ATRT-1716
Automated Traffic Recorder Tester

Operating Manual

Revision 1.0

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Table of Contents

Explanation of Terms and Abbreviations

Terms and Abbreviations

The following is a list of terms and abbreviations used throughout the text of this manual along with the definition.

Term or Abbreviation	Definition
ATR	Automated Traffic Recorder
ATRT-1716	Automated Traffic Recorder Tester, also referred to as "tester".
Axle Spacing	The distance between two consecutive axles of a vehicle, usually measured from the point of ground contact of one tire to the same point on the other tire or from a point on an axle hub to the same point on the other axle hub.
FHWA	Federal Highway Administration
KPH	Kilometers per hour.
Loop	Used in this manual to refer to a loop of electrical wire used by an ATR to detect vehicles based on a change in inductance produced by the presence of a vehicle over the loop.
MPH	Miles per hour.
Piezo	Used in this manual to refer to a piezoelectric transducer used by an ATR for counting the axles of moving vehicles based on an electrical voltage that is produced when a vehicle drives over the transducer.
Road tube	Used in this manual to refer to a hollow rubber tube that produces a pulse of air when driven over by a moving vehicle. The air pulse is detected by an ATR and used to count axles.
Tester	Used in this manual to refer to the ATRT-1716.
USB	Universal Serial Bus. A common communication port found on a personal computer.

Introduction

The ATRT-1716 (tester) provides a sequence of test inputs to an Automated Traffic Recorder (ATR) and simulates a set of field inputs that the ATR might be subject to in an actual field installation. The testers provide an accurate record of the census of vehicles that were simulated to the inputs of the ATR, and this record is compared to the report created by the ATR to determine the accuracy of the ATR under test. The term "ATR" is used to describe a piece of equipment, which may also be known as a Traffic Counter, Counter/Classifier, Traffic Data Recorders, or Traffic Monitoring Device. For brevity, the term ATR will be used throughout this manual.

The ATR is used extensively to gather highway usage data for allocation of highway maintenance resources. Like a census-taker, the ATR reports count and classification data for vehicular traffic passing the installation location. The aggregated database of these usage factors over the years allows various types of analysis, such as a statewide snapshot of highway usage at any point in time, or longitudinal usage profiles over a selected span of years for any specified region or roadway. The results, in turn, are used in allocating resources for maintenance to highways throughout the state.

The tester generates "signatures" of vehicles by creating a pattern of outputs that appear to the ATR under test just as a vehicle would in a field installation. The signatures are designed to simulate various vehicles passing over a set of roadway sensors as defined by the operator during the test setup. The tester software includes a set of vehicle signature files that correspond to the 13 vehicle types established in FHWA Scheme F. In addition, you may design your own vehicle signatures with up to 20 axles and any practical axle spacing. You may select any combination from the set of standard and custom signatures during a test setup.

The signatures are modified by the spacing and layout of the sensor array you specify during the test setup. Nine sensor arrangements are available for one, two, or three sensors per lane. Up to 8 separate lanes can be simulated simultaneously.

The signatures are further modified by the simulated speed of the vehicle. During setup you can specify up to 16 speed bins that the signatures will be recorded in. The testers will output the signatures at speeds that fit into these pre-defined ranges so that the ATR report will match the tester report.

A Personal Computer (PC) using a Microsoft Windows operating system controls the tester and serves as the operator interface and data storage system. You define the test setup (speed bins, lanes, intervals, etc.), specify the spacing and layout of the sensor array to be used by the tester, and fill in the test report header using the PC keyboard. The computer creates the signature timing and directs the output to the sensor simulators (in the tester) per the setup.

You must then configure the ATR in harmony with the tester setup to properly categorize the signatures sent by the tester to the ATR. The specified sensor outputs are then connected to the ATR inputs, and the testing is started from the PC keyboard.

The test session stops after the time you establish during the setup has elapsed. This could be as little as 4 minutes, up to as much as 4 days, or practically any amount of time in between, based on the purpose of the testing and the needs of the user. When the test is complete, the record of the volume, speeds, and classifications of signatures sent to the ATR are automatically stored on a disk file in the PC driving the tester.

You then retrieve the record of vehicles counted by the ATR (using the same PC if desired) and store

Introduction

this file also. The two files may now be compared to determine the accuracy of the ATR that was tested, manually or automatically. Automatic file comparison is available via the Auto Compare software.

Highway usage statistics are vitally important for reclaiming Federal tax monies for maintenance and improvement projects. ATR devices are the primary instrument used to collect the basic data for these purposes. It is evident that the costs to an agency of inaccurate traffic data could be significant. This is especially true because when an ATR fails, it is most often recording fewer vehicles than are present, which could result in a lesser justification than is actually appropriate.

Figure 1. ATRT-1716

Simulated Sensor Types

Loops

The loop simulator inductance is similar to a field installation of 3 turns of wire in a 6' x 6' rectangular loop with AWG 14 wire. The inductance for the loop turns alone is 74 micro-Henries. An additional 30 to 150 micro Henries comes from a typical lead-in cable. For the typical ATR, the standard loop detectors can tune into the loop in the range of 50 to 350 micro Henries. Based upon the above-described loop used in ATR installations and the typical loop detector's inductance range, a simulated loop with a base inductance between 120-150 micro-Henries was selected for use in the 1700.

Piezo

The piezo simulations consist of step changes in voltage levels matched in time duration and magnitude to the roadway sensor outputs.

Road Tubes

The road tube simulator was designed and built to generate controlled air pressure transients using audio speakers to simulate the pressure wave produced by the vehicle passing over a road tube. A rubber hose is used to deliver the air pressure transient to the air switch input of the ATR.

Installing the Software

Computer Requirements

Windows XP (minimum)
At least one available USB port.

Software Installation

Installation of the software is a simple process. However it may require an administrative access to the computer.

The ATRT-1716 comes with a software CD which can be used to install the software. If the CD is not available, the software can be downloaded from the Internet. To download the software visit our website: www.atsi-tester.com.

To install the software from a CD insert it into the CD drive of the PC. A start-up screen should open automatically. In the start-up screen click "ATRT-1716" button, then follow the instructions in the software installation wizard.

To install the software that was downloaded from our website double-click the downloaded executable file to run the installation. Follow the instructions in the software installation wizard.

> **Note:** Do not forget to install the ATSI Tester USB device driver for ATRT-1716.

ATRT-1716 USB Driver Installation

To communicate with the ATRT-1716 an *ATSI Tester USB driver* needs to be installed. The same driver is used with several ATSI products and is included on the software installation CD. The latest version of the driver can also be downloaded from our website: www.atsi-tester.com. The driver installation package is also copied to the computer during the software installation.

To install the USB device driver from a CD insert it into the CD drive of the computer. A start-up screen should open automatically. In the start-up screen click "ATSI Tester USB Driver" button, then follow the instructions in the device driver installation wizard.

To install the USB device driver package that was downloaded from our website double-click the downloaded executable file to run the installation. Follow the instructions in the device driver installation wizard.

To install the USB device driver from the package copied during software installation open My Computer and navigate to the directory where the ATRT-1716 software was installed. In that directory, open the folder caller "driver" and run dpinst.exe and follow the instructions.

Sensor Setup

The Sensor Setup page will be the first page to appear. Here the "field setup" is recreated for the ATR to be tested. The software allows the setup(s) to be named and saved so the setup(s) can be quickly loaded for future testing.

The first choice to be made on this page is the Sensor Arrangement. This list box lets you select how the pavement sensors are arranged. Select the arrangement first then specify the types of sensors used in the Sensor Type boxes.

With the Sensor Arrangement now chosen, the software will automatically enable Sensor Types, Distance, Number of Lanes, and/or Loop Length where appropriate. Fill in the information to match your field setup and the Sensor Setup page is now complete. This setup can be saved by clicking the Save button and giving the setup an easily identifiable name. Saving each Sensor Setup will simplify testing by allowing you to quickly Load the setup again for future testing.

Note: Clicking the Save button on the Sensor Setup page will only save the information on this page and will not affect information on any other pages.

Figure 2. Sensor setup

Test Setup

Next is the TEST SETUP page. This page allows you to choose the type of test to run. There are two methods used to determine when a test ends: Set Number of Vehicles and Interval Test.

As implied by the description, the Set Number of Vehicles method allows you to use a fixed number of vehicles for the test. The number entered is the number of times each selected vehicle is sent to the classifier for each speed bin selected. Once each vehicle has been sent to the classifier at a speed within each speed bin the test automatically finishes. The Interval Test method allows selection of the time duration of the test. This is accomplished by selecting the number of intervals then choosing the specific interval period.

