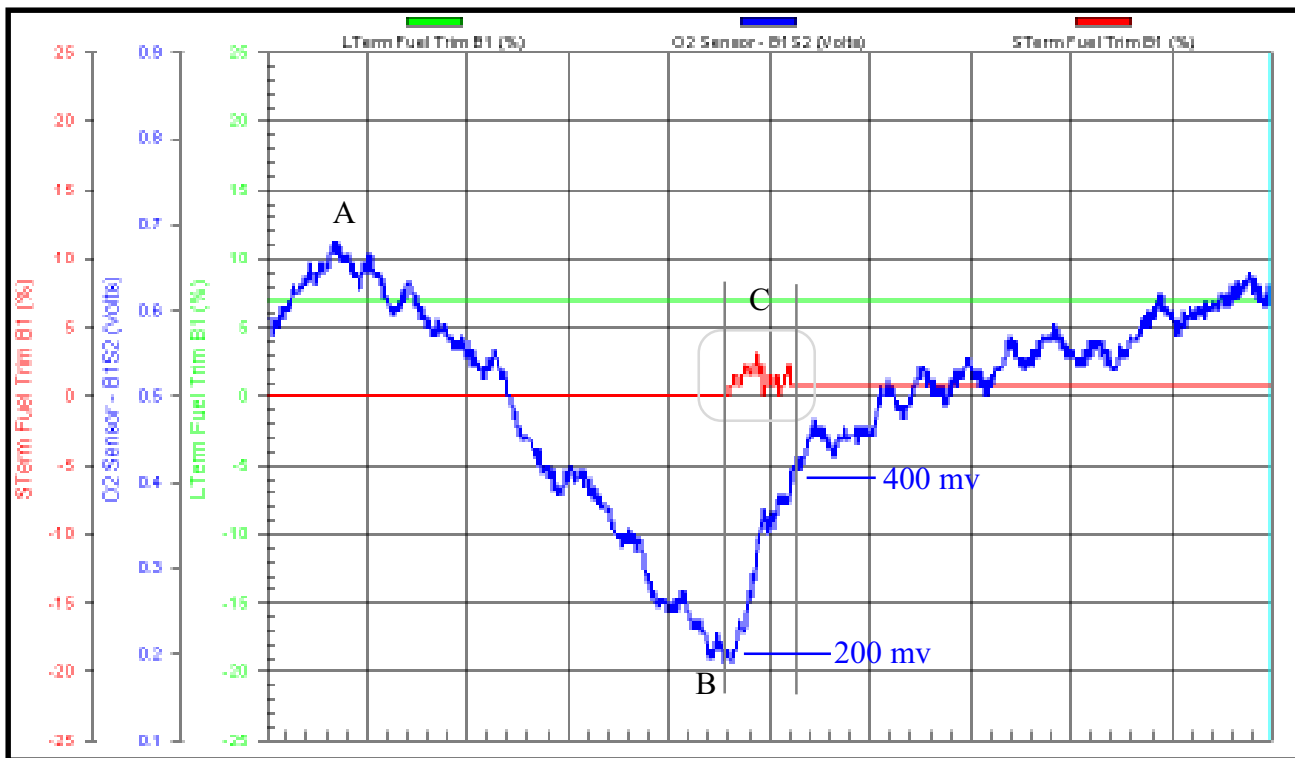
The unit contains all of the modules and materials for the latest version of SET. It is constructed of powder-coated metal to ensure durability, and includes all power sources needed to perform the experiments. GM's standard SET curriculum is also available through ATech. General Motors, after evaluating many cheap imitations, has sold the ATech model for over eight years in their training materials catalog.

For those schools with limited budgets, ATech has developed the virtual SET breadboard. The virtual SET is a computer software based highly interactive version of the GM SET hardware. It allows the student to pick and place parts, wire the circuit, and then make all measurements required by



SET Virtual Breadboard

the exercises in the SET program. Measurements can be made at any point in the circuit and with the three standard meters - Voltmeter, Ammeter, and Ohmmeter. Students are prompted to remove power from the circuit before measuring resistance. All three stages of the program are available for \$275.00 each. If you have computers available for student use, this is a very effective way to reduce your costs. Use one or two of the hardware versions with five or ten of the virtual. Networked versions are available.



