



## **OPERATING INSTRUCTIONS**

Before installing or operating this unit, please read this operating manual thoroughly so that you can obtain the maximum use from it.

This manual should be retained for future reference and used to answer your operational questions as they arise.

## **OWNER'S RECORD**

The Probe model number is located on the stopper. The analyzer box model number and the serial number are located on the IntelliStick Electronics Assembly.

Record the serial number in the space provided below. Refer to these numbers whenever you call IntelliStick™ Customer Service.

Probe Model No. \_\_\_\_\_

Analyzer Box Model No. \_\_\_\_\_

Serial No. \_\_\_\_\_

# TABLE OF CONTENTS

Owners Record.....	2
Introduction.....	4
Overview.....	5
Installation .....	7
Warnings.....	8
Usage Guide.....	13
PDA Software Installation.....	16
PC Software Installation.....	27
Evaluating Data.....	37
Troubleshooting guide.....	41
FCC Part 15.....	43
End User License Agreement.....	44
Limited Warranty.....	48

# INTRODUCTION

## *PACKAGE CONTENTS*

- ✓ IntelliStick™ Electronics Assembly
- ✓ IntelliStick™ Oil Sensor Probe Assembly
- ✓ Installation Kit
  - Electronics Assembly mounting screws (4)
  - Crimp-on Spade Terminal (2)
  - Zip ties (7)
  - 5/64" Allen Wrench
- ✓ IntelliStick™ Software Installation CD
- ✓ Installation Guide & User Manual

## *VEHICLE REQUIREMENTS*

- ✓ Space to mount the Electronics Assembly (see Figure 2.0)
- ✓ Steel dipstick tube with an inner diameter between 0.35" and 0.75".
- ✓ 6 volt, 12 volt, or 24 volt vehicle power

## *PDA REQUIREMENTS*

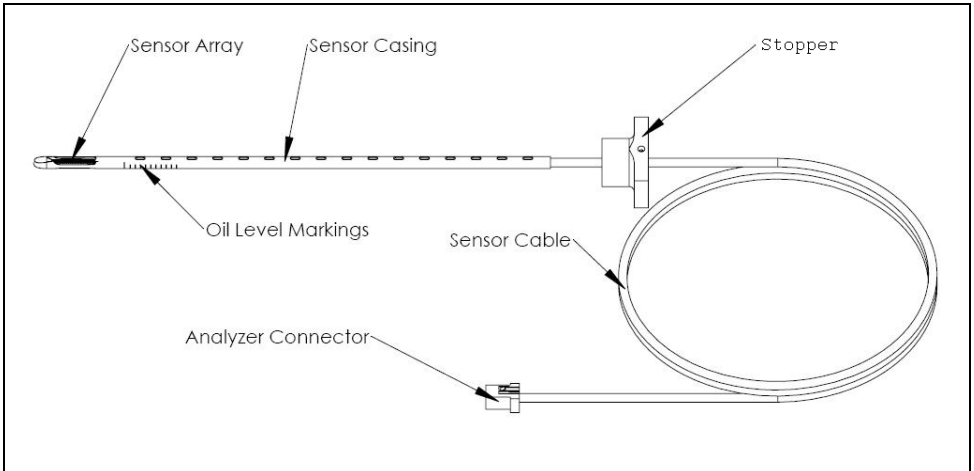
- ✓ Windows® based PDA with BlueTooth®
- ✓ Hard drive space - 2 MB
- ✓ A PC with Microsoft™ ActiveSync 4.1 or above

## *PC REQUIREMENTS*

- ✓ Windows XP
- ✓ Compatible Bluetooth®

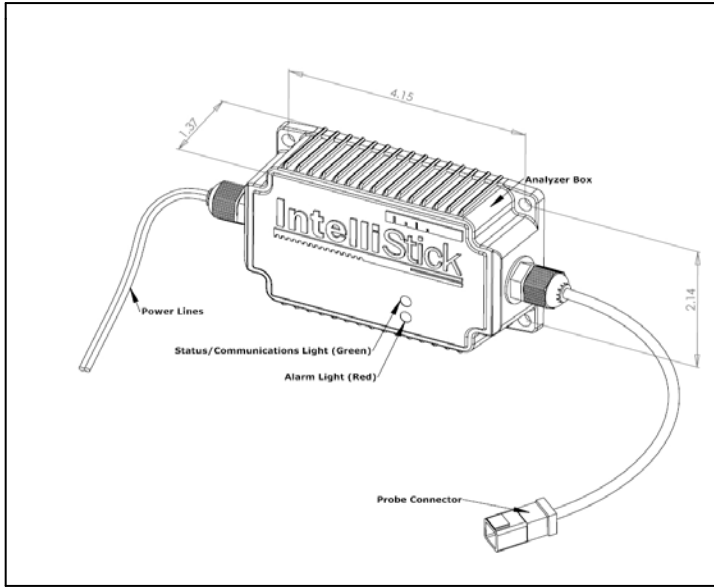
## OVERVIEW OF THE INTELLISTICK

The IntelliStick system consists of three parts:



*Figure 1.0 IntelliStick Probe Assembly*

1. The probe assembly (Figure 1.0) consists of an oil pan sensor at the end of a cable, a stopper to hold the probe securely in place inside the dipstick tube, and a connector.
2. The electronics assembly (Figure 2.0) can be mounted under the hood or in the vehicle's passenger cabin. It reads the oil condition from the probe and communicates with a PDA or PC using a Bluetooth wireless link.
3. The PDA and/or PC software displays the oil condition. It allows users to examine how the condition is changing over time so that they can judge when best to change their oil, based on the various steps of oil degradation.



***Figure 2.0 IntelliStick Electronics Assembly***

*“Inline fuse holder not shown”*

## VEHICLE INSTALLATION

### *TIME REQUIRED FOR INSTALLATION*

Approximately **30 min**

### *TOOLS REQUIRED*

- Electric Drill with #8 drill bit
- Philips #2 Screwdriver
- 5/64" Allen Wrench (included in kit)
- Wire Cutter
- Wire Stripper
- Terminal Crimper
- Socket set (metric or SAE depending on vehicle)

**Note:** *Prior to installation, open the IntelliStick package and inspect the contents. Look over the IntelliStick Probe and the Electronics Assembly to ensure that shipping damage has not occurred. Make sure that all the parts are present before proceeding.*

# **WARNING**

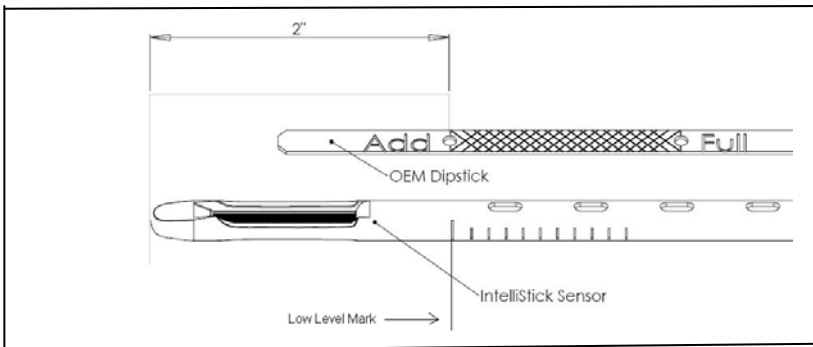
During installation:

- ! DO NOT INSTALL THE INTELLISTICK WITH THE ENGINE ON OR HOT**
- ! DO NOT USE THE INTELLISTICK FOR ANYTHING OTHER THAN ITS INTENDED PURPOSE**
- ! DO NOT STRAP OR SECURE WIRES AND CABLES TO BRAKE LINES.**
- ! DO NOT INSTALL THE ELECTRONICS ASSEMBLY CLOSE TO ANY DIRECT HEAT SOURCE SUCH AS EXHAUST COMPONENTS.**
- ! DO NOT CUT THE INTELLISTICK DIPSTICK CABLE AND RE-ATTACH THE CABLE CONNECTOR.**
- ! CAUTION: THIS PRODUCT IS NOT INTENDED FOR USE AS AN OIL LEVEL SENSOR. PLEASE BE SURE TO RETAIN THE MECHANICAL DIPSTICK OR OTHER OIL LEVEL SENSOR PROVIDED BY THE VEHICLE OR EQUIPMENT MANUFACTURER IN ORDER THAT YOU MAY CONTINUE TO MONITOR AND MAINTAIN OIL LEVELS IN ACCORDANCE WITH THE MANUFACTURER SPECIFICATIONS AND INSTRUCTIONS**

## PROBE INSTALLATION

1. Open the Engine Compartment and remove the dipstick.
2. Carefully line up the LOW mark of the IntelliStick probe with the LOW mark of the dipstick tube (Figure 3.0). Straighten the IntelliStick wire and move the stopper along the cable to line it up with the same stop on the vehicle's dipstick (Figure 4.0). Secure the stopper to the cable by tightening the set screw to maintain the alignment. **DO NOT** over-tighten the set screw to avoid damaging the cable.