Set Number of Vehicles

This method requires you to choose the number of vehicles to be included within the test as well as the minimum time between the vehicles. As previously mentioned, the number entered is the number of times each selected vehicle is sent to the classifier for each speed bin selected.
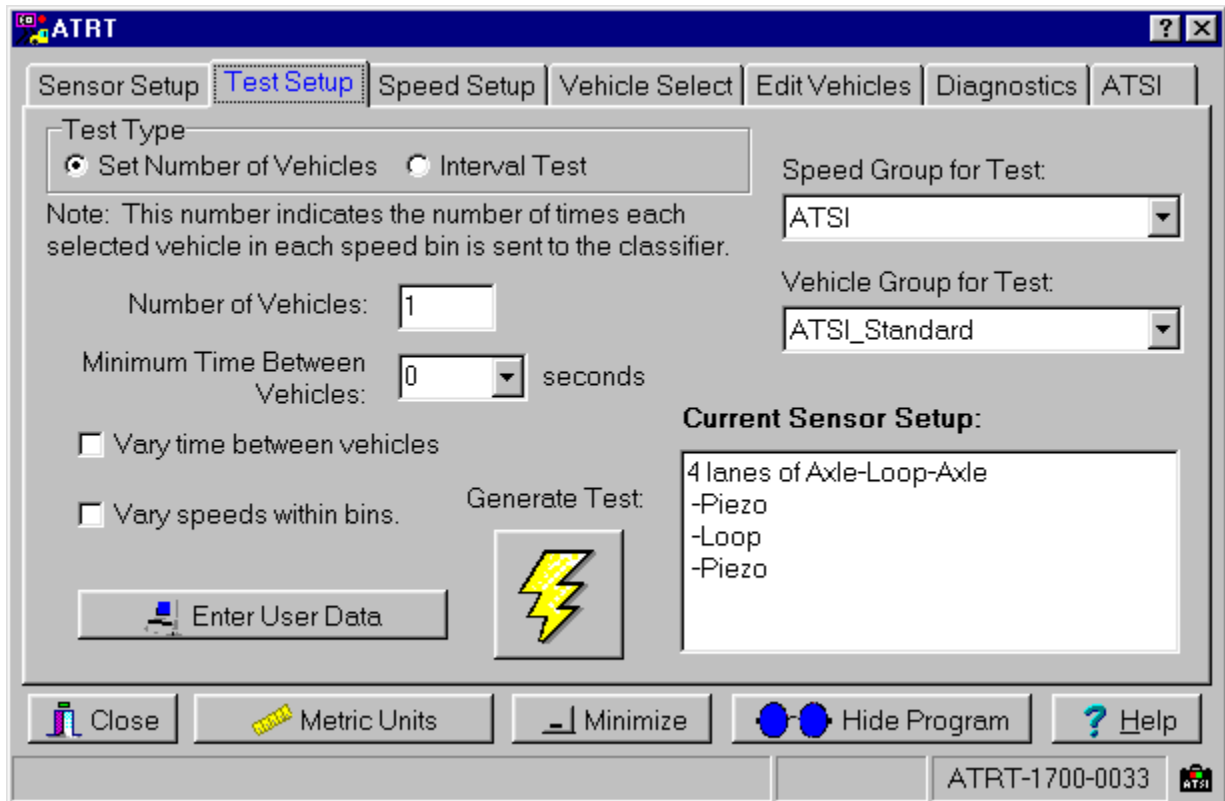

Figure 3. Set number of vehicles test type

Test Setup

Interval Test

This method allows selection of the duration of the test. This is accomplished by selecting the number of intervals then choosing the specific interval period. An interval is simply the number of periods the test will run. The interval period is the length of time each test interval will last (in minutes). Only predefined interval periods may be used; clicking on the drop down arrow will list all possible values. Note: there is a 25 second break in the tester outputs between intervals.
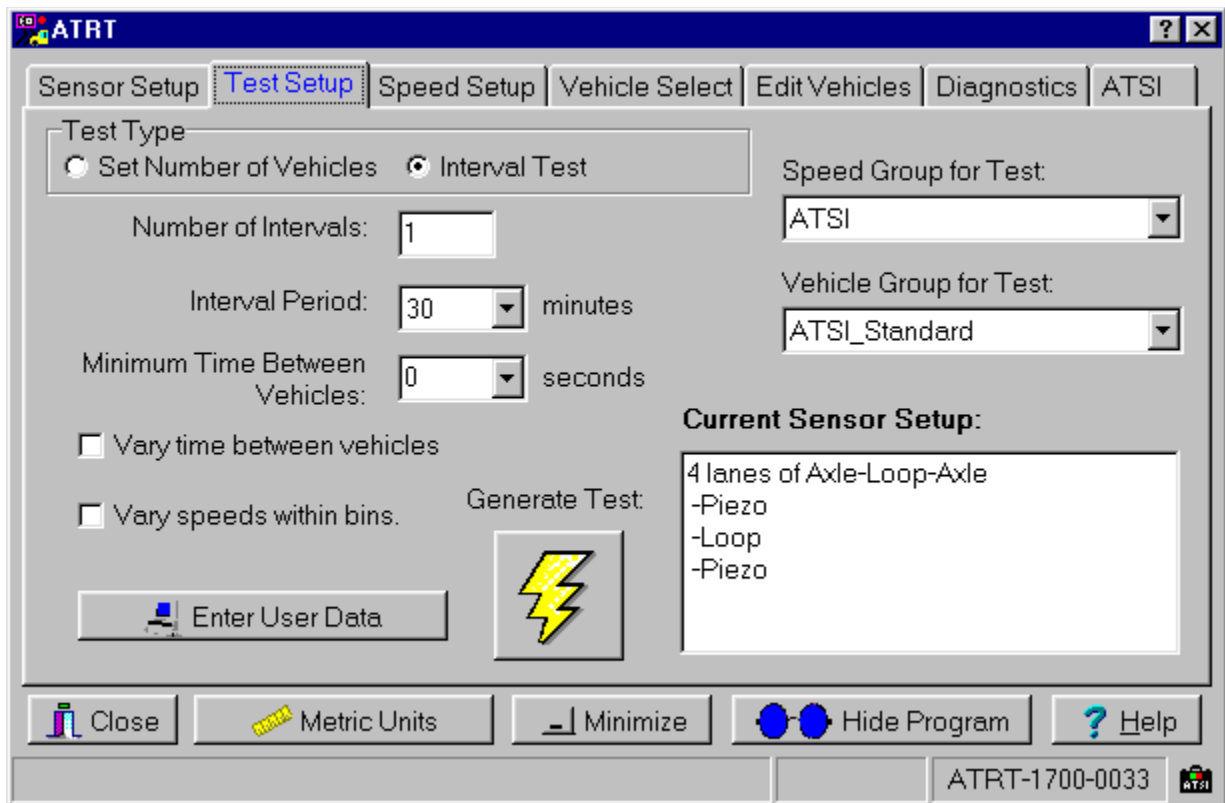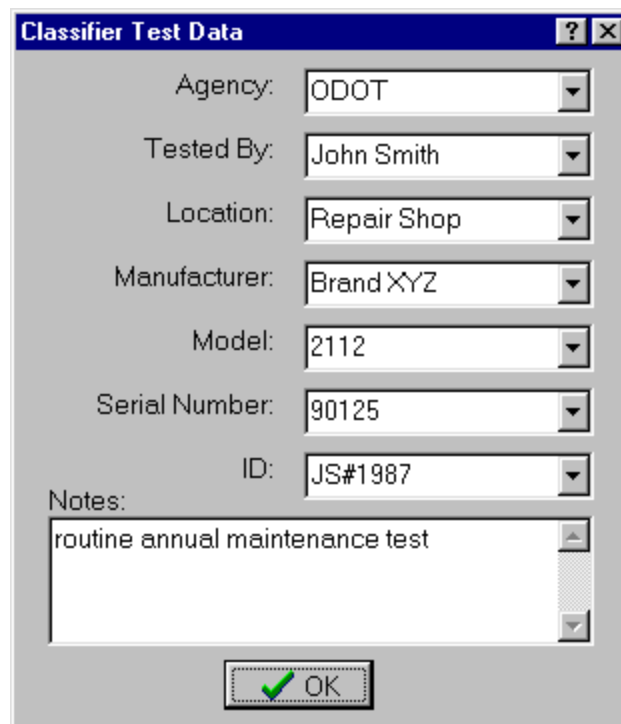
Figure 4. Interval test

Test Setup

After choosing the Test Type, you then choose the Speed and Vehicle Groups to complete this page's test setup. By enabling the Vary Speeds Within Bins option, vehicle speeds are varied within the limits of the speed bins during tests; otherwise, vehicle speeds are set to middle of the speed bins. Similarly, the Vary Time Between Vehicles option varies the time between vehicles (gap time) according to the range specified. Note: There must be at least 3 KPH between the limits of the speed bin(s) for the speeds to vary. The test speed will be a random value, such that the maximum possible speed tested will be the upper limit minus 1 KPH, and likewise, the minimum possible speed tested will be the lower limit of the speed bin plus 1 KPH. The speed will change after each vehicle has been simulated at the speed.

