VERUS PRO™

User Manual

EAZ0077L20A Rev. A

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IMPORTANT:
Before operating or maintaining this unit, please read this manual carefully paying extra attention to the safety warnings and precautions.

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Safety Information

For your own safety and the safety of others, and to prevent damage to the equipment and vehicles upon which it is used, it is important that the accompanying *Important Safety Instructions* be read and understood by all persons operating, or coming into contact with, the equipment. We suggest you store a copy near the unit in sight of the operator.

This product is intended for use by properly trained and skilled professional automotive technicians. The safety messages presented throughout this manual are reminders to the operator to exercise extreme care when using this test instrument.

There are many variations in procedures, techniques, tools, and parts for servicing vehicles, as well as in the skill of the individual doing the work. Because of the vast number of test applications and variations in the products that can be tested with this instrument, we cannot possibly anticipate or provide advice or safety messages to cover every situation. It is the responsibility of the automotive technician to be knowledgeable of the system being tested. It is essential to use proper service methods and test procedures. It is important to perform tests in an appropriate and acceptable manner that does not endanger your safety, the safety of others in the work area, the equipment being used, or the vehicle being tested.

It is assumed that the operator has a thorough understanding of vehicle systems before using this product. Understanding of these system principles and operating theories is necessary for competent, safe and accurate use of this instrument.

Before using the equipment, always refer to and follow the safety messages and applicable test procedures provided by the manufacturer of the vehicle or equipment being tested. Use the equipment only as described in this manual.

Read, understand and follow all safety messages and instructions in this manual, the accompanying *Important Safety Instructions*, and on the test equipment.

Safety Message Conventions

Safety messages are provided to help prevent personal injury and equipment damage. All safety messages are introduced by a signal word indicating the hazard level.

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury to the operator or to bystanders.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to the operator or to bystanders.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in moderate or minor injury to the operator or to bystanders.

Safety messages contain three different type styles.

- Normal type states the hazard.
- **Bold type states how to avoid the hazard**.
- *Italic type states the possible consequences of not avoiding the hazard*.

An icon, when present, gives a graphical description of the potential hazard.

Example:

WARNING

Risk of unexpected vehicle movement.

- **Block drive wheels before performing a test with engine running.**

A moving vehicle can cause injury.

Important Safety Instructions

For a complete list of safety messages, refer to the accompanying *Important Safety Instructions*.

SAVE THESE INSTRUCTIONS

Contents

Chapter 1 Using This Manual

This manual contains tool usage instructions.

Some illustrations shown in this manual may contain modules and optional equipment that are not included on your system. Contact your sales representative for availability of other modules and optional equipment.

1.1 Conventions

The following conventions are used.

1.1.1 Bold Text

Bold emphasis is used to highlight selectable items such as buttons and menu options.

Example:

- Press the **OK** button.

1.1.2 Symbols

Different types of arrows are used. The “greater than” arrow (>) indicates an abbreviated set of selection instructions.

Example:

- Select **Utilities > Tool Setup > Date**.

The example statement abbreviates the following procedure:

1. Navigate to the **Utilities** screen.
2. Highlight the **Tool Setup** submenu.
3. Highlight the **Date** option from the submenu.
4. Press **OK** to confirm the selection.

The solid arrows (◀ , ▶ , ▲ , ▼) refer to the four directions of the directional arrow keys.

Example:

- Press the down ▼ arrow.

1.1.3 Terminology

The term “select” means highlighting a button or menu item and pressing the **Accept**, **OK**, **Yes, or other similar** button to confirm the selection.

Example:

- Select **Reset**.

The above statement abbreviates the following procedure:

1. Navigate to and highlight the **Reset** selection.
2. Press the **OK, or similar,** button.

1.1.4 Notes and Important Messages

The following messages are used.

Notes

A NOTE provides helpful information such as additional explanations, tips, and comments.

Example:

NOTE:
For additional information refer to...

Important

IMPORTANT indicates a situation which, if not avoided, may result in damage to the test equipment or vehicle.

Example:

IMPORTANT:
Do not disconnect the data cable while the Scanner is communicating with the ECM.

1.1.5 Hyperlinks

Hyperlinks, or links, that take you to other related articles, procedures, and illustrations are available in electronic documents. Blue colored text indicates a selectable hyperlink.

Example:

IMPORTANT:
Read all applicable Safety Information before using this tool!

1.1.6 Procedures

An arrow icon indicates a procedure.

Example:

To change screen views:

1. Select the **View button**.
   The dropdown menu displays.
2. Select an option from the menu.
   The screen layout changes to the format selected.

Chapter 2 Introduction

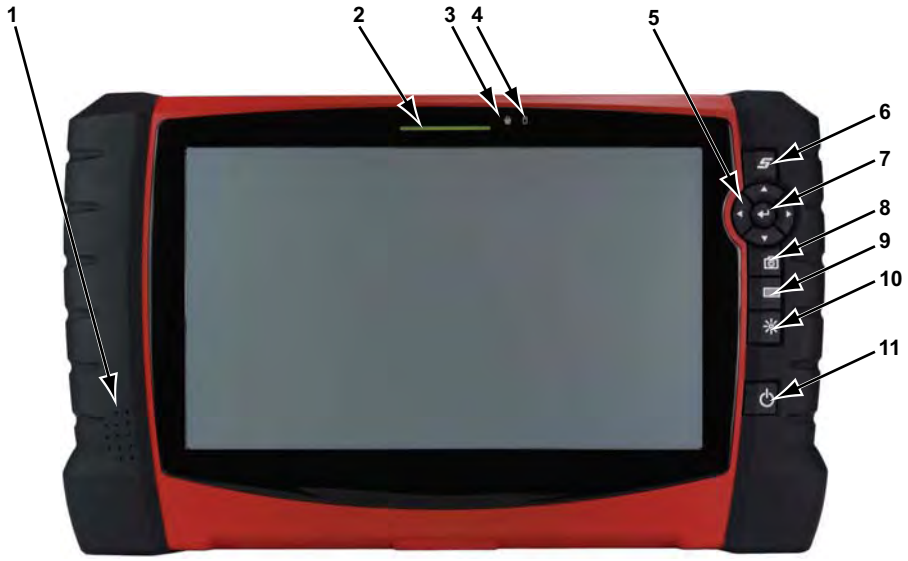
The Diagnostic Platform is a specialized personal automotive diagnostic solution that combines information with test instrumentation to help you diagnose symptoms, codes, and complaints quickly and efficiently. There are three main components to the system:

- Display Device—the central processor and monitor for the system
- Scan Module—the device for accessing vehicle data
- Scope Multimeter Module—the device for sampling circuits and signals

This manual describes the construction and operation of these three devices and how they work together to deliver diagnostic solutions.

2.1 Display Device

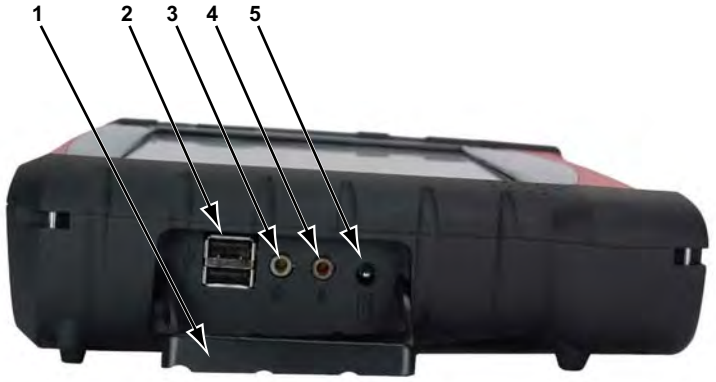
2.1.1 Functional Description



1— Audio Speaker
2— Power Indicator LED (light emitting diode)
3— Microphone
4— Hard Drive Activity LED
5— Directional Buttons; left (◀), right (▶), up (▲), down (▼)
6— S Button (special functions)
7— Enter Button
8— Camera (shutter) Button
9— Virtual Keyboard Button
10—Brightness Button
11—Power Button

Figure 2-1 *Model D10 front view*

Left Side of Unit



1— Hinged Cover
2— USB (universal serial bus) Ports (2)
3— Head Phone Jack
4— Microphone Jack
5— DC Power Supply Input Port

Figure 2-2 *Model D10 side view*

1— Kennsington Lock (standard security device connection, device not included)
2— Battery Compartment Cover
3— Collapsible Stand (closed)
4— Camera Lens

Figure 2-3 *Model D10 back view*

2.1.2 Technical Specifications

Processor:
Intel Atom Z530P 1.6GHz

Operating System
Microsoft Windows Embedded Standard SP3

Touch Screen
Resistive Touch Panel

Display:
10.2 inch diagonal, LCD TFT
1024 x 600 resolution WSVGA
16 bit color

Battery:
Lithium Ion Smart Battery Pack
Approximate 4 hour run time
Approximate 4 hour charge time (with or without unit operating)

DC Jack Operating Voltage
10V to 32V DC

Communications:
802.11 b/g/n Wireless
Bluetooth 2.0

Dimensions:
Width:
13.23 inches
336.1 mm
Height:
8.07 inches
205 mm
Depth:
2.41 inches
61.3 mm

Weight (including battery pack and Scope Multimeter Module):
5.1 lbs.
2.31 kg

Weight (including battery pack, without Scope Multimeter Module):
4.5 lbs.
2.04 kg

Operating Temperature Range (ambient):

At 0 to 90% relative humidity (non-condensing)

32 to 113°F

0 to 45°C

Storage Temperature (ambient):

At 0 to 70% relative humidity (non-condensing)

–4 to 140°F

–20 to 60°C

Environmental Conditions:

This product is intended for indoor use only

This product is rated for Pollution Degree 2 (normal conditions)

Power Supply:

Supply Rating; 19 VDC. 3.42A

2.1.3 Power Sources

Your Display Device can receive power from any of the following sources:

- Internal Battery Pack
- AC/DC Power Supply
- Vehicle Power
- Docking Cradle (Optional)

Internal Battery Pack

The display unit can be powered from the internal rechargeable battery. A fully charged standard battery provides sufficient power for about 4.5 hours of continuous operation. A LED on the front of the unit indicates the battery state of charge.

AC/DC Power Supply

The display unit can be powered from a wall socket using the AC/DC power supply. The AC/DC power supply also powers the internal battery pack charging process.

Vehicle Power

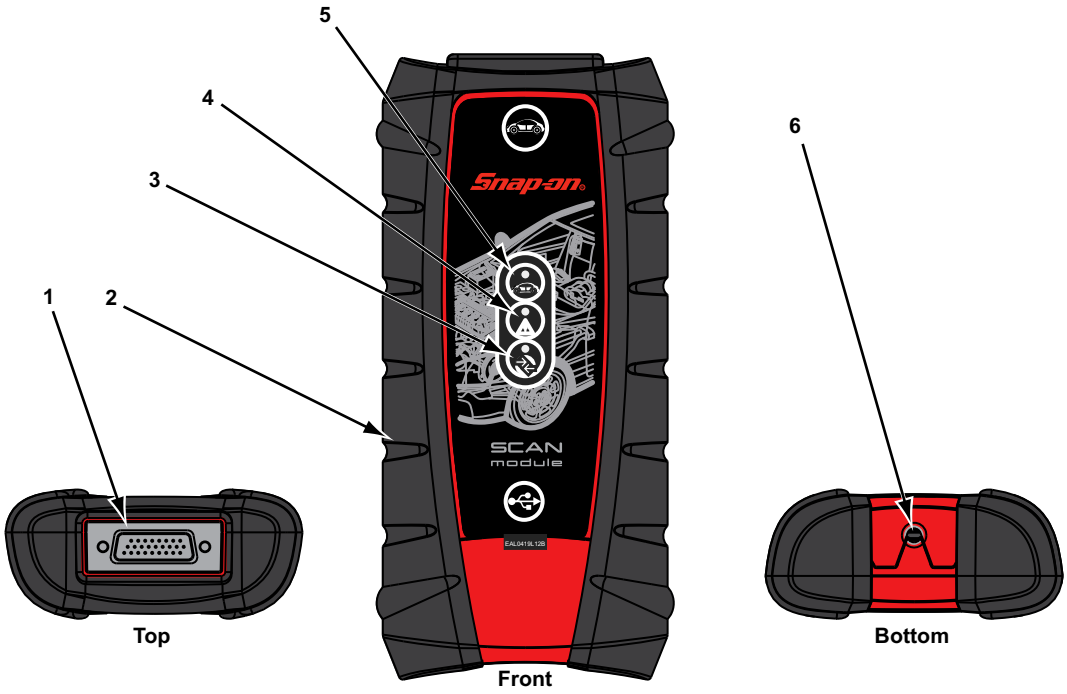
The display unit can be powered from a standard 12-volt power port on the test vehicle through a direct cable connection. The vehicle power cable connects to the DC power supply port on the left side of the display unit.

Docking Cradle (Optional)

The display unit can be powered and operated when installed on the optional docking cradle. The docking cradle also powers the internal battery pack charging process and allows USB connectivity for attaching peripherals. Contact your sale representative for additional details.

2.2 Scan Module

2.2.1 Functional description



1— Data cable connector
2— Memory card port (remove protective hand grip for access)
3— Bluetooth LED (green)
4— Communication issue LED (red)
5— Vehicle power LED (green)
6— Universal serial bus (USB) port (remove protective hand grip for access)

Figure 2-4 *Scan Module*

Wireless Communication

The Scan Module is a wireless communications device that transmits vehicle data to the display device without a physical connection. A signal lost due to moving out of range automatically restores itself when the display unit is brought closer to the Scan Module. The Scanner sounds a tone and the Display Device shows a warning message when the signal is lost.

2.2.2 Technical Specifications

Dimensions:

Length:

8.04 inches

204.3 mm

Height:

3.82 inches

97 mm

Depth:

1.66 inches

42.1 mm

Weight (including protective hand grip):

0.9 lbs.

0.408 kg

Communications:

Bluetooth 2.0

USB Power:

5V @ 500mA

Data Cable Connector Power:

8V to 32V, Maximum 12 Watts

Operating Temperature Range (ambient):

At 0 to 90% relative humidity (non-condensing)

32 to 113°F

0 to 45°C

Storage Temperature (ambient):

At 0 to 70% relative humidity (non-condensing)

–4 to 140°F

–20 to 60°C

Environmental Conditions:

This product is intended for indoor use only

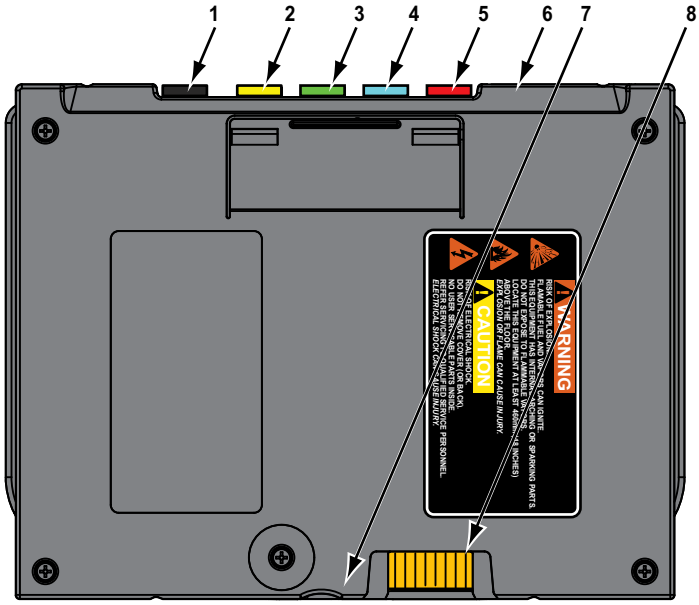
This product is rated for Pollution Degree 2 (normal conditions)

2.2.3 Power Sources

The Scan Module operates on 12V or 24V vehicle power, which it receives through the data cable connector. The unit powers on whenever it is connected to an OBD-II/EOBD compliant data link connector (DLC). For non OBD-II/EOBD compliant vehicles, the unit can be powered from a suitable power port on the test vehicle using the auxiliary power cable supplied with your kit.

2.3 Scope Multimeter Module

2.3.1 Functional Description



1— Common (Ground) Port
2— Channel 1 Port
3— Channel 2 Port
4— Channel 3 Port
5— Channel 4 Port
6— Auxiliary Port (not visible in illustration)
7— USB Port (under protective cover)
8— Display Device Connection

Figure 2-5 *Scope Multimeter Module, removed from Display Device*

Remote Operation

The Scope Multimeter Module installs into the Display Device and is held in place by a lock tab. Depress the lock tab and the Scope Multimeter Module is easily removed from the Display Device. A USB cable (supplied with your kit) can then be used to connect the Scope Multimeter Module to the Display Device. Now, you can continue to remotely monitor circuit activity while moving the Display Device around the vehicle.

2.3.2 Technical Specifications

Dimensions:

Length:

6.75 inches

171.5 mm

Height:

5.1 inches

129.5 mm

Depth:

0.89 inches

22.6 mm

Weight (including protective hand grip):

0.66 lbs.

0.30 kg

Operating Temperature Range (ambient):

At 0 to 90% relative humidity (non-condensing)

32 to 113°F

0 to 45°C

Storage Temperature (ambient):

At 0 to 70% relative humidity (non-condensing)

–4 to 140°F

–20 to 60°C

Environmental Conditions:

This product is intended for indoor use only

This product is rated for Pollution Degree 2 (normal conditions)

2.3.3 Power Sources

The Scope Multimeter Module operates on USB power (5V @ 500mA) supplied by the Display Device. Power is provided either through direct connection to the Display Device, or through a USB cable when the Scope Multimeter Module is separated from the Display Device.

Chapter 3 Getting Started

Make sure the Display Device has a charged battery or is connected to an AC/DC power supply (see Power Sources on page 8). It is highly recommended to back up personal and saved data to a USB mass storage device on a regular basis to prevent loss in the event of system corruption or hard disk drive failure.

3.1 Powering Up

Press the Display Device Power button to switch the unit on. The system boots up, then opens the Home screen (Figure 3-2).

3.1.1 Module Buttons

The Module buttons configure the Display Device for the type of test to be performed. Table 3-1 on page 11 gives brief descriptions of the available Module buttons, which operations are available depends upon the individual configuration of your system. Use the stylus or your finger tip to select from the Module buttons.

Table 3-1 *Module buttons (sheet 1 of 2)*

Name	Button	Description
Scanner		Configures the unit to operate as a scan tool. See Scanner Operations on page 20.
OBD Direct		Allows you to perform generic OBD-II or EOBD system tests without identifying the specific vehicle. See OBD Direct Operations on page 50.
Component Test		Opens a diagnostic database of specific tests for the identified vehicle. See Component Test Operations on page 58.
Scope Multimeter		Configures the unit to operate as a lab scope, graphing multimeter, or digital multimeter. See Scope Multimeter Operations on page 66.
Information		Provides the information needed to make repairs once you have made your diagnosis. The linked program varies by region. See Information Operations on page 90.

Table 3-1 *Module buttons (sheet 2 of 2)*

Name	Button	Description
Vehicle History		Identifies the test vehicle and organizes and manages work in progress and service records. See Vehicle History Operations on page 91.
Data Manager		Opens the organization system for saved data files. See Data Manager Operations on page 96.
Help		Opens the on-line help for the system. See Help Operations on page 103.
System Settings		Establishes and manages wireless connections to peripheral devices, such as the Scan Module. See System Settings Operations on page 104.
Exit		Closes the diagnostic Platform software and returns the display to the Windows desktop. See Powering Down on page 16.

3.1.2 Toolbar

Operation of the buttons located on the toolbar are described in the table below:

Table 3-2 *Module buttons*

Name	Button	Description
Home		Touching this button returns you to the Home screen from any test.
Windows Toolbar		Touching this button opens and closes the standard Windows toolbars at the top and bottom of the screen.
Menu		Touching this button opens a menu that provides information and basic operations and features for the current screen.
Change Vehicle		The currently identified vehicle is shown to the right of the buttons, touching allows you to change the identified test vehicle.
View Record		Touching the button opens an editable worksheet of vehicle records.
Hardware Status		Indicates the wireless connectivity status of the Scan Module.
		Indicates the wireless connectivity status of the Scope Multimeter.

Menu Button Options

The Menu button on the Toolbar at the base of the display screen opens a list of basic operations and features. Menu options vary by module and may include:

- **Safety Information**—opens the Important Safety Instructions document, which should be read and understood prior to using the Diagnostic Platform.
- **File**—allows you to print or save the data being viewed.
- **Edit**—allows you to configure alarms when viewing Scanner data.
- **Setup**—allows you to adjust tool settings.
- **Help**—allows you to view supporting documentation.

Selecting a menu item opens a submenu of choices, and some submenus also open an additional menu. A right arrowhead (▸) indicates additional choices are available. Touch an item to select it.

File

Use to print or save a copy of the data currently being viewed. Selecting opens a submenu:

- **Save**—available from the Scan Module, opens an additional submenu with these options:
  - **Screenshot**—saves a graphic image of the current screen
  - **Collected Data**—saves a recording of all the data currently in the buffer plus the number of frames designated after the trigger event (see Properties on page 42).
- **Print**—available from the Scan Module, opens an additional submenu with these options:
  - **Screen**—sends the current screen image to a printer.
  - **Troubleshooter**—prints the full text of the troubleshooter topic shown in the main body.
- **Print Article**—available from the Component Test module, has one of the following results:
  - If connected to a printer, the file is sent to the printer.
  - If not connected to a printer, the article is saved as a .xps file, which can be retrieved, moved, or copied and printed at a later time.
- **Print Preview**—available from the Component Test module, displays how the selected article will appear when printed.
- **Page Setup**—available from the Component Test module, opens a dialog box that allows you to adjust the format (orientation and margins) of the pages to be printed.

Selecting a print option opens a standard Windows Print dialog box, which allows you to print or save the file.

Edit

This Scan Module option performs the same function as the Alarms button on the Scanner Toolbar. (For more information refer to Alarms on page 41).

Setup

This Scan Module option allows you to adjust tool settings to your personal preferences. Selecting Tools opens a submenu that includes the following:

- Graph Properties
- Unit Setup
- Download Firmware
- Display BEN

Graph Properties

Selecting opens the General Graph Properties dialog box, which is similar to what is available from the Properties button on the Scanner Toolbar (see Properties on page 42). Changes made here apply to all of the graphs. Graph properties options allow you to:

- Change the background and plot colors of the graphs.
- Switch graph grid lines on and off.
- Adjust how much data is captured after a triggering event.
- Adjust the sweep time of the graphs.

Unit Setup

Selecting opens a dialog box that allows you to choose between US standard or metric units of measure for temperature, vehicle speed, and pressure readings.

To change the units setup:

1. From the Toolbar select **Setup** > **Unit Setup**.
   The Setup dialog box opens to the Units tab (Figure 3-1).

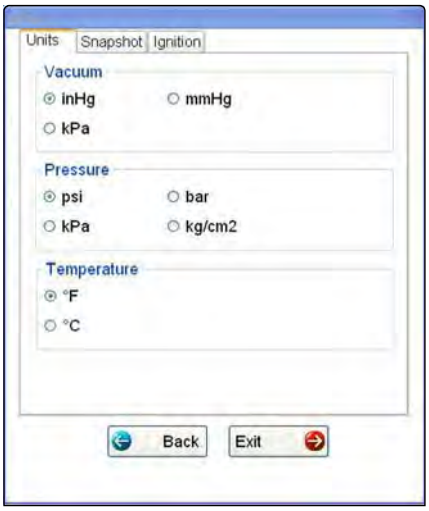


Figure 3-1 *Sample view options*

2. Tap the values to select each item, the “radio knob” indicates the selected setting.
3. Tap **Back** or **Exit** to close the dialog box and apply the changes.

Table 3-3 *Scan tool units of measurement*

Setting	Default	Option
Vacuum (manifold pressure)	kPa (kilopascal)	inHg (inches of mercury)
		mmHg (millimeters of mercury)
Pressure	kPa (kilopascal)	psi (pounds per square inch)
		bar (atmosphere)
		kg/cm2 (kilograms per centimeter squared)
Temperature	°C (degrees Celsius)	°F (degrees Fahrenheit)
Vehicle Speed	kph (kilometers per hour)	mph (miles per hour)

Download Firmware

This option is used to update the firmware on your Display Device. For firmware information, contact your sales representative or Customer Care. While downloading the firmware, do not interrupt the download process. Connection interruption may result in damage to the unit.

NOTE:
It is recommended to connect the unit to an AC power source when downloading firmware.

Display BEN

This option shows the BEN of the currently identified vehicle in the Scanner toolbar. The BEN is a unique identifier that is used internally for data coordination and communication.

Help

A variety of utilities and additional resources are available through the Help menu. Menu options vary by module and may include:

- User Manual
- Version Info
- Activation Status
- User's Manuals
- About Component Test
- About Scanner

User Manual

This option opens this document, which provides overall navigation and operation information for the Diagnostic Platform.

Version Info

This option opens a window showing the version of the software and a copy of the Software License Agreement. Tap **OK** to close the window.

Activation Status

This option opens a dialog box with version and licensing details for the system, and activation status for the Display device and all other modules.

User's Manuals

This Scan Module option opens a submenu of support documentation, such as vehicle communication software manuals. These manuals provide connection and test information for specific vehicles. Selecting a menu item opens a printable PDF version of the document in a separate window.

About Component Test

This option opens a dialog box that contains software version and details, copyright data, and other specific details about the Component Test module.

About Scanner

This option opens a dialog box that contains software version and details, copyright data, and other specific details about the Scan Module.

3.1.3 Windows Toolbar

This is the standard Windows toolbar. Your Display Device is a fully functional personal computer based on the Windows Embedded Standard operating system. Refer to Microsoft documentation for additional information.

3.2 Powering Down

All vehicle communication must be terminated before shutting down the Display Device. A warning message displays if you attempt to shut down while the Scan Module is communicating with the vehicle. Forcing a shut down while communicating may lead to ECM problems on some vehicles. Exit the Scan Module before powering down.

To power down the Display Device:

1. Navigate to the Home screen.
2. Select the **Exit** button.
3. From the Windows desktop, open the Windows **Start** menu.
4. Select **Turn Off Computer**.
5. Select **Turn Off** in the dialog box.
   The open programs close and the power switches off.

3.2.1 Emergency Shutdown

In case of emergency, press and hold the Power button for 5 seconds to force a shutdown.

Chapter 4 Navigation

This chapter discusses how to use the hardware controls and features for the Display Device. There are no external controls on the Scan Module or Scope Multimeter Module, They can only be operated when used in conjunction with the Display Device.

4.1 Controls and Features

The external controls on the Display Device are simple because most operations are controlled through the touch screen. Touch screen navigation is menu driven, which allows you to quickly locate the test, procedure, or data that you need through a series of choices and questions. Detailed descriptions of the menu structures are found in the chapters for the various modules.

The following sections describe the external controls and features of the display device.

4.1.1 Control Buttons

Name and location of control buttons:

Table 4-1 *Display Device control buttons*

Name	Button	Description
S Button		A function button that provides a shortcut for capturing a screen image.
Directional Buttons		Moves the cursor or highlight on the display screen up, down, right, or left.
Enter Button		Selects a highlighted item or returns the display to the previous screen.
Camera Button		Operates the built-in camera. Press once to open the application. The button then acts as a shutter to take a photograph of what is visible on the screen.
Keyboard Button		Opens or closes the virtual keyboard.
Brightness Button		Increases the screen backlighting in seven incremental steps, then returns to the lowest setting and repeats.
Power Button		Turns the unit on and off.

All other tool operations are controlled through the touch screen.

4.1.2 LEDs

There are two light-emitting diodes (LEDs) on the front face of the device (see Figure 2-1 on page 3 for locations):

- Power Indicator LED—this device uses three colors to show the battery and power status as follows:
  - Green indicates a either a battery with a full, or nearly full, charge or DC power
  - Orange indicates a battery that is charging. An orange LED that fades on and off at three second intervals indicates the unit is in Standby mode.
  - Red indicates a low battery (15% of capacity or less).
- Hard Drive Activity LED—illuminates when the central processing unit (CPU) is reading or writing to the hard disk drive (HDD).

4.1.3 The Stand

The built-in stand extends from the back of the unit to allow hands-free viewing. The stand clips into the unit for storage and pivots out so the display is at a 45 degree angle when in use.