You can use a permanent marker to make a mark on the probe that lines up with the Full mark on the OEM dipstick.



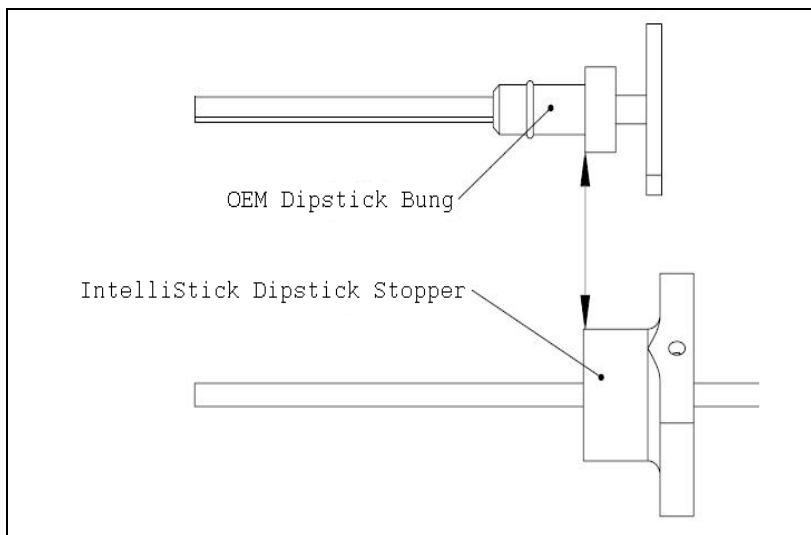
**Figure 3.0** Low Mark Alignment

**Note:** The *LOW* mark on the IntelliStick probe is located 2 inches from the tip of the probe. This is to ensure that the sensor is always immersed in oil.

3. Insert the IntelliStick probe into the dipstick tube and make sure the stopper is secure on top of the dipstick tube.

**Note:** In some cases, the dipstick tube will be too narrow or too curved for the probe to reach the oil pan. In such cases, the IntelliStick unit can be returned for a full refund within 30 days.

4. Store the original dipstick in a safe place.



*Figure 4.0 Stopper Alignment*

## **ELECTRONICS ASSEMBLY INSTALLATION**

1. Find a suitable location for the electronics assembly. It should be easily accessible and away from any direct heat sources, brake lines and moving engine components such as steering system and/or cooling fan.
2. Use the existing holes in the electronics assembly to determine the location of mounting holes to be drilled.
3. Carefully drill the mounting holes using a #8 drill bit. Make sure the holes are clear from obstructions, fuel lines, brake lines, coolant lines and pre-existing wiring.
4. Securely mount the electronics assembly using the supplied hardware.
5. Locate a proper chassis grounding point.

6. Route the **black** grounding wire to the grounding point. Cut the wire to length prior to affixing the spade terminal connector, leaving enough slack to secure the wire with the zip ties.

**Note:** *Whenever the chassis ground is being used, the spade terminal should be secured onto a paint free surface.*

7. Disconnect the inline fuse holder and remove the fuse.
8. Locate a non-interrupted 12V or 24V power source.

**Note:** *Connection to a power bus is always preferable to a battery. However the power bus chosen must always be on - the Intellistick does not function correctly if it loses power when the vehicle is switched off.*

9. Carefully route the **red** wire to the power source, making sure to leave enough slack for attachment. Use zip ties to secure the wire to existing vehicle wiring wherever possible.
10. Attach the spade terminal connector to the wire and secure it to the power source.

## *FINAL ASSEMBLY*

1. Determine the route of the dipstick probe cable to the Electronics Assembly and lay it in place. Secure it with zip ties but leave enough slack at the end to remove the IntelliStick probe when necessary. Coil any extra wire in a safe location and attach the cable connector to the Electronics Assembly.
2. Insert the fuse into the fuse holder, close and lock the fuse holder.
3. Verify that the Green LED on the Electronics Assembly is flashing.

## USAGE GUIDE

### *Normal Use*

The Electronics Assembly stores data from the last two weeks when installed as instructed. It keeps data from the moment power was applied to it for the last two weeks.

When the PC / PDA is within range of the selected IntelliStick unit, it will establish Bluetooth communications. This takes between 30 seconds to 3 minutes, depending on the connection strength. The PC / PDA will then download previous data and continuously monitor the IntelliStick unit for as long as it remains in range.

It is best to retrieve data from the IntelliStick unit via the PC / PDA at least twice a week to have up-to-date information on your oil condition. Looking at the display on the PC / PDA, you can tell what stage of its life the oil is at.

The main page displays the IntelliStick graph from the last 100 hours that the oil has been at operating temperature, and a pointer. The pointer indicates the current slope of the graph.

A downward slope indicates that the oil contains lubricity additives or detergents and that they are being used up. This is good, because lubricity additives are present to prevent engine wear.

A prolonged flat graph means the lubricity additives are mostly gone so only the base oil is lubricating the engine. Some polishing wear may occur.

A prolonged upward slope indicates basestock oxidation and degradation of the oil. The oil is losing its ability to lubricate and polishing engine wear is accelerating.

The oil condition takes a long time to change, so the graph will not change rapidly. For more information, see page 35 on Evaluating Data.

## Checking Oil Level

The IntelliStick probe can be withdrawn from the dip-tube and used like a conventional dipstick. In some cases, the original factory dipstick may be more accurate for precise measurement of oil level, for example determining fill level when adding oil.

**CAUTION: THIS PRODUCT IS NOT INTENDED FOR USE AS AN OIL LEVEL SENSOR. PLEASE BE SURE TO RETAIN THE MECHANICAL DIPSTICK OR OTHER OIL LEVEL SENSOR PROVIDED BY THE VEHICLE OR EQUIPMENT MANUFACTURER IN ORDER THAT YOU MAY CONTINUE TO MONITOR AND MAINTAIN OIL LEVELS IN ACCORDANCE WITH THE MANUFACTURER SPECIFICATIONS AND INSTRUCTIONS.**

## Status Lights and Alarms

The Electronics box has two lights:

- The **Green Light** indicates power. Long flashes will be noticeable whenever it is communicating with the PC / PDA.
- The **Red Light** is an alarm. Its causes include:
  - ✓ Oil level loss. This includes removal of the probe from the oil pan.
  - ✓ Coolant Intrusion into the oil
  - ✓ Any other sort of contamination of the oil that causes an unusual response.

The red light will turn off when the cause of the alarm is gone.

If the PC / PDA running the IntelliStick Monitor program is in range of the IntelliStick, then a message box will appear on the screen displaying some information about the alarm condition.

If alarm conditions have occurred previously, the IntelliStick Monitor program will show a message the first time it connects afterwards.

# SOFTWARE INSTALLATION

The IntelliStick Oil Monitoring Software can be installed on either a PDA or a Personal Computer (PC). The installation CD gives the user the option to choose either installation or both at the same time.

This section describes the Personal Digital Assistant (PDA) or Smartphone version. The next section describes the PC / laptop version.