The lower right hand of the page is a non-editable box that displays the Current Sensor Setup. This is helpful to "double check" that an incorrect setup was not chosen accidentally.

The only thing left to fill in is the Enter User Data information. Clicking on this button produces a form for you to fill out so that classifier and user information can be included in the test report. Note: Information entered on this form will be saved to disk for easy reuse. Click on the appropriate drop down arrow to find previously entered data.

Figure 5. Classifier test data

Test Setup

Generate Test

With the test data entered into the User Data form, a test is now ready to be generated. At this point, ensure that the test cables are properly connected to the ATRT and the classifier being tested. **An Interval Test will require synchronized computer and classifier clocks**.

Figure 6. Generate test

Clicking the Generate Test button shown above, will bring up the Test Display window. The first test option is the **Start Now** option. Clicking this button immediately starts the ATRT to begin the testing procedure. Be sure to have the classifier setup to record before clicking this button.

The next option, **Auto Start**, gives you the ability to setup a test and then have it start at a later time. The time shown to the left of the Auto Start button is the user-changeable starting time for this option. Clicking the Auto Start button once turns the button into an hour glass enabling the feature. Clicking the button again will disable the feature. The reason for an auto start option is to help run tests on classifiers that can only be started at certain times (at the top of the hour, for example). This should help eliminate the need for extensive waiting for classifiers (of this type) to begin recording.

Note: It is recommended to start 10 seconds after the classifier time to allow for minor differences between the system (computer) clock and the classifier clock.
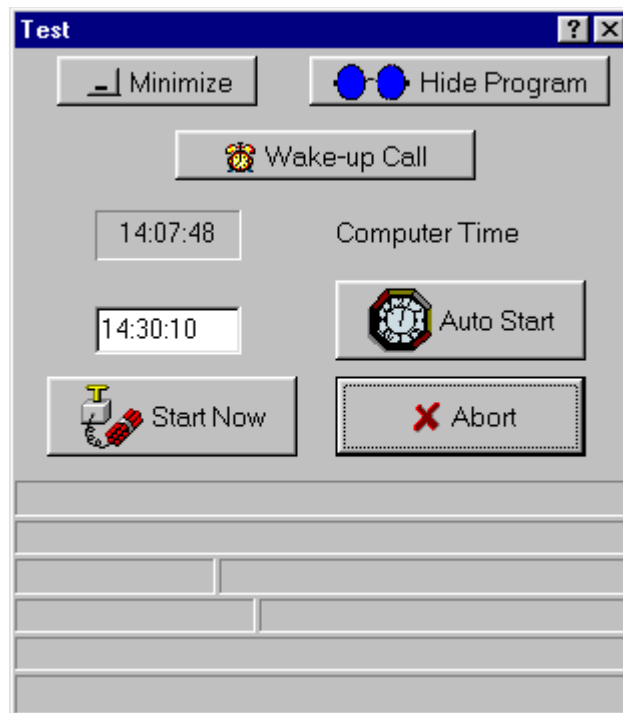

Figure 7. Start test window

Test Setup

The third function is the *WAKE-UP CALL* button. This button brings up a small window (Figure 8) where the alarm clock can be set by entering minutes and seconds then clicking on the alarm clock. The remaining time will count down and generate an alarm once the time reaches zero. It can be paused by clicking on the alarm clock during count down or shut off by clicking on the *CLOSE* button.

Figure 8. Alarm clock

Once the test has been started, the Test display window changes as shown in Figure 9. Click the *ABORT* button to stop the test at any time. The *ABORT* button often has a slow response, but should always respond within four seconds.

All pertinent information regarding the current vehicle being simulated by the ATRT is displayed during the test. The bottom status bar (line of information) contains two panels of information, this information is only helpful when getting technical support.
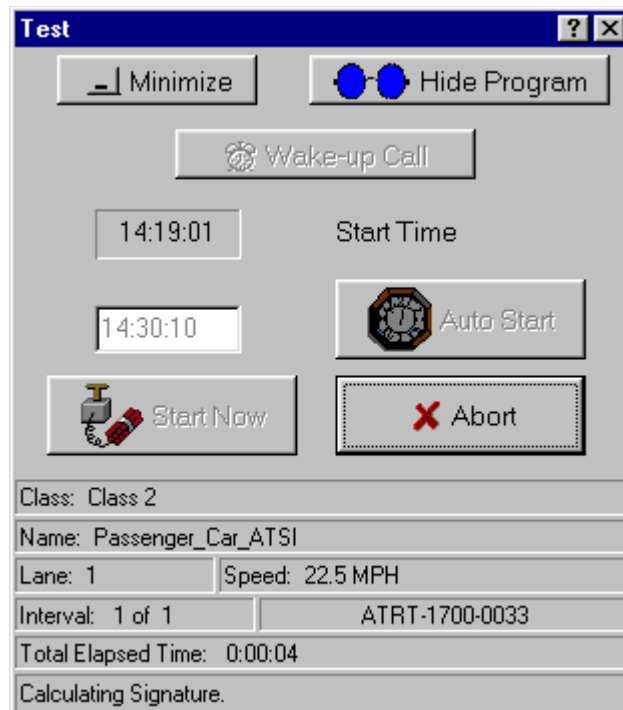

Figure 9. Test display window

Test Setup

Test Complete

Upon completion of a test, a small window will appear offering three different options as shown in Figure 10. The first option, Auto Compare,offers the user the ability to select an ATRT report and the Classifier report and compare them for discrepancies. The second option is to view the report in the companion report viewer that was installed with the ATRT software. The final option is to perform another test. ***Note****: The report filename is automatically generated based on the date and the number of tests generated (e.g. Jun_11__Test_02.txt).*
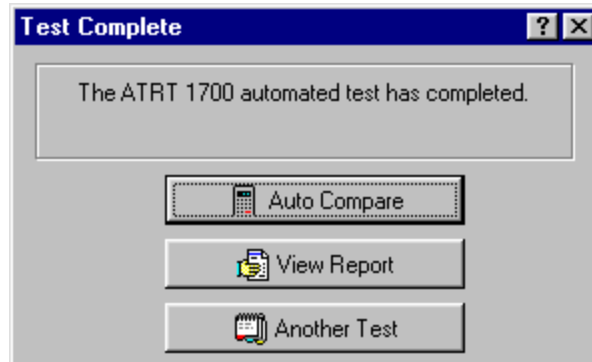

