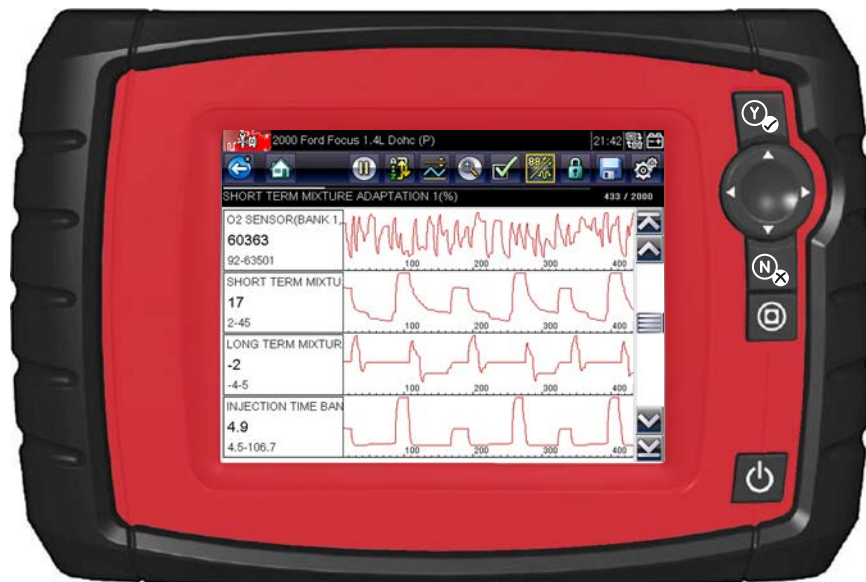


ETHOS⁺

User Manual



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User Manual Information

This manual includes information and images applicable with diagnostic software version 18.4 and later. Some information within this manual may not be applicable with other diagnostic software versions.

The information in this manual is periodically revised to ensure the latest information is included. The current version of this manual and other technical documentation is available online from Snap-on Diagnostics.

Product Support Information

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Website Links:

Snap-on Diagnostics and Information

- <http://diagnostics.snapon.co.uk>

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- <https://www.snapon.com/diagnostics/uk/User-Manuals.htm>

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Product Training Videos

Diagnostic tool specific training videos are available on our website. Follow along and learn the basics of diagnostic tool operation with our free training videos.

Videos are product specific and are available at:

<http://diagnostics.snapon.co.uk> - Click on the "Training and Support" tab, select "Diagnostic Tools", then select the applicable diagnostic tool, and then select "See Quick Tips".



NOTE:

Sample titles are listed below. Not all titles may be available for all diagnostic tools, and are subject to change.

Snap-on® Training Solutions® - Training Videos (examples)	
Introduction and Navigation	Global OBD-II
Scanner Codes	Digital Multimeter
Scanner Data in PID View	Graphing Multimeter & Lab Scope
Scanner Data in Graphing View	Guided Component Tests
Fast-Track® Troubleshooter	Vehicle Specs & Resets
Functional Tests	SureTrack® & Wi-Fi

Diagnostic Quick Tips - Video Series

Snap-on Diagnostic Quick Tips videos are available at no charge on our website and on our YouTube channel. These videos are developed from real repair case studies to help professional technicians use diagnostic tools to solve specific vehicle problems (e.g. performing a Ford Relative Injector Flow Test).

Additional videos are also available showing specific diagnostic tool features (e.g. ShopStream Connect - Software Updates).



Figure 1-1

Videos are available at:

<http://diagnostics.snapon.co.uk> - Click on "Diagnostic Tools", then select the applicable diagnostic tool, then select "See Quick Tips"

<https://www.youtube.com/user/snaponscanner/videos> - Use the search function to find a title, or enter "Diagnostic Quick Tips" in the search field to see a list of all applicable titles.



NOTE:

URL links (above) and titles listed (below) are subject to change and may not be available in all markets.

A sample list of titles are listed below, other titles may be available.

Some videos may not be applicable for use with all diagnostic tools.

Snap-on® Training Solutions® - Diagnostic Quick Tips Videos (examples)	
Air/Fuel Ratio Sensor Test	Fuel Injector Voltage and Current Tests (Scope)
Alternator Ripple Test (Scope)	Fuel Pump Current Ramp Test (Scope)
BMW® Rain Sensor Calibration	Harley-Davidson® ABS Brake Bleed
CAN Bus Diagnostics (Scope)	Harley-Davidson® Functional Tests
Chevrolet® Volt Coolant Pump Bleed	Harley-Davidson® Key Fob Programming

Snap-on® Training Solutions® - Diagnostic Quick Tips Videos (examples)	
Chrysler HVAC Test	Hyundai Blind Spot Detection System Calibration
Chrysler VVT System Cleaning	Hyundai Occupant Detection System Reset
Chrysler Wheel & Tire Calibrations	Ignition Coil Current and Voltage Comparison
COP Ignition Test	Ignition Coil Current Ramp Test
Dual Screen Diagnostics: Scanner vs. Scope	Ignition Coil Primary Voltage Test
Electronic Throttle Control System Diagnostics	Ignition System Diagnostics Using the SIA2000 (Scope)
FIAT® 500 Proxi Alignment	MINI Battery Relearn
FIAT® 500 Throttle Body Relearn	Multi Channel Cam / Crank Correlation
Flex Ray Bus Diagnostics	OBD-II Mode 10 Permanent Codes
Ford Battery Monitor System	Oil Specs & Service Light Resets
Ford Coil Current RFI Test (Scope)	PID Trigger Functions (Scanner)
Ford Flash Reprogramming	Piezo Injectors Signature Test
Ford Misfire Monitor Neutral Profile Correction (Scanner)	Relative Compression Test (Scope)
Ford PATS Key Programming	ShopStream Connect - Data Manipulation
Ford Relative Compression Test	ShopStream Connect - Software Updates
Ford Relative Injector Flow Test	Speed Up Your Diagnostics (Scanner)
Ford TPMS Reprogramming	The Power of Troubleshooter Tips (Scanner)
Ford® 6.7L Transmission Solenoid Characterization	Top Level Menus: Built In Scope Training
Ford® Diesel Injector Coding	Toyota EVAP Test
VW / Audi Flexible Service Reset (Scanner)	Toyota Multiple Freeze Frame (Scanner)
	Toyota Transmission Compensation Coding