## I. PDA Software Installation and Usage

### *REQUIREMENTS*

- ✓ PDA with Bluetooth
- ✓ Windows CE / Mobility 4.20 and above or Pocket PC Operating System

**Note:** *To install the IntelliStick Monitoring Software onto your PDA, you must have access to a PC with Microsoft ActiveSync version 4.1 or higher.*

### *Microsoft ActiveSync Installation*

PDA owners should already have some version of ActiveSync installed on their PC. Otherwise, the latest version of ActiveSync can be downloaded at the following link:

<http://www.microsoft.com/windowsmobile/activesync/activesync45.msp>

### *IntelliStick Software Installation*

- Connect the PDA to the PC and run ActiveSync
- Insert the installation disc into the PC  
**Note:** *If Autoplay is disabled on the PC, Go into the CD drive and double click "Setup".*
- Select the "PDA\Smartphone IntelliStick Monitor" box and click OK to continue

The software installation package has two programs that will be installed in the following order:

- ***Microsoft .NET Compact Framework 2.0 (.NET CF)***
  - If you already have Microsoft .NET CF 2.0, click “No” when the installer prompts you for an update
  - Installation is automatic if no version of Microsoft .Net CF is present at all. Follow directions prompted by the PDA
  
- ***IntelliStick, Inc. IntelliStick Monitor Installation***
  - The program will be installed automatically
  - Follow directions prompted by the PDA
  
- Restart the PDA to finalize the installation.

# SOFTWARE MANUAL

## Main Page

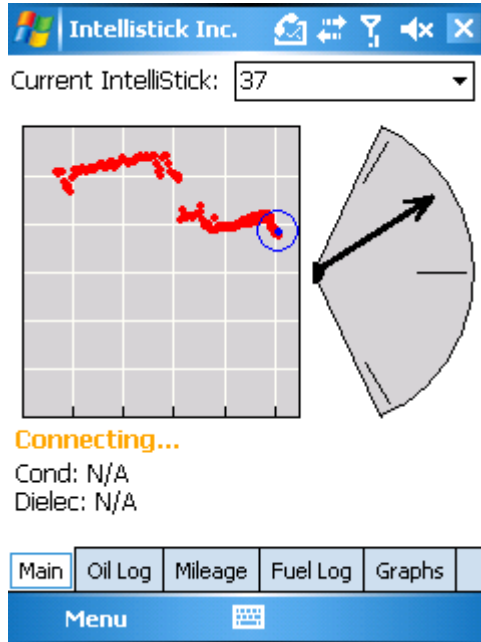


Figure 5.0

The main page (Figure 5.0) displays the IntelliStick reading graph from the last 100 hours that the oil has been hot, and a pointer. The pointer indicates the slope of the reading graph. For more information, see page 35 on Evaluating Data

The upper right corner of the window shows the unit being monitored.

The lower left corner displays the raw readings at the present time. The lower right corner displays the current temperature ( $^{\circ}\text{F}$ ) of the oil. This is updated every 15-30 seconds.

The “Menu” link has the following options:

- 1) **Quit Program:** Shut down the IntelliStick Monitoring Software. This will completely exit the software and can allow a malfunctioning Microsoft Bluetooth driver to be restarted.
- 2) **Owner Info:** Edit information about the vehicle and its owner
- 3) **Options:** Turn on/off the weekly mileage log reminder  
Disable/Enable Oil Loss notification
- 4) **Tools**
  - a. **Run Setup Wizard:** Look for new IntelliStick units
  - b. **Export Data to file:** Create a zip file of your downloaded data.
  - c. **View Alarm Log:** Display Alarm history

## Alarm Notifications

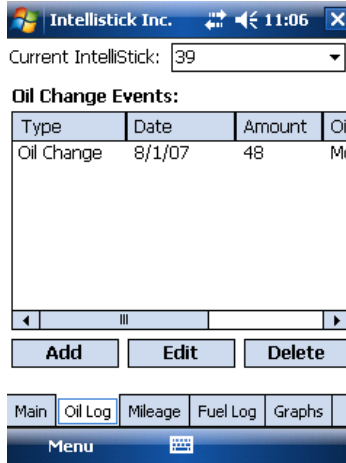
If the IntelliStick detects any abnormal readings then it will trigger an alarm. When an alarm is detected a red light on the electronics assembly will be lit. If the IntelliStick Monitor is in range of the IntelliStick then a message box will appear on the screen displaying the type of alarm that is detected and some basic information of the alarm condition. Also, if alarm conditions were recorded by the electronic assembly then when the IntelliStick Monitor downloads the history it will show a message box with information on the alarm that was detected. In addition to the alarm notifications there is also an alarm log that can be viewed by going to Menu->Tools->Alarm Log. The alarm log will display the type of alarm and the time that it occurred at. There are three types of alarm conditions:

Oil Contamination Alarm - It is possible that the oil has been contaminated.

Oil Level Loss Alarm - It is possible the oil level is lower than usual.

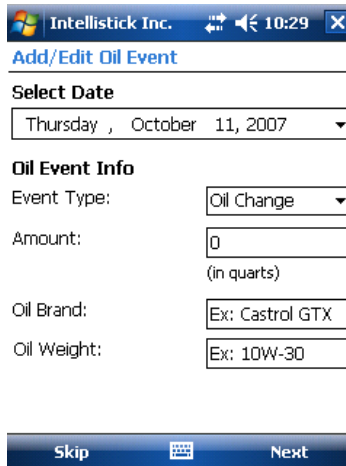
General Alarm - The IntelliStick detected some abnormal readings.

# Oil Log



*Figure 6.0*

Oil changes, top-offs, or the addition of additives should be recorded in the “Add/Edit Oil Event” tab (Figure 7.0). This allows their effect on the Kauffman curve to be tracked. To record any of those events, click “Add” and enter the corresponding date, amount, oil brand and type.



*Figure 7.0*

# Mileage Log

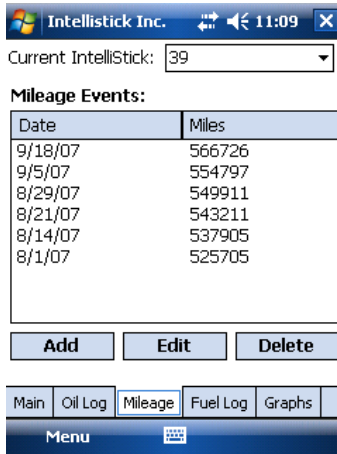


Figure 8.0

A weekly entry of the odometer reading can be recorded in the “Mileage Log” window (Figure 8.0).

To add a new entry, click “Add” and enter the date and the corresponding odometer reading:



Figure 9.0

## Fuel Log

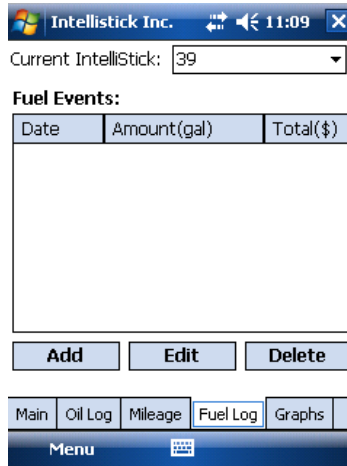


Figure 10.0

The fuel log (Figure 10.0) functions in the same manner the oil and the mileage logs do. Its purpose is to record data related to the fuel consumption in terms of the amount of gas and dollars it takes to run the engine. This data can later be compared against the oil performance. The “Add” button leads to the window below where the number of gallons and the price paid for each trip to the gas station should be recorded:

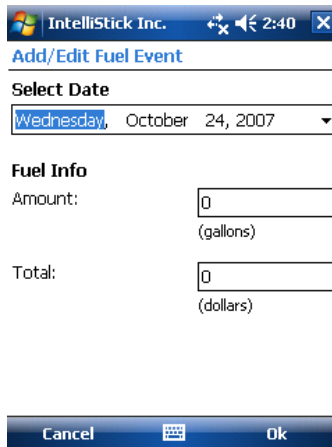
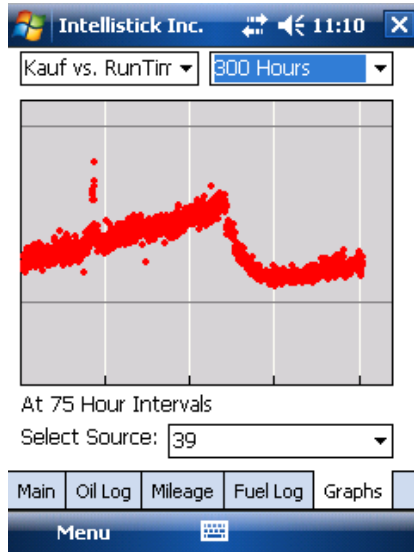


Figure 11.0



*Figure 12.0*

This window shows more detailed graphs than the one on the main screen. There are three possible displays for this window:

- a. **Kauf vs. Time:** the Kauffman Curve of oil readings against engine run time (Figure 12.0). The graph page plots the Kauffman curve from the oil. For an interpretation of the Kauffman curve, refer to the section on “EVALUATING DATA” on page 36.
- b. **Raw Data vs. Time:** The red (Conductance) and green (Dielectric) lines are plots of the raw readings from each of the two electrode sensors on the probe.
- c. **Temp vs. Time:** The green plot is the ambient temperature measured at the Electronics while the red one is the oil temperature measured by the dipstick probe.