Figure 10. Test complete

Speed Setup

The remaining page tabs are used to save different test setups, and vehicles for re-use. The SPEED SETUP page shown in Figure 11 is where new *SPEED GROUPS* and *SPEED BINS* are created and modified if needed. A lower and upper bound set the range that the test vehicles' speed must remain within.
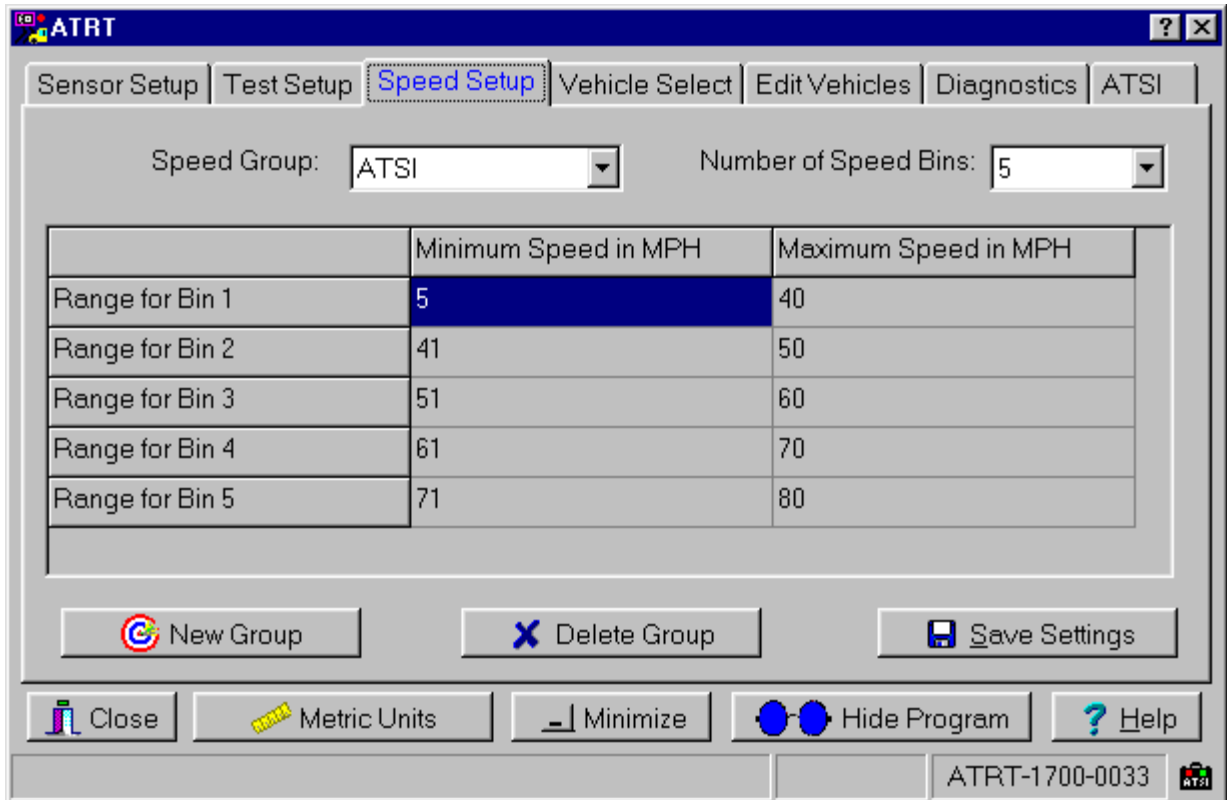

Figure 11. Speed bin setup

Each range (or set of limits) is called a speed bin. There may be up to 16 non-overlapping speed bins. The minimum and maximum for each speed bin may be the same number. For example a minimum of 55 and maximum of 55 will ensure that the speed of all simulated vehicles using this speed bin will be 55 MPH (or KPH where appropriate).

A *SPEED GROUP* is the name associated with a set of speed bins. This name is used to determine the speeds at which vehicles are simulated during a test. To enter bin data:

1. Use the mouse to select the number of bins from the drop down list.
2. Click on the cell (box) in the upper left hand corner of the data entry grid.
3. Enter the minimum value for this bin (e.g. 5) then hit the <TAB> key to advance to the next cell.
4. Enter the maximum value for this bin (e.g. 20) then hit the <TAB> key to advance to the next cell.
5. Continue repeating the above steps until all bins are full.
6. Click the Save Settings button.

To create a new speed group:

1. Click the New Group button and type in the group name and click OK.
2. Continue with the steps described above to enter the bin data.

Remember, the minimum and maximum for each speed bin may be the same number (e.g. 25 MPH to 25 MPH), however, there must be at least 1 MPH (or 1 KPH in metric mode) between one speed bin and the next. If accidental changes were made to any settings and wish to be discarded, select any page tab to bring up the *Discard Entry* warning and click OK.

Vehicle Select

The VEHICLE SELECT page shown in Figure 12 allows you to determine which vehicles will be included in the test. A vehicle is selected by clicking on the desired vehicle designator. The selected vehicles are identified by a check mark to the left of the vehicle designator::vehicle type (e.g. Bus_ATSI::Class 4). To display any cut-off portion, keep the mouse pointer motionless over the desired vehicle, and a help hint will display all of the information.

The *VEHICLE GROUP* is the name associated with a set of specific vehicles. This name is used to determine which vehicles are simulated during a test. The default listing in the Vehicle Group section is the ATSI_Standard group shown in Figure 12. This group cannot be changed or edited in any way. Also listed in the Vehicle Group's drop down window is User_1 through User_30 as shown in Figure 13. These user-defined groups can be modified and saved to replicate your vehicle needs.
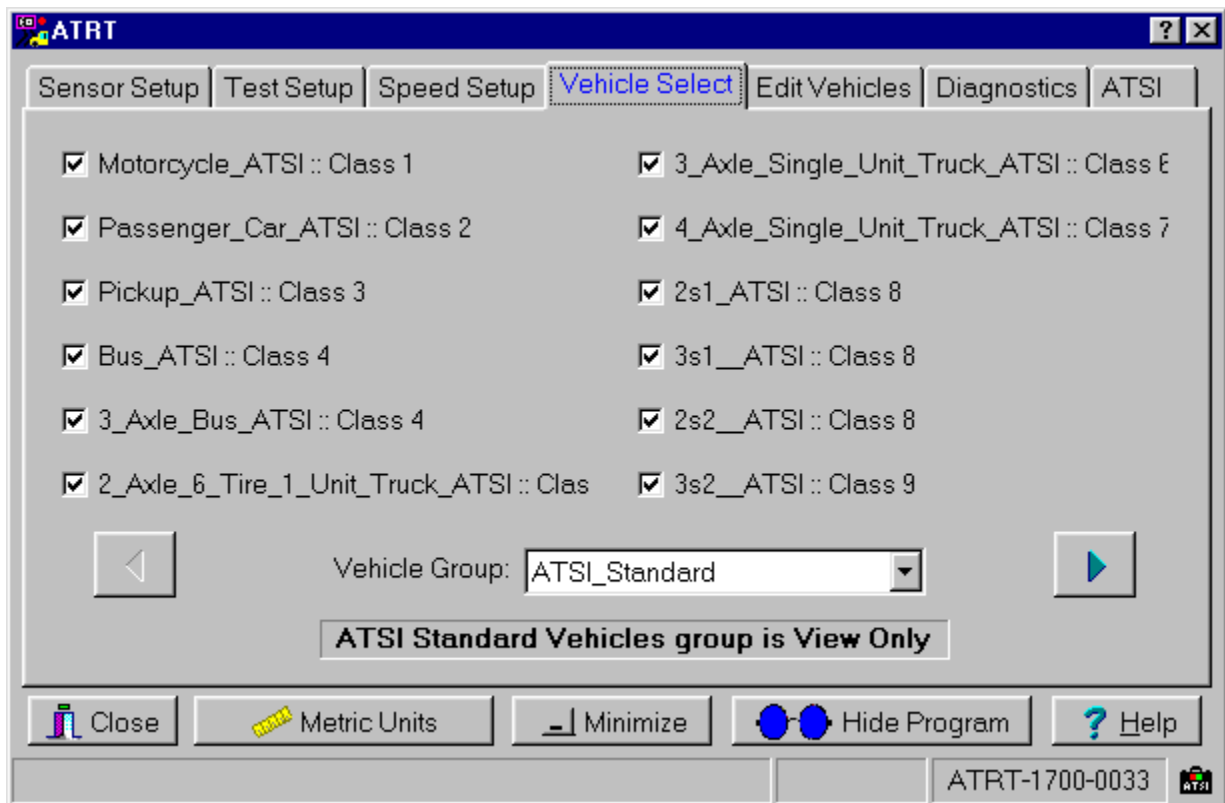

Figure 12. ATSI standard vehicle select

Vehicle Select

To create and save a new group:

1. Choose a User name (e.g. User_1) in the drop down window
2. Select the vehicles to be included in the test
3. Click the *Save Settings* button and then click Yes to the warning prompt
4. Click the *Rename Group* button to give the group a new name
5. Repeat steps 1-4 to create more groups