4.2 Camera Operation

A single press of the Camera button on the front of the Display Device activates the camera. With the camera active, the touch screen becomes the view finder and is also used for reviewing photographs that are taken. Buttons on the touch screen are used to operate the camera. The buttons change depending on what camera function is active:

Table 4-2 *Camera buttons (part 1 of 2)*

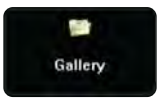
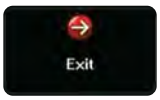
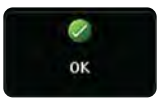
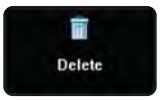
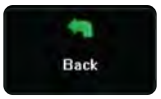
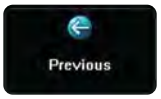
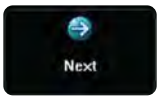
Name	Button	Description
Photo		Acts as a shutter to take a photograph of what is visible in the view finder, which is the left-hand portion of the screen.
Gallery		Opens a thumbnail gallery of recently taken pictures.
Exit		Closes the camera application and returns to the previous screen.
OK		Displays after a picture is taken. Selecting saves the photograph and returns to the view finder.
Delete		Displays after a picture is taken and in Gallery mode. Selecting discards the photograph and returns to the previous screen.

Table 4-2 *Camera buttons (part 2 of 2)*

Name	Button	Description
Back		Displays in Gallery mode. Selecting returns to the previously viewed screen.
Previous		Displays in Gallery mode. Selecting opens the picture prior to the current image in the gallery.
Next		Displays in Gallery mode. Selecting opens the picture after to the current image in the gallery.

To use the camera:

1. Press the **Camera** button.

   The camera screen opens and the **Camera** button now controls the shutter.
2. Focus the image to be captured in the view finder.
3. Press the **Camera** button, or tap the **Photo** button.

   The view finder now shows the captured picture.
4. Select **OK** to save the image, or **Delete** to delete it.

   The view finder is live and the Camera button is the shutter, repeat steps 2, 3, and 4 to take additional pictures.
5. Select **Exit** from the live view to close the camera application.

Photographs are stored on the hard drive and can be retrieved from the desktop by selecting **My Documents** > **ShopStream** > **Camera Folder**.

Chapter 5 Scanner Operations

The Scanner allows you to establish a data link to the electronic control systems of the vehicle being serviced to retrieve diagnostic trouble codes (DTCs), view live data parameters, and perform tests. The Scanner can access the electronic control module (ECM) for various vehicle control systems such as engine, transmission, antilock brake system (ABS) and more.

Scanner testing requires connecting the Scan Module to the test vehicle using the data cable and test adapters. On screen instructions tell you how to connect the Scan Module, additional connection information can be found in the appropriate vehicle communication software manual for the test vehicle, which is available through the Help menu.

5.1 Getting Started

Prior to first use of the Scan Module the unit must be paired with the Display Device to establish a wireless communication link. Refer to Pairing the Scan Module on page 105 for details.

A demonstration program allows you to become familiar with Scanner operations and testing without being connected to an actual vehicle.

5.1.1 The Demonstration Program

The Scanner demonstration program allows you to become familiar with many of the test capabilities without connecting to a vehicle. Sample data and mock test results help you learn the menus and basic operations.

The Scan Module must be paired with the display device to use the demonstration program. See Pairing the Scan Module on page 105 for details. Both the Scan Module and the display device must be powered on.

To start the demonstration program:

1. From the Home screen, tap the **Scanner** icon.

   The manufacturer menu displays. This menu includes all makes that are covered by any of the Diagnostic Platform modules, not just those for which Scanner information is available. There is also a Demonstration button included in the list.
2. Tap the **Demonstration** button.

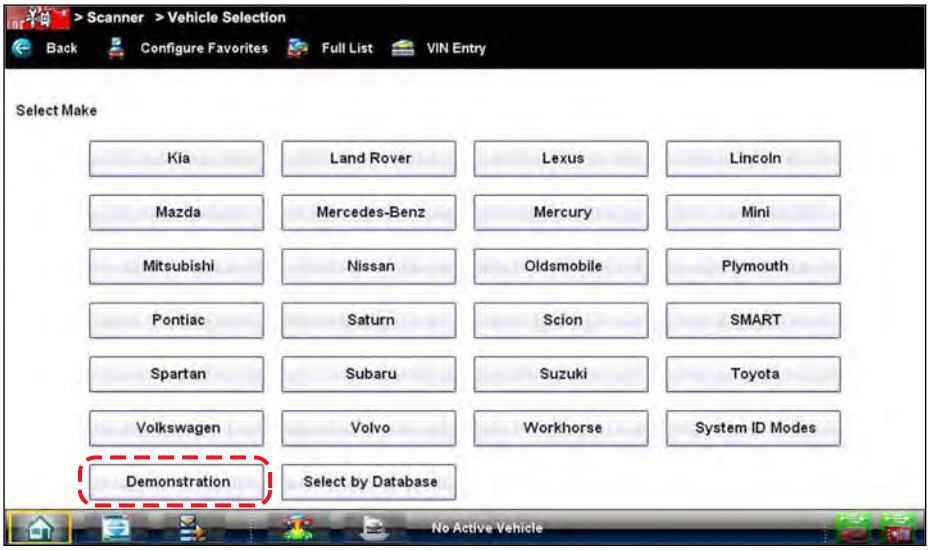


Figure 5-1 *Sample demonstration selection*

A screen with two choices now displays:

- 2000 Ford Focus Demo—contains simulated data for a 2000 Ford Focus.
- OBD Training Mode—provides simulated data for an OBD-II/EOBD vehicle that allows you to access any of the standard functions.

3. Select either option and a confirmation message displays.
4. Select **Ok** to load the selected database.
5. Follow the on-screen instructions and select as needed until the Systems menu displays.
6. Select from any of the systems listed, then select from the submenus.

IMPORTANT:
Do not connect a vehicle to the Scan Module while in the Demonstration mode.

5.1.2 Disconnecting the Diagnostic Platform From a Vehicle

When disconnecting the Diagnostic Platform from the vehicle, make sure the Scanner software is not communicating with the vehicle.

To exit Scanner and disconnect from a vehicle:

1. From a codes or data display screen, tap the **Exit** button on the upper toolbar.

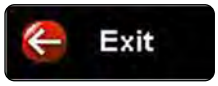


Figure 5-2 *Sample upper toolbar Exit button*

The screen goes to the codes or data menu.

2. Tap the **Back** button on the upper toolbar.

Figure 5-3 *Sample upper toolbar Back button*

The screen goes to the system menu.

3. Tap the **Back** button on the upper toolbar.
   A “stopping communication” briefly displays followed by the systems menu.
4. Tap the **Change Vehicle** button on the Toolbar.

Figure 5-4 *Sample Toolbar Change Vehicle button*

The vehicle description on the toolbar should now read “No Active Vehicle”.

5. Tap the **Home** button on the Toolbar.

Figure 5-5 *Sample Toolbar Home button*

The Home screen displays.

6. Disconnect the test adapter from the vehicle connector.

NOTE:
Damage to the electronic control module (ECM) of the vehicle can occur if communication is disrupted. Ensure that the vehicle communication cable is properly connected at all times during testing. Exit all active tests before removing the test cable or powering down.

5.2 Vehicle Identification

The Scanner information presented is provided by a direct link to the ECM of the test vehicle. Therefore, certain attributes of the test vehicle must be entered into the Diagnostic Platform so that the data displays correctly. Vehicle identification information is carried over if you enter the Scan Module either from the Component Test module or from one of the records stored in the Vehicle History module. However, you may need to enter additional attributes in some instances.

The vehicle identification sequence is menu driven, you simply follow the screen prompts and make a series of choices. Each selection you make advances to the next screen. A Back button in the upper left corner of the screen returns you to the previous screen. Exact procedures may vary somewhat by vehicle.

To identify a vehicle for Scanner testing:

1. Tap the **Scanner** module button from the Home screen.
   A list of manufacturers displays (Figure 5-6).

Figure 5-6 *Sample manufacturer list*

2. Select the manufacturer of the test vehicle from the list.

   A model year menu displays.

3. Select the year of the test vehicle from the menu.

   A list of vehicle types or models displays. Several selections may be required to identify the vehicle type and model, follow the screen prompts and enter the required information.

   A confirmation dialog box displays once all the required data has been entered (Figure 5-7).

Figure 5-7 *Sample confirmation dialog box*

4. From the Confirm vehicle details dialog box, select:
   a. **OK** to continue.
   b. **Cancel** to return to the engine list.

   When Yes is selected a list of systems available for testing on the identified vehicle displays.

5. Select a test to continue (Figure 5-8).

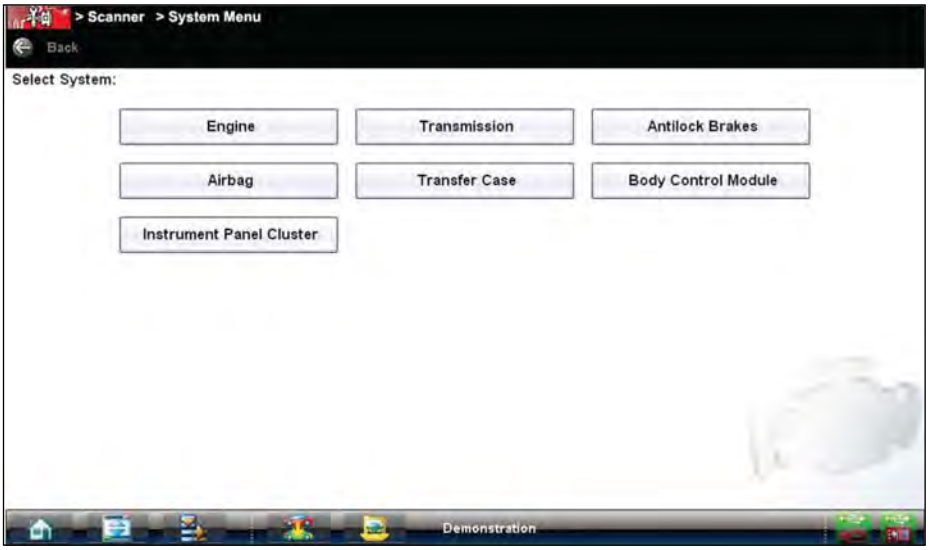


Figure 5-8 *Sample available tests list*

The identification sequence is now complete, refer to Navigation on page 26 for details on how to navigate through the Scanner data and Operations on page 29 for information on how to perform tests.

NOTE:
If you return to the Home screen and select Component Test, Information, or another module the vehicle identification entered here is carried over. However, additional information may be needed in some instances.

5.2.1 Alternative Vehicle Identification

Occasionally, you may identify a test vehicle that the Scanner does not recognize, the database does not support, or has some unique characteristics that prevent it from communicating with the Scanner through the normal channels. In these instances, a menu of alternate choices that allow you to establish communication with the vehicle by other means displays. In addition to being able to identify a different manufacturer, the following alternatives are available:

- OBDII/EOBD—allows you to perform generic OBD-II or EOBD tests, see OBD Direct Operations on page 50 for additional information.
- System ID Modes—allows you to begin the vehicle identification by first selecting the system to be tested. Selecting opens a menu of manufacturers that support this mode.
- Select by Database—allows you to begin the vehicle identification by first selecting which manufacturer database to load. Selecting opens a menu of available databases.

5.3 Connecting to a Vehicle

Make a selection from the systems available for testing list and instructions for connecting the Scanner to the vehicle with the data cable display on the screen (Figure 5-9).

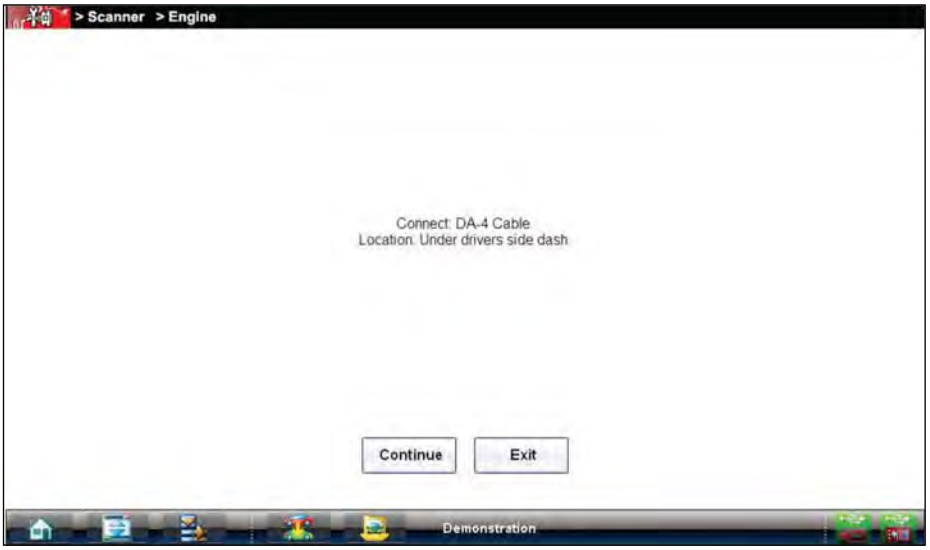


Figure 5-9 *Sample vehicle connection message*

5.3.1 Cables

One of two data cables, one for OBD-II/EOBD compliant vehicles and one for non-OBD-II/EOBD models, are used to connect the Scan Module to the test vehicle. The 26-pin end of either cable attaches to the data cable port on the Scan Module and is secured with two captive screws. The 16-pin end of the OBD-II cable plugs directly into the data link connector (DLC) of the test vehicle. The 15-pin end of the non-OBD-II cable attaches to a cable adapter and is secured with captive screws, the adapter then plugs into the diagnostic connector on the test vehicle.

A replaceable 7.5 amp blade-type fuse is installed in the vehicle connector end of the cable to protect the unit from high circuit voltage and current. A green LED, also on the vehicle connector end of the cable, illuminates whenever there is power supplied to the cable. An LED that fails to illuminate indicates either a problem on the vehicle power circuit or a blown data cable fuse.

All OBD-II/EOBD vehicles have vehicle battery power (B+) available on the DLC, so the Scan Module should power on as soon as the cable is connected to the vehicle. The auxiliary power cable supplies power for testing models that do not have B+ available on the diagnostic connector. An OBD-I Data Cable and adapters (optional in some markets) are required for testing models that are not OBD-II or EOBD compliant.

The large end of the auxiliary power cable plugs into the vehicle accessory port. The small end of the cable fits into a power port built into the side of the cable adapter. An in-line fuse on the auxiliary cable provides circuit protection.

On-screen instructions on the display device screen tell you which cable, and adapter if needed, to use once a test vehicle has been identified. The screen message also includes the location of the vehicle diagnostic connector. Follow the on-screen instructions for connecting to the vehicle.

5.3.2 No Communication Message

If the Scanner is unable to establish a communications link, a “no communications” message displays. A “no communication” message, means the Scan Module and the vehicle control module cannot communicate with each other for some reason.

The following conditions cause a “no communication” message to display:

- The Scanner is unable to establish a communication link with the vehicle.
- You selected a system for testing that the vehicle is not equipped with (such as ABS).
- There is a loose connection.
- There is a blown vehicle fuse.
- There is a wiring fault on the vehicle, or in the data cable or adapter.
- There is a circuit fault in the data cable, Personality Key, or adapter.
- Incorrect vehicle identification was entered.

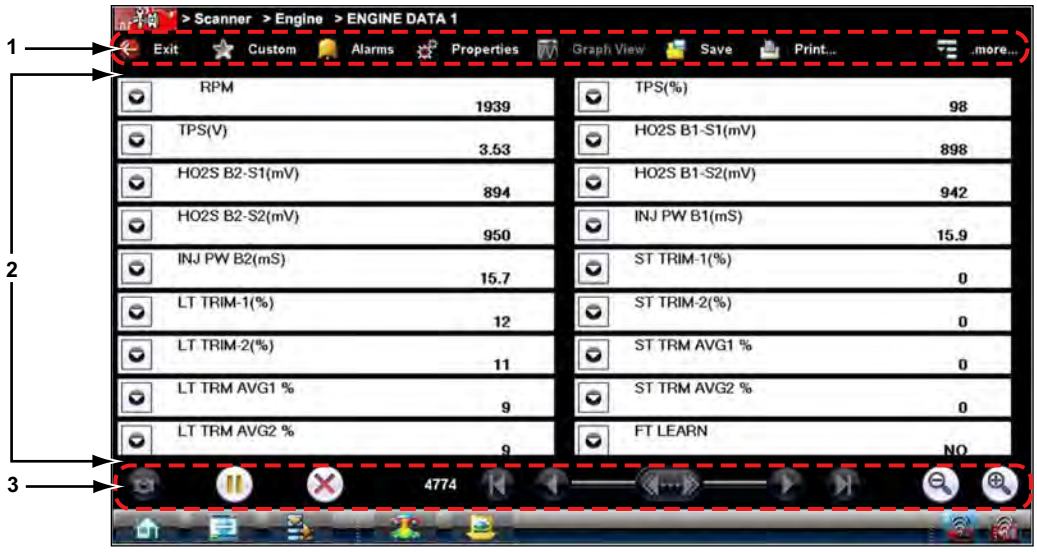
Refer to the Vehicle Communication Software manuals for manufacturer-specific problems.

5.4 Navigation

This section describes how to navigate the Scanner interface and select scanner tests.

5.4.1 Scanner Screen Layout

The Scanner screens typically include three sections (Figure 5-10):



1— Scanner Toolbar

2— Main Body

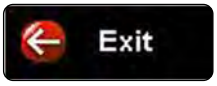
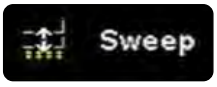
3— Data Buffer Toolbar

Figure 5-10 *Scanner screen layout*

Scanner Toolbar

The Scanner toolbar contains a number of buttons that allow you to configure the displayed data and to exit. The table below provides a brief explanation of the Scanner toolbar button operations:

Table 5-1 *Scanner toolbar buttons*

Name	Button	Description
Exit		Closes the current test and returns you to the menu.
Back		When available, returns to the previously viewed screen.
Custom		Allows you to select which parameters are displayed on the screen.
Alarms		Allows you to set an alarm on certain data parameters when the signal goes above or below the alarm setting.
Properties		Allows you to adjust the display characteristics for all of the data screens.
Graph View		Allows you to simultaneously view up to 16 data graphs at a time.
Save		Saves a copy of the current frame of data that can be viewed on the tool or in ShopStream Connect.
Print		Opens a standard Windows Print dialog box for saving a print copy of the current frame of data.
More		Opens a dropdown menu of the additional options shown below.
Scale		Switches the scale values, displayed along the left-hand side of the graphs, on and off.
Sweep		Switches the sweep values, displayed at the base of the graphs, on and off.

Main Body

The main body of the screen varies depending on the stage of operation. The main body can show vehicle identification selections, the main menu, test data, instructions, troubleshooting information, controls, and other diagnostic information.

Data Buffer Toolbar

Whenever communication is established with a vehicle, the Scanner continuously records data transmitted by the ECM in the data buffer. The toolbar below the main body of the screen contains the buttons for navigating the buffered data (Table 5-2).

Table 5-2 *Data buffer toolbar buttons*

Name	Button	Description
Go To Start		Moves to the first frame in the data buffer
Pause		Suspends data capture and changes to show the Play button
Play		Starts or resumes data capture and changes to show the Pause button
Go To End		Moves to the last frame in the data buffer
Clear		Erases data in the data buffer
Step Back		Moves to the previous frame in the data buffer
Frame Counter		Indicates the data buffer frame currently displayed
Step Forward		Moves to the next frame in the data buffer
Snapshot		Arms the software to take a snapshot of vehicle data
Zoom In		Increases the magnification by decreasing the sweep of the graph
Zoom Out		Decreases the magnification by increasing the sweep of the graph

Use the slider in the middle of the toolbar to quickly move through paused data.

Figure 5-11 *Sample data buffer slider*

5.4.2 Screen Messages

Screen messages appear when additional input is needed before proceeding. There are three types of on-screen messages, confirmations, warnings, and errors.

Confirmation Messages

Confirmation messages inform you when you are about to perform an action that cannot be reversed or when an action has been initiated and your confirmation is needed to continue.

When a user-response is not required to continue, the message displays briefly before automatically disappearing.

Warning Messages

Warning messages inform you when completing the selected action may result in an irreversible change or loss of data.

Error Messages

Error messages inform you when a system or procedural error has occurred. Examples of possible errors include a disconnected cable or a peripheral, such as a printer, is powered off.

5.4.3 Making Selections

The Scanner software is a menu driven program that presents a series of choices one at a time. As you select from a menu, the next menu in the series displays. Each selection narrows the focus and leads to the desired test. Use your fingertip or the stylus to make menu selections.

5.5 Operations

The Scanner allows you to establish a data link to the electronic control systems of the vehicle being serviced in order to view live data parameters and perform tests. You can use selected functional tests, get troubleshooting tips, and access vehicle-specific trouble codes for various vehicle control systems such as engine, transmission, antilock brake system (ABS) and more.

The Scanner has two main functions:

1. Scanner—provides access to Vehicle Communication Software functions such as reading codes, viewing data, and performing functional tests.
2. Fast-Track Troubleshooter—provides the diagnostic power of Fast-Track Troubleshooter, a database of experience based information developed by master technicians.

After a system is selected and the Scanner establishes communication with the vehicle, a Scanner Main menu, which lists available tests, displays.

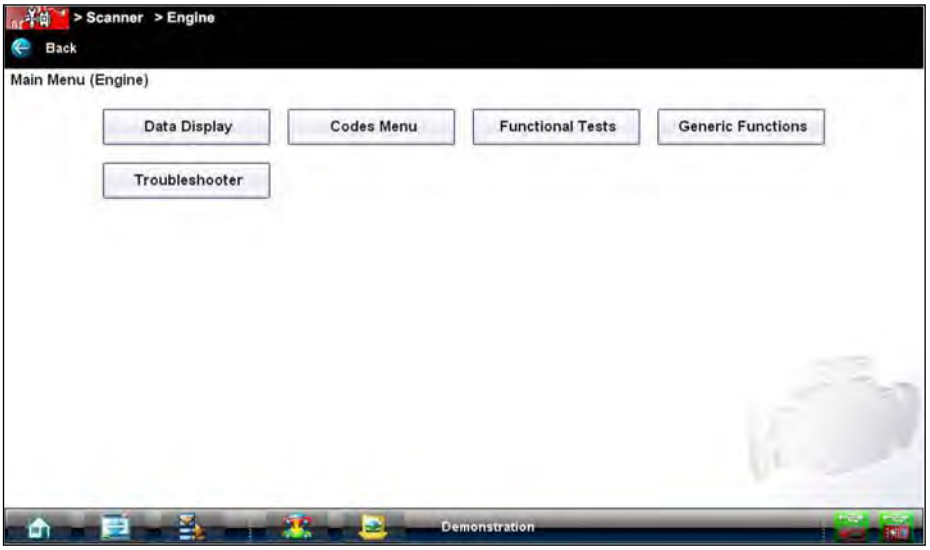


Figure 5-12 *Sample Scanner Main menu*

Main menu options vary slightly by year, make, and model. The main menu may include:

- **Data Display**— displays data parameter information from the vehicle control module. Selecting may open a submenu of viewing options.
- **Codes Menu**—displays diagnostic trouble code (DTC) records from the vehicle control module. Selecting may open a submenu of viewing options.
- **Clear Codes**—erases DTC records and other data from the ECM. This selection is found on a Codes submenu for some models.
- **Functional Tests**—provides specific subsystem and component tests. The tests vary depending on the manufacturer and model.
- **Actuator Tests**—similar to functional tests, checks the operation of certain actuators, such as solenoid valves and relays.
- **Memory Resets**—allows you to reprogram adaptive values for certain components after making repairs. Selecting opens a submenu. These options are found on the Functional Tests Menu for some models.
- **System Tests**—provides specific subsystem testing. Performing these tests is similar to functional tests.
- **Generic Functions**—lets you access certain available Generic OBD II functions from a proprietary menu (1996 and newer vehicles only).
- **Troubleshooter**—provides step-by-step procedures, integrating parameter data and retrieving trouble codes when appropriate, for specific symptoms of the identified vehicle.

To perform a Scanner test

1. **Launch the Scanner**—Tap Scanner on the Home screen.
2. **Identify the vehicle**—Identify the test vehicle by selecting from the menu options.
3. **Select the system**—Select the system to be tested from the systems menu.
4. **Connect the data cable to the vehicle**—Follow the on-screen connection instructions to connect the Scan Module to the test vehicle.
5. **Select a test from the Scanner main menu**—Select the desired test.

5.5.1 Data Display

Depending upon the test vehicle, this selection may appear as Data, Data Display, Data Only, Data (No Codes), or something similar. All are similar. Selecting has one of the following results:

- A submenu of data viewing choices displays.
- Vehicle data displays.

A submenu displays when more than one data viewing mode is available on the identified vehicle. On some models, the engine must be started or cranked before data can be displayed. For these models, a “Waiting to Communicate” message displays if the engine was not cranked or started.

Data Screens

When a Data selection is made, the screen displays the data list for the selected module.The items available for any control module vary from one vehicle to another.

Data is presented in a 2-column format. An abbreviated parameter name is at the left of each column and its value is at the right edge of the column. Parameters display in the order that they are transmitted by the ECM, so expect variation between vehicles.

Gesture scrolling allows you to quickly move through the data list. Simply touch the screen and drag your finger up or down to reposition the parameters being displayed. Position bars momentarily appear to the right of each column indicate the position of the current screen in relation to the entire list as you scroll. Each column of parameters scrolls independently of the other column. Figure 5-13 shows a typical data screen.

1— Graph button

2— Parameter name

3— Parameter value

Figure 5-13 *Sample data screen*

Data Graphs

Tap the **Graph** button to open a data graph for that parameter (Figure 5-14). Selecting a parameter for graph view moves it to the top of the list. Tap the **Graph** button again to close the graph for that parameter and return to a data list view.

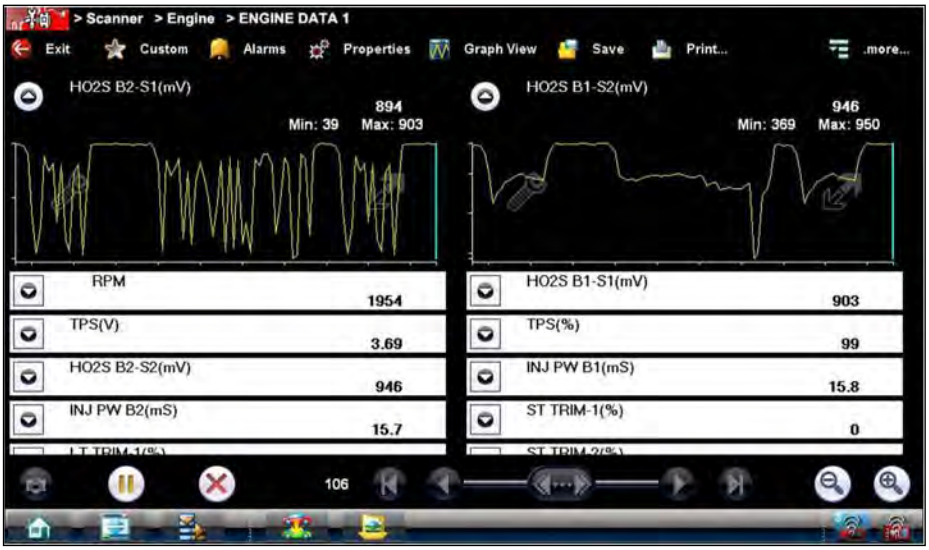


Figure 5-14 *Sample graph view*

The icons that display on each data graph allow you configure settings for the selected graph only:

Table 5-3 *Data graph icon operations*

Name	Button	Description
Expand/Collapse		Tap to expand the graph to fill the entire screen, tap again to collapse the graph to the standard view.
Graph Properties		Tap to open the Graph Properties dialog box, which allows you to set triggers for recording a snapshot and to adjust the scale.

Triggers

Triggers establish threshold values, an upper limit and a lower limit, for recording a data snapshot. A snapshot allows you to closely evaluate conditions that caused the triggering event.