## *IntelliStick Setup Wizard*

The setup wizard will run automatically upon starting the IntelliStick Monitoring Software. It looks for Intellistick units within range and allows you to install them into the PDA. This should be done once the probe and the electronics assembly are installed and powered (green light flashing on the electronics assembly). Make sure you remain within a few feet of the Intellistick unit to pick up the Bluetooth signal. Good signal strength is particularly important when detecting a unit for the first time.

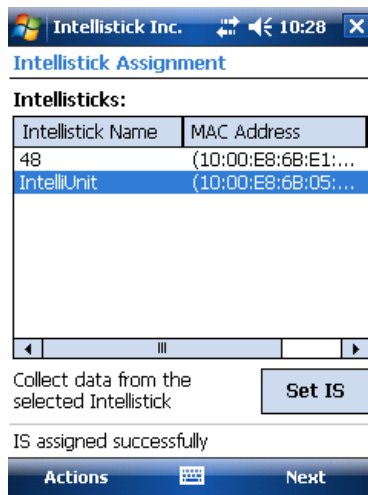
A small amount of information about the vehicle is requested during the Setup Wizard.



*Figure 13.0*

Read the welcome screen (Figure 13.0) and click “Next”. If more than one IntelliStick units are found, a list of all the units will appear (See figure 14.0). Choose the appropriate unit and click “Next”. The owner information page will be the next window if only one unit is found.

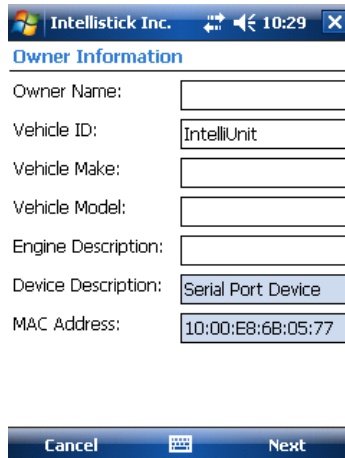
*Note: Sometimes Windows asks for a PIN number to connect to the IntelliStick's Bluetooth. The PIN number is 0000 (Four zeroes).*



*Figure 14.0*

## Personalize IntelliStick

Data about the vehicle each IntelliStick is in can be recorded in the “Owner Information” window (Figure 15.0). Any information can be changed except for the vehicle ID. Vehicle ID should only be assigned once during the first setup. If the Vehicle ID is changed, the program will assume that the IntelliStick unit has been moved into a different vehicle.

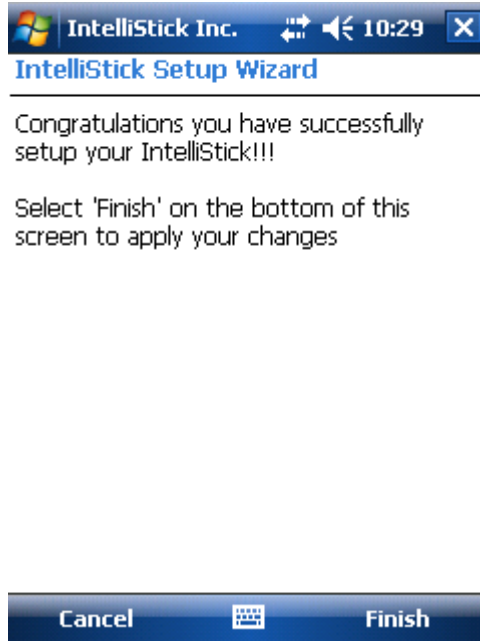


*Figure 15.0*

Once this page is completed, click “Next”

The last two steps of the setup wizard involve filling in the oil and mileage logs. Those pages have been discussed in the previous sections.

Once complete, click the “Finish” button and restart the PDA.



*Figure 16.0*

## PC SOFTWARE INSTALLATION & USAGE

Requirements:

- ✓ PC or laptop with Windows XP
- ✓ Compatible Bluetooth®. The Bluetooth device can be built in or an external adapter.

### ***INSTALLATION***

- Insert the Installation Disc into the PC CD-ROM drive.

*Note: If autoplay is disabled, go into the CD-Rom drive and double click the setup file to begin the installation.*

- **.Net 2.0 Compact Framework** is the first software to be installed in a series of three. Upon acceptance of the license agreement, the rest of the installation will load itself. If the software is already present in the computer, the installation program will automatically skip to the next one.
- **Windows Installer 3.1** is the second software in the series. Upon acceptance of the license agreement, the installation once again will load itself. This installation will also be skipped shall the software be already present on the computer.
- The PC Intellisitck Monitor software is the last of the series
  - Select the Installation folder and click next. If you fail to choose one, the default installation folder will be  
**C:\Program Files\Intellistick Inc\PC Intellistick Monitor**
- Click “Next” again to start the installation.
- Close the window once the installation is successfully completed.

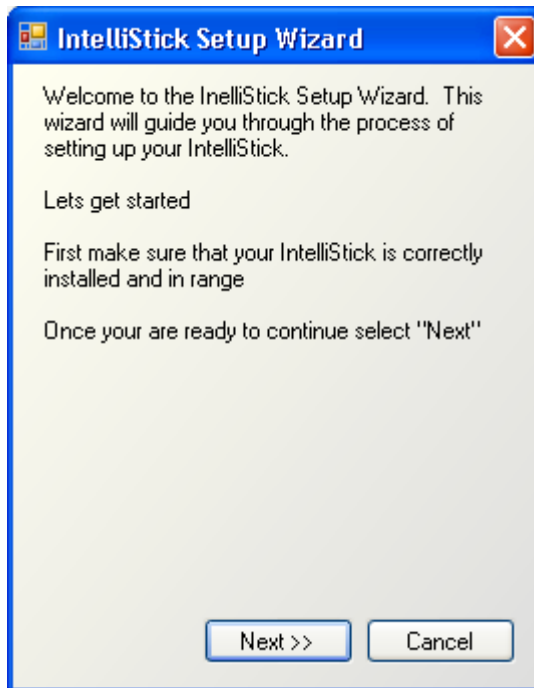
*Note: You do not need to restart your computer unless the installer asks you to.*

## ***INTELLISTICK SETUP WIZARD***

The setup wizard will run automatically upon starting the IntelliStick Monitor program for the first time. It looks for Intellistick units within range and allows the user to set them up into the program.

This should be done once the probe and the electronics assemblies are installed and powered (green light flashing on the electronics assembly). Make sure you remain within a few feet of the Intellistick unit to pick up the Bluetooth signal. Good signal strength is particularly important when detecting a unit for the first time.