Note: ATSI Default vehicles contain *_ATSI* as part of their vehicle designator. They are predefined vehicles that fall within FHWA Vehicle Types. The vehicles were selected because they are within a specific vehicle class and should not contain attributes that could allow classification in more than one type of vehicle class. The ATSI Default vehicles cannot be modified. Due to the ambiguous nature of the classification scheme, some classifiers may not agree with the ATSI classification of a vehicle, because the FHWA classifications overlap one another. To correct this mismatch, create a new vehicle with the same axle spacings but with a different class. If you disagree with the classifier's categorization, the rules on the classifier must be changed. The manual for the classifier should describe if these rules can be changed and how to change them.
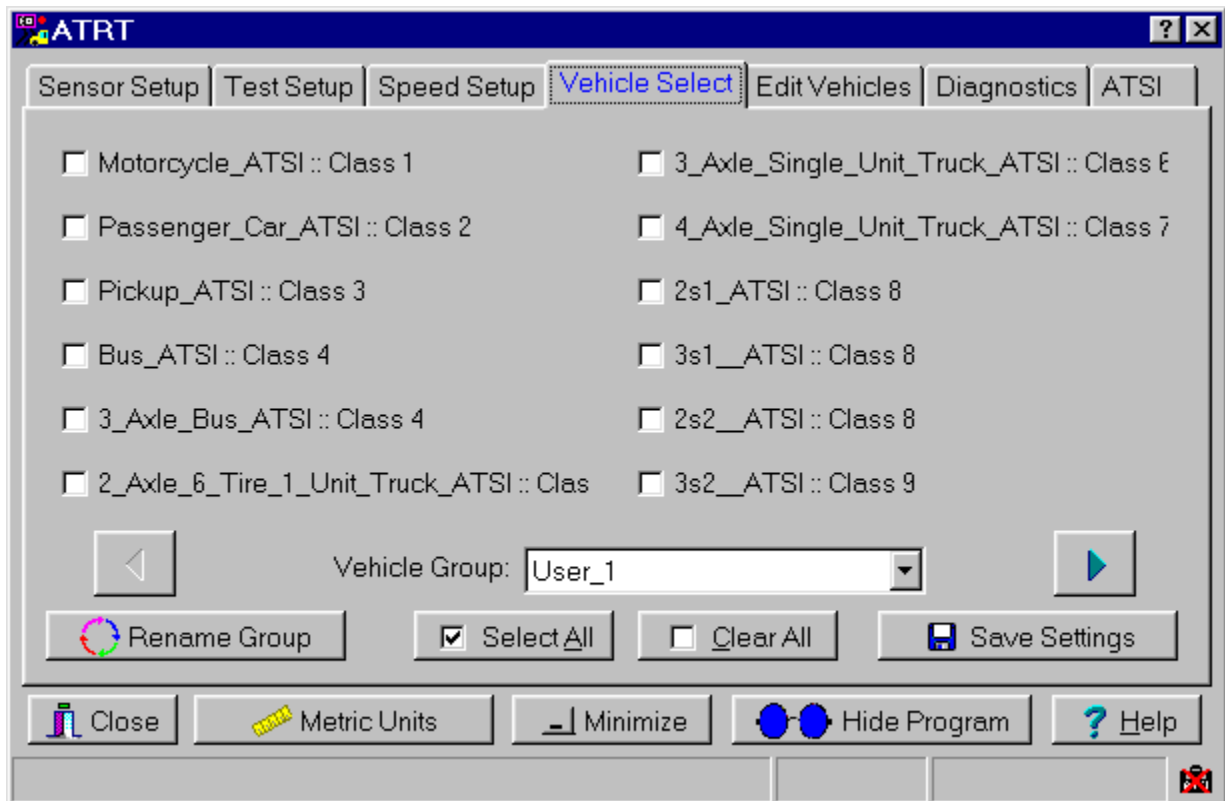

Figure 13. User vehicle group

Edit Vehicles

The FHWA classification schemes are an industry standard, however, many agencies add or make changes to the FHWA classifications to suit their needs. The **EDIT VEHICLE** page shown in Figure 14 is where vehicle changes or additions are made.

Some classifiers may not agree with the ATSI classification of a vehicle. To correct this mismatch all vehicle classes can be modified except the ATSI standard vehicles which cannot be edited. In order to change the class of an ATSI vehicle, you will need to create a new vehicle with the same axle spacings but with a different class. Changing the type of a vehicle to correspond to the classifier's type will ensure the reports will match.

The Edit Vehicle page has different modes depending on the car selected. If an ATSI standard car is displayed, the View Only mode is displayed. In this mode, the *Delete Vehicle* and *Make Changes* buttons are not displayed on screen.

Any vehicle other than an ATSI Standard, places the software in the View & Edit mode allowing you to review a Vehicle and its properties (i.e. Vehicle Type, Number of Axles, and Axle Spacing). If changes need to be made, then you must switch to the Edit Mode. Access the Edit Mode by clicking the *Make Changes* button. When in the Edit Mode, notice the buttons for New Vehicle and Delete Vehicle now display Save Entry and Discard Entry. Changes can now be made to the properties of the vehicle listed.

Note: When the New Vehicle button is pressed and a valid new name is entered, the properties from the previous vehicle remain. This makes it easy for the user to copy vehicles, or create new vehicles that are similar to existing vehicles. However, any and all properties of a New Vehicle may be changed.
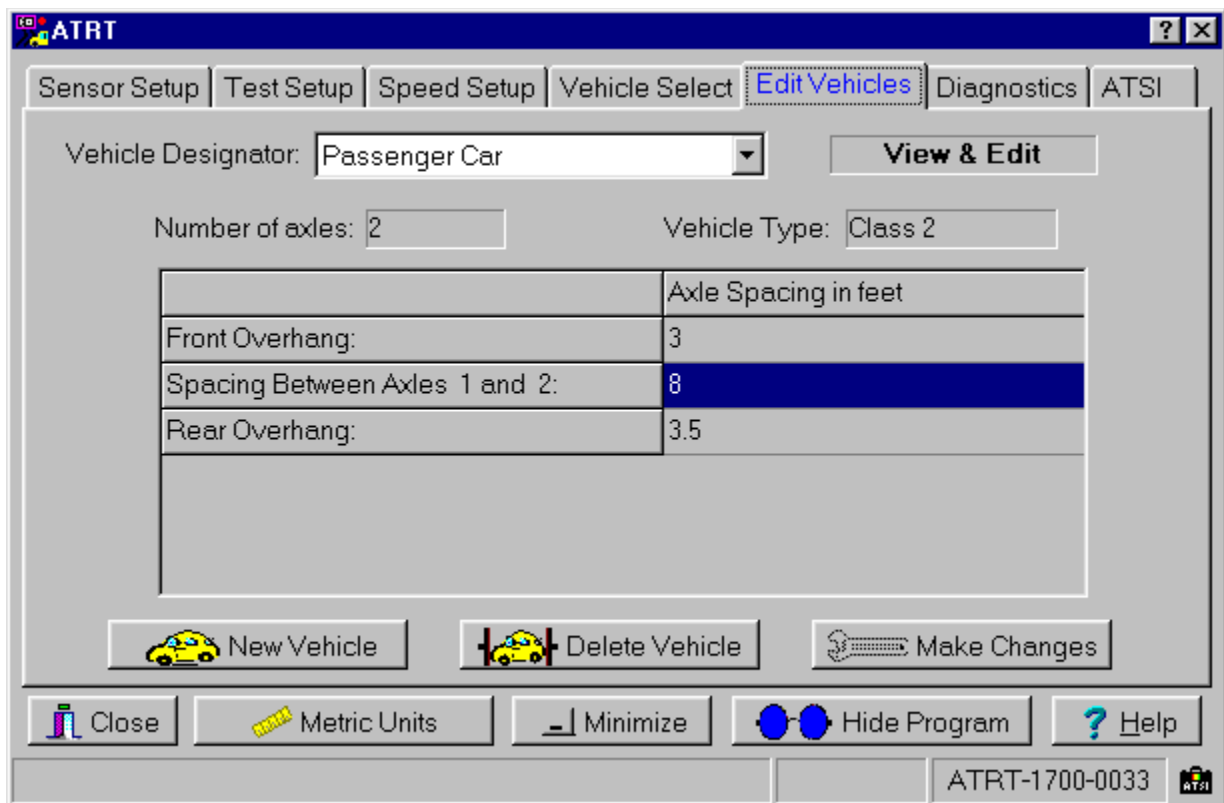

Figure 14. Edit vehicles

Diagnostics

If you wish to take a look at whether a classifier is recognizing a particular vehicle, you can create a quick test on the **DIAGNOSTIC** page.