When a snapshot is taken, the Scanner captures additional data after the trigger point is detected, data collection pauses, and the buffered information is automatically saved as a movie. This gives you a complete picture of what was happening before the fact, what occurred at the trigger point, and what happened after the fact.

Data collection is paused following a trigger event. Select the **Play** button to resume viewing live data. A vertical line now appears on each of the data graphs to indicate the triggering point. The trigger line on the parameter that triggered the snapshot is a different color than those on the other graphs. This makes it easy to determine which parameter caused the trigger when triggers are set for multiple parameters.

To adjust the amount of data collected after a trigger:

1. Tap the **Properties** button on the Scanner toolbar to open the dialog box.
2. Highlight one of the **Samples After Trigger** options:
3. Tap the Accept button to close the dialog box.

NOTE:
You can also adjust the amount of data collected after a triggering event using the Properties button on the Scanner toolbar. See Properties on page 42 for additional information.

To set triggers and record a snapshot:

1. Tap the Graph Properties icon on the parameter graph you wish to set triggers on.

   The Graph Properties dialog box opens.
2. From the Graph Properties dialog box, tap **Triggers On**.

   A check mark appears in the box and the minimum and maximum fields activate (Figure 5-15).

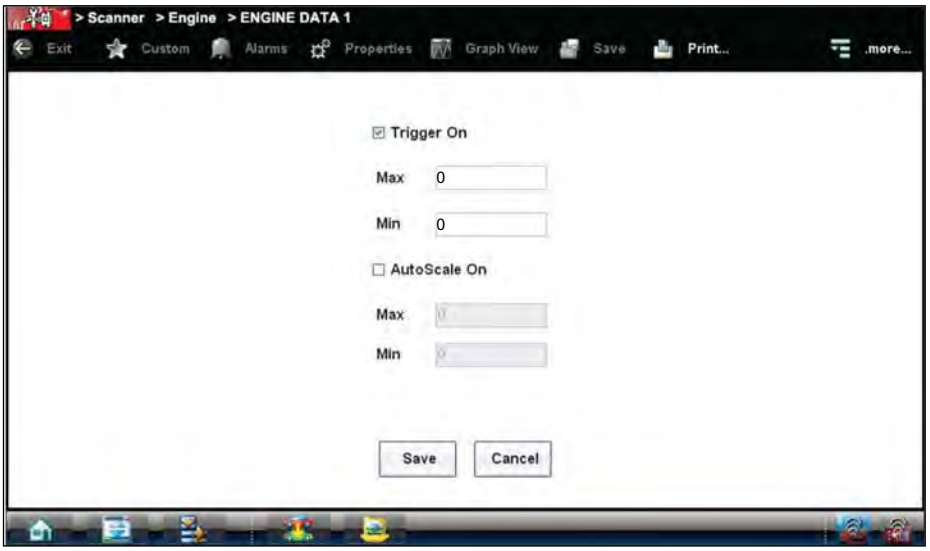


Figure 5-15 *Sample Graph Properties dialog box*

3. Tap either **Max:** (maximum) or **Min:** (minimum) to activate that field and open the keyboard.
4. Type the desired trigger value into the field.
5. Tap the other field and enter a trigger value, then close the virtual keyboard.
6. Tap **Save** to close the dialog box.

   Trigger lines (blue for upper and red for lower) display on the selected parameter graph.

   The area between the upper and lower trigger lines establishes the triggering condition. Once the snapshot is armed, any data points that register outside of the set trigger conditions initiates a snapshot. The Scanner continues to record the preset amount of data after the trigger and includes it in the snapshot.
7. Tap **Snapshot** on the Data Buffer Toolbar to arm the snapshot.

   The Snapshot button changes color to indicate it has been armed (Figure 5-16).

Figure 5-16 *Sample armed Snapshot button*

Once all of the data is compiled, data collection pauses and the information is saved as a movie. A confirmation screen displays to let you know the name automatically assigned to the saved file and where to locate it.

Figure 5-17 *Sample saved movie confirmation screen*

8. Select **OK** to close the confirmation screen.
9. Tap the **Play** button on the toolbar to resume viewing live data.

NOTE:
Selecting an armed Snapshot button disarms it.

Scale

Scale adjusts the upper and lower values displayed on the vertical axis of a data graph. Two scale modes are available; auto scale and manual scale. Auto scale, which is the default setting, automatically adjusts the graph scale based upon the minimum and maximum values transmitted by the ECM. Manual scale allows you to set the minimum and maximum values.

To manually set the scale on a graph:

1. Tap the Graph Properties icon to open the dialog box for the graph you wish to scale.
2. From the Graph Properties dialog box, tap **Auto Scale On**.

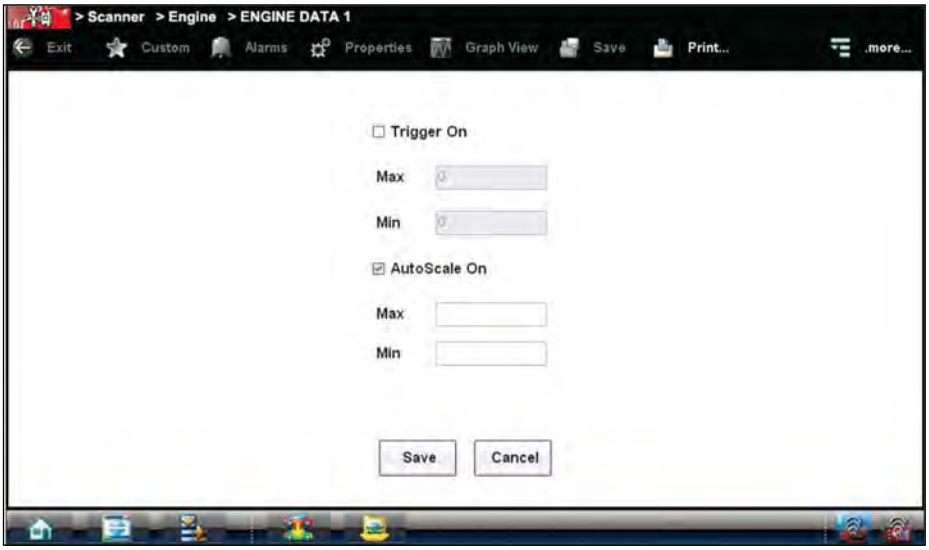


Figure 5-18 *Sample manual scale selection*

The check mark is cleared from the box and the minimum and maximum fields activate

3. Tap either **Max:** (maximum) or **Min:** (minimum) to activate that field and open the keyboard.
4. Type the desired scale value into the field.
5. Tap the other field and enter a value, then close the virtual keyboard.
6. Tap **Save** to close the dialog box.

   The dialog box closes and the parameter scale is now at the set values.

Using Zoom

The zoom options on the Data Buffer toolbar allow you to change the magnification level of the sweep when viewing data graphs. Use the Zoom In (+) button to increase magnification, and the Zoom Out (–) button to decrease magnification.

5.5.2 Codes Menu

This selection may appear as Codes, Codes Menu, Codes Only, codes (No Data), or something similar on the menu. Selecting opens a list of data parameter viewing options that may include:

- Display Codes
- Clear Codes
- Freeze Frame/Failure Records
- DTC Status

Display Codes

Selecting opens either a list of diagnostic trouble codes (DTCs) stored in the selected electronic control module (ECM), or a submenu of DTC viewing options. Submenu options include:

- **Trouble Code Information**—opens a list of codes in ECM memory
- **History Codes**—opens a list codes whose symptoms are not currently present. History codes indicate an intermittently occurring problem.

- **Failed This Ignition**—opens a list of codes that set during the current ignition cycle.
- **MIL SVS or Message Requested**—displays ECM requests to light the malfunction indicator lamp (MIL) or service vehicle soon (SVS) lamp, or display a driver information alert.
- **Last Test Failed**—displays a complete list of failed tests.
- **Test Failed Since Code Cleared**—displays a list tests that failed since the last time codes were cleared from ECM memory.

A code list includes the DTC and a brief description (Figure 5-19).

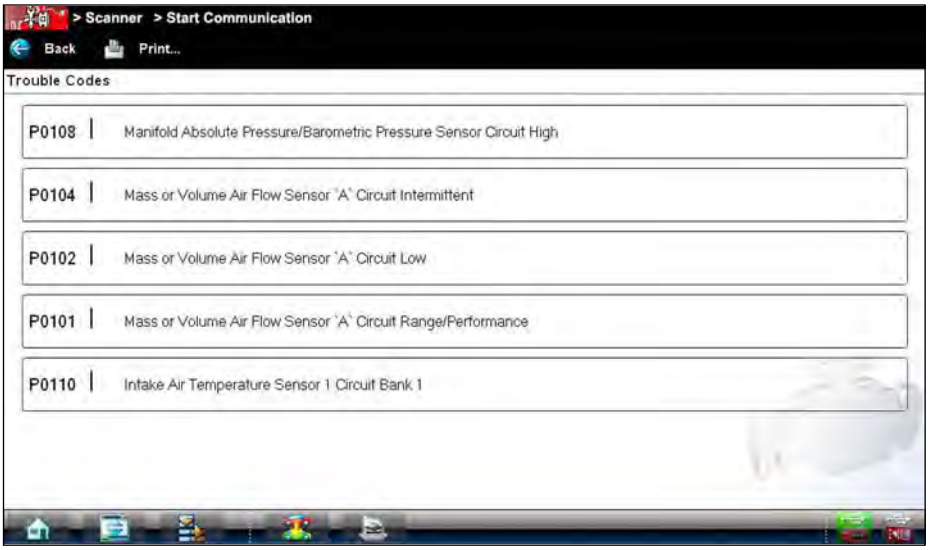


Figure 5-19 *Sample code list*

Clear Codes

The Scanner clears trouble codes from the control module memory on some vehicles. If this function is not available on the test vehicle, Clear Codes does not appear as a menu option.

To clear codes:

1. Select **Clear Codes** from the Codes Menu.
   A confirmation message displays.
2. Make sure any conditions shown on the confirmation message are met, then select **Yes**.
   A “codes cleared” message displays once the operation is complete.
3. Select **Continue** to return to the Codes Menu.

Freeze Frame/Failure Records

This selection displays the DTC that was set, along with corresponding data, when the ECM commanded the malfunction indicator lamp (MIL) to turn on.

DTC Status

This selection allows you to view the records of a particular DTC.

To check DTC status

1. Select **DTC Status** from the Codes Menu.
   The DTC Status entry field displays and the virtual keyboard opens (Figure 5-20).

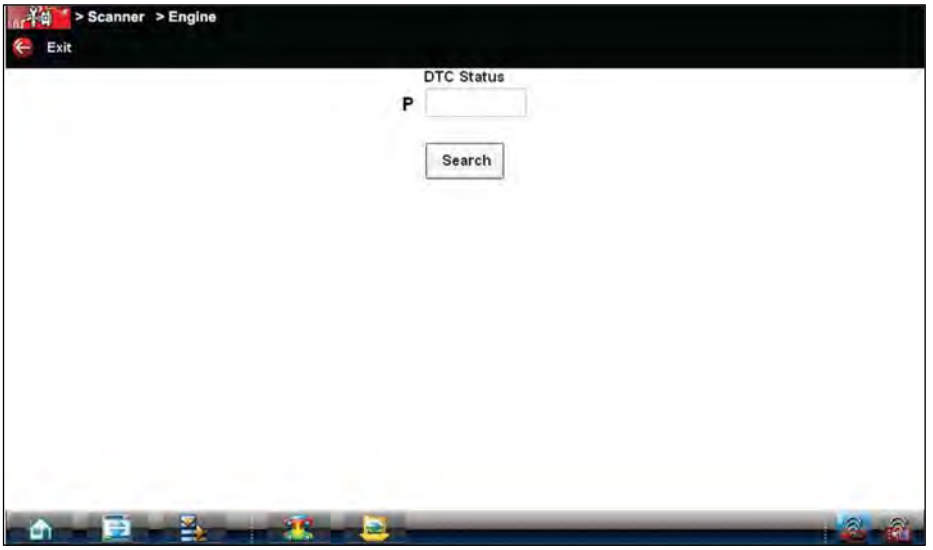


Figure 5-20 *Sample DTC Status entry field*

2. Use the virtual keyboard to enter the characters of the DTC.
3. Tap the virtual keyboard **Backspace** button if needed to erase a character.
4. Tap the virtual keyboard **Return** key once all the code characters are entered.
   The DTC status report displays (Figure 5-21).

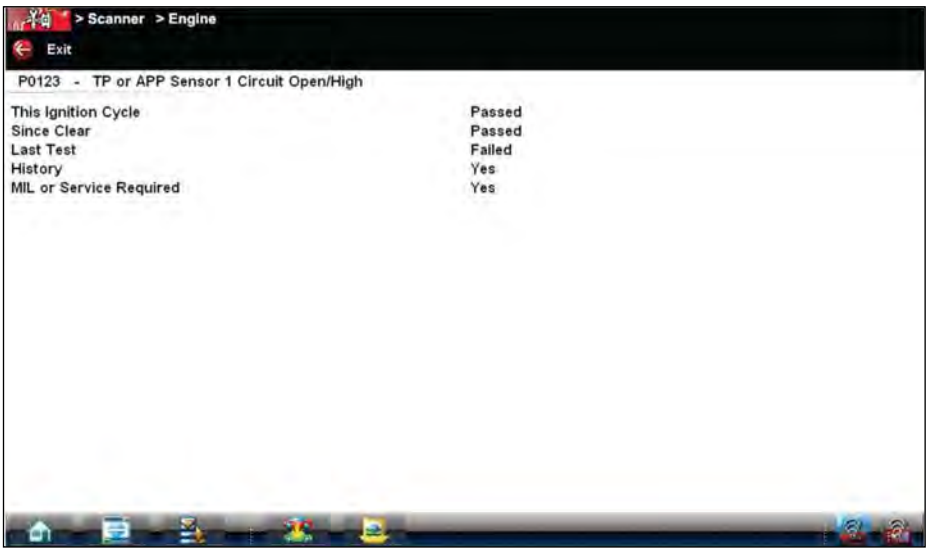


Figure 5-21 *Sample DTC status report*

5. Tap **Exit** to return to the DTC status entry screen.
6. Tap **Exit** again to return to the Codes menu.

5.5.3 Functional Tests

The **Functional Tests** selection is used to access vehicle-specific subsystem and component tests. Available tests vary by manufacturer, year, and model, and only the available tests display in the menu.

There are four general types of functional test operations:

- **Information Tests**—are read-only tests, like selecting “VIN” from a Functional Tests menu to display the VIN of the identified vehicle.
- **Toggle Tests**—switch a component, such as a solenoid, relay, or switch, between two operating states.
- **Variable Control Tests**—command a certain value for a system or component, such as varying the spark timing in 1° increments or the EGR valve duty cycle in 10% increments.
- **Reset Tests**—reset the adaptive, or learned, values that are stored in the control module.

Selecting Functional Tests opens a menu of test options that varies by make and model. Selecting a menu option either activates the test or opens a submenu of additional choices. Follow all screen instructions while performing tests. How and what information is presented on the screen varies according to the type of test being performed.

Some toggle and variable control tests display functional test controls at the top of the screen with data stream information below (Figure 5-22).

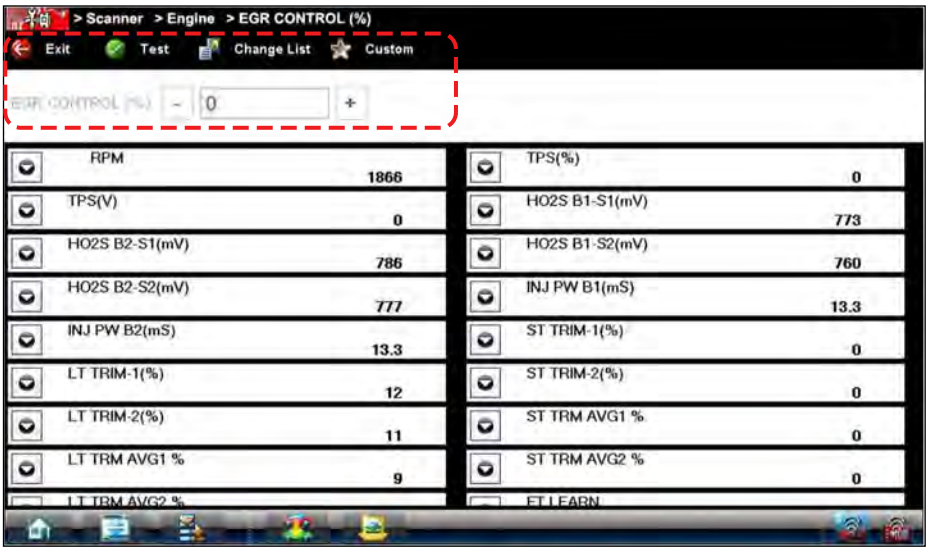


Figure 5-22 *Sample functional test controls*

Functional test controls allow you manipulate the test signal as shown in Table 5-4.

Table 5-4 *Functional test control buttons*

Name	Button	Description
Test		Activates the test.
Return		Moves focus back to the data list.
Change List		Allows you to switch data lists.
Custom		Allows you to select which parameters display during the functional test.
Minus		Switches an item to low or off, or incrementally reduces a variable signal.
Plus		Switches an item to high or on, or incrementally increases a variable signal.

5.5.4 Generic Functions

The **Generic Functions** selection opens a menu of available OBD-II/EOBD functions on 1996 and newer vehicles. For additional information on generic function refer to the *Global OBD Vehicle Communications Software Manual*. Menu options typically include:

- Readiness Monitors—displays the status of the OBD-II/EOBD required monitors
- ($02) Freeze Frame—displays data stored in ECM memory when a DTC is set
- ($05) Oxygen Sensor Monitoring—displays on-board oxygen sensor monitoring test results
- ($06) Non-Continuous Monitors—displays the status of system monitors
- ($08) Request Control of On-Board System—establishes bidirectional ECM communication
- ($09) Calibration Identification—displays the ECM calibration identification numbers
- ($09) Calibration Verification Number—displays the ECM calibration
- ($09) In-Use Performance Tracking—displays a monitoring conditions report
- ($09) Vehicle Identification Number—displays the VIN

Refer to the *Global OBD Vehicle Communications Software Manual* for additional information.

5.5.5 Troubleshooter

Troubleshooter is a database of experience-based information of validated real-world repair strategies that have been compiled by top-notch technicians. Troubleshooter simplifies the diagnosis process, as it contains information on virtually all common diagnostic trouble code (DTC) problems and driveability symptoms.

Troubleshooter information is organized into a series of diagnostic tips that are designed to quickly lead you to the root cause of a particular problem. The tips are vehicle-specific, which means only tips that relate to the identified vehicle are presented.

NOTE:
Troubleshooter appears in a Scanner menu only if tips are available for the system selected on the identified vehicle.

5.5.6 Scanner Toolbar Operations

The Scanner toolbar is used to configure certain aspects of the displayed data and to exit. The following sections explain how to use the toolbar.

Custom

The **Custom** button on the Scanner Toolbar is used to determine which specific parameters display. Minimizing the number of parameters on the data list allows you to focus on any suspicious or symptom-specific data parameters. You can add or remove most parameters from the list. Any parameter that has a lock icon next to it cannot be removed from the list.

IMPORTANT:
Limiting the number of parameters to display only those that apply to a particular situation allows for a faster refresh rate of the data. A smaller data lists also reduces the amount of memory used for saved files.

To create a custom data list:

1. Select **Custom** on the Scanner Toolbar.
   The parameter selection dialog box with all of the parameters selected opens (Figure 5-23).
2. Tap the **Deselect All** button to clear the highlights from the screen.

Figure 5-23 *Sample custom configuration screen*

3. Create a custom data list by tapping the parameters to be included. Highlighting indicates a parameter that displays, parameters that are not highlighted do not display.

Keep the following in mind when configuring a custom data list:

- If the list of parameters is longer than what is shown on the screen, touch and drag the screen to bring the additional parameters into view.
- Use the **Select All** button to display the complete list.
- Use the **Deselect All** button to remove all the currently selected parameters from the list.
- Tap individual parameters to highlight and include them in the list.
- Tap individual highlighted parameters to remove them from the list.
- Use the **Cancel** button to return to the data display.

4. Once all desired parameters have been selected, return to the data list:
   - Use the **List View** button to return to a data screen in PID List format.
   - Use the **Graph View** button to return to a data screen in Graph View format (see Graph View on page 43 for details.

NOTE:
Graph View is only available when 16 or fewer parameters (the number that can display on a single screen) were selected for the custom list. Make sure that no more than 16 parameters are highlighted if the screen displays a single graph when the Graph View button is selected.

Alarms

Alarms are visual indicators alongside a parameter in the data display list that change color to show the status of the signal. A green alarm indicates on, a gray alarm indicates off. Only digital parameters, those with a range limited to two states, can have alarms. Parameters with continuous ranges, such as variable voltage and pressure values, cannot have alarms.

The **Alarms** selection is used to configure visual indicators on certain data parameters. If a vehicle does not provide signals for these functions, the alarm indicators are unused.

The alarm indicator assignments remain as selected until you exit the data list:

To configure alarm settings:

1. Select the **Alarms** button on the Scanner Toolbar.
   The Alarm List dialog box opens.
2. Check the parameters that you want to show alarms.
3. Select **Save**.
   Alarm indicators now appear next to the selected parameters in the Data List. The indicators are green when the value is on or high, and gray when the value is off or low (Figure 5-24).

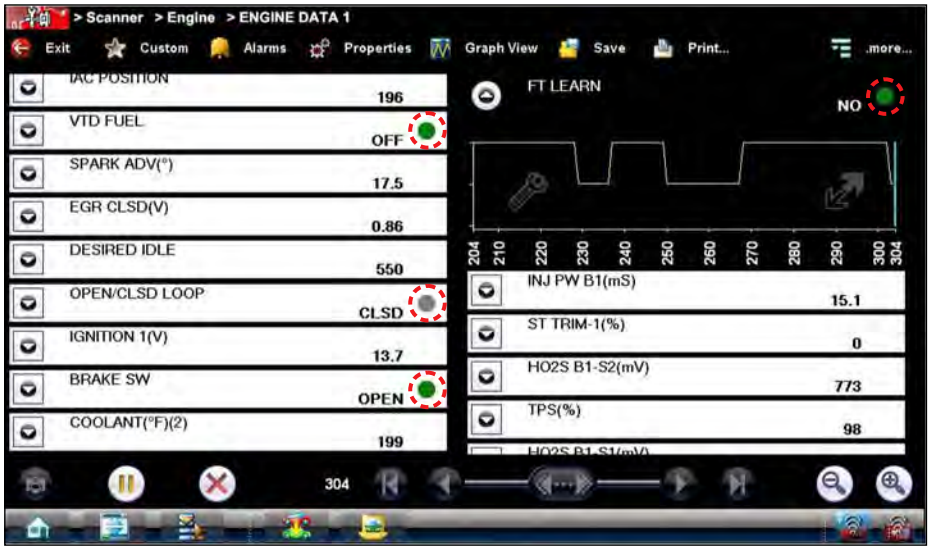


Figure 5-24 *Sample alarm indicators*

NOTE:
Alarms can only be set for certain parameters. If the Alarm List dialog box is empty, no parameters are available and alarms cannot be set.

Properties

The **Properties** button on the Scanner Toolbar is used to configure certain characteristics of the parameter graph display. Selecting opens a Properties dialog box that allows you to adjust colors, settings, and sweep (Figure 5-25).

Figure 5-25 *Sample properties dialog box*

Selecting either color option, **Edit Plot Color** or **Edit Background Color**, opens a standard color selection dialog box. select a color, then tap **OK** to close the dialog box.

The Show Grid button is used to switch a background grid pattern on the data graphs on and off:

- To switch the grid on; tap to highlight **Show Grid**, then tap **Accept**.
- To switch the grid off; tap **Show Grid** twice so it is not highlighted, then tap **Accept**.

The Samples After Trigger setting determines how many data samples are recorded following a triggering event. The highlighted samples button indicates the number of frames that are included in the recording after a triggering event.

The sweep options let you choose the amount of data that displays across the graph. Values are in sample points, or frames of data. A frame of data equals one complete transmission of the serial data by the control module.

Graph View

Graph View allows you to simultaneously display up to 16 parameter graphs (Figure 5-26). The graphs must first be opened in the data list in order to be included when Graph View is selected from the toolbar. The display defaults to a single graph if more than 16 graphs are open when the toolbar button is selected. Should this happen, return to the data list and close some of the graphs.

Figure 5-26 *Sample Graph View screen*

A simple toolbar in Graph View allows you switch scale and sweep values on and off, and to return to the List View. The Data Buffer toolbar at the base of the screen remains active.

NOTE:
The screen does not scroll in Graph View mode, it adjusts to show only the selected parameters.

Graph View mode can also be engaged from the custom data list configuration screen. Refer to Custom on page 40 for details.

Save

The **Save** button is used to record movies of vehicle datastream values. Saved files and be helpful when trying to isolate an intermittent problem or to verify a repair during a road test.

To save a movie:

- Select **Save**.

  A save movie dialog box displays while data is being saved. The movie is saved when the message box disappears.

Figure 5-27 *Sample save dialog box*

Saved files can later be viewed by selecting Data Manager on the home screen. From the Data Manger open the Scanner Data Folder, then locate and select the saved file to be viewed.

Print

Selecting Print from the toolbar opens a standard Windows Print dialog box. Select from the options as needed to print the current frame of data.

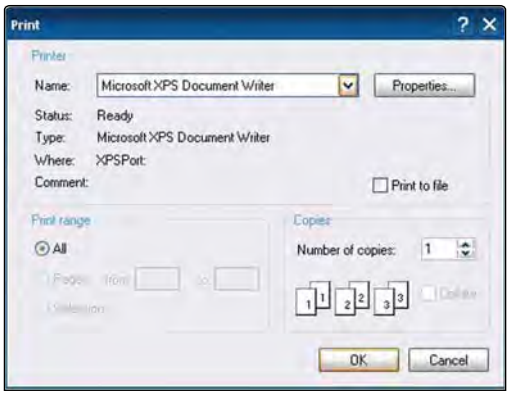


Figure 5-28 *Sample print dialog box*

If the Display Device is connected to a printer, the current frame of data is printed. If the Display Device is not connected to a printer, the frame of data is saved as an “XPS” file. A dialog box opens so that you can name the print file and specify the location that it is saved to, follow the on-screen instructions.

Saved files can be printed at a later date, or opened and reviewed.

NOTE:
Saved print files cannot be viewed using the Data Manager, they can only be opened into an internet browser.

To open a saved print file:

1. Minimize the Diagnostic Suite to view the desktop.
2. From the desktop select **My Documents** > **ShopStream** > **Scanner Data Folder**.
3. Locate the file you wish to view.
4. Double tap the file to open it.
   The internet browser launches and the file opens.

More

Whenever the More button appears on the toolbar it indicates that there are additional options available. Selecting the More button from the Scanner toolbar opens a dropdown menu that offers two choices that only apply to data graphs:

- Scale
- Sweep

Scale

The **Scale** option switches the scale values, displayed along the left-hand side of the data graphs, on and off (Figure 5-29). The dropdown menu closes once a selection is made.

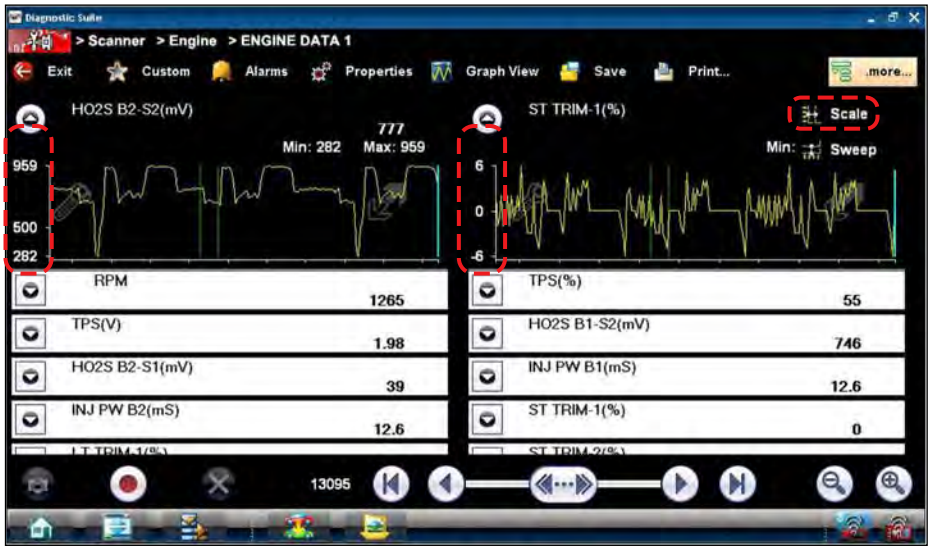


Figure 5-29 *Sample data graph scales*

Sweep

The **Sweep** option switches the sweep values, displayed below the data graphs, on and off (Figure 5-30). The dropdown menu closes once a selection is made.