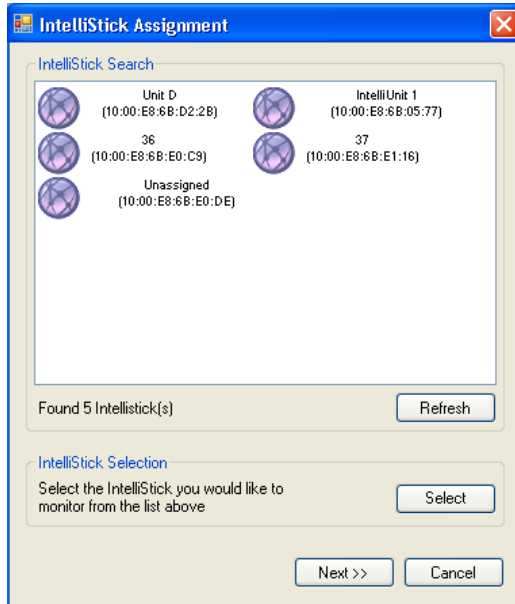
A small amount of information about the vehicle is requested during the Setup Wizard.



*Figure 17.0*

The search will take place right after the Setup Wizard introduction screen (Figure 17.0). It may take a few minutes depending on the number of BlueTooth devices in the proximity.

If more than one IntelliStick device is found, a list will appear as shown in Figure 18.0:

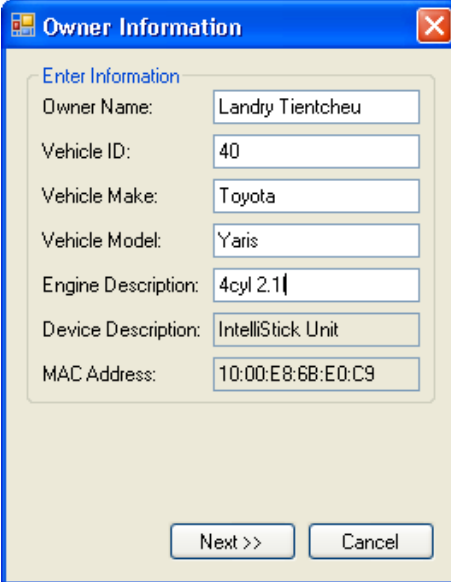


*Figure 18.0*

Choose the appropriate unit and click “Select”. Finally, click “Next” to proceed.

## PERSONALIZE INTELLISTICK

Information about the vehicle each IntelliStick is in can be recorded in the “Owner Information” window (Figure 19.0). The Owner Information window setup takes place right after the IntelliStick unit has been selected.



Field	Value
Owner Name:	Landry Tientcheu
Vehicle ID:	40
Vehicle Make:	Toyota
Vehicle Model:	Yaris
Engine Description:	4cyl 2.1
Device Description:	IntelliStick Unit
MAC Address:	10:00:E8:6B:E0:C9

Figure 19.0

**Note:** Any information can be changed except for the vehicle ID. Vehicle ID should only be assigned once during the first setup. If the Vehicle ID is changed, the program will assume that the IntelliStick unit has been moved into a different vehicle. The next two steps in the setup wizard are the oil log and the mileage log entries, which are described below. The user has the option to skip those two steps and proceed to the final step, if the requested information is not readily available.

Once all the information is properly entered and the installation complete, click the “Finish” button to apply all the changes and get started.

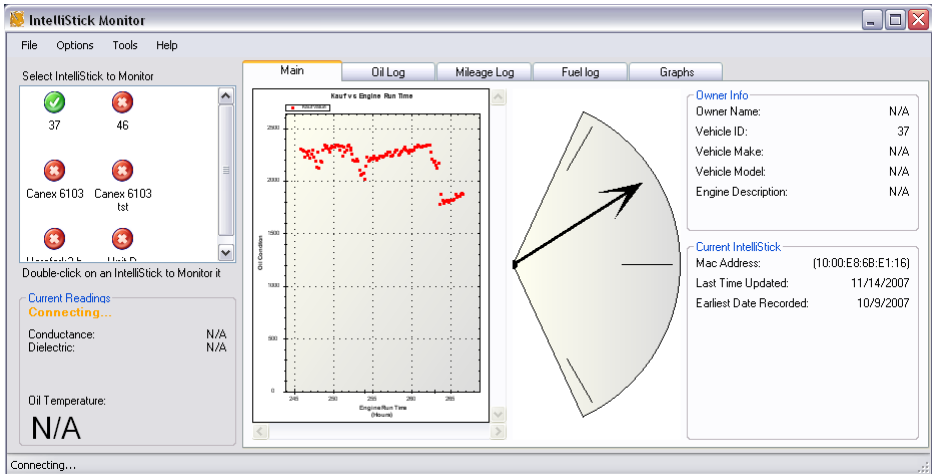


Figure 20.0

The main page (Figure 20.0) displays the reading graph and the slope pointer. The pointer indicates the slope of the reading graph. A downward slope is generally good, while prolonged operation with an upward slope indicates degradation of the oil. For more information, see page 35 on Evaluating Data

The right hand side of the window shows information about the unit currently being monitored. The upper left hand side box allows the user to choose which IntelliStick to monitor. The green bullet with a check sign indicates the currently monitored unit. The red bullet with a cross sign indicates an inactive unit. Only one IntelliStick unit can be monitored at a time. If you have more than one Intellistick, you can change which unit is currently being monitored by double clicking on it.

The lower left corner of the window displays the conductance and dielectric readings of the oil as well as the oil temperature. This information is updated every 15 seconds whenever the IntelliStick being monitored is connected.

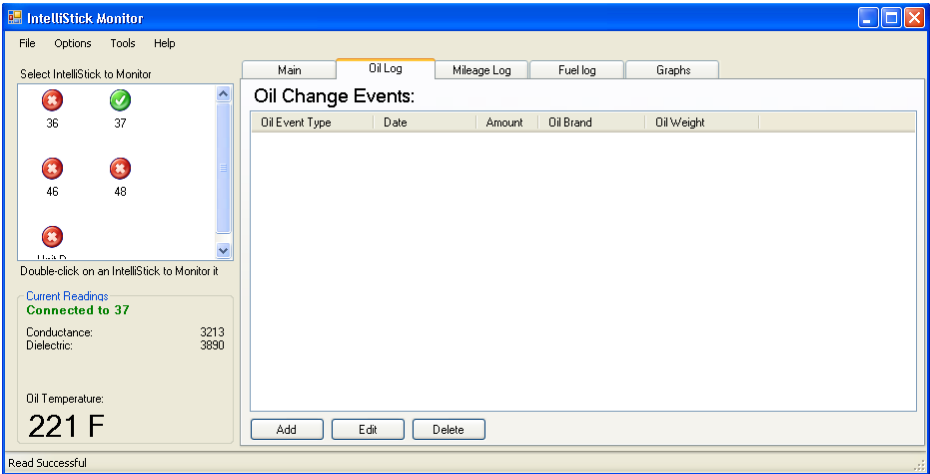


Figure 21.0

Oil changes, top-offs, or addition of additives are recorded in the “oil log” window (Figure 21.0). To add any one of those events, click “Add” and the “Add/Edit Oil Event” window (Figure 22.0) pops up:



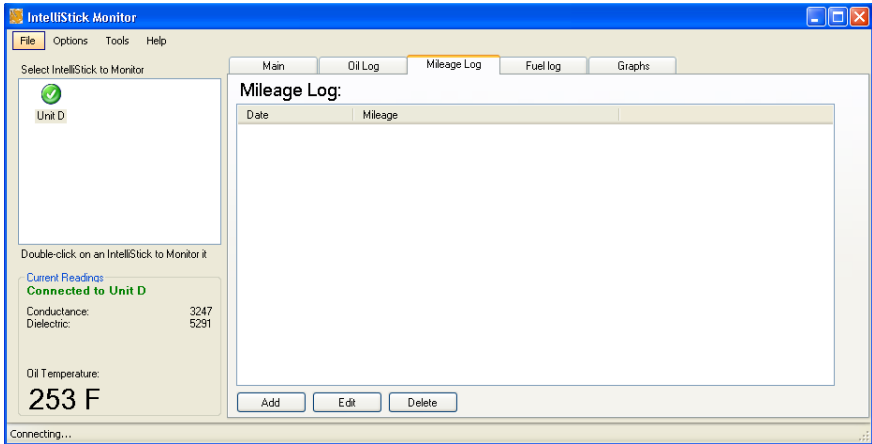
Figure 22.0

Choose the type of event you wish to record, fill in the appropriate date, amount, brand and type of oil. Lastly, enter the odometer reading displayed at the time the change occurs. Thus, events happening during the oil lifecycle will be highlighted along the Kauffman curve shown for your oil.