The Diagnostic page shown in Figure 15 allows you to set up a test for an individual vehicle. If needed, go back back to the **SENSOR SETUP** page and modify the setup or keep the current setup shown in the upper right corner of the Diagnostics page.   You can also select the *Vehicle Speed* and the *Lane* for the simulated test vehicle. Once the page is setup, click the lightning bolt (*Send Single Vehicle*) to start the single vehicle test.
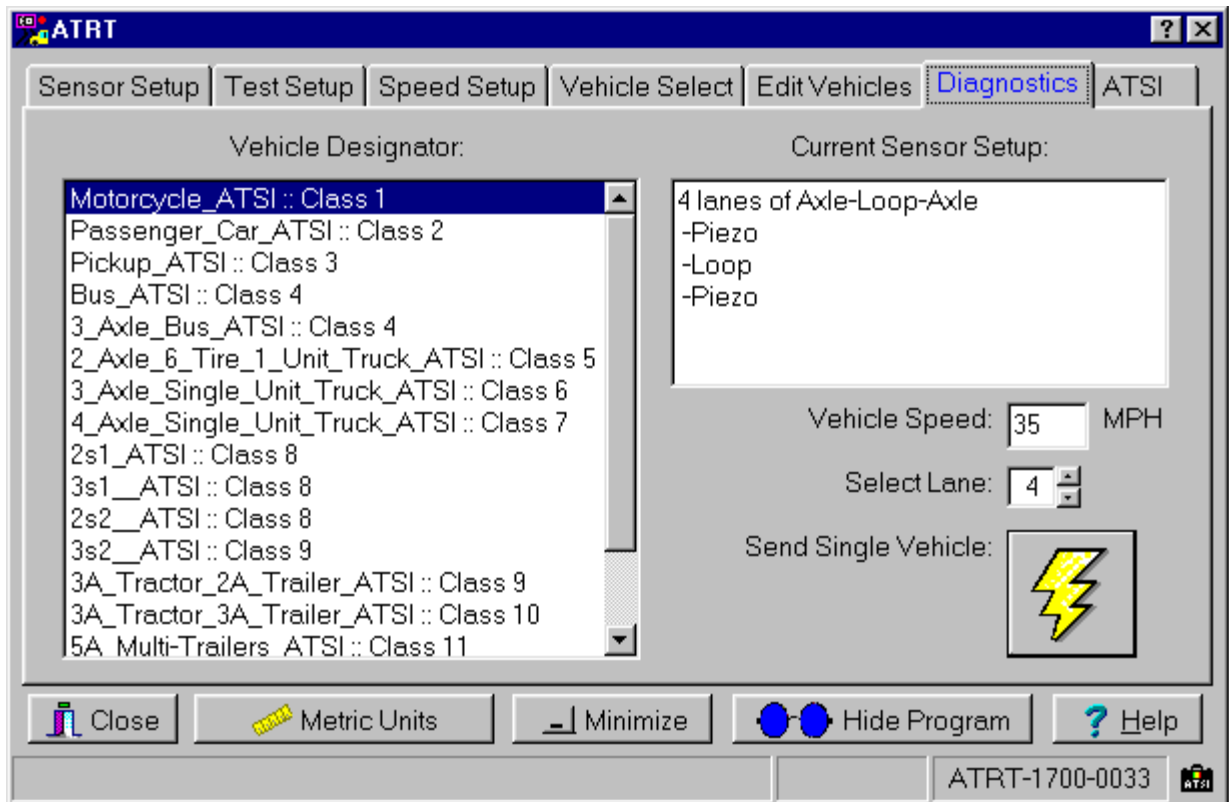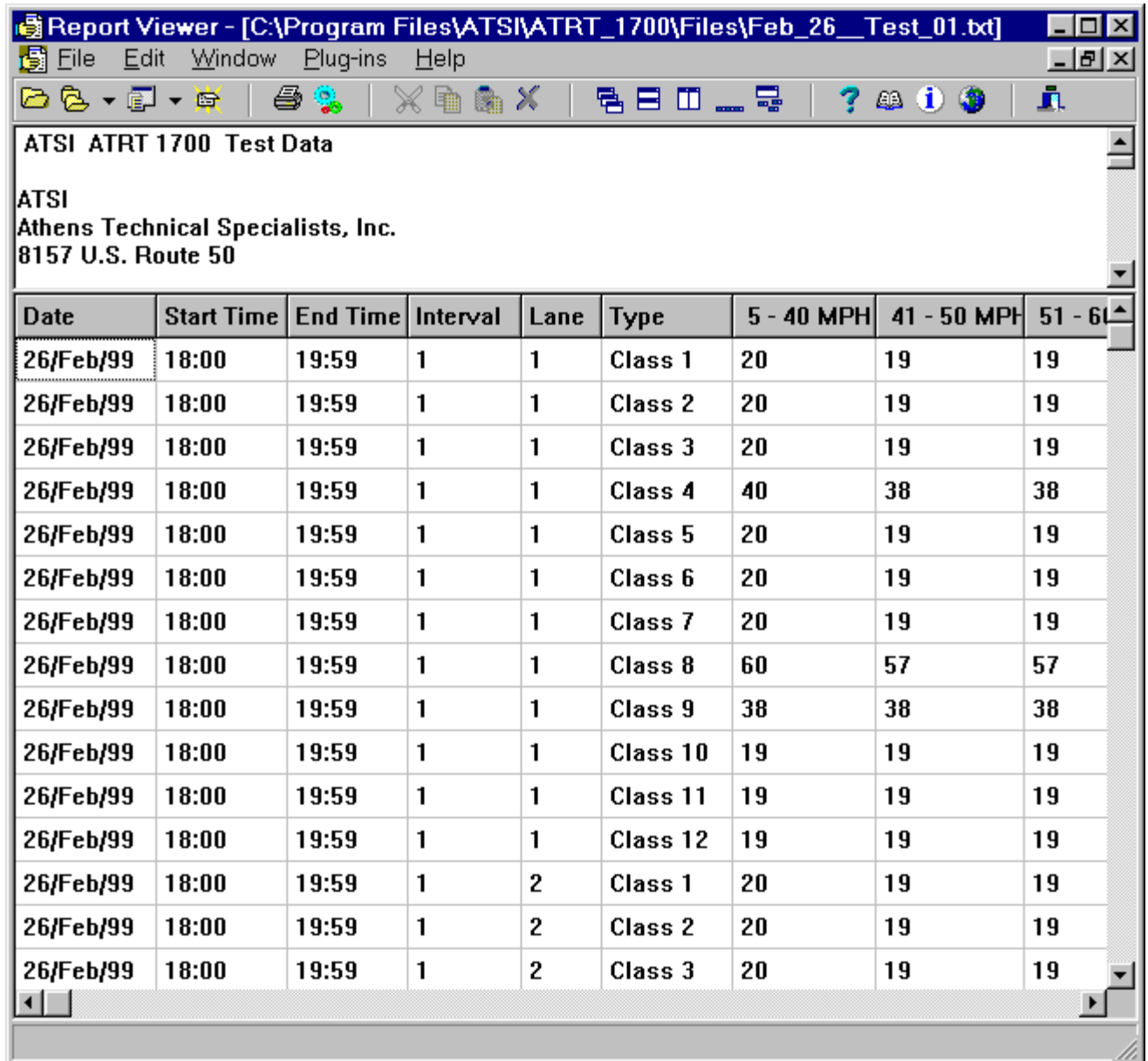
Figure 15. Diagnostics

Report Viewer

The Report Viewer is installed automatically with the ATRT software and allows you to view the data generated from a completed test. The Report Viewer can be accessed from the Test Complete window. A sample report is shown below in Figure 17. The Report Viewer is also used to view Auto Compare reports which are described in the Auto Compare section.

The viewer splits the screen into two different windows: the top for test setup information and the bottom for the test results. Since the window is too small to display all of the speed bins and intervals, use of the scroll bars are necessary to view the remainder of the test results. The columns can be reduced or increased in size and also moved (i.e. click and drag a column that is hidden and move it to an area of the screen to be viewable).

Figure 17. Report viewer

Report Viewer

This program is a viewer only, in order to print a test report the user must open the file in a spreadsheet application of their choice. The following steps show you how to open an ATRT-generated test in Microsoft® Excel 2000:

1) Select File > Open and in the *"Files of Type:"* field, select **Text Files (*.prn, *.txt, *.csv)**
2) Now browse and select the report file you want to open and click **OK**.
3) Make the selections showng below and then click **Next**:

> *Original Data Type = **Delimited***
> *Start Import at Row = **1***
> *File Origin = Windows **(ANSI)***

4) In Step 2, make the following selections and click **Next**:

> *Delimiters = check the **Tab** box*
> *Text Qualifier = "*
> *Leave "Treat consecutive delimiters as one" un-checked*

5) In the final Step, in the "Column Data Format" section, select **General** and click **Finish**.