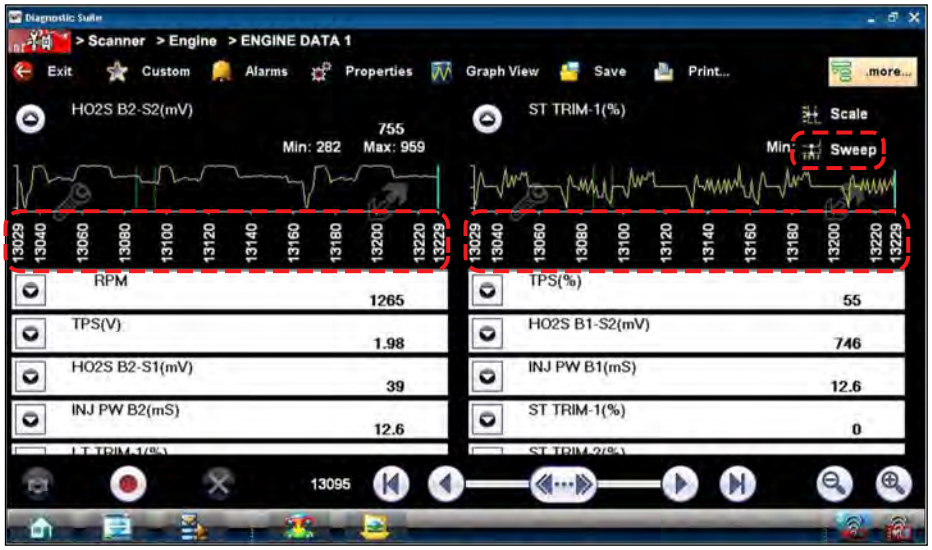


Figure 5-30 *Sample data graph sweep*

5.6 Exiting the Scanner

The Scanner remains open as long as there is an active communication link with the vehicle. You must disconnect this communication link in order to exit from Scanner tests and close the Diagnostic Platform software. A warning message displays if you attempt to shut down while the Scanner is communicating with an ECM.

NOTE:
Damage to the vehicle electronic control module (ECM) may occur if communication is disrupted. Make sure the data cable and the USB cable are properly connected at all times during testing. Exit all tests before disconnecting the test cable or powering down the tool.

To exit the Scanner:

1. From an active screen, select **Exit** from the Scanner Toolbar to return to the Systems Menu.
2. From the Systems Menu, select **Back** from the Scanner data menu.

   A “stopping communications” message briefly displays followed by the Scanner main menu.

Now, the Scanner is no longer communicating with the vehicle and it is safe to return to the Home screen and exit the Diagnostic Platform software.

5.7 Downloading Firmware

The internal programming of the Scan Module, known as the firmware, can be updated using the VERUS Diagnostic Platform. Firmware updates increase the Scan Module diagnostic capabilities, typically by adding new tests, new models, or enhanced applications to the databases.

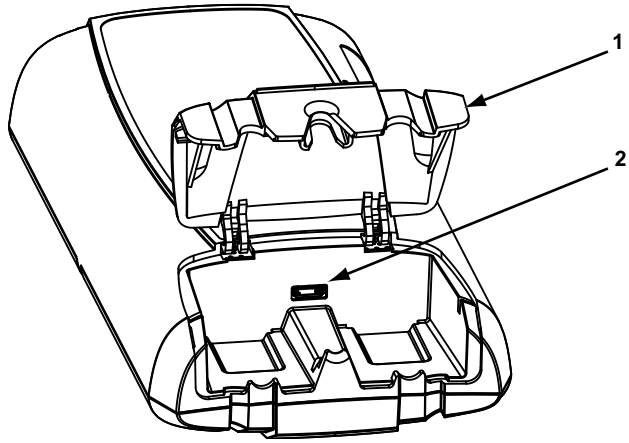
The display device automatically searches for available updates for all of the VERUS components when it is connected to the internet. Any updates that are found are downloaded and stored on the device. However, the update must be installed in order to complete the process. This section describes installing an update to the Scan Module firmware. A notification message displays if an update is available when Scanner is selected from the VERUS Home screen (Figure 5-31).

Figure 5-31 *Firmware update available message*

The firmware update process, as explained in the following procedure, begins automatically after ten seconds unless the Update Now or Update Later button is selected. Selecting **Update Now** begins the process immediately. **Update Later** defers the operation, closes the message, and launches the Scan Module. Not updating does not impact operations, the Scan Module remains fully functional but may not benefit from the additional features available in the update. Selecting **Details** in the upper-right corner opens a list of what is included in the update.

To update the firmware:

1. Power on the Display Device.
2. Connect the Scan Module to the Display Device as follows (Figure 5-32):
   a. From the bottom of the Scan Module, gently lift up and out on the sides of the handgrip to free it from housing.
   b. Open the hinged cover on the base of the Scan Module to expose the USB port.
   c. Plug the small end of the USB cable into the USB port on the Scan Module.
   d. Plug the large end of the USB cable into one of the ports on the side of the display device.



1— Hinged cover

2— USB port

Figure 5-32 *Scan Module service port*

NOTE:
The Scan Module and Display Device must be connected with the USB cable to update the firmware. The USB cable powers the Scan Module so there is no need to connect to a vehicle.

3. Select **Scanner** from the Display Device Home screen.
4. Select **OK** when the firmware update notification displays (Figure 5-31).
   The update begins and installation progress is tracked on the screen (Figure 5-33).

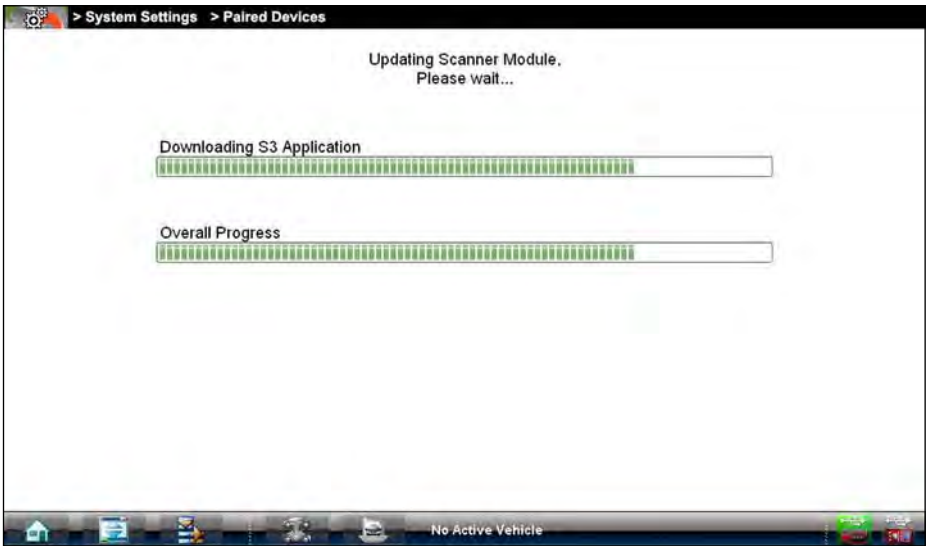


Figure 5-33 *Sample update in progress screen*

A “Reprogramming succeeded” message displays once the installation process is complete (Figure 5-34).

Figure 5-34 *Sample firmware update complete message*

5. Select **OK** to close the message and return to Scanner operations.
   The Scan Module, with the latest firmware update, is now ready to use.

Chapter 6 OBD Direct Operations

This Home screen option allows you to access Generic OBD-II/EOBD Scanner tests without completing a vehicle identification. OBD Direct presents a quick way to check for diagnostic trouble codes (DTCs), isolate the cause of an illuminated malfunction indicator lamp (MIL), check monitor status prior to emissions certification testing, verify repairs, and perform a number of other services that are emissions-related. This mode is also used for testing OBD-II/EOBD compliant vehicles that are not included in the Scanner databases.

OBD Direct is a Scanner function, and the Scan Module must be connected to the test vehicle and communicating with the Display Device. This function only provides generic OBD-II/EOBD information. To access enhanced OBD-II/EOBD functions, select Scanner from the Home screen.

Selecting OBD Direct on the Home screen opens a menu with two options (Figure 6-1):

Figure 6-1 *Sample OBD Direct main menu*

6.1 OBD Health Check

The OBD Health Check offers a way to quickly check for and clear generic diagnostic trouble codes (DTCs) and to check readiness monitors. Selecting OBD Health Check opens a submenu of options (Figure 6-2).

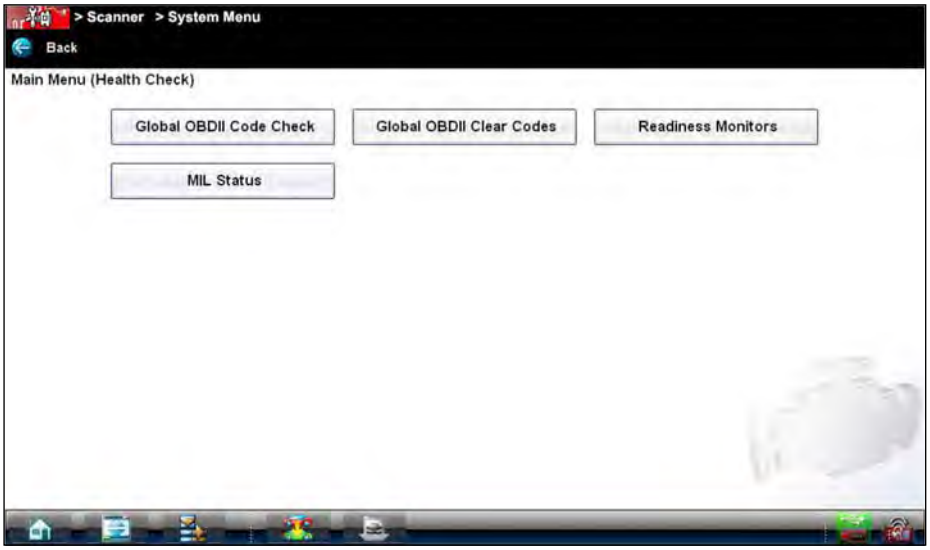


Figure 6-2 *Sample OBD Health Check menu*

6.1.1 Global OBD II Code Check

This option displays any stored emission related generic DTCs reported by the ECM. Selecting opens a submenu with two choices: Codes and Pending Codes.

Select an option to display the code list. Refer to Codes Menu on page 35 and the *Global OBD Vehicle Communication Software Manual* for additional information.

Codes

Codes displays a list of current emission related DTCs. OBD-II/EOBD Codes have a priority according to their emission severity, with higher priority codes overwriting lower priority codes. The priority of the code determines the illumination of the MIL and the code erase procedure. Manufacturers rank codes differently, so expect to see differences between makes.

Pending Codes

The purpose of this service is to enable the scan tool to obtain “pending” or maturing diagnostic trouble codes. These are codes whose setting conditions were met during the last drive cycle, but need to be met on two or more consecutive drive cycles before the DTC actually sets.

The intended use of this service is to assist the service technician after a vehicle repair and after clearing diagnostic information, by reporting test results after a single driving cycle.

- If a test failed during the driving cycle, the DTC associated with that test is reported. If the pending fault does not occur again within 40 to 80 warm-up cycles, the fault is automatically cleared from memory.
- Test results reported by this service do not necessarily indicate a faulty component or system. If test results indicate another failure after additional driving, then a DTC is set to indicate a faulty component or system, and the MIL is illuminated.

6.1.2 Global OBD II Clear Codes

This option is used to clear all emission related diagnostic data such as, DTC records, freeze frame data, and test results, from ECM memory. Although OBD Direct only displays generic OBD-II data, clearing codes erases all of the stored data including any enhanced codes.

A confirmation screen displays when the clear codes option is selected to prevent accidental loss of data. Select Yes on the confirmation screen to continue. Refer to Codes Menu on page 35 and the *Global OBD Vehicle Communication Software Manual* for additional information.

6.1.3 Readiness Monitors

Use this menu option to check the readiness of the monitoring system. An OBD-II/EOBD system checks the status of emission-related subsystems by running continuous or periodic tests. Test results are shown in the data viewer (Figure 6-3).

Figure 6-3 *Sample readiness monitor test report*

Gesture sweep to view the entire list of Readiness Monitors to ensure that all tests are complete. It is possible to print the readiness test status or save it as part of a Vehicle history.

6.1.4 MIL Status

This item is used to check the current condition of the Malfunction Indicator (MIL). Additional information, such as which ECM commanded the MIL on and the distance driven while the MIL is on (if supported), can also be displayed. It is also possible to print the MIL Status.

6.2 OBD Diagnose

Selecting OBD Diagnose opens a menu with the following options:

- Start Communication—begins the test session
- Select Communication Protocol—allows you to select which protocol to use
- Connector Information—provides data link connector (DLC) location details for most models

6.2.1 Start Communication

Use the following procedure to conduct an OBD Direct test session:

To perform an OBD Direct Test:

1. Select **Start Communications** from the OBD Direct menu.

   A generic connection message displays (Figure 6-4), connect the Scan Module to the test vehicle as instructed.

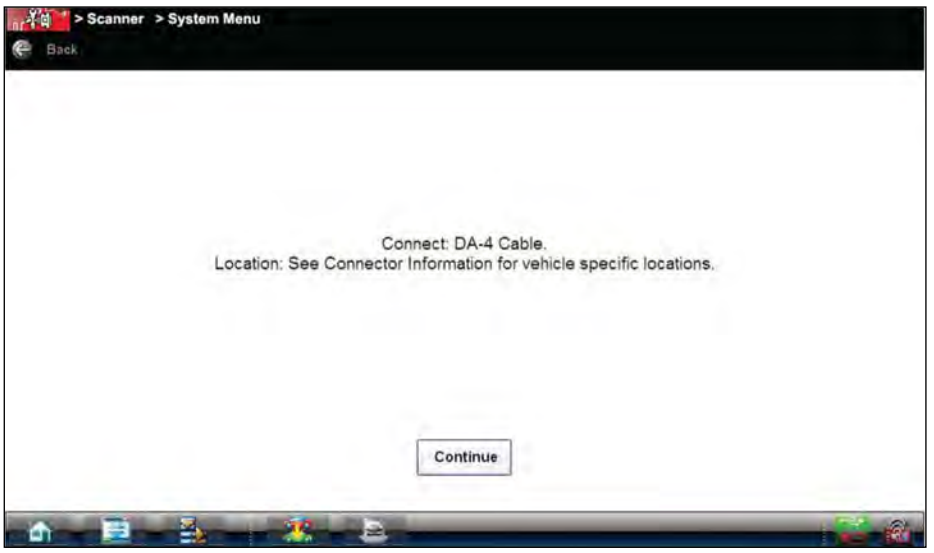


Figure 6-4 *Sample generic connection message*

2. Select **Continue**.

   A communications message that shows how many ECMs were detected, Which ECM is communicating, and which communication protocol is being used displays (Figure 6-5).

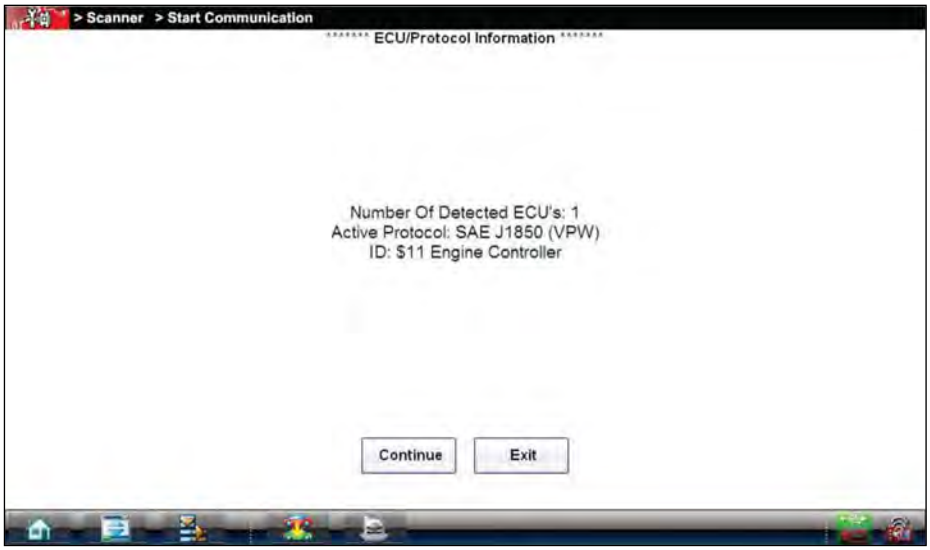


Figure 6-5 *Sample communication message*

3. Select **Continue** and a menu of available tests displays (Figure 6-6).

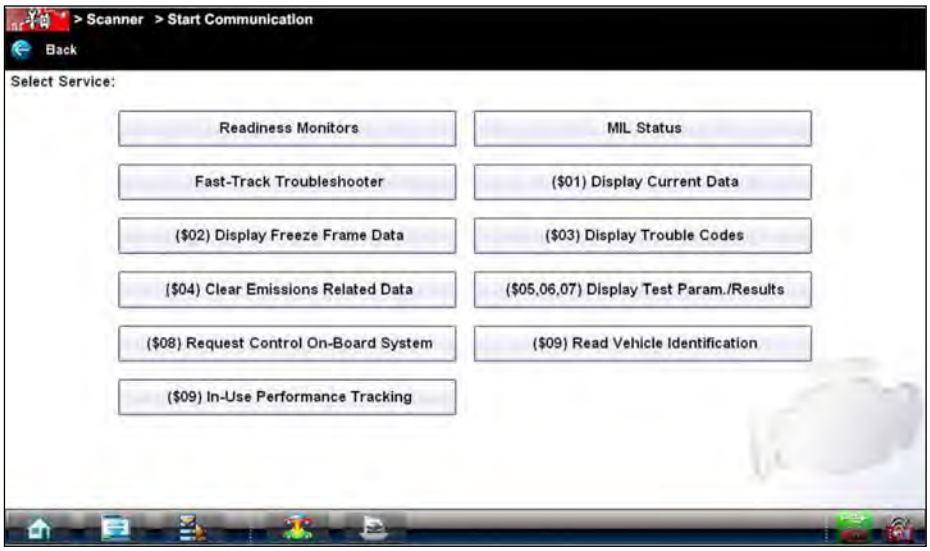


Figure 6-6 *Sample Start Communication menu*

4. Select a test to continue.

Readiness Monitors

Use this menu item to check the readiness of the monitoring system. If a monitor system is not supported, it is not displayed. Scroll, if needed, to view the entire list of monitors. Selecting Readiness Monitors opens a submenu with two choices:

- Monitors Complete Since DTC Cleared—displays the results of all monitor tests that have run since the last time the electronic control module (ECM) memory was cleared.
- Monitors Complete This Cycle—displays only the results of monitor tests that ran during the current drive cycle, they reset when the ignition is switched off.

MIL Status

This item is used to check the current condition of the Malfunction Indicator (MIL). Additional information, such as which ECM commanded the MIL on and also the distance traveled while the MIL is on (if supported), can also be displayed. It is also possible to print the MIL Status.

Fast-Track Troubleshooter

Fast-Track® Troubleshooter is a database of experience-based information of validated real-world repair strategies that have been compiled by top-notch technicians since 1988. The Troubleshooter system simplifies the diagnosis process, as it contains information on virtually all common diagnostic trouble code (DTC) problems and driveability symptoms for most vehicles covered by the vehicle communication software.

($01) Display Current Data

Use this item to display the current emission related data from the selected electronic control module (ECM) of the vehicle. Displayed data includes analog inputs and outputs, digital inputs and outputs, and system status information broadcast on the vehicle data stream.

($02) Display Freeze Frame Data

This item is used to display freeze fame data for any stored emission related diagnostic trouble codes (DTC). In most cases the stored frame is the last DTC that occurred. Certain DTCs, those that have a greater impact on vehicle emission, have a higher priority. In these cases, the highest priority DTC is the one for which the freeze frame records are retained.

Freeze frame data includes a “snapshot” of critical parameter values at the time the DTC set.

($03) Display Trouble Codes

This is used to display any stored emission related DTCs reported by the various ECMs.

($04) Clear Emissions Related Data

This item is used to clear all emission related diagnostic data such as, DTCs, freeze frame data, and test results from the memory of the selected ECM.

($05, 06, 07) Display Test param./Results

This selection opens a submenu of test parameters and test results from various sensors, such as the oxygen sensor (O2S), monitor test results, and a record of DTCs detected during the last drive cycle. The menu includes:

- Oxygen Sensor Monitoring ($05)
- Specific Monitored Systems ($06)
- DTCs Detected During Last Drive ($07)

($08) Request Control of On-board System

This service enables bidirectional control of the ECM so that the Scanner is able to transmit control commands to operate the vehicle system. This function is useful in determining how well the ECM responds to a command.

Available options vary by make, model, and year of the test vehicle. Select a test and follow the on-screen instructions.

($09) Read Vehicle Identification

This selection displays the vehicle identification number (VIN), the calibration identification, and the calibration verification number (CVN) of the test vehicle.

($09) In-use Performance Tracking

This selection displays the “In-use Performance Tracking” of monitored data. It is basically a record of the number of times each of the monitor tests have been completed.

6.2.2 Select Communication Protocol

A communication protocol is a standardized way of data communication between an ECM and a scan tool. Global OBD may use several different communication protocols.

Touch **Select Communication Protocol** to open a menu of options (Figure 6-7).

Figure 6-7 *Sample communication protocol menu*

When the All Protocols setting is used the Scanner attempts to establish communication using each protocol in order to determine which one the vehicle is broadcasting on.

6.2.3 Connector Information

This option opens a database of vehicle diagnostic connector locations that includes most makes and models.

To locate a vehicle diagnostic connector:

1. Select **Connector Information** from the System menu.
2. Select a manufacturer from the list presented.
3. Select a model from the list presented.
   Instructions for which, if any, cable adapter or pin to use displays.
4. Select **Continue**.
   Information on where to locate the vehicle diagnostic connector displays.
5. Select **Continue** to return to the System menu.

Chapter 7 Component Test Operations

The Component Test software is a component-testing powerhouse, providing you with a robust diagnostic database for use with scopes and meters. It is like having access to a complete library of shop manuals for testing engine-management components, transmission sensors and components, and ABS systems.

Component Test helps you with everything from selecting the appropriate test for a specific component to showing the hook-up location and correct pin configuration. This software thoroughly guides and instructs you on proper testing procedures and offers tips from the internal troubleshooter database. The component test procedures, tips, and meter settings reduce your overall set-up and diagnostic testing time. Vehicle-specific component tests are provided for engine, transmission, ABS, charging, transfer case and suspension systems.

⚠ WARNING

Risk of electrical shock.

- **Read the Important Safety Instructions document provided separately for messages on the safe use of this product.**
- **This product is intended for Measurement Category I (for example, automotive 12V systems), do not use this product for Measurement Categories II, III, and IV.**
- **Measurement Category I is for performing measurements on circuits not directly connected to MAINS or MAINS circuits (an example of a MAINS circuit is 120V AC or 240V AC household or industrial electricity), do not connect this product to MAINS or MAINS circuits.**
- **Do not apply the Black Ground Lead to test points other than ground/system return/ vehicle chassis.**

Electrical shock can cause personal injury, equipment damage, or circuit damage.

IMPORTANT:
Maximum rated transient over voltage impulse is 500 volts, do not exceed the rated transient over voltage.

7.1 Vehicle Identification

The component test information presented is specific to the vehicle being tested. Therefore, certain attributes of the test vehicle must be entered into the Diagnostic Platform so that the correct data can be retrieved. Vehicle identification information is carried over if you enter the Component Test module either from the Scan Module or from one of the records stored in the Vehicle History module. However, you may need to enter additional attributes in some instances.

The vehicle identification sequence is menu driven, you simply follow the screen prompts and make a series of choices. Each selection you make advances you to the next screen.

7.1.1 Identifying a Test Vehicle

Exact procedures to identify the test vehicle may vary somewhat by vehicle and market. The following procedure, which identifies a 2008 Ford Focus for testing the fuel injection system, is typical of what to expect.

To identify a vehicle for Component Test:

1. Tap the **Component Test** module button from the Home screen.
2. Select which database to load for the test vehicle if requested (optional).
   After the database loads, a list of manufacturers displays.
3. Select **FORD** and a list of systems available for testing displays (Figure 7-1).

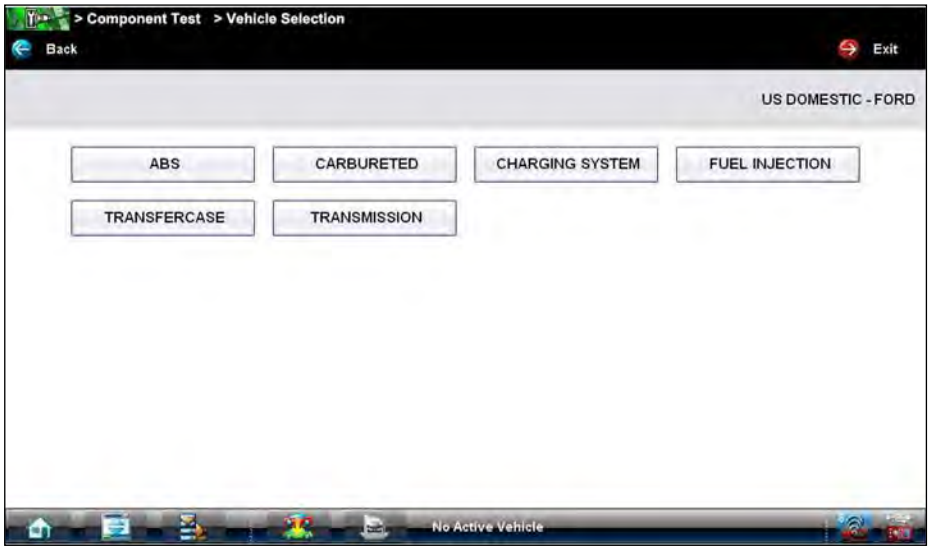


Figure 7-1 *Sample available systems menu*

4. Select **FUEL INJECTION** and a model year menu displays.
5. Select **2008** from the year menu and a list of available models displays.
6. Select **FOCUS** from the model list and a list of available engines displays.
7. Select **2.0L ZETEC** from the engine list and a confirmation dialog box displays (Figure 7-2).

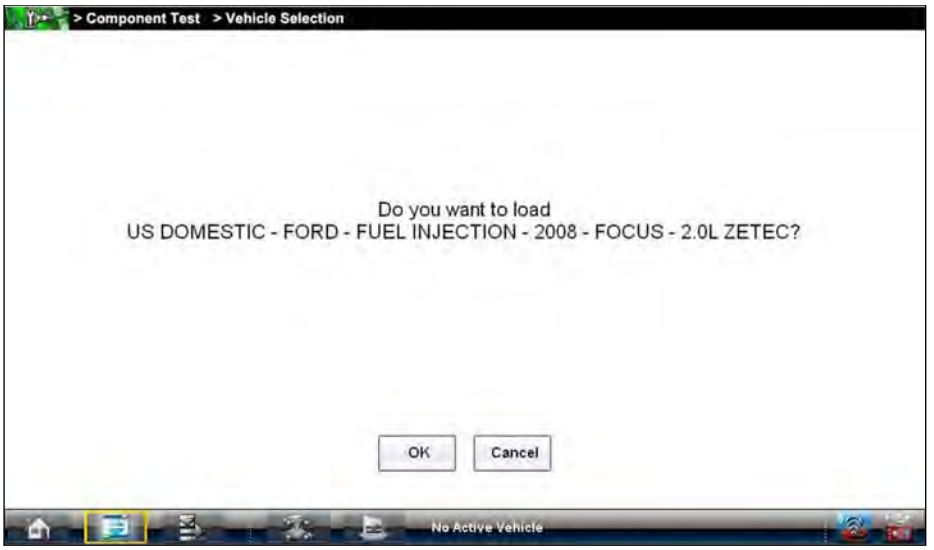


Figure 7-2 *Sample confirmation dialog box*

8. From the confirmation dialog box, select **OK** to continue, or Cancel to return to the engine list. A list of tests available for the identified vehicle displays (Figure 7-3).