Waveforms from ATech's General Motors OBDII Demonstrator

Over the years, ATech's involvement with the OEMs has resulted in many interesting and, at times, frustrating experiences. The process of developing system demonstrators using actual vehicle components usually requires that engineers from the OEM get involved. Most projects require knowledge and information that is not readily available to Training Departments. Even with the direct involvement of the system engineers, unusual and interesting things are often discovered. Some examples follow:

During the development of one of ATech's OBDII Engine Control trainers, it was discovered that a major manufacturer scan tool read A/C malfunction codes when the fault was knock sensor related. Could have resulted in some expensive repairs!

Another OBDII trainer cost ATech personnel three weeks effort trying to make the misfire detection work as stated in the service manual. Finally, the software designer who wrote the misfire computer code was located and he readily admitted that it did not work. His actual words were "It is next to impossible to create a misfire code on the system at the present time". The OEM Training Department was not aware of this until the ATech Demonstrator was built.

On an ABS demonstrator, the manufacturer's Training Department was not aware of a difference in deceleration trigger rates between front

and rear wheels until it was shown on an ATech system.

ATech's demonstrator/trainers often show system operations that go unnoticed by everyone. The figure above from the GM OBDII suitcase demonstrator is a case in point. From point A to point B the downstream oxygen sensor (cat monitor) moves from the rich area (above .45v) to the lean area (below .45v). This indicates to the PCM that more oxygen is being released by the converter. The time from A to B is approximately 160 seconds. Considering the time and the level of oxygen output, the PCM "thinks" the converter may be cooling off. If the converter is cool, it cannot recombine the oxygen in the exhaust stream with the carbon monoxide and hydrocarbons. At point B the PCM produces an increase in the injector pulse width for approximately 20 seconds. The increase is accomplished by a tweak of the short term fuel trim (C). The increase in fuel acts to raise the temperature of the converter, which reduces the oxygen output and moves the sensor output back toward the center area. The PCM holds the increase in short term fuel trim until the downstream oxygen sensor's output signal returns to a value indicating correct operation. This PCM strategy was not known to occur while the vehicle was being driven at 55 MPH. Graphs were made by an AutoTap Scantool available from ATech.

In the last newsletter, we covered the first steps toward creating a full Computer Based Instructions (CBI) application using Microsoft Power Point with the aid of Visual Basic for Applications (VBA). You learned how to edit the existing Visual Basic code within a module to create and modify questions and answers for a Quiz. We discussed the use of User Forms and used a form for the user logon. In this issue, we will attempt to create a user-friendly interface using User Forms, to change and modify the same questions and answers for the Quiz.

A couple of things we will add to the application in addition to the user interface is the ability to keep track of the student’s score using a text file, and create a control to enable the teacher to place the student record file in any location accessible to the computer from which the application is running. Instead of a basic Start Quiz button that calls the user logon form, we’ve created a form that allows you to make several choices (*see figure 1*).

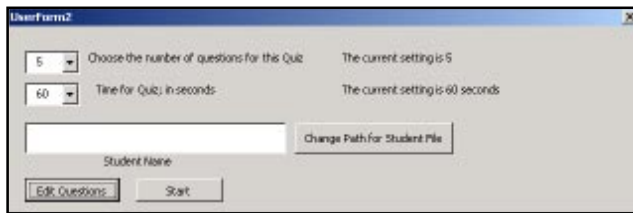


Fig. 1 logon dialog box

In figure 1, you can see that we’ve added the ability for the teacher to choose the number of questions, maximum time allowed for Quiz, the ability to edit questions and answers, and the option to change the location of the student file, in addition to allowing the student to logon and start the Quiz. Notice also that the form gives you feedback for current settings. For the Power Point template, the teacher can choose 5, 10, 15 or 20 Questions for the Quiz. You can choose 60, 120, 180, or 240 seconds as the maximum allowed time for the Quiz. Clicking on the “Change Path for Student File” button will open yet another form (*see figure 2*).

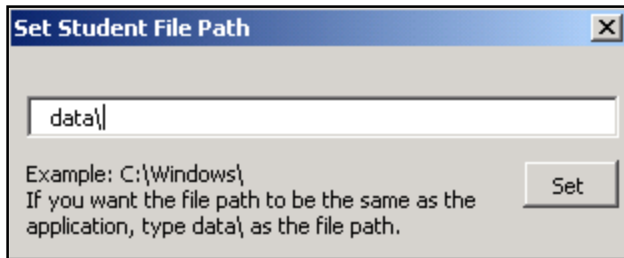


Fig. 2 Setting Student File Loc.