The step listed above may be different in other spreadsheet applications but they are listed here as merely a guide to help you. If you have trouble opening the report, refer to your spreadsheet applications help files for further details when opening .txt file types.

Setup Examples

Prior to actual test setups, be sure to have all cables attached to the ATRT and have the classifier prepared to test.

Example 1

The following is a scenario of a user who has a classifier to be tested with the ATRT-1716. The classifier's setup is axle-loop-axle with a loop length of 6 feet and distances of 5 and 11 feet between the sensors as shown below in Figure 18. Sensors used are piezos and loops on a 4 lane highway.
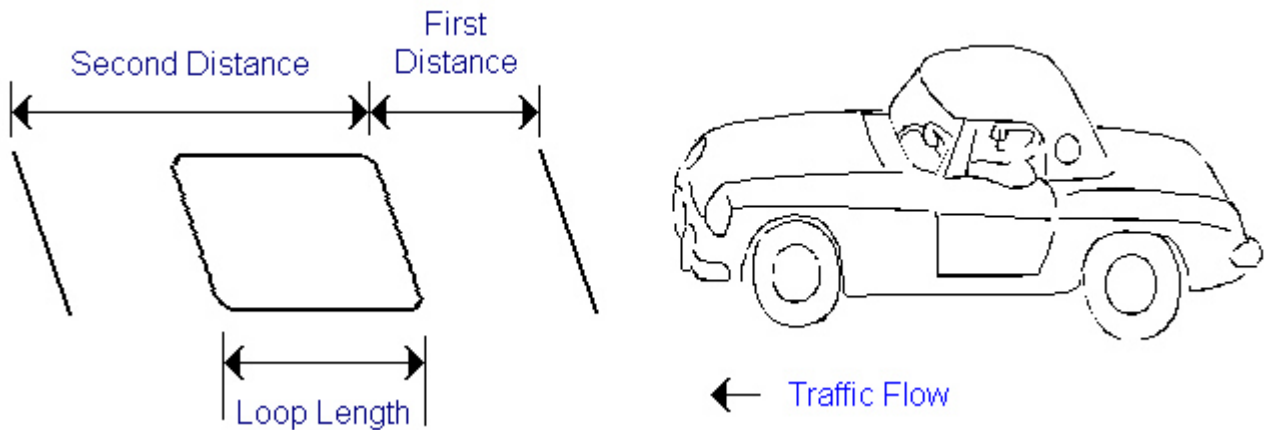

Figure 18. Sensor setup example

A step by step procedure shown over the next few pages will guide the user through a typical setup for the above stated example.

Setup Examples

Step 1 : Sensor Setup

1)   Choose the sensor arrangement to match the field setup. In this case it would be Axle-Loop-Axle.

2)   Select the sensor type, Piezo-Loop-Piezo. Notice that when sensor 1 was selected, sensor 3 was automatically filled-in to match the first sensor.

3)   Fill in the distances between the sensors. The first distance is measured from the leading edge of the first sensor that the traffic will encounter to the leading edge of the second sensor that the traffic will encounter (5'). The second distance is measured from the leading edge of the second sensor that the traffic will encounter to the leading edge of the third sensor that the traffic will encounter (11'). The loop length is measured from one end of the loop to the other. (See Figure 19 above)

4)   Choose the Number of Lanes as 4.

5)   Choose the Loop Length as 6 feet.

6)   *OPTIONAL*: Click Save and give the setup a filename so it can be used again at a later time.

Step 2 : Test Setup Page

1)   Click the Interval Test radio button to select this test type.

2)   Type in 12 for the Number of Intervals.

3)   Select 30 minutes from the drop-down menu for the Interval Period.

4)   Select 1 second from the drop-down menu for the Minimum Time Between Vehicles.

5)   Select ATSI from the drop-down menu for the Speed Group for Test.

6)   Select ATSI_Standard from the drop-down menu for the Vehicle Group for Test.

7)   Now click the Enter User Data to bring up the User Data window and fill it in as shown.

8)   Finally, click the Generate Test button to bring up the Test window.

Setup Examples

For this example, the Auto Start option will be chosen to start the test.

1)   Type in 14:30:10 for the starting time.

2)   Click the Auto Start button.

3)   **Optional**. Click the Minimize button to send the program to the taskbar or click the Hide Program button to send it to the system tray.

Note: *There is a 25 second break between intervals. ATSI suggests starting 10 seconds after the classifier time to allow for minor differences between the system (computer) clock and the classifier clock.*

The 6 hour long test is now in progress.

Example 2

This example has the exact same scenario as described in Example 1. The only difference is that the technician is an experienced user of the ATRT-1716. They have performed many tests and saved the sensor setups (*Example 1.sen for this example*) to be able to quickly reload them for a future test situation. This example shows the use of the load feature and the time it saves.

Step 1 : Sensor Setup Page

1)   Click the Load button to bring up the Open window.
2)   Select Example 1.sen and click the Open button. This loads the Sensor Setup page with the values that were saved from a previous setup.

Continue the setup by repeating steps 2 and 3 as shown in Example 1.

        ATRT-1716 Operating Manual Rev. 1.0

Auto Compare Software

The Auto Compare software is a valuable tool to quickly compare an ATRT test report with the classifier report and generate a comparison report. The Quick Reference Guide that accompanies your tester steps you through preparing the classifier's report file for use with the Auto Compare Software. The *Manual* button shown in Figure 19 opens a PDF version of the Quick Reference Guide if you cannot locate your copy.

Figure 19 shows the opening screen of the Auto Compare software. The top half of the window displays fields for typing the filenames of the reports to be compared. Both fields also have an associated *BROWSE* option to allow the user to view the folder which holds test reports.
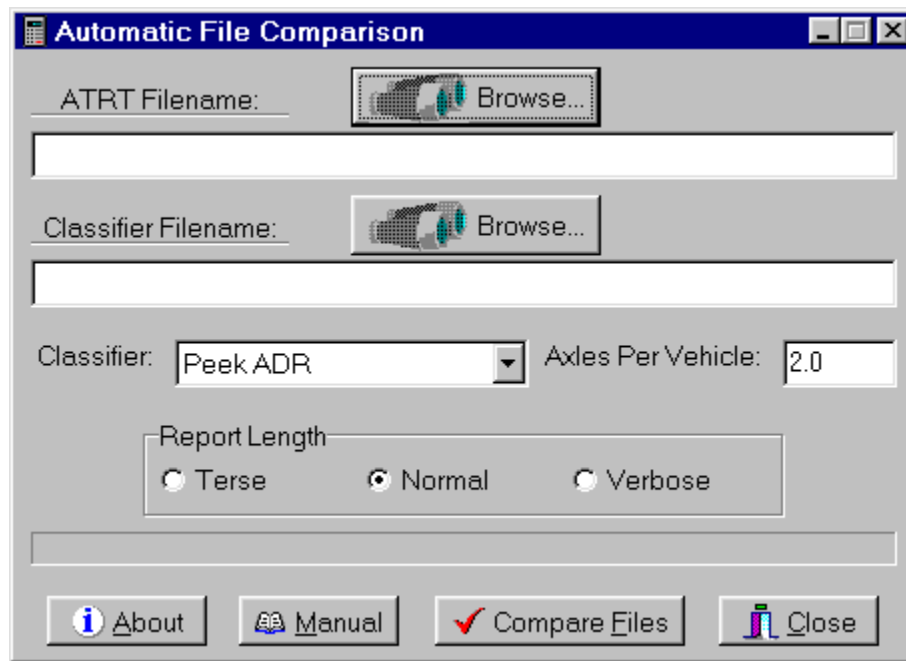
Figure 19. Auto compare setup

If you accepted the default installation of the program files, you can find ATRT files in the following folder:
C:\Program Files\ATSI
ATRT_1700\Files.

The *CLASSIFIER* field located in the bottom half of the window must be selected to match the Classifier. (i.e. if the Classifier File is a Peek ADR report, the Classifier field must indicate Peek ADR). If they do not match and the Compare Files button is clicked, an error will pop up as shown in Figure 20.

Figure 20. File error.