If for any reason, you need to go back and edit a previously recorded oil change or top-off, choose the listed event in the oil log and click on “Edit”. This function will allow the user to modify any of the previous information except for the mileage entry. Any modification related to mileage can only take place in the “Mileage Log” window (Figure 23.0).

The “Delete” button allows the user to remove an entry if necessary.

# MILEAGE LOG



*Figure 23.0*

A weekly entry of the odometer reading should be recorded in this window. It allows the program to eventually plot the performance of the oil versus the number of miles associated with engine run time.

The “Add” button allows the user to make a new entry; enter the date and mileage. The “Edit” button allows the user to make modifications to any past entry. The “Delete” button will remove any chosen mileage entry that may have been recorded by mistake.

# FUEL LOG

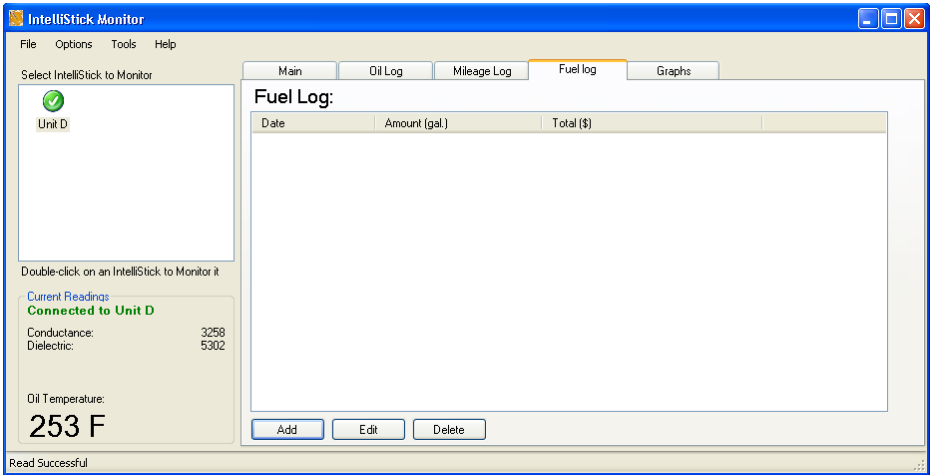


Figure 24.0

The fuel log (Figure 24.0) functions in the same manner the oil and the mileage logs do. Its purpose is to record data related to fuel economy in terms of the amount of gas and dollars it takes to run the engine. This data can later be compared against oil performance.

The “Add” button leads to Figure 25.0 where the number of gallons and the price paid for each trip to the gas station should be recorded:

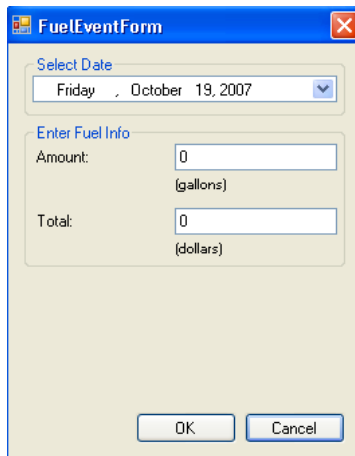


Figure 25.0

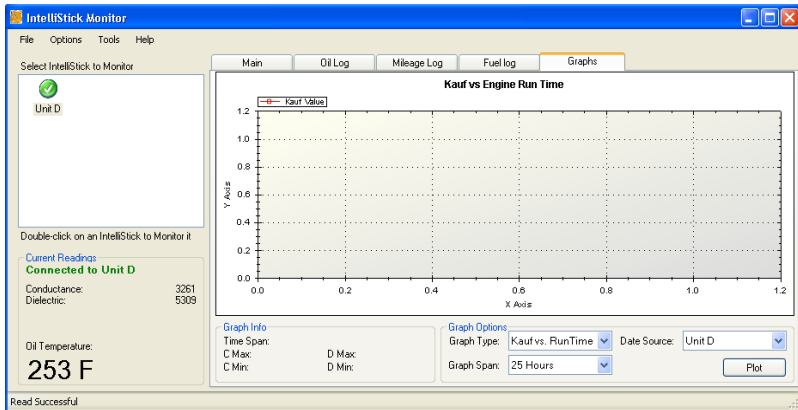


Figure 26.0

The graph page (Figure 26.0) monitors the condition of oil. This window shows more detailed graphs than the one on the main screen. There are three possible displays for this window:

- Kauf vs. Time:** the Kauffman Curve of oil reading against engine run time. For an interpretation of the Kauffman curve, refer to the paragraph entitled “EVALUATING DATA” on the following page.
- Raw Data vs. Time:** The red (Conductance) and green (Dielectric) lines are plots of the raw readings from each pair of electrodes against time. Note that the raw readings change significantly with temperature.
- Temp vs. Time:** The green plot is the ambient temperature where the electronics assembly is mounted while the red one is the oil temperature measured by the probe.

# EVALUATING DATA

## HOW THE INTELLISTICK WORKS

The Intellistick oil condition monitoring system uses a patented sensor design originally developed for the U.S. Army. It electrically stimulates the oil at a particular low voltage and frequency that is designed to obtain the greatest response from both additives and oxidation byproducts in the oil. The oil itself does not react electrically. The reading is obtained by measuring the overall conductivity of the oil and compensating for changes due to variations in the temperature of the oil.

## INTERPRETING THE RESULTS

The 'Kauffman Conductance Curve' is created by graphing the reading vs. engine run time. The different stages of oil life cause distinct changes in the curve.

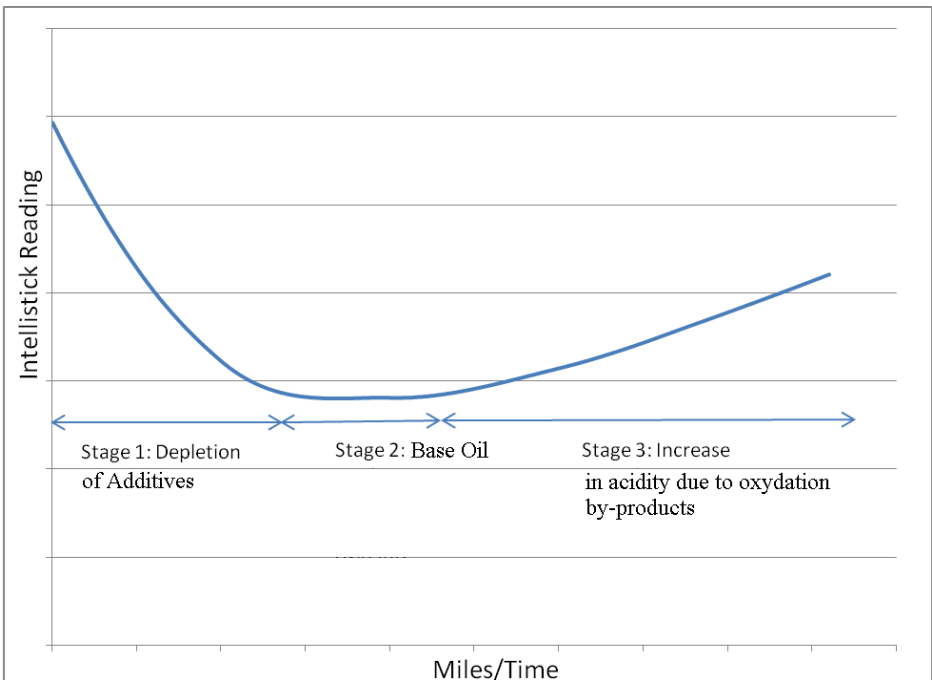


Figure 27.0

During the **first** stage the conductance reading is declining. This is because of the depletion of the lubricity, antioxidant and detergent package in the oil. All modern motor oils must contain these additives, without them the oil does not adequately protect the engine. A gradual decrease in conductance indicates that the additives are present and that they are being used up as they work. This is normal.