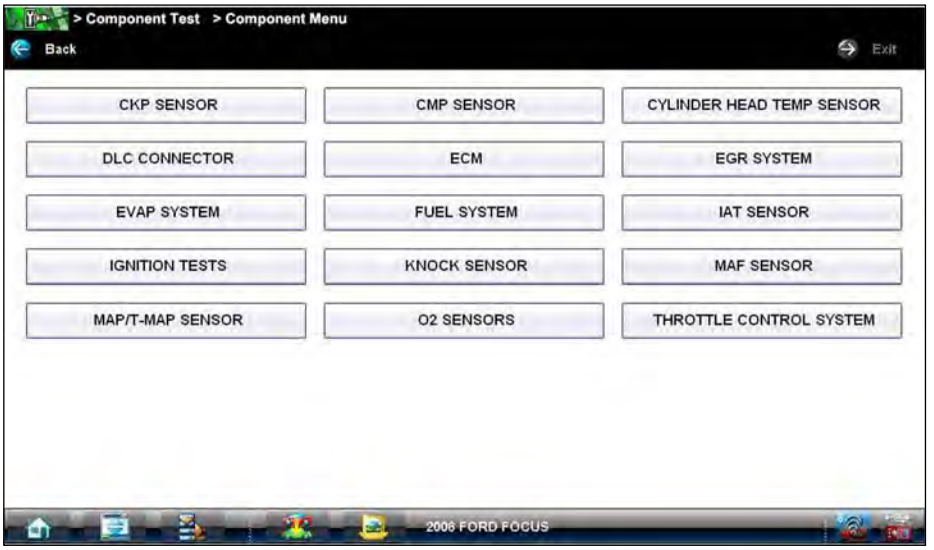


Figure 7-3 *Sample available tests list*

9. Select a test to continue.

The identification sequence is now complete, refer to the Operations section that follows for details on how to navigate through the Component Test information and perform tests.

NOTE:
If you return to the Home screen and select Scanner or Information the vehicle identification entered here is carried over. However, additional information may be needed by some modules.

7.2 Operations

The Component Test software provides vehicle specific component test procedures and information that aid in setting up scopes and meters. Once a test vehicle is identified, you can select a component test from the list of available tests. For most selections two main choices are available on the component menu:

1. **COMPONENT INFORMATION**—provides information on the selected component and connector pin details that assists you in understanding the components prior to diagnosis.
2. **TESTS**—provides a pre-configured list of tests, guides you through performing the tests, and offers tips and resources to reduce setup and testing time.

7.2.1 Component Information

Component Information provides details on specific vehicle components to provide a better understanding the components prior to diagnosis.

The Component Information screens contain information to assist you with testing. The screens are divided in sections to help quickly guide you to the correct information (Figure 7-4):

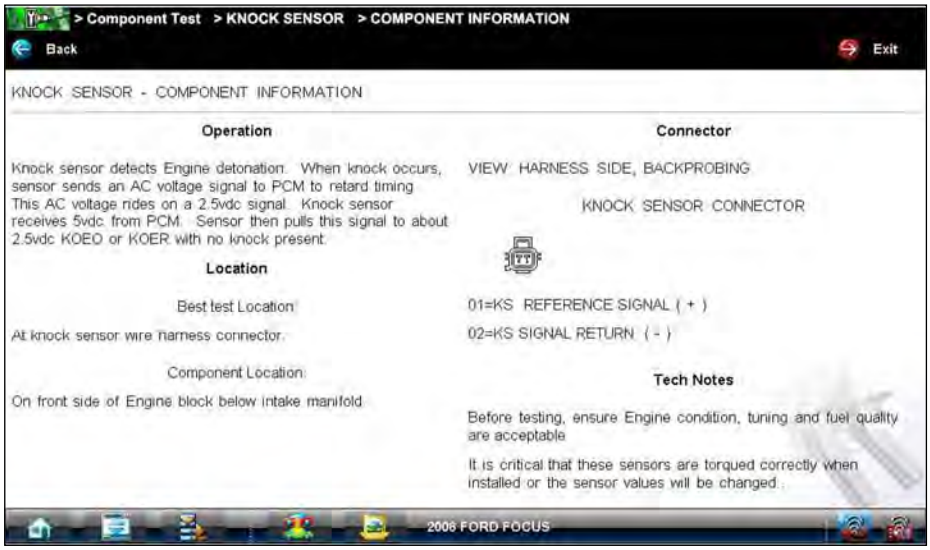


Figure 7-4 *Sample Component Information screen*

- **Operation—**provides a general description of normal component operation.
- **Connector—**displays the component connector and lists pin assignments.
- **Location**—identifies the component location and the best place for testing it.
- **Tech note**—provides component test-related tips (for example, common failures or faults) as well as update or recall information.

To view component information:

1. Select a component from the tests list.
2. Select **COMPONENT INFORMATION** from the component menu.

NOTE:
An additional selection, such as front or rear for an oxygen sensor (O2S), may be required before advancing to the component information screen.

The component information screen displays (Figure 7-4). A scroll indicator along the right edge of the screen appears if there is additional information below what is visible.

3. Gesture sweep to view any additional information.
4. Select **Back** at any time to return to the previous screen.

7.2.2 Tests

The Tests section guides you through the process of performing tests on a specific component. It also provides specifications, tips on how and where to connect the test meter leads, and also automatically configures the multimeter or lab scope to perform the selected test.

Once a test vehicle is identified, you can select a component from the available tests list.

To select a test:

1. Select a component from the list.
2. Select **TEST** to open the list.

NOTE:
More than one selection is available in some instances. For example, a primary and a secondary tests selection display when ignition tests is selected.

The list shows all of the tests available for the selected component, choices vary by make, model, and year.

Selecting opens an additional submenu similar to the one shown in Figure 7-5 when more than one option is available.

Figure 7-5 *Sample O2S voltage test submenu*

3. Select a test option and the test screen displays (Figure 7-6).

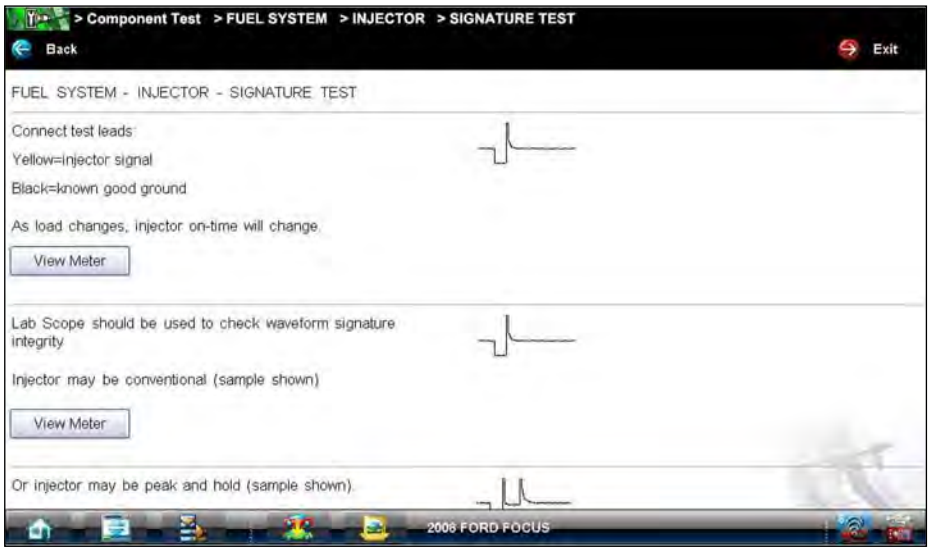


Figure 7-6 *Sample Test screen*

4. Gesture sweep to view any additional information.

   A scroll indicator displays momentarily along the right edge of the screen if there is additional information below what is on the screen.
5. Select **Back** at any time to return to the previous screen, or select **Exit** to return to the main component menu.

Hyperlinks

Component test screens contain hyperlinks that can either take you to another page containing additional information or open an additional window on top of the current screen. Hyperlinks display as buttons. Common hyperlinks are:

- **View Meter**—opens a live meter set up to perform the test in the lower portion of the screen (Figure 7-7). Once the meter view is open, the Component Test toolbar at the top of the screen is replaced by the Scope Multimeter toolbar, which allows you to make adjustments to the settings. See Scope Multimeter Toolbar on page 72 for details.
- **Show More Information**—advances to a new screen with more detailed information about a particular test, select **Back** to return to the test screen.

View Meter

A Meter button, which is only available in the Component Test view meter mode, appears on the upper toolbar (Figure 7-7).

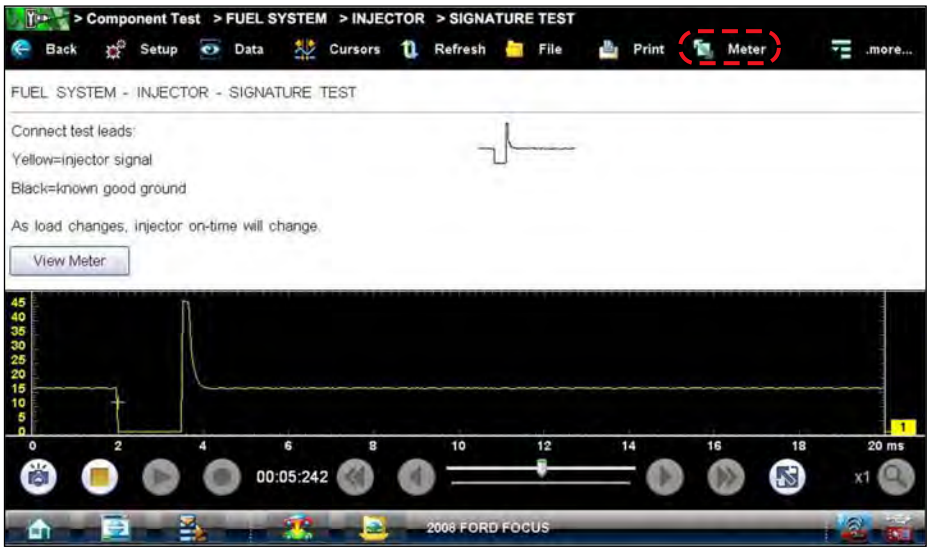


Figure 7-7 *Sample view meter window*

Three view meter options are available:

1. With View Meter active (Figure 7-7), tap the **Meter** button on the toolbar once and the meter expands to fill the entire screen.
2. Tap the **Meter** button a second time and the meter open as a separate window (Figure 7-8). This window can remain open if you switch to the Scan Module and can be accessed from the Windows toolbar at the bottom of the screen. You can also resize and reposition the meter window on the screen.

Figure 7-8 *Sample meter view in a separate window*

Tapping the **Close** button (red box with an X) when viewing the meter in a separate window closes the meter and returns you to the Component Test screen.

3. Tap the **Meter** button a third time to close the separate window and return to the standard meter view as shown in Figure 7-7.

   Select **Exit** from the toolbar to close meter view and return to the Component Test screen.

Connecting to a Test Vehicle

Before performing a test, you must connect the meter test leads to the vehicle. Certain component tests require the use of specific leads. Information on specific leads and other connecting information displays on the initial test screen. Follow the on-screen connection instructions in the test procedure to connect the test leads.

Performing a Test

Once you connect the test leads to the vehicle, you can proceed with testing.

To perform component tests:

1. Follow the instructions displayed in the test procedure section.
2. Gesture sweep to view all of the instructions and follow the on-screen procedures.
3. Select the View Meter hyperlink to display test results.
4. Refer to the on-screen information to verify test results.

IMPORTANT:
Refer to Scope Multimeter Operations on page 66 for additional information on working with the View Meter window.

Chapter 8 Scope Multimeter Operations

This Scope Multimeter module provides all the tools needed for performing electrical and electronic circuit tests and for monitoring signals and circuit activity. The Scope Multimeter module easily separates from the Display Device and connects with a USB cable so that test results can be remotely monitored as you perform other tasks.

The Scope Multimeter works interactively with other modules. Selecting “View Meter” from a Component Test or Scanner test launches the Scope Multimeter module.

⚠ WARNING

Risk of electrical shock.

- **Read the Safety Information provided for important warnings on the use of this product**
- **This product is intended for Measurement Category I (for example, automotive 12V systems), do not use this product for Measurement Categories II, III, and IV.**
- **Measurement Category I is for performing measurements on circuits not directly connected to MAINS or MAINS circuits (an example of a MAINS circuit is 120V AC or 240V AC household or industrial electricity), do not connect this product to MAINS or MAINS circuits.**
- **Do not apply the Black Ground Lead to test points other than ground/system return/ vehicle chassis.**

Electrical shock can cause personal injury, equipment damage, or circuit damage.

IMPORTANT:
Maximum rated transient over voltage impulse is 500 volts, do not exceed the rated transient over voltage.

8.1 Remote Scope Multimeter Setup

The Scope Multimeter module can be removed from the Display Device, then connected to the Display Device with a USB cable. This increases the range of mobility for the Display Device while monitoring signals on the test vehicle. A Type A/B USB cable, which is provided with your kit, makes the connection.

NOTE:
The Scope Multimeter module can be removed from the Display Device at any time, whether powered on or not. However, data and settings will be lost if it is removed while operating.

To prevent accidental loss of data, make it a practice to first save the current data if desired, then select either the **Power Off** or **Back** button from the toolbar to suspend meter operation. Power Off saves the current settings, but does not save data. Settings are not saved if Back is selected.

To setup the Scope Multimeter for remote viewing:

1. Depress the Scope Multimeter module release tab located on the top of the unit (Figure 8-1).

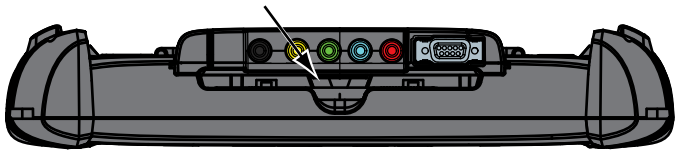


Figure 8-1 *Scope Multimeter release tab*

2. Slide the Scope Multimeter module free of the Display device.
3. Open the USB port cover on the bottom of the Scope Multimeter module (Figure 8-2).

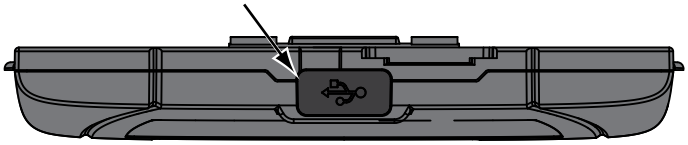


Figure 8-2 *Scope Multimeter module USB port location*

4. Connect the square end of the USB cable to the port on the Scope Multimeter.
5. Open the hinged cover on the left-hand side of the Display Device (Figure 8-3).

1— Hinged cover

2— USB ports

Figure 8-3 *Scope Multimeter module USB port location*

6. Connect the rectangular end of the USB cable to either of the two ports on the Display Device. The Scope Multimeter is now ready for remote use.

8.2 Getting Started

The Scope and Multimeter module enables the following functions:

- Lab Scope
- Ignition Scope
- Graphing Multimeter
- Digital Multimeter

8.2.1 Capabilities

The following tables detail the software and hardware capabilities.

Table 8-1 *Scope*

Function	Range	Accuracy/Comments
Signal Measurement	Ch. 1—yellow banana jack Ch. 2—green banana jack Ch. 3—blue banana jack Ch. 4—red banana jack	Each channel input is referenced to common ground input (GND—black banana jack)
Sample Rate	Single trace mode = 6 MSPS (Ch. 1 only) Dual trace mode = 3 MSPS (Ch. 1 & 2 only) Four trace mode = 1.5 MSPS (Ch. 1–4)	Continuous sampling, MSPS = mega samples per second
Bandwidth	DC–3 MHz	3 db point @ 3 MHz
Input Impedance	10 MOhm @ DC 4 kOhm @ 3 MHz	Channel 1–4
VDC (Full Scale)	100mV–400V	Do not measure greater than 75VDC
VAC (Full Scale)	100mV–400V	Do not measure greater than 50VAC (rms)

Table 8-2 *Graphing Multimeter*

Function	Range	Accuracy/Comments
Signal Measurement	Ch. 1—yellow banana jack Ch. 2—green banana jack	Each channel input is referenced to common ground input (GND—black banana jack)
Sample Rate	1.5 MSPS	Continuous sampling, MSPS = mega samples per second
Bandwidth	DC–3 MHz	3 db point @ 3 MHz
Input Impedance	10 MOhm @ DC 4 kOhm @ 3 MHz	Channel 1–4
VDC (Full Scale)	75VDC	Do not measure greater than 75VDC
VAC (Full Scale)	50VAC	Do not measure greater than 50VAC (rms)
Low Amp Probe	20A scale (100mV/Amp) 40A scale (10mV/Amp)	Connect Low amp Probe (+) to Ch. 1 (yellow banana jack) and (–) to GND input (black banana jack). See NOTE below.

Table 8-3 *Digital Multimeter*

Function	Range	Accuracy/Comments
Signal Measurement	Ch. 1—yellow banana jack	Channel 1 input is referenced to common ground (GND—black banana jack)
VDC (Full Scale)	75VDC	Do not measure greater than 75VDC
VAC (Full Scale)	50VAC	Do not measure greater than 50VAC (rms)
Signal Measurement Input Impedance	10 MOhm	
Ohm Measurement Diode Test Continuity Test	Ch. 3—blue banana jack Ch. 4—red banana jack	Each channel input is referenced to common ground (GND—black banana jack)
Ohms	400 Ohm–40 MOhm	Fixed scales or Auto Ranging
Glitch capture	Approximately 50 uS	
Diode Test	2 V Scale	

NOTE:
200V to 400V scales are not to be used to measure signals greater than 50VAC (rms) or 75VDC.

IMPORTANT:
Do not use the Low Amp Probe to measure current on conductors at a potential greater than 46VAC peak or 70VDC.

8.2.2 Leads, Probes and Adapters

The Scope Multimeter uses standard safety banana plugs that are compatible with many accessories. The various leads, probes, clips, and adapters that are supplied with, or available as optional equipment, are explained in this section.

IMPORTANT:
When removing leads from their sockets, do not pull on the wire because it can damage the leads. Pull on the plug.

Channel 1 Lead

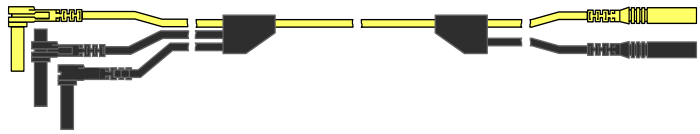


Figure 8-4 *Yellow Channel 1 Lead*

The shielded yellow lead is used for Channel 1 (Figure 8-4) and other channel connections that need additional grounding. The lead color matches the color of socket 1 on the Display Device and the color of trace 1 on the test screens.

This yellow lead includes a black, right-angle, common ground plug and a black, stackable, common ground plug. The non-stackable ground plug always connects to the ground (GND) port on top of the unit. The stackable ground plug is used for connecting additional leads, such as the Channel 2 Lead or the Secondary Coil Adapter Lead, that require grounding. The stackable lead grounds through the non-stackable lead and does not need to be connected to the port on the unit.

Channel 2 Lead

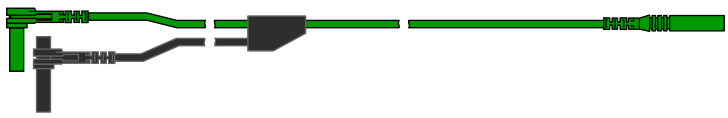


Figure 8-5 *Green Channel 2 lead*

The shielded green lead (Figure 8-5) is used for Channel 2. The lead color matches the color of socket 2 on the Display Device and the color of trace 2 on the test screens. This green lead includes a stackable, black, right-angle ground plug.

Channel 3 Lead

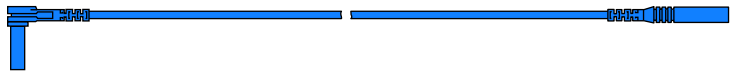


Figure 8-6 *Blue Channel 3 lead*

The non-shielded blue lead (Figure 8-6) is used for either Channel 3 or Digital Meter minus (–). The lead color matches the color of socket 3 on the Display Device, as well as the color of trace 3 on the test screen.

Channel 4 Lead

Figure 8-7 *Red Channel 4 lead*

The non-shielded red lead (Figure 8-7) is used for either Channel 4 or Digital Meter plus (+). The lead color matches the color of socket 4 on the Display Device, as well as the color of trace 4 on the test screen.

Alligator Clips

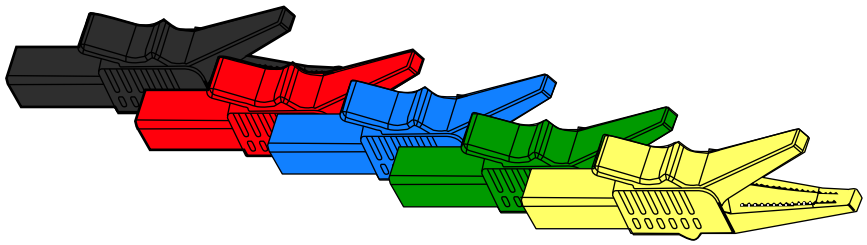


Figure 8-8 *Alligator clip*

Insulated alligator clips, colored to match each test lead, are included. A black clip for the common ground lead is also supplied (Figure 8-8). Each clip plugs into the straight end of a channel lead.

Test Probes

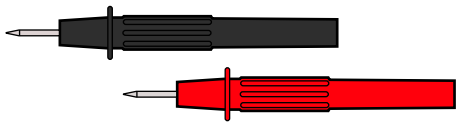


Figure 8-9 *Test probe*

Two test probes are included, one black and one red (Figure 8-9). The test probes plug into the straight end of the test leads.

Secondary Coil Adapter Lead (optional)

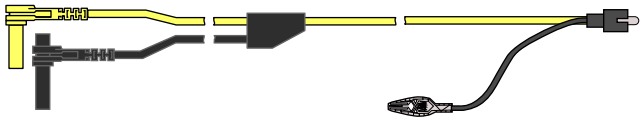


Figure 8-10 *Secondary Coil Adapter lead*

The optional Secondary Coil Adapter lead (Figure 8-10) connects to the clip-on secondary wire adapter, coil-in-cap adapter or coil-on-plug adapter to display secondary waveforms.

Secondary Ignition Clip-on Wire Adapter (optional)

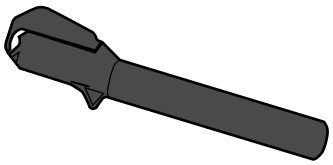


Figure 8-11 *Secondary Ignition Clip-on Wire Adapter*

The optional Secondary Ignition Clip-on Wire Adapter (Figure 8-11) connects the Secondary Coil Adapter lead to a secondary ignition lead on the vehicle to display ignition patterns.

Inductive RPM Pickup Adapter (optional)

Figure 8-12 *Inductive RPM Pickup adapter*

The optional Inductive RPM Pickup adapter (Figure 8-12) connects to the scope auxiliary port of the Display Device with a DB9F plug. It can be used to trigger a waveform or display RPM. With the Ignition Scope, the RPM Pickup connects to cylinder number one to establish the firing order.

Low Amp Current Probe (optional)

The optional Low Amp Current Probe provides accurate and reliable non-intrusive testing of ignition coils, fuel injectors, fuel pumps, relays, electric motors, and parasitic draw. Use to measure current from 10 mA to 60 Amps with a resolution of 1 mA.

Figure 8-13 *Low Amp Current Probe*

8.3 Navigation

The following section describes how to navigate the screen interface.

8.3.1 Screen Layout

The screens typically include the following sections (Figure 8-14):

- **Scope Multimeter Toolbar—**allows you to configure the tool for the type of test and to adjust the settings for each channel, or trace.
- **Main Body of the screen—**displays test results. Options on the toolbar let you select how tests display on the screen.
- **Trace Details**—displays trace settings, which can be adjusted or switched through the touch screen.
- **Record/Playback Control Toolbar**—allows you to record and navigate through paused data.

1— Scope Multimeter toolbar

2— Main body

3— Trace Details

4— Record/Playback Control toolbar

Figure 8-14 *Scope Multimeter screen layout*

Scope Multimeter Toolbar

The Scope Multimeter toolbar is used to set up the tool for testing and to configure the settings for each trace. Table 8-4 on page 73 gives brief descriptions of the control buttons on the toolbar:

Table 8-4 *Scope Multimeter toolbar buttons*

Name	Button	Description
Back		Returns to the previously viewed screen.
Setup		Opens a dialog box that allows you to select personal preferences for viewing and saving data.
Data		Switches the trace information displayed at the base of the screen between three available states.
Cursors		Opens a dialog box that allows you to switch cursors on and off, and to reposition them on the screen.
Refresh		Clears the Min/Max and Current values on the trace details section of the screen.
File		Opens a dialog box that allows you to select options for saving data.
Print		Opens a dialog box that allows you to configure and print data.
Power Off		Switches the Scope Multimeter off. This retains the settings and reduces battery drain when switching to a different module. The Play and Record buttons on the Playback toolbar switch the meter back on.

Main Body of the Screen

The main body of the screen varies depending on what display options have been selected. Up to four traces, along with digital readouts of current signal values, signal status and triggering conditions, can be displayed simultaneously on the main body of the screen. Adjustments to the display are made through the scope toolbar as explained above.

Each trace is displayed as voltage over time on a standard oscilloscope screen. Voltage level is recorded on the vertical, or “y”, axis and time is presented on the horizontal, or “x”, axis of the screen. Values are shown for each graduation on the scales.

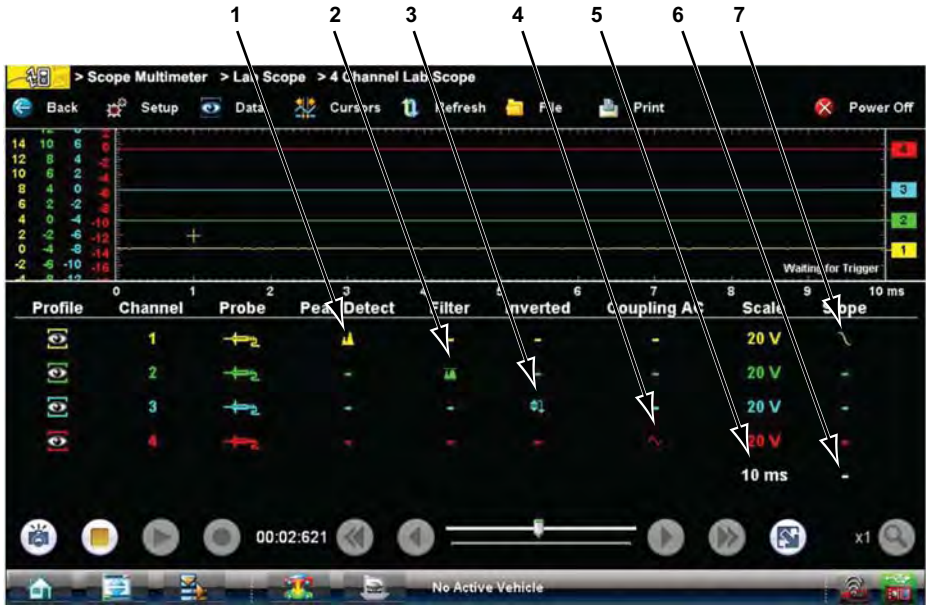
When using transducers, the pressure being sensed by the transducer is converted into a voltage signal. However, the values are shown as pressure on the display screen rather than voltage.