Auto Compare Software

The *AXLES PER VEHICLE* field is used if the classifier was set up to estimate the number of vehicles by a ratio of axle hits; the ratio used by the classifier must be entered here. If a "co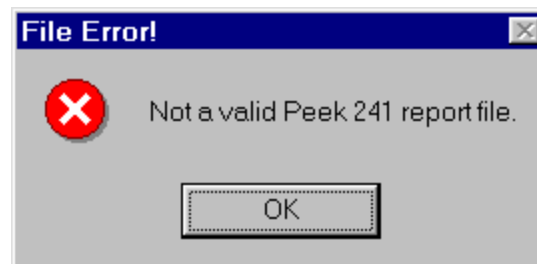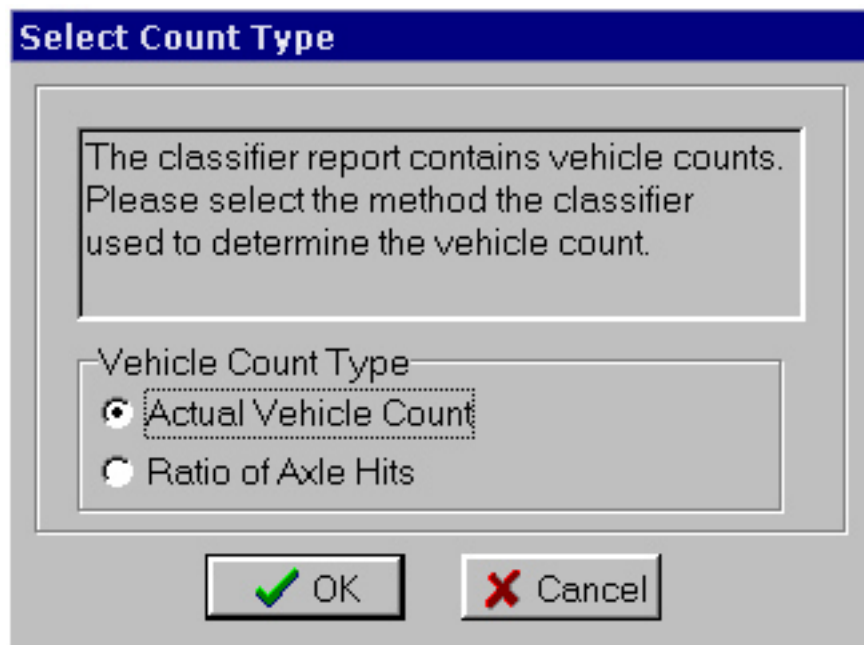unt only" type of classifier report is detected by the ATRT, then the form shown in Figure 21 will appear. If loops were used as vehicle detectors then the classifier used an actual vehicle count. However, if axle detectors were used, then a ratio of axle hits is typically used, and the axles per vehicle ratio is used in the comparison. ***Note**: some classifiers have an advanced feature that allows actual vehicle counts using only axle sensor(s), for a correct assessment, the same type of report generated by the classifier must be indicated here.*

The *REPORT LENGTH* option offers the user a choice of how the results of the comparison test are shown on the report. The *TERSE* option makes it easy to find problem areas by only showing data containing differences. The NORMAL report shows more information than the terse report; if any row contains a discrepancy, then that entire row is included in the report. For a complete report, choose the *VERBOSE* report option where all information generated in a test is shown in the report. A *VERBOSE* report may be used when complete printed documentation of testing is required.

Figure 21. Select count type

Auto Compare Software

An Auto Compare report consists of three sections as shown below in Figure 22 and can be viewed with the Report Viewer. The first section provides information from the ATRT test report. This information is based upon the Sensor and Test Setup pages of the ATRT software. The second section displays information from the report generated by the classifier. The information displayed depends upon the classifier with some classifiers providing more information than others.

The last section is the comparison report. As shown in the example below, the report consists of columns of ATSI information and classifier information (e.g. ATSI 5-40 MPH & Peek 241 0-40 MPH). The column next to these is the *DIFFERENCE* column which is displayed in red text to make it easy to quickly look down the column to see if there are any discrepancies listed.

Report Viewer - [C:\Program Files\ATSI\ATRT_1700\Files\Feb_26__Comparison_01.txt]

File   Edit   Window   Plug-ins   Help

```
ATSI  ATRT 1700  Auto-Compare          Peek ADR
Report  (Terse)                        C:\Program Files\ATSI\ATRT_1700\Files\feb_26_1.adr.dat
                                       000        "[BINOUT VERSION]"
ATSI                                   2.05       "BINOUT V2.05 (29 FEB '96.)"
Athens Technical Specialists, Inc.     101        "[BASIC FILEHEADER]"
8157 U.S. Route 50                     2          "VERSION NO"
```

ATSI	ATSI	ATSI	Peek ADR	ATSI	Peek ADR	ATSI	Peek ADR	ATS
Date	Start Time	End Time	End Time	Interval	Interval	Lane	Lane	Typ
4/Mar/99	14:00	15:59	16:00	71	71	4	4	Clas
4/Mar/99	14:00	15:59	16:00	71	71	4	4	Clas
4/Mar/99	14:00	15:59	16:00	71	71	4	4	Clas
			16:00		71		4	NO
Total Vehicles Sent:	558,329							
Total Vehicles Received:	558,330							
% Vehicles miscounted:	0.00							
% Vehicles in wrong speed bin:	0.00							
% Vehicles with wrong type:	0.00							

Figure 22. Auto compare report

Cable Pinouts

The ATRT-1716 is shipped with the connectors for the user to make the cables required for the different sensors and classifiers that are available. The user can have the cables made and shipped to them if desired. Contact ATSI for pricing and arrangements for this service.

Piezo 1 - 8

1   Piezo 1
2   Common
3   Piezo 2
4   Piezo 3
5   Common
6   Piezo 4
7   Piezo 5
8   Common
9   Piezo 6
10 Piezo 7
11 Common
12 Piezo 8

Piezo 9 - 16

1   Piezo 9
2   Common
3   Piezo 10
4   Piezo 11
5   Common
6   Piezo 12
7   Piezo 13
8   Common
9   Piezo 14
10 Piezo 15
11 Common
12 Piezo 16

Loop 1 - 8

1   Loop 1
2   Loop 1
3   Loop 2
4   Loop 2
5   Loop 3
6   Loop 3
7   Loop 4
8   Loop 4
9   Loop 5
10 Loop 5
11 Loop 6
12 Loop 6
13 Loop 7
14 Loop 7
15 Loop 8
16 Loop 8

Loop 9 - 16

1   Loop 9
2   Loop 9
3   Loop 10
4   Loop 10
5   Loop 11
6   Loop 11
7   Loop 12
8   Loop 12
9   Loop 13
10 Loop 13
11 Loop 14
12 Loop 14
13 Loop 15
14 Loop 15
15 Loop 16
16 Loop 16

Limited Warranty and Return Merchandise

The ATRT-1716 (Product), distributed by Athens Technical Specialists, Inc. (ATSI), is warranted to the original purchaser (Purchaser) to be free of defects in materials and workmanship for a period of one year from the purchase date stated on the invoice. Within this period, in the event of a defect, malfunction, or other failure of the product while in the custody of the Purchaser, ATSI will remedy the defect or cause of failure without charge to the Purchaser. The Purchaser's sole remedy is restoration of product operation. ATSI accepts no liability for incidental or related expenses. Under no circumstances will ATSI's liability exceed the purchase price for items claimed to be defective.

This Limited Warranty does not extend to any Product that has been damaged or rendered defective as a result of accident, misuse, abuse, modification of the product, or service by anyone other than ATSI.

EXCEPT AS EXPRESSLY SET FORTH IN THIS WARRANTY, ATSI MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICUALR PURPOSE. ATSI EXPRESSLY DISCLAIMS ALL WARRANTIES NOT STATED IN THIS LIMITED WARRANTY. ANY IMPLIED WARRANTIES THAT MAY BE IMPOSED BY LAW ARE LIMITED TO THE TERMS OF THIS EXPRESS LIMITED WARRANTY.

Warranty Repair

What you must do to return the Product for repairs covered under the Limited Warranty :

Request a Return Merchandise Form by phone, fax, or email from the ATSI Service Department or complete the form at www.atsi-tester.com. Return the Product along with the completed form with prepaid postage to :

ATSI
8157 US Route 50
Athens, OH 45701
(740) 592 - 2874
(740) 594 - 2875 Fax
service@atsi-tester.com

Note : To protect your Product against in-transit damage or loss, it is recommended that all shipments be insured.