In the **second** stage the conductance will stay steady. This means that the lubricity additive package is almost entirely depleted and the oil lubricity is strongly dependent on the base oil. A small amount of polishing wear may be occurring on the engine. This second stage may have a gradual rise, because the antioxidant package is starting to lose its capability to stop basestock oxidation.

In the **third** stage the conductance is increasing again. This is a result of the buildup of oxidation by-products. This means that the oil is oxidizing, breaking down and further losing its ability to lubricate. Engine polishing wear will be accelerating. If this stage goes on for long enough the reading will start to level out again – this means that the viscosity of the oil is increasing and severity of engine wear is increasing.

Every Kauffman curve will be unique based on the oil type, the brand, and the operating conditions of the engine. Although each curve is unique, the characteristic turning points of the curve will be present with all oils because all oils degrade in the same way. The difference between curves will be in the reading value and duration of each of the stages. For example, premium oils such as synthetic oils contain more additives and resist oxidation much longer.

Interpreting a given curve to determine an optimal oil change interval requires a certain amount of understanding of each of the stages and through which, a compromise can be made between the oil efficiency and the life of the engine.

For example, if protecting the engine is the primary concern, the oil should be changed at the end of stage one just as the lubricity additives

in the oil have been depleted. On the other hand, if it is acceptable to incur some polishing wear, the oil change can be postponed until stage three is well underway.

### *CONTAMINATION AND OIL LOSS*

In addition to indicating the life stage of the oil, IntelliStick can also detect several types of oil contamination as well as major oil loss.

A relatively sharp increase of the conductance reading indicates **fuel contamination of the oil**. This is because the fuel decreases the viscosity of the oil and tends to oxidize rapidly. Seeing a relatively sharp increase in conductance reading at an unexpected point on the curve may mean there is fuel leaking into the oil.

The IntelliStick probe's sensor has two measurement arrays. Using the two of them together, harmful amounts of water and coolant can be detected. This is because the 'dielectric array' has a very fine spacing that is extra sensitive to water or coolant droplets suspended in the oil.

An increase in the ratio between the dielectric and conductance array outputs signals the **presence of water**. When this occurs the red alarm light comes on and the software will display a message box alerting the user the next time the software is connected.

An **oil loss** is shown by a rapid decrease in conductance and a drastic increase in the ratio between the dielectric and conductance array outputs. Likewise, when this occurs the alarm light comes on and the software will display a message box.

## DATA EXPORT

This task is accomplished by the following steps:

- Go to the IntelliStick *Menu*
- Click on *Tools*
- Click on *Export Data to File*
- Fill in the appropriate information
  - *The default location is **Mobile Device** for PDAs and **My Documents** for PCs*
- Click *Save*

The previous action will create a zip file, which will be saved under the selected folder.

To allow IntelliStick Inc to analyze your oil condition and to continuously improve the system, the exported file can be emailed to [data@intellistick.com](mailto:data@intellistick.com)

To browse your PDA files from your PC, click “Explore” in the ActiveSync menu bar on your PC. Then click on the system folder entitled “My Windows Mobile-Based Device.” A list of all available folders will pop up. Select the folder where your file was saved.

## SOFTWARE UPDATES

Update to the IntelliStick software will be made available on the IntelliStick website as necessary. [intellistick.com](http://intellistick.com)

# TROUBLESHOOTING

## Notes on Bluetooth

The IntelliStick Monitor PC software is only compatible with Bluetooth devices that use either the Microsoft or Widcomm stack. Any Bluetooth dongle that is compatible with Windows XP plug and play drivers will work with the IntelliStick software. If you are using a Bluetooth dongle that requires its own driver software, the IntelliStick software may not work with that driver.

The PDA software is compatible with almost all PDA or Smartphone devices.

## Problem Symptoms and Solutions

Should any problem occur with the unit, make the following simple tests to determine whether or not servicing is required. If the problem persists after you have made these tests, consult [IntelliStick.com](http://IntelliStick.com) for further information.

Symptom	Solution
The green light on the electronics assembly is not lit	<ul style="list-style-type: none"><li>• Verify that the black cable is properly grounded.</li><li>• Ensure the fuse is securely inserted into the fuse holder.</li></ul>
Green light on the electronics assembly blinks very rapidly and Bluetooth cannot connect.	<ul style="list-style-type: none"><li>• The electronics assembly is overheated. Wait for it to cool down; the green light will resume slow flashing.</li></ul>
The program frequently warns that the probe may be out of the oil.	<ul style="list-style-type: none"><li>• Check oil level.</li><li>• Increase the depth to which the probe is installed into the oil pan. This is done by loosening the set-screw on the stopper, adjusting the cable length, and re-tightening the stopper.</li><li>• On some vehicles, oil level can drop below the sensor during normal use, particularly with high RPM engines or during cornering or slope climbing</li></ul>

	<ul style="list-style-type: none"> <li>• This warning can be disabled under the Options menu.</li> </ul>
The graphs show very little data.	<ul style="list-style-type: none"> <li>• Be patient. Data can only be recorded when the oil temperature is above 150 F. If only short trips are made, the oil may not heated long enough for a reading.</li> <li>• Ensure the Intellistick is connected to a power supply that is on continuously.</li> </ul>
Windows asks for a PIN number to connect to the IntelliStick's Bluetooth	<ul style="list-style-type: none"> <li>• Occasionally Windows does this the first time an IntelliStick is detected. The PIN number is 0000 (Four zeroes).</li> </ul>
Recurrent Bluetooth Connection Failures	<ul style="list-style-type: none"> <li>• Exit the IntelliStick software by clicking "Menu" from the main window then "Quit Program."</li> </ul>
Bluetooth is not working (PC/Laptop version)	<ul style="list-style-type: none"> <li>• Make sure that the Bluetooth communication is enabled</li> <li>• Reset the device according to the manufacturer's reset procedure. Windows Bluetooth driver software will sometimes crash.</li> </ul>

\*Note: Even when the electronics assembly is out of range, the IntelliStick Monitor will still attempt to communicate with it every ten seconds. This will often lead to a corrupted Bluetooth stack.

## TECHNICAL SUPPORT

For technical assistance, visit the Customer Support section of [www.intellistick.com](http://www.intellistick.com) or contact Customer Support @ 1.888. 812. 5988  
 Mon - Fri: 8 am – 6 pm PDT  
 Sat - Sun: 10 am – 6 pm PDT

## SPECIFICATIONS

<b>Operating Environment</b>	15 - 250 <sup>0</sup> F (-10 to 120 <sup>0</sup> C)
<b>Dip-tube Compatibility Requirements</b>	Steel dipstick tube with a diameter between 0.35” and 0.75”. Minimum restriction : 0.30”. Minimum bend radius 2’.
<b>Power Supply</b>	6-24V dc nominal. 100mA max (Typical - 10mA)
<b>Communications</b>	Bluetooth Class II

### FCC PART 15 STATEMENT

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

#### Part 15.21

Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

**NOTE:** The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment.

# END USER LICENSE AGREEMENT

IntelliStick, Inc.

*4340 Von Karman Avenue, Suite 200*

*Newport Beach, California 92660*

**IMPORTANT:** THIS END USER LICENSE AGREEMENT ("EULA") IS A LEGAL AGREEMENT BETWEEN YOU AND INTELLISTICK, INC. ("COMPANY"). CAREFULLY READ THIS EULA. USE OF ANY SOFTWARE OR ANY RELATED DOCUMENTATION (COLLECTIVELY, "SOFTWARE") EMBEDDED WITHIN OR SHIPPED WITH A COMPANY HARDWARE PRODUCT OR OTHERWISE MADE AVAILABLE TO YOU BY COMPANY IN WHATEVER FORM OR MEDIA INCLUDING ANY SOFTWARE UPGRADES WILL CONSTITUTE YOUR ACCEPTANCE OF THESE TERMS. IF YOU DO NOT AGREE WITH THE TERMS OF THIS EULA, DO NOT INSTALL OR USE THE SOFTWARE.