Trace Details

The Trace Details section displayed at the base of the screen can be used to quickly adjust settings for capturing the trace. The Trace details are accessed using either the **Data** button on the upper toolbar or the **Touch and Grow** button on the Playback toolbar. Both buttons function the same and cycle the Trace Details selection through three states:

- **Displayed**—trace settings are displayed in this mode
- **Explanded**—trace settings are displayed in a larger format in this mode
- **Off**—trace settings are not displayed in this mode

Adjustments are made by tapping the item to be changed on the touch screen. A dash (–) indicates a function that is not selected, and an icon indicates an active function (Figure 8-15).



1— Peak Detect on
2— Filter on
3— Inverted trace
4— Coupling AC on
5— Sweep setting
6— Trigger setup
7— Trigger set on the rising slope

Figure 8-15 *Sample data detail display*

The following trace adjustments and settings are available:

- **Profile**—switches the trace for the selected channel on and off.
- **Channel**—opens a dialog box that allows you to configure the trace setup (see Trace Controls on page 78 for details).
- **Probe**—opens a dialog box that allows you to select the type of test probe being used.
- **Peak Detect**—maximizes the signal sampling rate in order to capture fast events, such as spikes, glitches and other anomalies, that may normally be undetected.
- **Filter**—smooths out the trace when the signal is disrupted by noise or other interference.
- **Inverted**—switches the polarity of the displayed signal.
- **Coupling AC**—subtracts the average value of the waveform by blocking the DC portion of an input signal to amplify the AC portion. This makes small variations in the trace visible.
- **Scale**—opens a dialog box that allows you to select the scale, which is the total value displayed on the vertical axis of the display.
- **Sweep**—the current sweep setting is shown in white at the end of the scale list, selecting opens a dialog box that adjusts the sweep (see Sweep Controls on page 80 for details).
- **Slope**—only active when a trigger is set, indicates whether the trigger is set to activate on the rising or falling slope of the trace. Tapping the slope icon switches the slope. The white dash

at the bottom of the slope column is used to set the trigger, selecting it opens the trigger setup dialog box (see Trigger Controls on page 80 for details).

Record/Playback Control Toolbar

The record/playback control toolbar at the base of the screen is used for recording data and for reviewing paused data. Use the stylus or your finger tip to activate the buttons. A position counter in the toolbar displays a numerical value of where the current screen is in relation to the entire recorded file.

Use the slider in the middle of the toolbar to quickly move through paused data.

Figure 8-16 *Sample data buffer slider*

Use the toolbar buttons (Table 8-5) to more precisely navigate the data.

Table 8-5 *Data buffer toolbar buttons (part 1 of 2)*

Name	Button	Description
Snapshot		Arms the software to take a snapshot of the sampled data
Step Back		Moves to the previous point in the recorded data
Back 1Frame		Moves to the previous frame in the recorded buffer
Stop		Stops recording data
Record		Begins recording data
Play Recording		Plays the data recording in a continuous loop at actual speed
Forward 1 Frame		Moves to the next frame in the recorded data
Step Forward		Moves to the next point in the recorded data
Position Indicator		Indicates the position of the buffered data currently displayed. Values are minutes:seconds:milliseconds of elapsed time

Table 8-5 *Data buffer toolbar buttons (part 2 of 2)*

Name	Button	Description
Touch and Grow		Expands and collapses the Trace Detail area on the display screen to allow for easier finger tip control
Zoom		Increases or decreases the magnification of the graph

8.3.2 Making Selections

Most selections for setting up and operating the scope are made using the stylus and the scope toolbar. The cursor lines, the trace zero line, and the trigger point indicator (+) can be repositioned by selecting and dragging them in the main body of the screen.

There are two basic types of controls on the toolbar:

- Switches
- Dialog boxes

A Switch changes states when tapped. Changes happen immediately as the selection is made.

A dialog box opens as a separate window on the screen and typically includes a number of choices. Changes happen immediately, however, the dialog box must be closed to return to the main window and continue. Make a selection to close the dialog box.

8.4 Operations

This section describes configuring the scope or meter and performing tests.

8.4.1 Starting the Scope and Multimeter

Use the following procedure to set up the scope multimeter for performing tests.

To start the scope multimeter:

1. Select the **Scope Multimeter** button on the Home screen.
   The Scope Multimeter main menu, a list of setup options, displays;
   - Lab Scope
   - Ignition Scope
   - Graphing Meter
   - Digital Multimeter
   - Presets
2. Tap to select from the menu options.
   A submenu of scope or meter configuration displays, see below for additional information.
3. Tap to select a configuration and the Scope Multimeter opens.

Presets

Presets are factory configured meter settings for common component tests. Selecting opens a list of available setups. Selecting from the list opens the scope multimeter configured to perform the selected test. In addition to the factory presets, you can create your own custom meter configurations and save them as presets.

Lab Scope Options

The following options are available for testing:

- 4 Channel Lab Scope
- Volts DC
- Low Amps (20)
- Low Amps (40)
- Low Amps (60)
- Ignition Probe
- 100 psi Vacuum
- 100 psi Pressure
- 500 psi Pressure
- 5000 psi Pressure
- MT5030 Vacuum
- MT5030 Pressure
- EEDM506D Temperature

Ignition Scope Options

The following options are available for testing:

- Parade
- Cylinder
- Raster
- Superimposed
- Single Cylinder Ignition

Graphing Options

The following options are available for testing:

- Dual Graphing
- Volts DC
- Volts DC Average
- Volts AC RMS
- Frequency
- Pulse Width
- Injector Pulse Width
- Duty Cycle

- Low Amps (20)
- Low Amps (40)
- Low Amps (60)
- MC Dwell (60)
- MC Dwell (90)
- 100 psi Vacuum
- 100 psi Pressure
- 500 psi Pressure
- 5000 psi Pressure
- MT5030 Vacuum
- MT5030 Pressure
- EEDM506D Temperature

Digital Multimeter Options

The following options are available for testing:

- Volts DC
- Volts DC Average
- Volts AC RMS
- Ohms
- Diode/Continuity
- Low Amps (20)
- Low Amps (40)
- Low Amps (60)

8.4.2 Scope and Multimeter Setup

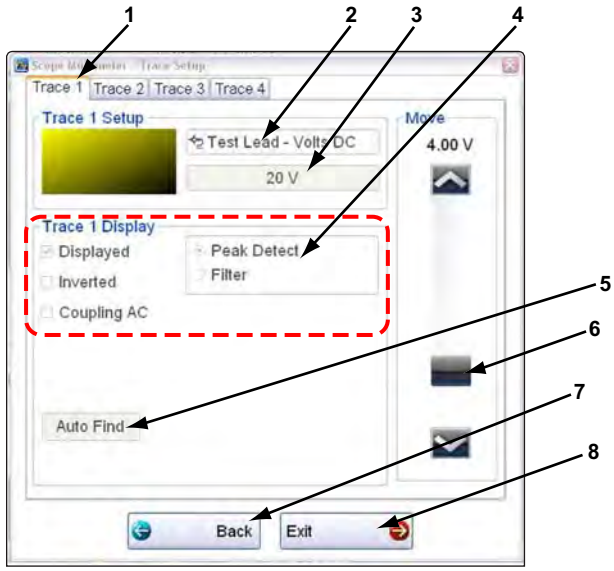
The following sections explain how to adjust the scope and multimeter for the specific type of signal being sampled. Most of these setup operations are available from the toolbar.

Trace Controls

The Trace controls are used to adjust individual characteristics of how the signal is sampled and displayed for each of the four traces.

To adjust trace controls:

1. Select **Setup** from the Scope Multimeter toolbar.
   The Scope Multimeter Preferences dialog box opens
2. Select **Traces** to open the submenu.
3. Select the trace to be configured from the submenu.
   The traces dialog box displays (Figure 8-17).



1— Trace tabs

2— Trace Probe button

3— Trace Scale button

4— Trace characteristics check boxes

5— Auto Find button

6— Baseline position

7— Back button

8— Exit button

Figure 8-17 *Traces dialog box*

4. Select the **Trace Probe** button to open the menu.
5. Highlight a probe on the list and tap **OK** to close the window.
6. Select the **Trace Scale** button to adjust the vertical scale of the display.

   A dropdown menu opens. Menu options vary depending upon which test lead is selected.
7. Select a trace scale option, then close the window.
8. Select or deselect the trace characteristic items as needed:
   - **Displayed**—this trace is on screen when checked, and not visible when not checked.
   - **Inverted**—signal polarity is reversed when checked, normal when not checked.
   - **Coupling AC**—check when sampling an AC signal, uncheck for DC signals.
   - **Peak Detect**—use when trying to capture a fast event or signal glitch.
   - **Filter**—use when radio frequency interference (RFI) may be disrupting the signal.
9. The scope samples the signal and internally calculates the best way to display it when **Auto Find** is selected. A scale and the vertical position for the zero line of the trace that allows the whole waveform to fit on the screen is established when Auto Find is selected. If Auto Find is selected on the trigger channel, it also sets the trigger level halfway between the minimum and maximum value of the sampled signal to provide a stable waveform.
10. The baseline position is the zero line of the trace, use the slider and arrows to adjust it.
11. Select **Back** to return to the Preferences dialog box, or select **Exit** to close the dialog box and return to the scope.

Sweep Controls

Sweep is the amount of time represented by the screen, or the horizontal scale of the display.

To adjust Sweep controls:

1. Select **Setup** from the Scope Multimeter toolbar.
   The Scope Multimeter Preferences dialog box opens
2. Select the **Sweep** button to open the sweep dialog box (Figure 8-18)

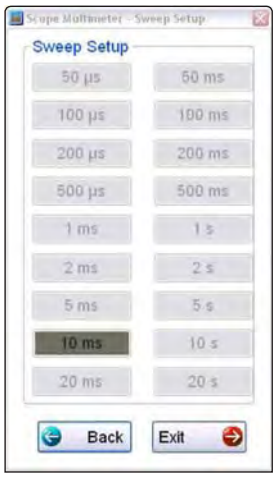


Figure 8-18 *Sample Sweep Setup dialog box*

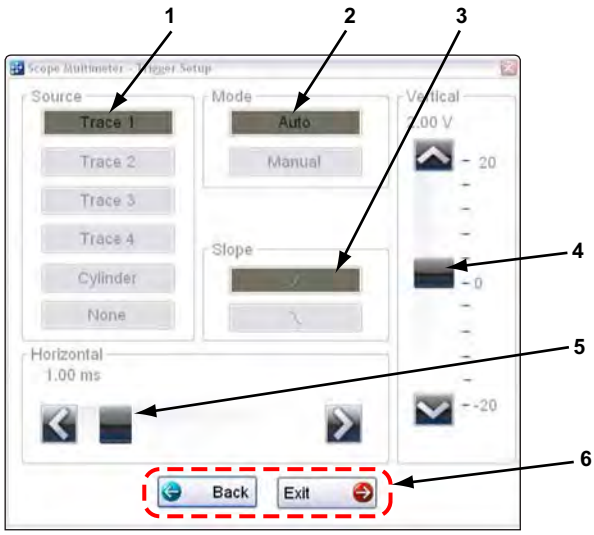
3. Choose an option from the list.
4. Select **Back** to return to the Preferences dialog box, or select **Exit** to close the dialog box and return to the scope.

Trigger Controls

Triggering allows you to set the scope so that it only begins displaying a trace once predetermined signal conditions, or triggers, are met. The trigger point is indicated by a plus sign (+) on the scope grid. The plus sign can be dragged across the grid with the stylus to roughly position it. The trigger controls allow you to precisely position the trigger.

To adjust trigger controls:

1. Select **Setup** from the Scope Multimeter toolbar.
   The Scope Multimeter Preferences dialog box opens
2. Select **Trigger** to open the Trigger Setup dialog box (Figure 8-19).
3. Use the dialog box controls to set the trigger.
4. Select **OK** to close the dialog box.
5. Select **Back** twice to close the Scope Multimeter Preferences dialog box.



1— Source—selects the triggering event:

- Trace 1—sets the trigger to channel 1.
- Trace 2—sets the trigger to channel 2.
- Trace 3—sets the trigger to channel 3.
- Trace 4—sets the trigger to channel 4.
- Cylinder—sets triggering to the firing of a cylinder detected by the optional RPM Pickup or Secondary Ignition Adapter.
- None—switches triggering off.

2— Mode—sets the method of triggering:

- Auto (automatic)—if a trigger is found, the waveform displays. If a trigger is not found after about a half second, the waveform and a “trigger not found” message displays.
- Manual—if a trigger is found, the waveform displays. If a trigger is not found nothing displays (no waveform and no message).

3— Slope—sets triggering to the rising (top button) or falling (lower button) slope of the signal waveform.

4— Vertical position—moves the trigger position up and down on the grid.

5— Horizontal position—moves the trigger timing left and right on the grid

6— Select **Back** to return to the Preferences dialog box, or select **Exit** to close the dialog box and return to the scope.

Figure 8-19 *Trigger controls*

View Controls

Use the view controls to set display attributes.

To adjust view controls:

1. Select **Setup** from the Scope Multimeter toolbar.
   The Scope Multimeter Preferences dialog box opens.
2. Select View to open a submenu.

Three types of adjustment are available on the submenu:

- **Display**—use to adjust what information displays and how it appears
- **Layout**—use to set how many traces display and how they display on the screen
- **Units**—use to adjust time and voltage interval settings

Selecting an item opens a dialog box. Dialog box options for each item are discussed below.

3. Make dialog box selections as needed.
4. Select **Back** to return to the Preferences dialog box, or select **Exit** to close the dialog box and return to the scope.

Display Settings

Selecting **Display** from the View submenu opens the Display dialog box (Figure 8-20).

Figure 8-20 *Sample Display dialog box*

The following options are available from the Display dialog box:

- **Show RPM**—adds an engine speed field at the top of the screen (Figure 8-21).

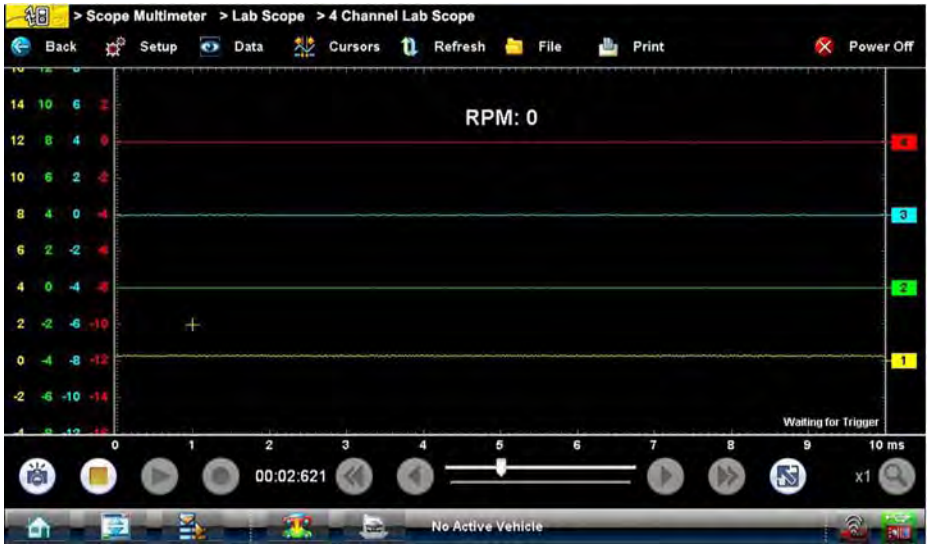


Figure 8-21 *Sample Show RPM selected*

- **Show Digital KV**—available only in ignition scope, displays digital kilovolt readings, rather than waveforms, on the screen (Figure 8-22).

Figure 8-22 *Sample Show Digital KV selected*

- **Show Grid**—switches grid lines on the screen off and on (Figure 8-23).

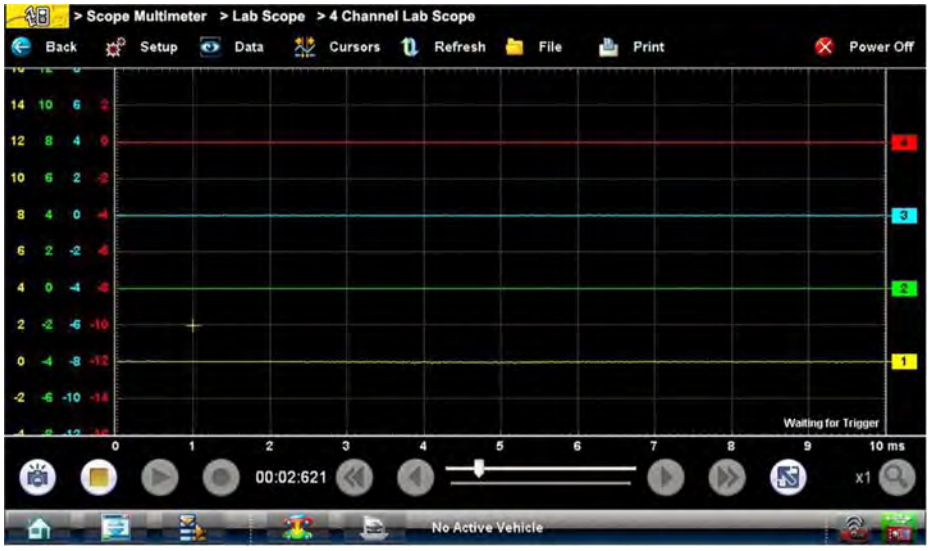


Figure 8-23 *Sample grid selected*

- **Invert Colors**—switches the screen background to white.

Layout Settings

The selected radio knob on the Layout dialog box shows which setting is active. Use the stylus to switch between settings:

- **1 Window**—shows all traces on the same screen (Figure 8-23).
- **2 Windows**—shows two separate traces in two ways: horizontal, one below another (Figure 8-24) or vertical, side-by-side (Figure 8-25)
- **3 windows**—shows three traces, one below another, on the same screen (Figure 8-26).
- **4 windows**—shows four traces, one below another, on the same screen.

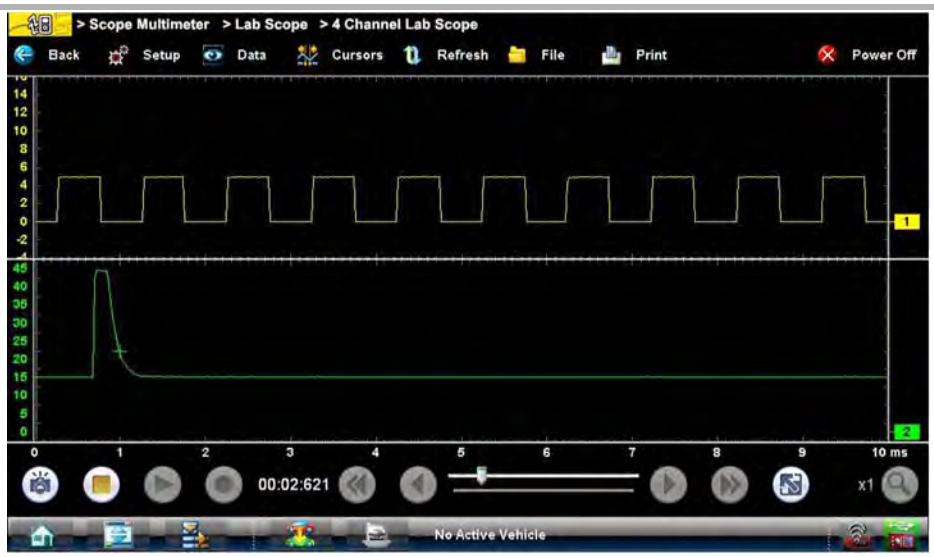


Figure 8-24 *Sample 2 Windows horizontal display*

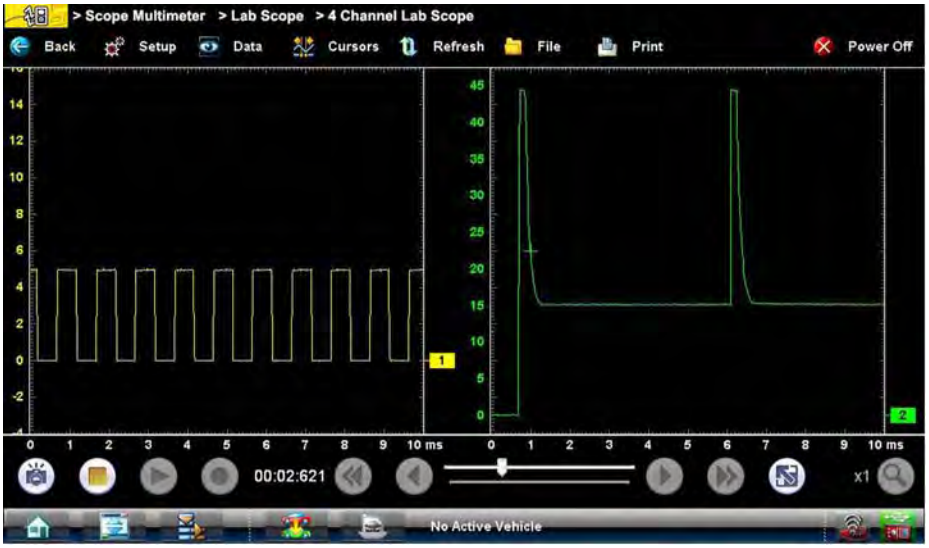


Figure 8-25 *Sample 2 Windows vertical display*

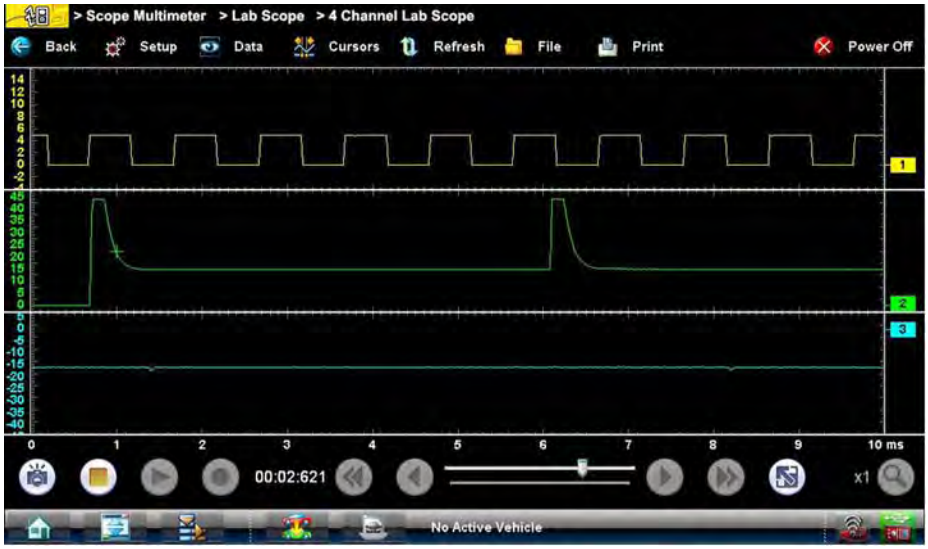


Figure 8-26 *Sample 3 Windows display*

Units Settings

The Units dialog box allows you to switch between Full Scale or Per Division settings for the trace setup and the display settings. Selecting Full Scale configures the units to the full viewing area of the screen, while Per Division adjusts the units to a single division (one tenth) of the screen.

The selected radio knob on the Units dialog box shows which setting is active. Use the stylus to switch between settings (Figure 8-27).

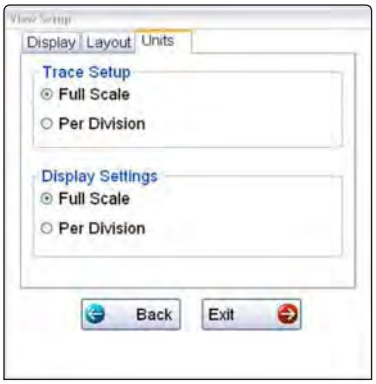


Figure 8-27 *Sample View Units dialog box*

Setup Controls

Basic tool settings are adjusted here.

To adjust setup controls:

1. Select **Setup** from the Scope Multimeter toolbar.
   The Scope Multimeter Preferences dialog box opens
2. Select **Setup** from the dialog box.
   A submenu of options displays:
   - **Back**—use to return to the Preferences dialog box
   - **Units**—use to set how measurement values display, US standard or metric
   - **Snapshot**—use to adjust the percentage of data captured following a trigger event
   - **Ignition**—use to configure the ignition scope for the test vehicle

   Selecting from the submenu opens a dialog box for that item. Dialog box options for each item are discussed in the following sections.
3. Make dialog box selections as needed.
4. Select **Exit** to close the dialog box and return to the scope.

Units

Selecting Units opens the Setup dialog box. The units of measurement can be changed between US standard or metric. The selected radio knobs on the Setup dialog box show which settings are active (Figure 8-28).

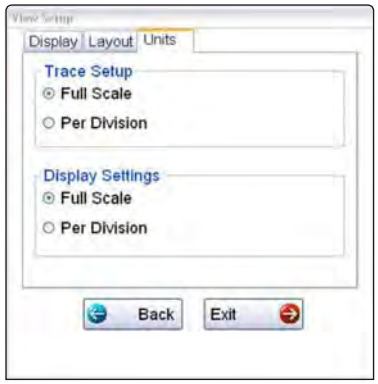


Figure 8-28 *Sample Setup Units dialog box*

Abbreviation	Description
bar	bar
inHg	inches of mercury
kg/cm2	kilograms per centimeter squared
kPa	kilopascal
mmHg	millimeters of mercury
psi	pounds per square inch

Snapshot

The Snapshot tab of the Setup dialog box opens a window that allows you to select how much data is captured after a snapshot is triggered (Figure 8-29). Available selections, which range from ten to ninety percent in ten-percent increments, are shown as buttons with the current setting highlighted. Select a button, then select **Back** or **Exit** to close the dialog box.

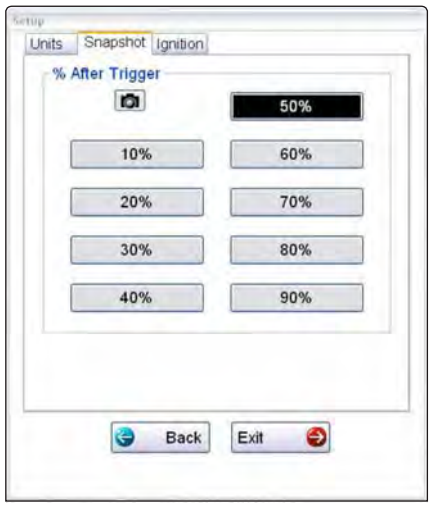


Figure 8-29 *Sample Snapshot dialog box*

Refer to Trigger Controls on page 80 for information on how to setup a trigger.

Ignition

The Ignition tab of the Setup dialog box is used to configure the scope for displaying secondary ignition patterns. There are two main selection fields (Type and Cylinders) and the fields vary depending upon the type of ignition system selected in dialog box (Figure 8-30).

Figure 8-30 *Sample Setup Ignition dialog box*

To setup ignition tests

1. Select the **Setup** button to open the Setup dialog box.
2. Select the **Ignition** tab of the dialog box.
3. Highlight the ignition system for the test vehicle in the “Type” field:
   - **Standard**—use for systems with a distributor
   - **Waste Spark**—use for coil pack systems that fire 2 plugs simultaneously
   - **Direct**—use for coil-on-plug systems
   - **Other**—use for systems that do not fit any of the above categories
4. Select the number of cylinders for the test vehicle in the “Cylinders” field.

   Scroll through the list using the up and down arrows on either side of the number.
5. This step varies depending upon the type of ignition system:
   - If testing a Standard system, select the Firing Order.
   - If testing an Other system, select the RPM Factor.

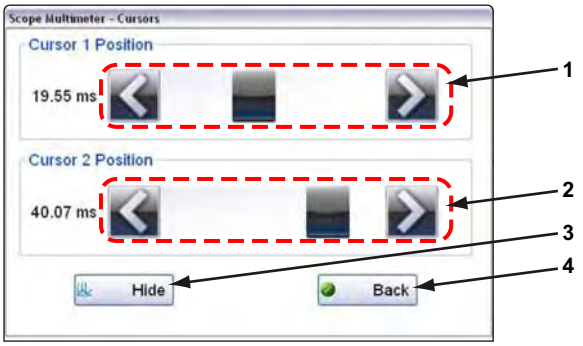
     Scroll through the list of available choices using the up and down arrows below the displayed firing order or RPM factor.
6. This step also varies depending upon the type of ignition system:
   - On a Standard or Direct system, choose between Coil and Plug for the Number 1 Trigger.
   - On a waste Spark system, select the polarity of the firings using the +, –, and arrow buttons.
7. Select **Back** to return to the Preferences dialog box, or select **Exit** to close the dialog box and return to the scope.