The dialog box in figure 2 allows the teacher to set the location of the student file. If you would

like to keep the student file in the same directory as the MS Power Point Application, you can just leave the default location in the text box “data\”. To change the location, you type the full path in the text box and click the “Set” button. Keep in mind that if you map the student’s computer to a shared directory on a server or even on the teacher’s computers, you can type the mapped drive letter in the text box.

Clicking the “Edit Questions” button in the logon dialog box (*see figure 1*) will open a form for the first question (*see figure 3*).



Fig. 3 Edit Questions & Answers

Here you have several choices. You can edit the question, any of the three possible answers, and select which of the three answers are correct. You can then choose to continue to the next question or save the changes to question 1 and start the Quiz.

The new application feature that we’ve added is the ability to store the student’s score to a text file. The text file entries looks much like the following:  
1/17/2002 8:26:12 AM | Mitch Belew | 5 of 5 | 100 %

Notice that we write the time, date, student’s name, number of correct answers, number of questions and the calculated percentage for the score. It doesn’t matter how many questions you choose for the quiz, the score will always be calculated correctly.

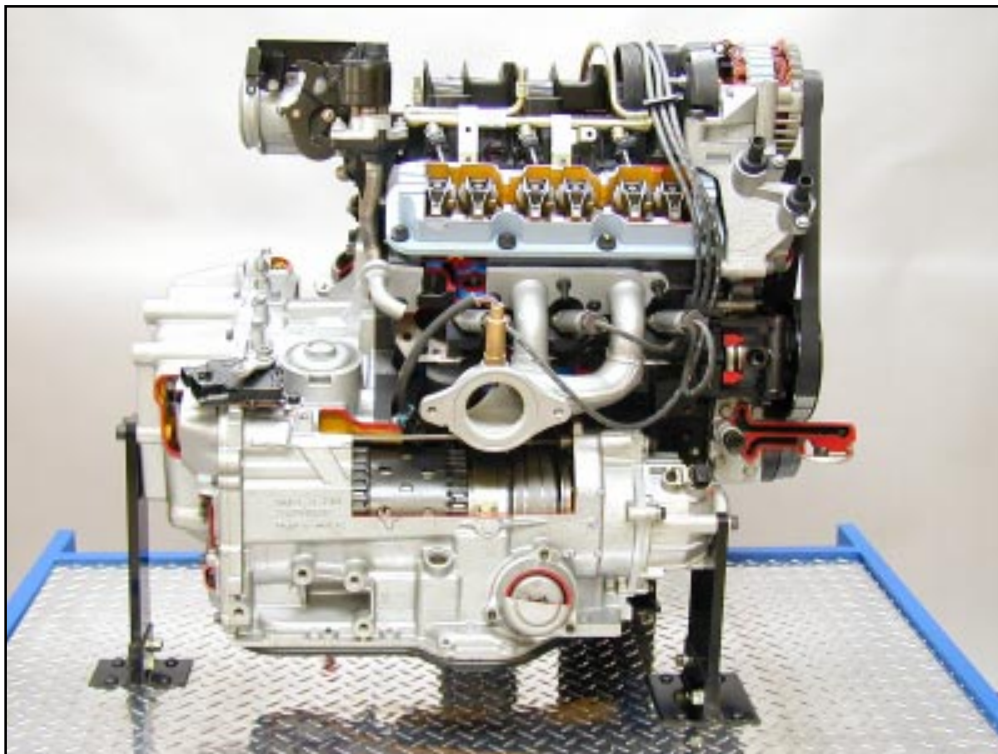
More details will be available with the download of the enhanced Power Point VBA file, including instructions for adding new forms and adding more than 20 questions. You will find that the user forms make it much easier and faster to use this application in your classroom. The instructions file will also cover the routine for calculating the student’s score to a percentage.

In our next newsletter we will add some custom animations and MS Power Point plug-in to the CBI application. Plug-ins are added features in MS Power Point that allow you to do things like create animations and run various applications from within Power Point to give the application more interactivity.



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