**1. License Grant.** The Software is licensed, not sold. Company grants to you a personal, non-transferable and non-exclusive right to use the copy of the Software provided with this EULA solely in connection with the single Company hardware product purchased or otherwise made available to you by Company. Modifying, translating, renting, copying, distributing, transferring or assigning all or part of the Software, the written materials accompanying the Software, or any rights granted hereunder, to any other persons or removing any proprietary notices, labels or marks from the Software is strictly prohibited. Furthermore, you hereby agree not to create derivative works based on the Software. You may permanently transfer all of your rights under this EULA, provided you retain no copies, you transfer all of the Software in connection with a transfer of the Company hardware product upon which the Software was originally installed, and the recipient agrees to the terms of this EULA. If the Software is an upgrade, any transfer must include all prior versions of the Software.

**2. Copyright.** You acknowledge that no title to the intellectual property in the Software is transferred to you. You further acknowledge that title and full ownership rights to the Software will remain the exclusive property of Company and/or its suppliers/licensors, and you will not acquire any rights to the Software, except the license expressly set forth above.

**3. Reverse Engineering.** To the maximum extent permissible under applicable law, you agree that you will not attempt, directly or indirectly, to reverse compile, reverse engineer, modify, translate or disassemble the Software in whole or in part. Any failure to comply with the above or any other terms and conditions contained herein will result in the automatic termination of this license and the reversion of the rights granted hereunder to Company.

**4. Disclaimer of Warranty.** THE SOFTWARE IS PROVIDED AS A COMPONENT OF THE SINGLE COMPANY HARDWARE PRODUCT PURCHASED BY YOU AND DOES NOT INCLUDE ANY SEPARATE WARRANTY OF ANY KIND. TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, COMPANY DISCLAIMS ALL SEPARATE WARRANTIES WITH REGARD TO THE SOFTWARE, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE WARRANTY OF NON-INFRINGEMENT OF THIRD PARTY RIGHTS, AND THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. COMPANY DOES NOT WARRANT THAT THE SOFTWARE WILL SATISFY YOUR REQUIREMENTS OR THAT THE OPERATION OF THE SOFTWARE WILL BE UNINTERRUPTED OR ERROR-FREE.

**5. Limitation of Liability.** TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, COMPANY HAS NO ADDITIONAL OR SEPARATE LIABILITY UNDER THIS EULA. IN NO EVENT SHALL COMPANY BE LIABLE FOR ANY LOSS OR DAMAGE OF ANY KIND, INCLUDING BUT NOT LIMITED TO INCIDENTAL, INDIRECT, CONSEQUENTIAL OR SPECIAL DAMAGES OR FOR LOSS OF PROFITS OR COST OF

PROCUREMENT OF SUBSTITUTE PRODUCTS OR TECHNOLOGY OR OTHER FINANCIAL LOSS ARISING OUT OF THE USE OR INABILITY TO USE THE SOFTWARE, WHETHER BASED ON BREACH OF WARRANTY, TORT, STRICT LIABILITY OR OTHERWISE, EVEN IF COMPANY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT SHALL COMPANY BE LIABLE FOR ANY CLAIM BY A THIRD PARTY. THIS LIMITATION OF LIABILITY SHALL NOT APPLY TO CLAIMS FOR PERSONAL INJURY OR DEATH TO THE EXTENT PROHIBITED BY APPLICABLE LAW.

**6. State/Jurisdiction Laws.** SOME STATES/JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES OR LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY MAY LAST, OR THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO SUCH LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU. THE LIMITED WARRANTY GIVES YOU SPECIFIC RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE/JURISDICTION TO STATE/JURISDICTION.

**7. Export Laws.** This EULA involves products and/or technical data that may be controlled under the United States Export Administration Regulations and may be subject to the approval of the United States Department of Commerce prior to export. Any export, directly or indirectly, in contravention of the United States Export Administration Regulations, or any other applicable law, regulation or order, is prohibited.

**8. Governing Law.** This EULA will be governed by the laws of the State of California, United States of America, excluding its conflict of law provisions.

**9. Severability.** If any provision of this EULA shall be held to be invalid, illegal or unenforceable, the validity, legality and enforceability of the remaining provisions hereof shall not in any way be affected or impaired.

**10. No Waiver.** No waiver of any breach of any provision of this EULA shall constitute a waiver of any prior, concurrent or subsequent breach of the same or any other provisions hereof, and no waiver shall be effective unless made in writing and signed by an authorized representative of the waiving party.

## **LIMITED WARRANTY**

IntelliStick warrants to the original purchaser that the product will be free from defects in materials and workmanship under normal and proper use for one year from the original date of purchase. IntelliStick, at its option, shall repair or replace the product or parts determined by IntelliStick to be defective in materials or workmanship.

To obtain warranty service, the customer must return the product or the defective part(s) to the Company at the following address, appropriately packed, along with a dated proof of purchase, before the end of the warranty period:

IntelliStick, Inc.  
4340 Von Karman Ave, Suite 200  
Newport Beach, CA 92660

Prior to shipping the product or defective part(s), the customer must call 1-888-812-5988 to request a Return Material Authorization (RMA) and must include the RMA number and a description of the problem along with the returned product or part.

IntelliStick will use commercially reasonable efforts to repair or replace within 30 days of receipt.

If the product or part has been updated or superseded, a replacement maybe made with a different model or part of comparable or better quality and function. Warranty of the repaired or replacement product or part is limited to 90 days or the unexpired portion of the original warranty period for the product, whichever is longer.

This warranty does not cover any defects or damages caused by: (1) modification, alteration, repair or service of this product by any persons or company other than IntelliStick; (2) physical abuse to, or misuse of, the product or operation thereof in a manner inconsistent with the use indicated in the instructions; (3) any use of the product other than that for which it was intended; or (4) shipment of the product to IntelliStick for service.

This warranty does not cover the labor costs associated with the installation or removal of the product or part(s) or the costs of shipping product or parts to IntelliStick. For your protection, IntelliStick recommends that you use a traceable and insurable form of mail for shipment. IntelliStick is not responsible for any items lost or damaged in transit.

## WARRANTY DISCLAIMER

NO OTHER EXPRESS WARRANTIES ARE MADE OR AUTHORIZED WITH RESPECT TO THE PRODUCT. TO THE MAXIMUM EXTENT PERMITTED UNDER APPLICABLE LAW, INTELLISTICK DISCLAIMS ALL IMPLIED WARRANTIES INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF NON-INFRINGEMENT OF THIRD PARTY RIGHTS, AND THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE .

## LIMITATION OF REMEDIES

REPAIR OR REPLACEMENT, AS PROVIDED UNDER THIS WARRANTY, IS THE EXCLUSIVE REMEDY FOR THE PURCHASER. IN NO EVENT SHALL INTELLISTICK BE LIABLE FOR ANY LOSS OR DAMAGE OF ANY KIND, INCLUDING BUT NOT LIMITED TO INCIDENTAL, INDIRECT, CONSEQUENTIAL OR SPECIAL DAMAGES OR FOR LOSS OF PROFITS OR COST OF PROCUREMENT OF SUBSTITUTE PRODUCTS OR TECHNOLOGY OR OTHER FINANCIAL LOSS ARISING OUT OF OR RELATING TO THE PRODUCT OR THE PROVISION OF ANY RELATED SERVICES OR REPRESENTATIONS, WHETHER BASED ON BREACH OF WARRANTY, TORT, STRICT LIABILITY OR OTHERWISE, EVEN IF COMPANY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT SHALL COMPANY BE LIABLE FOR ANY CLAIM BY A THIRD PARTY. THIS LIMITATION OF LIABILITY SHALL NOT APPLY TO CLAIMS FOR PERSONAL INJURY OR DEATH TO THE EXTENT PROHIBITED BY APPLICABLE LAW.

## STATE/JURISDICTION LAWS

SOME STATES/JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES OR LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY MAY LAST, OR THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO SUCH LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU. THIS LIMITED WARRANTY GIVES YOU SPECIFIC RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE/JURISDICTION TO STATE/JURISDICTION.