Data

The **Data** button on the toolbar switches the trace details information at the base of the screen through three states as previously explained in Trace Details on page 73.

Cursor Controls

Select **Cursors** from the toolbar to open the Cursors dialog box (Figure 8-31).



1— Cursor 1 controls
2— Cursor 2 controls
3— Show or Hide button
4— Back button

Figure 8-31 *Cursor controls*

Cursor 1, the top slider and arrows, is the left-hand cursor on the screen. Cursor 2, the lower set of controls, is the right-hand cursor on the screen. Drag the slider or tap the arrows to position the cursors. Each tap of the stylus moves the cursor incrementally in the direction of the arrow.

Select **Show** to display the cursors (the button changes to Hide).

Select **Hide** to conceal the cursors (the button changes to Show).

Select **Back** to close the dialog box.

Refresh Controls

Selecting the **Refresh** button from the Scope Multimeter Toolbar clears the minimum and maximum digital values and updates the viewing screen.

File Controls

Selecting File from the toolbar opens a dialog box with a menu of save options:

- **Save Configuration**—saves the current setup values as a preset.
- **Save Single Frame**—saves the data currently on the screen only.
- **Save All Frames**—saves the current screen plus all the data stored in the buffer.

To save a file or configuration:

1. Select **File** from the toolbar.
2. Select a save option from the dialog box.

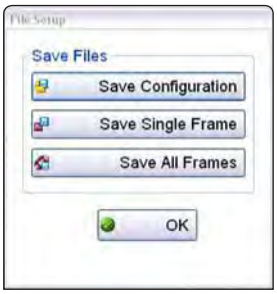


Figure 8-32 *Sample file setup dialog box*

The Save As dialog box and the virtual keyboard open.

3. Use the keyboard to name the file to be saved, then either select the **Save** button or tap **return** on the keyboard.

   A configuration description dialog box opens.

NOTE:
The description entered here is what displays in the information panel of the Data Manager.

4. Use the keyboard to enter a description of the file to be saved.
5. Select the **OK** button or tap **return** on the keyboard.
6. Select **OK** to close the file setup dialog box.

Once a configuration is saved, it becomes available as a preset. Files are saved to the Scope Multimeter Data Folder and can be retrieved through the **Data Manager**.

Print Controls

Selecting Print from the toolbar opens a standard Windows Print dialog box set up to print the current screen. A printer must be connected and setup on the Display Device. If not, the “Add Printer Wizard” opens and guides you through the procedure. Select from the menus as needed.

Chapter 9 Information Operations

After using the Scanner, Component Test, and Scope Multimeter to diagnose and locate the source of a problem, select **Information** on the Home screen to link to resources that help you fix the problem and get the vehicle back in service (Figure 9-1).

Figure 9-1 *Sample Home screen Information button*

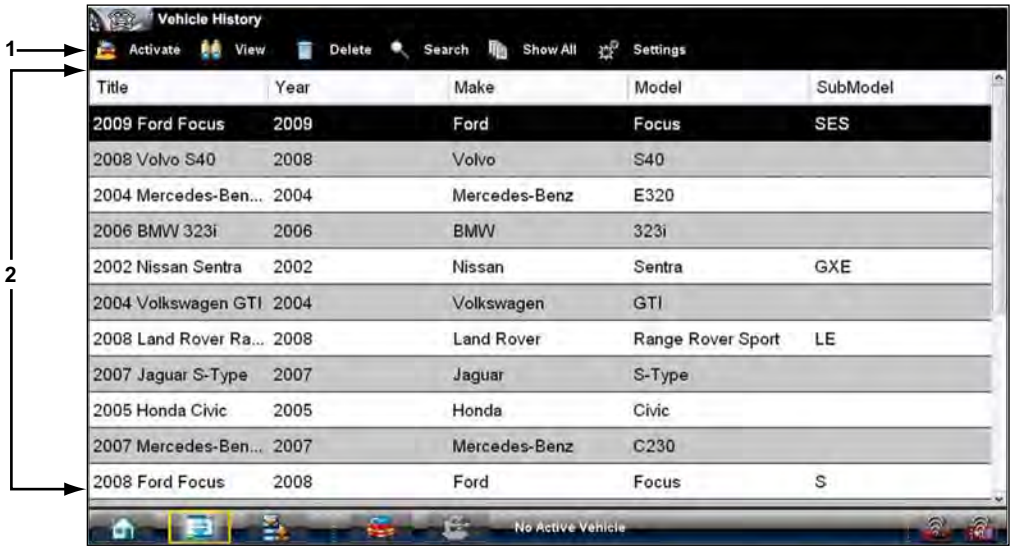
Chapter 10 Vehicle History Operations

The Vehicle History refers to any work in progress, such as a repair order, estimate or invoice, that has customer, vehicle, and repair information for a vehicle in your shop. The Vehicle History is the starting point for using the Diagnostic Platform.

The Scanner and Component Test software gets vehicle information from the Vehicle History, and can only start after a Vehicle History is opened.

10.1 Screen Layout

There are two main parts to the Vehicle History screen:



1— Vehicle History Toolbar—lets you manage the vehicle data

2— Main Body—lists all open Vehicle History records

Figure 10-1 *Sample Vehicle History screen*

10.1.1 Vehicle History Main Body

The main body of the screen lists all of the available Vehicle History items. By default, items are shown in the order in which they are entered. However, you can resort them by any of the categories shown as column headings. You can also resize the individual columns.

To sort Vehicle History items:

1. Tap a category heading.

   The listed items resort according to the selected category. A triangle appears alongside the name of the column that was used for the sort.
2. Select the triangle in the heading to reverse the sort order.

To resize a Vehicle History column:

1. Touch the line separating two columns.

   A line with arrowheads appears to show the column is ready for resizing.
2. Drag the line left or right to increase or decrease the column width.

10.1.2 Vehicle History Toolbar

The table below gives brief descriptions of the control buttons on the toolbar:

Table 10-1 *Toolbar buttons*

Name	Button	Description
Back		Returns to the previously viewed screen.
Activate		Loads the highlighted vehicle history.
View		Opens the worksheet for the currently highlighted vehicle history.
Delete		Erases the currently highlighted vehicle history.
Search		Opens a window that allows you to locate a particular vehicle history.
Show All		Available only after a search, use to return to a complete Vehicle History list.
Settings		Opens a window that allows you to configure which fields display on main Vehicle History screen.

Activate

Use this button to load an existing vehicle history when servicing a vehicle that you have previously worked on. The Diagnostic Platform uses the identification characteristics stored in the vehicle history to load the correct database, so there is no need to identify the test vehicle.

To activate a vehicle:

1. Locate and highlight the desired Vehicle History in the main body of the screen.
2. Tap **Activate** on the Vehicle History toolbar.

   The Activate button in removed from the toolbar once a vehicle has been selected.
3. Tap the **Home** button on the Toolbar.

   The Home screen displays with the activated vehicle shown on the toolbar.
4. Select any module button on the Home screen to begin testing.

View

Use this selection to open edit, add notes, and print the work sheet for an existing Vehicle History.

To modify an existing Vehicle History:

1. Highlight the Vehicle History be opened in the main body of the screen.
2. Tap **View** on the Vehicle History toolbar.

   The worksheet for the selected vehicle opens, and there are now Back and Save & Close buttons available on the toolbar.

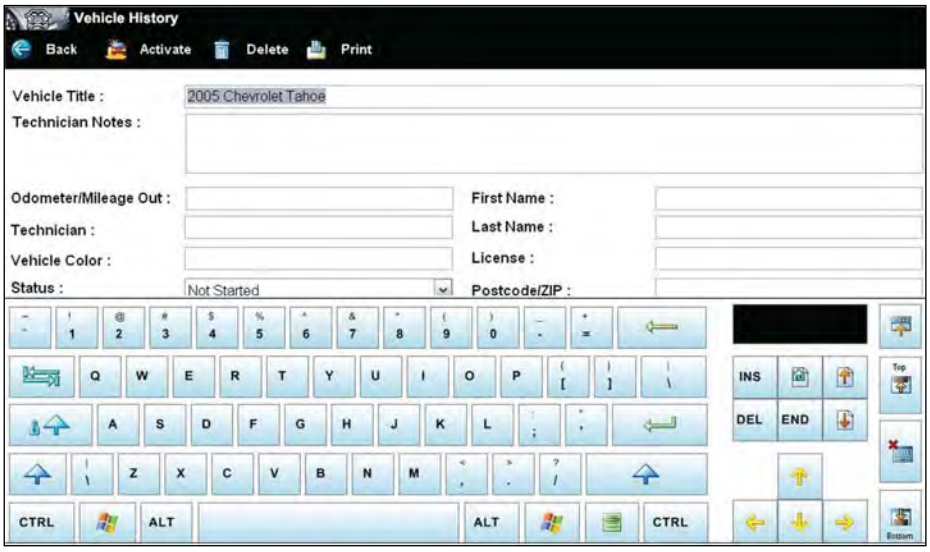


Figure 10-2 *Sample vehicle history worksheet*

NOTE:
The virtual keyboard automatically opens the first time you touch within one of the data fields.

3. Use the virtual keyboard to enter information in the data fields.
4. Tap **Save & Close** on the toolbar to save the changes you made and return to the Vehicle History screen.

   Use the **Back** button on the toolbar to return to the Vehicle History screen without saving the changes you made.

Delete

Use the Delete button to remove unwanted items from the Vehicle History list. Simply highlight the item to remove, then select **Delete**.

Search and Show All

Selecting Search opens a dialog box that allows you to search Vehicle History items by category (Figure 10-3).

Figure 10-3 *Sample Search dialog box*

To search:

1. Tap **Search** on the Vehicle History toolbar to open the search window.
2. A dropdown menu allows you to select the field to search:
   - Year
   - Make
   - Model
   - Color
   - Customer
   - License
   - State
   - Technician
3. Use the virtual keyboard to enter search criteria into the text field.
4. Select **Search** to start the search.

   The display returns to the Vehicle History screen with only the records fitting the search criteria showing.
5. Tap **Show All** on the toolbar to restore the complete Vehicle History list.

Settings

Use Settings to determine which categories of information display in the main body of the Vehicle History screen. Selecting the Settings button opens a dialog box.

To change Settings:

1. Tap **Settings** on the Vehicle History toolbar to open the dialog box.

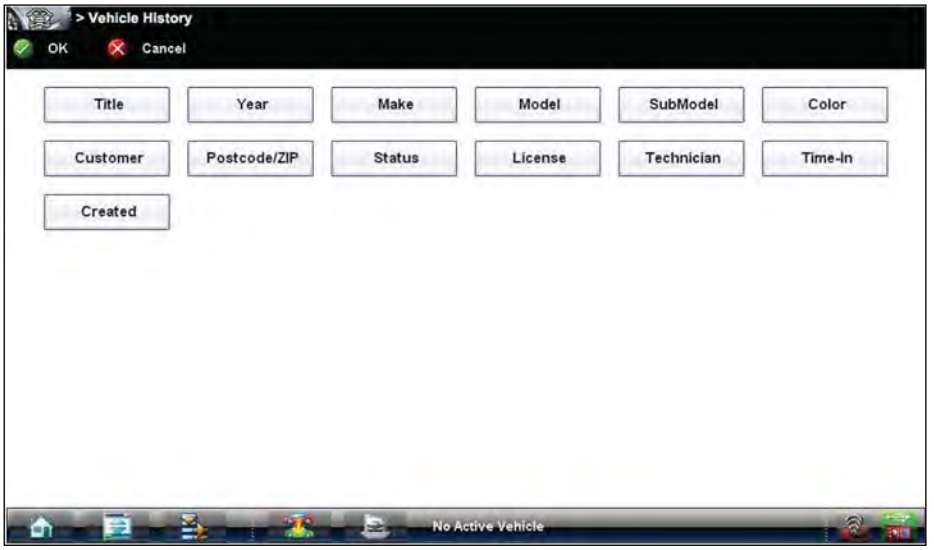


Figure 10-4 *Sample Settings dialog box.*

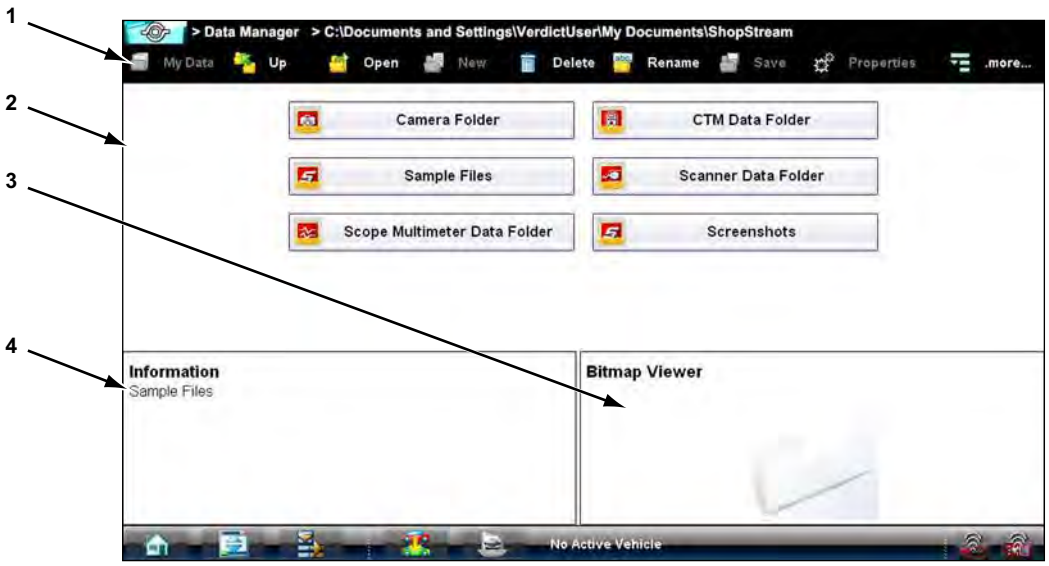
2. Tap to highlight the categories that you do not want to display on the main screen, remember:
   - Items that are highlighted do not display
   - Items that are not highlighted display
3. Select **OK** on the toolbar to implement the changes, select **Cancel** to disregard the changes. The dialog box closes and the screen updates.

Chapter 11 Data Manager Operations

The Data Manager module is used to store, sort, and review saved files. Most operations are controlled through the toolbar.

11.1 Screen Layout

Select Data Manager on the Module toolbar to open the file system. Use the toolbar at the top of the screen to navigate through the data. The folders panel below the toolbar displays the contents of the Windows “My Documents” folder, which is the Data Manager main screen. The information panel on the lower-left portion of the screen shows a summary of the saved file when available, and the preview panel on the lower right displays an image if the selected file is a graphic.



1— Data Manager Toolbar
2— Folders Panel
3— Preview Panel
4— Information Panel

Figure 11-1 *Sample Data Manager main screen*

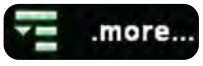
The main screen includes folders for saved files from the various modules:

- Camera Folder—contains photographs taken with the built-in camera.
- CTM Data Folder—contains files saved while working in the Component Test module.
- Sample Files—contains an assortment of example saved data files.
- Scanner Data Folder—contains files saved while working in the Scan Module.
- Scope Multimeter Data Folder—contains files saved while working with the Scope Multimeter.
- Screenshots—contains images saved by pressing the “S” button.

11.2 Navigation

Use the toolbar buttons as shown in the table below to navigate through the Data Manager:

Table 11-1 *Data Manager toolbar buttons*

Name	Button	Description
My Data		Returns to the Data Manager main screen.
Up		Moves the items displayed in the folders panel up one level in the file structure.
Open		Opens the highlighted folder or file.
New		Creates a new folder.
Delete		Moves the highlighted file or folder to the recycling bin.
Rename		Opens a dialog box and the virtual keyboard for renaming the selected file or folder.
Save		Saves the selected file.
Properties		Opens a dialog box and the virtual keyboard for renaming the selected file or folder.
More		Opens a menu of additional options.

11.3 Operations

Data Manager operations based on toolbar selections are explained in the following sections.

11.3.1 My Data

The My Data button is a shortcut that quickly returns you to the main Data Manager screen. Tap the button at any time to instantly return. Note the location of the page being viewed is shown near the top of the screen just above the toolbar.

11.3.2 Up

This button moves the items shown in the folders panel of the screen up in the file structure one level at a time. For example; one tap of the Up button when viewing the contents of the Scanner Data Folder returns you to the main screen. A second tap would display the contents of the “My Documents” folder.

11.3.3 Open

The Open button is only active (displays in color) when an item in the folders panel is highlighted.

To open a folder:

1. Highlight the file to open in the folders panel.
2. Tap the **Open** button to load the highlighted file.

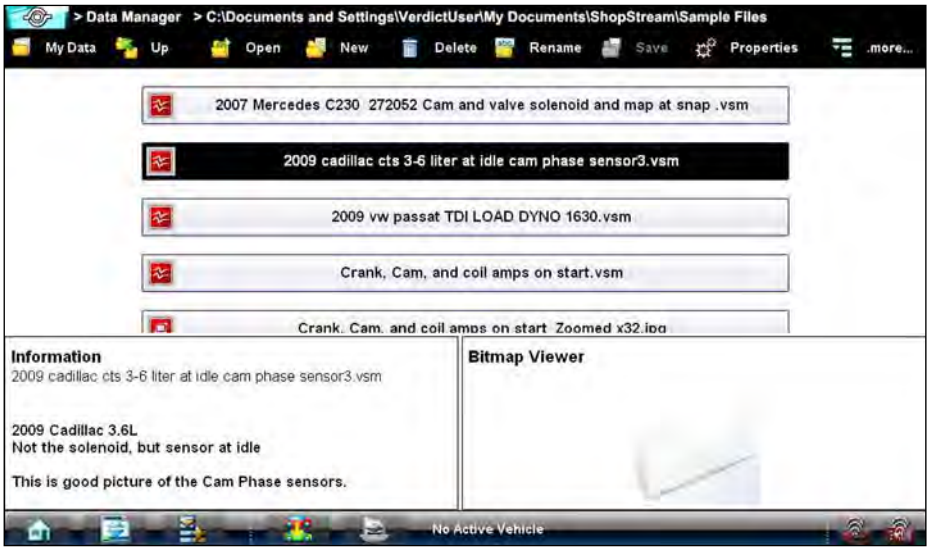


Figure 11-2 *Sample open folder showing information*

The screen advances and the contents of the open folder are shown in the folders panel. Highlight an item in the folders panel and the information or preview displays, if available, in the lower portion of the screen (Figure 11-2).

3. To exit the current folder:
   - Tap **My Data** on the toolbar to return to the main Data Manager screen.
   - Tap **More** > **Up** on the toolbar to return to the previous page.

11.3.4 New

The New button allows you to create a new folder. This option is only available when the button displays in color.

To create a new folder:

1. Tap the **New** button on the toolbar.
   The New Folder Name dialog box opens (Figure 11-3).
2. Touch the entry field on the dialog box to open the virtual keyboard.
3. Type a name for the new folder using the virtual keyboard.
4. Tap the **OK** button to create the new folder and return to the previous page. The Cancel button returns you to the previous page without creating a new folder.

Figure 11-3 *Sample New Folder name dialog box*

11.3.5 Delete

The Delete button moves folders or items within folders to the Recycling bin. A confirmation displays when a file is selected for deletion. Select **Yes** to delete the file or **No** to cancel.

To delete an item:

1. Touch to highlight the item or folder to be deleted.
2. Tap the Delete button on the toolbar.
   A confirmation message displays (Figure 11-4).

Figure 11-4 *Sample delete confirmation message*

3. Tap **Yes** to delete the selected item and return to the previous page. The No button returns you to the previous page without deleting the selected item.

11.3.6 Rename

The Rename button allows you to change the name of a folder or items within a folder.

To rename an item:

1. Highlight the item or folder to be renamed.
2. Tap the **Rename** button on the toolbar.
   The New Name dialog box opens (Figure 11-3).

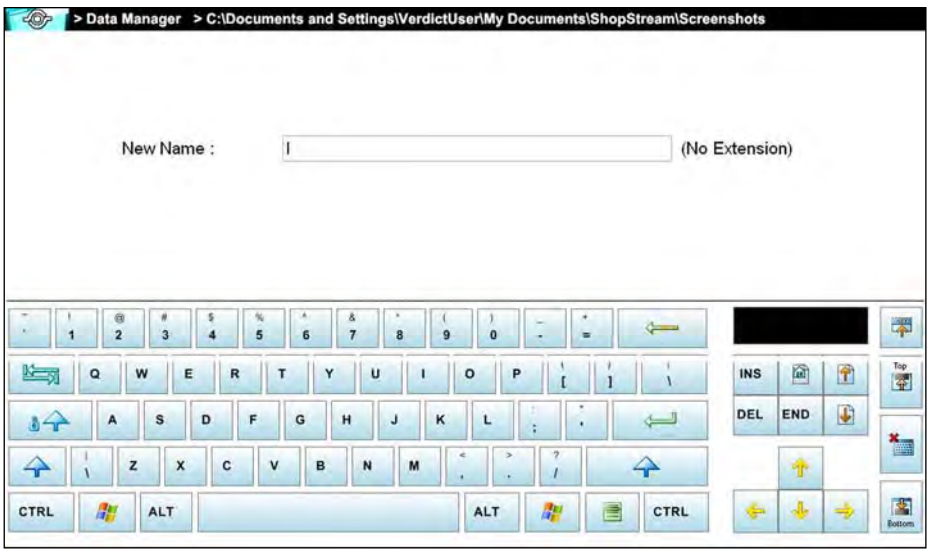


Figure 11-5 *Sample new name dialog box*

3. Touch the entry field on the dialog box to open the virtual keyboard.
4. Type the new name into the entry field using the virtual keyboard.
5. Tap the **OK** button to change the name and return to the previous page. The Cancel button returns you to the previous page without changing the name.

11.3.7 Save

The Save button is not implemented at this time.

11.3.8 Properties

The Properties button function allows you to change the name and assign identifying attributes to saved Scope Multimeter files. Operation is similar to renaming a file as discussed above, except there are additional fields for entering descriptive information.

To assign properties to an item:

1. Highlight the item or folder.
2. Tap the **Properties** button on the toolbar.
   The Properties dialog box and the virtual keyboard open (Figure 11-3).

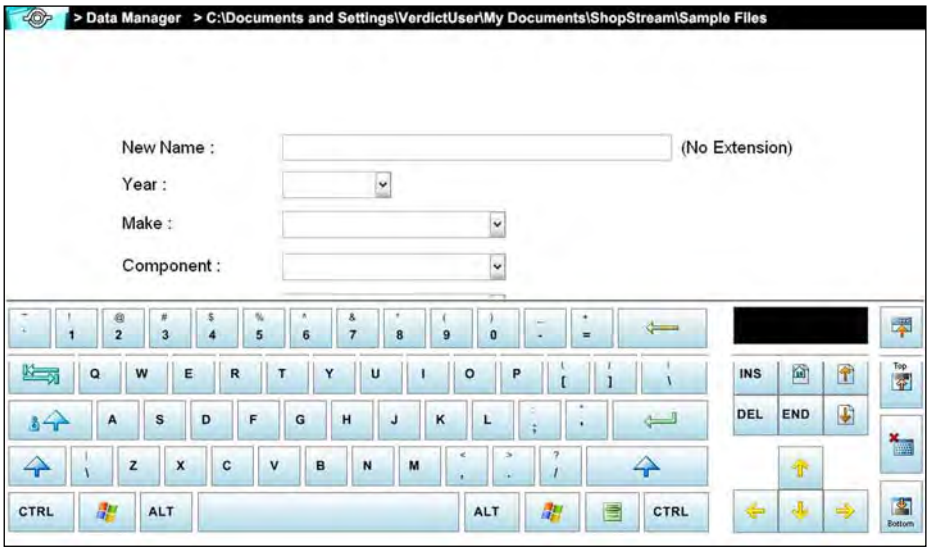


Figure 11-6 *Sample Properties dialog box without the virtual keyboard*

3. Type a new name into the field using the virtual keyboard if you want to rename the file.
4. Use either the virtual keyboard or the dropdown menus to fill in the Year, Make, Component, and Condition fields.
5. Tap the **OK** button to change the name and return to the previous page. The Cancel button returns you to the previous page without changing the name.

11.3.9 More

Selecting the More button opens a dropdown menu with two options:

- Shortcut—creates a shortcut to the highlighted item on the Data Manager main screen. A confirmation message displays when this option is selected.
- Email—opens a new e-mail message with the selected file attached. The display device must have an active e-mail account to use this feature.

11.4 Saved File Structure

The Diagnostic Suite automatically creates folders to manage saved files. Whenever 60 files are saved into any of the Data Manager menu option folders, a new folder is created. Folders may contain files for a day, week, month, or a year. An Older folder, when available, goes to the next higher level in the files structure menu (Figure 11-7).

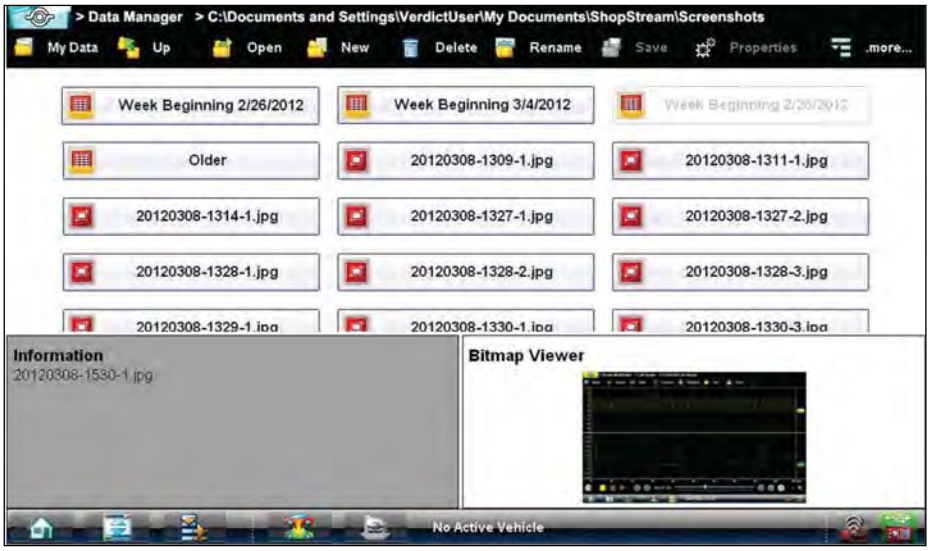


Figure 11-7 *Sample saved file folder structure*

Chapter 12 Help Operations

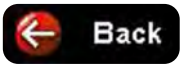
Selecting Help from the Home screen opens this manual in a dedicated screen viewer. Navigate through the file either by gesture scrolling on the touch screen, or with the scroll bar along the right edge of the viewing screen. A left-to-right scroll bar appears at the bottom of the screen when magnification is increased.

All listings in the Contents and Index are active links. Tap an entry with the stylus to go directly to that point of the document. Additional links within the text, shown in blue-colored type, also take you to the referenced section of the manual.

12.1 Using the Help Toolbar

A simple toolbar at the top of the screen is used to adjust screen magnification and to exit Help:

Table 12-1 *Help toolbar buttons*

Name	Button	Description
Back		Closes the help file and returns you to the previously viewed screen.
Zoom +		Incrementally increases the screen magnification.
Zoom –		Incrementally decreases the screen magnification.
Reset		Restores the default screen magnification.
Previous Page		Moves back one page in the document.
Page Counter		Shows the current page over the total number of pages in the document.
Next Page		Moves forward one page in the document.
More		Opens a menu of the additional options shown below.
Hide TOC		Closes the contents and search column so the document fills the screen.
Show TOC		Opens the contents and search column if they have been hidden.
Exit		Closes the help file, and any other open modules, and returns you to the Home screen.

Chapter 13 System Settings Operations

Selecting System Settings from the Home screen opens a menu with two options:

- Paired Devices
- Shop Information

Paired Devices allows you to check the status of and to pair wireless devices, such as the Scan Module, to the Display Device. Shop Information allows you to create and edit a personalized header that is included on printed documents.

13.1 Paired Devices

The Scan Module communicates with the Display Device with a wireless connection so that data is readily available while working anywhere on the vehicle. In order to do this, the modules need to be paired, or synchronized, the first time they are used together. Detailed information about paired modules can be found by selecting System Settings from the Home screen.

To check paired module details:

1. Tap the **System Settings** button on the Home screen.
2. Tap the **Paired Devices** option on the menu.
   The paired devices screen opens (Figure 13-1).

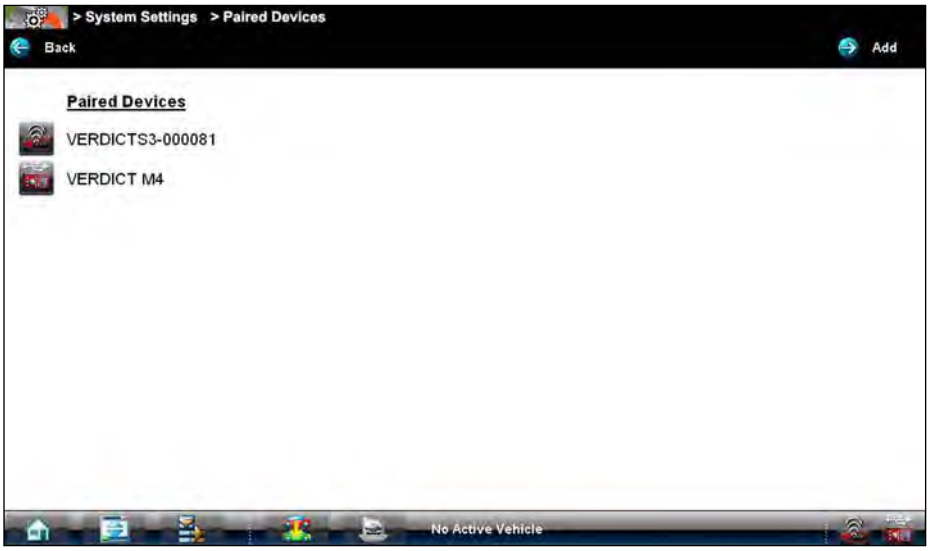


Figure 13-1 *Sample Paired Devices screen*

The Paired Devices screen lists all of the modules paired to the Display Device, and also indicates whether or not there is an active communications link between the units.

The Hardware Status indicators in the lower-right corner of the Home screen provides a quick reference of which modules have been paired to the Display Device (Table 13-1):

Table 13-1 *Hardware Status indicators*

Module	Not Paired	Paired
Scanner		
Scope Multimeter		

13.1.1 Pairing the Scan Module

The Scan Module needs to be either connected to a vehicle or connected to a powered USB port so that it is powered up during the pairing procedure. Make sure the Display Device has a charged battery or is connected to an AC power supply.

To pair the Scan Module with the Display Device:

1. Power on the Display Device.
2. Connect the 25-pin end of the data cable to the Scan Module data cable port.
3. Connect the 16-pin end of the data cable to a live vehicle data link connector (DLC).
   The green vehicle power LED should be illuminated.
4. Tap the **System Settings** button on the Home screen of the Display Device.
5. Select **Paired Devices** from the menu.
6. From the Paired Devices screen select **Add** from the toolbar.
7. When prompted select **OK** from the toolbar.
   The Display Device searches for compatible wireless devices, then displays the results. The Scan Module is listed as “VERDICT S3-” plus a partial serial number (Figure 13-2).

Figure 13-2 *Sample Scan Module selection*

8. Tap to select the Scan Module from the search results list.

   A search in progress message displays during the pairing procedure (Figure 13-3), the Paired Devices screen (Figure 13-1) displays once the procedure completes.

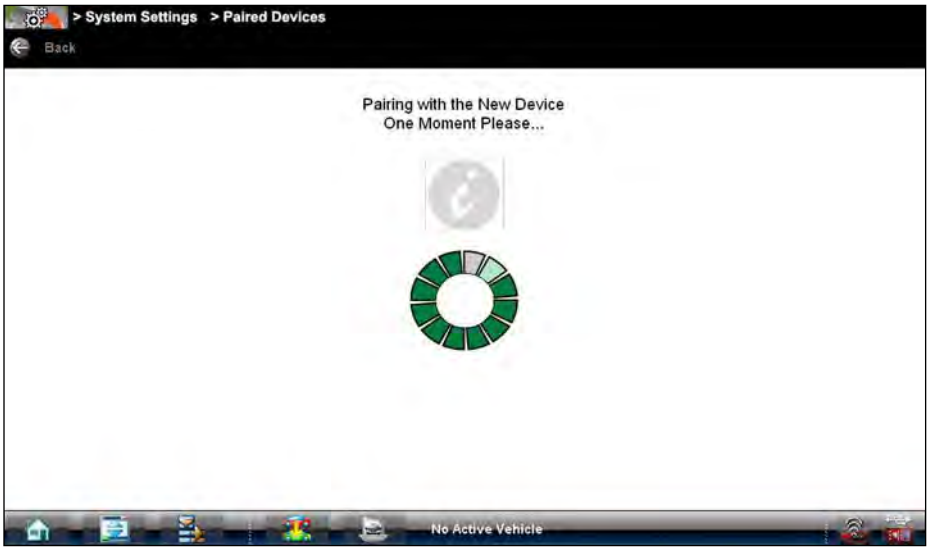


Figure 13-3 *Sample pairing in progress message*

9. Tap the **Home** button on the Toolbar to return to the Home screen.
10. Disconnect the data cable from the vehicle.

The Scan Module and Display devices are now paired for wireless communication and should automatically recognize each other when both are powered up.

13.2 Shop Information

This option allows you to add personalized shop information that can be included on printed data files. Selecting opens a form that can be filled in using the virtual keyboard. Select OK when the form is complete and the information is saved.

To add Shop Information:

1. From the Home screen select **System Settings**.
2. From the System Settings menu select **Shop Information**.

   The Shop Information dialog box opens (Figure 13-4).

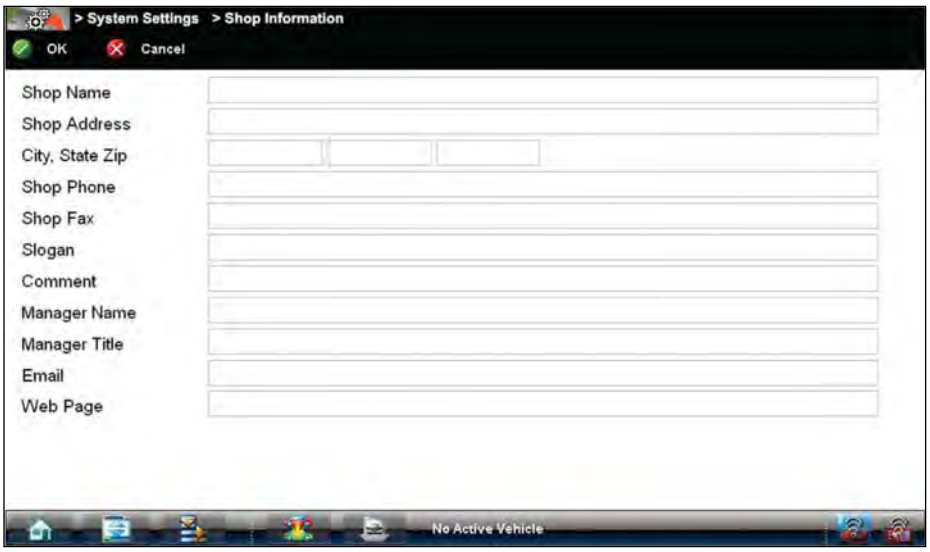


Figure 13-4 *Sample Shop Information dialog box*

3. Tap within any of the information fields and the virtual keyboard opens.
4. Use the virtual keyboard to fill in the Shop Information form.

   As an alternative, you can connect a USB keyboard to a USB port on the Display Device and use it to enter information into the form.

NOTE:
The screen does not scroll. Use the Top and Bottom buttons on the right side of the virtual keyboard relocate the keyboard on the screen so that you can complete the form (Figure 13-5).

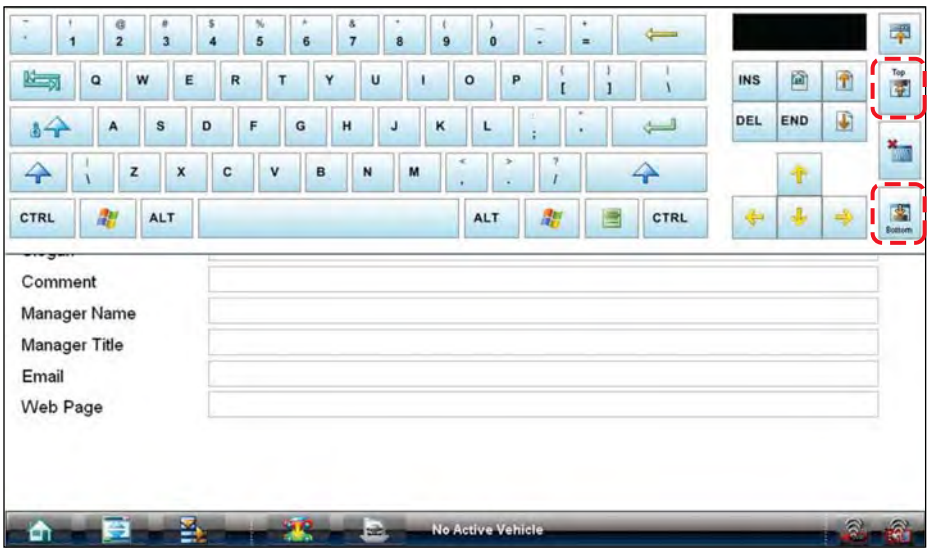


Figure 13-5 *Virtual keyboard Top and Bottom buttons*

5. Close the virtual keyboard and review the information once all the fields have been filled in.
6. Select **OK** from the toolbar to save the Shop Information, or **Cancel** to close the Shop Information dialog box without saving.

   The Shop Information screen closes and the screen returns to the System Settings menu.

Chapter 14 Maintenance

This section covers how to care for your Diagnostic Platform components.

14.1 Display Device

Perform the following services on your Display Device on a routine basis to keep it in top condition.

14.1.1 Cleaning the Touch Screen

The touch screen can be cleaned with a soft cloth and alcohol or a mild window cleaner.

IMPORTANT:
Do not use any abrasive cleansers or automotive chemicals on the touch screen.

14.1.2 Calibrating the Touch Screen

The touch screen can be calibrated for accuracy using the PenMount (PM) utility of the unit.

To calibrate the touch screen:

1. From the Windows toolbar select **Start** > **PenMount Control Panel**.

Figure 14-1 *Launching the calibration program*

2. In the PM Control Panel; highlight **PenMount 6000 RS232** and select **Configure**.
3. Select one of two calibration options:

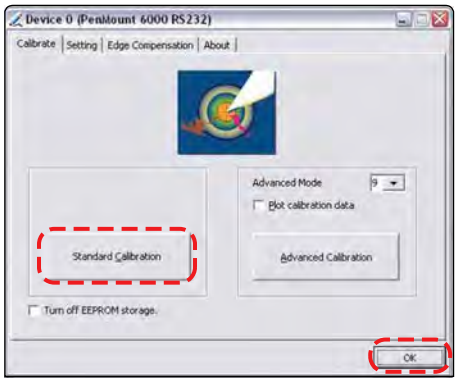


Figure 14-2 *Selecting a calibration option*

- **Standard**—uses 5 points on the screen to quickly bring the unit into calibration. Use the stylus to calibrate the screen.
- **Advanced**—uses 9, 16, or 25 points on the screen to accurately bring the unit into calibration. Use the dropdown menu to select the number of points, a stylus is required to calibrate the screen.

4. Touch and hold the center of each red box that displays in sequence.

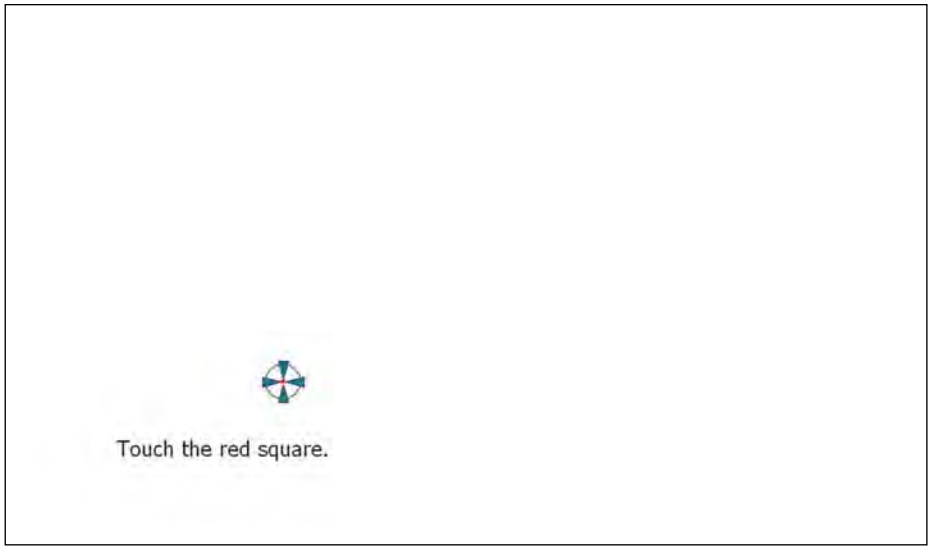


Figure 14-3 *Sample calibration target*

5. Select **OK** to close the dialog boxes once the calibration is complete.

Extended Desktop Touch Screen Calibration

Special consideration must be given to calibrating the touch screen when the Extended Desktop feature of the Display Device is used with an external monitor and the optional docking cradle. If the standard calibration method does not restore touch screen accuracy to a unit with extended desktop, use one of the procedures that follow.

To calibrate the touch screen without the unit installed in docking cradle:

1. From the Windows toolbar select **Start** > **Control Panel** > **Display**.
   The Display Properties dialog box opens.
2. From the dialog box select **Settings** > **Advanced**.
   The Default Monitor and Intel Driver dialog box opens.
3. From the dialog box select the **Display Config** tab.
4. From the Display Config tab, select LVDS (clone) CRT from the Display Configuration dropdown menu (Figure 14-4).

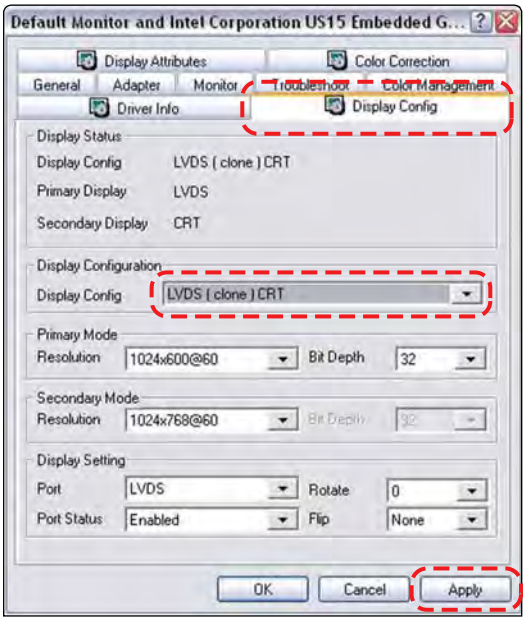


Figure 14-4 *Sample Display Config tab*

5. Select Apply.
6. Close the dialog boxes and the Control Panel window.
7. Calibrate the touch screen using the standard procedure.

NOTE:
This method disables the extended desktop. The same calibration issue arises if the extended desktop is used again.

To calibrate the touch screen with the unit installed in docking cradle:

1. With the Display Device installed in the docking cradle, connect a USB keyboard and an external monitor.

IMPORTANT:
The Intel Graphics Display Config should be set to "**LVDS (extended) CRT**", refer to the procedure above to verify or reset the configuration.

2. From the Windows toolbar select **Start** > **PenMount Control Panel** to open the dialog box.
3. From the dialog box, select the **Multiple Monitors** tab.

4. With the **Multiple Monitor Support** box checked, select the **Map Touch Screens** button (Figure 14-5).

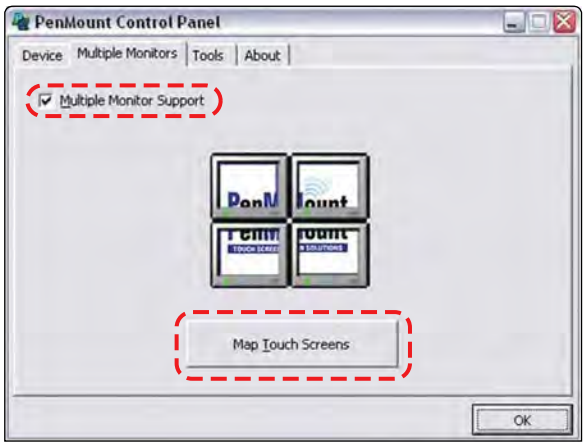


Figure 14-5 *Sample Multiple Monitors tab*

5. Follow the screen prompts and touch the screen of the Display Device as requested.
6. Type "**S**" on the USB keyboard to skip for extended display as requested.
7. Select **OK** from the Multiple Monitors tab to close the PenMount Control Panel dialog box.
8. Calibrate the touch screen using the standard procedures

14.1.3 Cleaning and Inspecting the Display Device

When using the Display Device, make sure to do the following:

- Check the housing, wiring, and connectors for dirt and damage before and after each use.
- At the end of each work day, wipe the Display Device housing, wiring, and connectors clean with a damp cloth.

IMPORTANT:
Do not use any abrasive cleansers or automotive chemicals on the Display Device.

14.1.4 Battery Service

Follow all safety guidelines when handling the battery pack.

WARNING

Risk of electric shock.

- **Prior to recycling the battery pack, protect exposed terminals with heavy insulating tape to prevent shorting.**
- **Disconnect all test leads and turn diagnostic tools off before removing the battery pack.**
- **Do not attempt to disassemble the battery or remove any component projecting from or protecting the battery terminals.**
- **Do not expose the unit or battery pack to rain, snow, or wet conditions.**
- **Do not short circuit the battery terminals.**

Electric shock can cause injury.

WARNING

Risk of explosion.

- **The Lithium battery is factory replaceable only, incorrect replacement or tampering with the battery pack may cause an explosion.**

Explosion can cause death or serious injury.

Battery Safety Guidelines

IMPORTANT:
The battery pack contains no user serviceable components. Tampering with the battery pack terminals or housing will void the product warranty.

Keep the following in mind when using and handling the battery pack:

- Do not short circuit battery pack terminals.
- Do not immerse the Display Device or battery pack in water, or allow water to enter the unit or battery pack.
- Do not crush, disassemble, or tamper with the battery pack.
- Do not heat the battery pack to over 100°C (212°F), or dispose of it in a fire.
- Do not expose the battery pack to excessive physical shock or vibration.
- Keep the battery pack out of reach of children.
- Do not use a battery pack that appears to have suffered abuse or damage.
- Charge the battery pack in the appropriate charger only.
- Do not use a battery charger that has been modified or damaged.
- Use the battery pack for the specified product only.
- Store the battery pack in a cool, dry, well ventilated area.

NOTE:
The battery pack should be used within a short period of time (about 30 days) after charging to prevent loss of capacity due to self-discharging.

If long-term storage of the battery pack is necessary, it should be stored in a in cool, dry, well ventilated place with a 30 to 75 percent state of charge to prevent loss of characteristics.

To prolong the life of your battery, power off the unit or place it into hibernation mode when not in use. The display Device has a built in charger that recharges the battery on demand whenever it is connected to a power source.

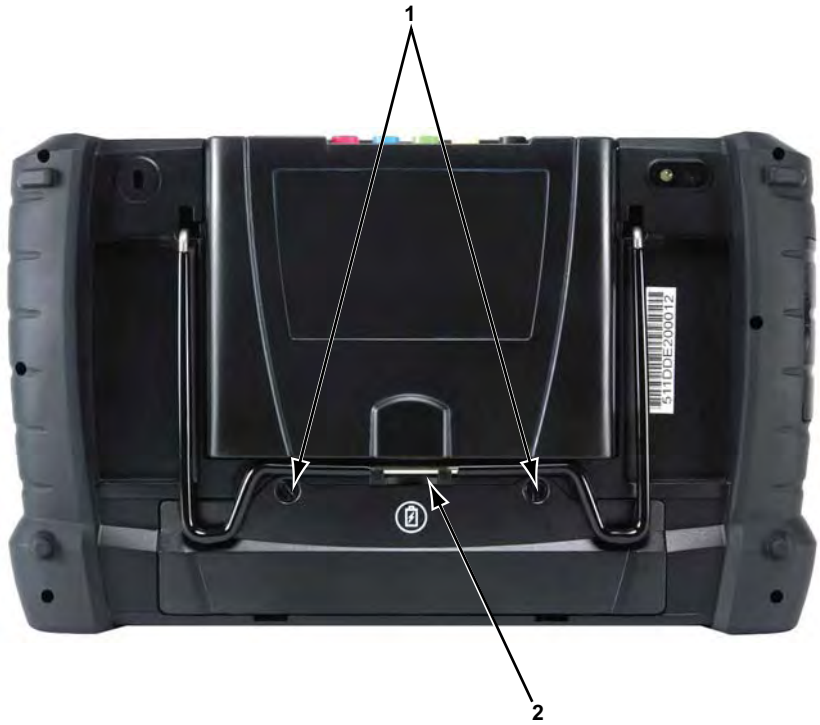
Replacing the Battery Pack

If the battery pack no longer hold a charge, contact your sales representative to order a new one.

IMPORTANT:
Replace the battery pack with original Snap-on replacement parts only.

To replace the battery pack:

1. Loosen the two captive screws that secure the battery pack to the back of the unit.
2. Insert a fingernail into the recess at the mid point of the top of the battery pack, then gently raise the battery pack up to release the electrical connector.



1— Captive Screws

2— Lifting Recess

Figure 14-6 *Display Device battery pack replacement*

3. Lift the battery pack clear of the unit.
4. Fit the three tabs on the bottom of the new battery pack into the slots, then rotate the assembly into position.
5. Make sure the battery pack is fully seated.
6. Tighten the two captive screws.

Disposing of the Battery Pack

Always dispose of a lithium-ion battery pack according to local regulations, which vary for different countries and regions. The battery pack, while non-hazardous waste, does contain recyclable materials. If shipping is required, ship the battery pack to a recyling facility in accordance with local, national, and international regulations. For additional information contact:

- North America—Rechargeable Battery Recycling Corporation (RBRC) at http://www.rbrc.org or http://www.call2recycle.org, or call 1(800) 822-8837 (USA)
- United Kingdom—Electrical Waste Recycling Company at http://www.electricalwaste.com

Products bearing the WEEE logo (Figure 14-7) are subject to European Union regulations.

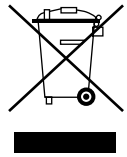


Figure 14-7 *sample WEEE logo*

NOTE:
Always dispose of materials according to local regulations.

Contact your sales representative for details.

Battery Pack Calibration

The internal battery pack contains a micro controller that monitors the battery pack characteristics and maintains an internal “fuel gauge”. The internal fuel gauge may lose some accuracy after many cycles of partial discharge and charge. Should this happen, the fuel gauge can be calibrated with the following procedure:

To calibrate the battery pack fuel gauge:

1. Fully charge the battery pack.
2. Fully discharge the battery pack at a steady rate.

IMPORTANT:
The battery must be completely discharged! Operate the diagnostic tool until it shuts down by itself due to a lack of power. Continue operating the tool when the “low battery” warning displays, do not begin charging until after the tool has automatically shut down.

3. Fully charge the battery pack.

NOTE:
It is not recommended to perform the calibration procedure more than once within 30 days.

14.1.5 Operating System Restore

Snap-on System Restore is a hard disk drive recovery program that allows you recover the hard disk drive files in the event of a failure. Running the program replaces all of the C drive data with the original factory data. Be aware, all new or modified files on the C drive will be lost.

The directional arrow buttons on the Display Device are used to navigate when performing a system restore. Use the Enter button to make selections.

To restore the operating system

1. Power on the Display Device.
2. Wait for the “Press Up Arrow to run Snap-on System Restore” message to display, then Press the **Up Arrow** button.

   A progress indicator displays while the program loads.
3. Select **OK** from the confirmation message.

A progress indicator displays while the files are being restored.

4. Select **OK** from the confirmation message.

   The Display Device shuts down, then reboots and the system recovery portion of the operation begins. Follow any on-screen prompts.

   The Display Device shuts down and reboots a second time. When the Home screen displays, the procedure is complete and the Display Device is ready for use.

14.2 Scan Module

This section covers how to care for your Scan Module.

14.2.1 Cleaning and Inspecting the Scan Module

When using the Scan Module, make sure to do the following:

- Check the housing, wiring, and connectors for dirt and damage before and after each use.
- At the end of each work day, wipe the housing, wiring, and connectors clean with a slightly damp cloth.

IMPORTANT:
Do not use any abrasive cleansers or automotive chemicals on the Scan Module.

14.2.2 Replacing the Protective Handgrip

The soft protective handgrip that covers the outer edges of the Scan Module is easily replaced should it become worn or damaged. Contact your sales representative for replacement parts.

To replace the protective handgrip:

1. Disconnect the data cable, and any other cables, if attached to the Scan Module.
2. From the bottom of the Scan Module, gently lift up and out on one side of the handgrip to free it from Scanner housing.
3. Repeat step 2 to loosen the other side of the handgrip.
4. Lift the handgrip off of the Scan Module housing.

NOTE:
The handgrip tapers toward the front of the Scan Module housing. Make sure the replacement handgrip is correctly oriented before attempting to install it.

5. Fit the new handgrip over the top, data cable end, of the Scan Module housing.
6. With your fingers, work the new handgrip onto the Scan Module housing from top to bottom. Make sure the tabs on the handgrip fit into the grooves on the housing.

Software License Agreement, United Kingdom

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7. TAXES AND CHARGES

You will be responsible for all applicable federal, state or local taxes, tariffs or duties, now or hereafter imposed except for those taxes related to the income of Snap-on.

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10. GOVERNING LAW AND JURISDICTION

This Agreement will be governed by the laws of the State of Wisconsin (excluding its choice of laws principles). **YOU CONSENT TO EXCLUSIVE JURISDICTION AND VENUE IN THE FEDERAL COURTS SITTING IN MILWAUKEE COUNTY, WISCONSIN, UNLESS NO FEDERAL JURISDICTION EXISTS, IN WHICH CASE YOU CONSENT TO EXCLUSIVE JURISDICTION AND VENUE IN ANY STATE COURT LOCATED IN MILWAUKEE COUNTY, WISCONSIN. YOU WAIVE ALL DEFENSES OF LACK OF PERSONAL JURISDICTION AND FORUM NON CONVENIENS. THE PARTIES HEREBY EXPRESSLY AGREE THAT THIS AGREEMENT SHALL NOT BE GOVERNED BY THE UNITED NATIONS CONVENTION ON CONTRACTS FOR THE INTERNATIONAL SALE OF GOODS**.

11. GENERAL

You agree that this Agreement is the complete and exclusive statement of the Agreement between you and Snap-on which supersedes any proposal or prior agreement, oral or written, and any other communications between you and Snap-on relating to the subject of this Agreement. If for any reason a court of competent jurisdiction finds any provision of this Agreement to be illegal or unenforceable, that provision will be enforced to the maximum extent permissible so as to effect the intent of the parties, and the remainder of this Agreement will continue in full force and effect. Any failure by either party to require strict performance by the other of any provision of this Agreement will not constitute a waiver of such provision or thereafter affect the party's full rights to require strict performance. This Agreement may only be amended by specific written amendment signed by authorized representatives of both parties.

YOU ACKNOWLEDGE THAT YOU HAVE READ THIS AGREEMENT, UNDERSTAND IT AND AGREE TO BE BOUND BY ITS TERMS AND CONDITIONS.

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