Contents

Contents	1
Safety Information	4
Chapter 1: Using This Manual	6
Conventions.....	6
Bold Text.....	6
Symbols	6
Terminology	7
Hyperlinks	7
Notes and Important Messages	7
Procedures.....	8
Chapter 2: Introduction.....	9
Functional Description	9
Technical Specifications	11
Control Buttons.....	12
Accept (Y/✓) Button	12
Directional Buttons	13
Cancel (N/X) Button	13
Shortcut Button	13
Power Button	13
Power Sources	13
Internal Batteries.....	13
AC Power Supply.....	14
Vehicle Power	14
Optional Stand and Hand Strap.....	14
Chapter 3: Getting Started.....	16
Installing the Batteries	16
Powering Up	17
Home Screen.....	17
Home Screen Buttons	18
Connecting to a Vehicle.....	18
The Demonstration Program	19
Powering Down	19
Emergency Shutdown	20
Chapter 4: Navigation	21
Screen Layout	21
Title Bar	21
Toolbar	22
Main Body	23
Screen Messages.....	24
Loading and Connecting Messages.....	24

Confirmation Messages	24
Warning Messages	24
Error Messages.....	24
Chapter 5: Scanner Operations.....	25
Vehicle Identification.....	25
Connecting to a Vehicle.....	27
Cables.....	27
No Communication Message	28
Operations	28
Service Codes.....	29
Code Scan	31
Data Display.....	35
Setting Trigger Levels	40
Exiting Scan Tool Tests.....	42
Chapter 6: OBD-II/EOBD Operations	43
OBD Direct	43
Start Communication	43
Select Communication Protocol.....	47
Connector Information	48
End of Diagnosis.....	48
Chapter 7: Previous Vehicles and Data.....	49
Vehicle History.....	49
View Saved Data	50
Viewing Codes and Code Scan Results.....	51
Delete Saved Data	53
Chapter 8: Tools	54
Tools Menu.....	54
Connect to PC.....	54
Configure Shortcut Key.....	55
System Information	55
Settings	56
Configure Units	63
Chapter 9: Maintenance	64
Cleaning and Inspecting	64
Cleaning the Touch Screen	64
Battery Service	64
Battery Safety Guidelines	65
Replacing the Batteries.....	65
Disposing of the Batteries	66
Chapter 10: ShopStream Connect	67
Using SSC (Connecting to your PC)	67
SSC Main Screen.....	68
Scanner DataViewer.....	69
Image Viewer.....	70
Printing the Code Scan Report.....	71
Software Upgrades and Updates	73

End User License Agreement 74
End User License Agreement71

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 automotive technician's responsibility 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 safety manual, 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:



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 safety manual.

SAVE THESE INSTRUCTIONS

This manual contains tool usage instructions. Some of the 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 in procedures 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 **Tools > Connect-to-PC**.

The example statement abbreviates the following procedure:

1. Select **Tools** from the home screen.
2. Highlight **Connect-to-PC** on the Tools menu.
3. Select **Connect-to-PC**.

The solid arrows (◀, ▶, ▼, ▲) are navigational instructions referring 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 **Brightness**.

The above statement abbreviates the following procedure:

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

1.1.4 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!

1.1.5 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.

1.1.6 Procedures

An arrow icon indicates a procedure.

Example:



To change screen views:

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

The scan tool interfaces with the electronic control system of a vehicle to retrieve diagnostic trouble codes (DTCs) and access serial data stream information. Various vehicle control systems, such as engine, transmission, and antilock brake system (ABS), are readily diagnosed using this scan tool. The scan tool is capable of graphing up to four live data parameters on a single screen.

This chapter describes the construction of the scan tool and addresses the use of the basic hardware controls and features in the following sections:

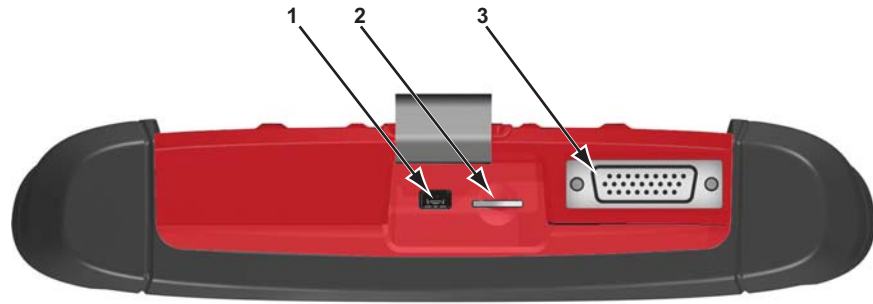
- [Functional Description](#), on page 9
- [Technical Specifications](#), on page 11
- [Control Buttons](#), on page 12
- [Power Sources](#), on page 13
- [Optional Stand and Hand Strap](#), on page 14

2.1 Functional Description



- 1— Y/✓ Button (Yes, Accept, or Continue)
- 2— Directional Buttons; left (◀), right (▶), up (▲), down (▼)
- 3— N/X Button (No, Cancel, or Return)
- 4— Shortcut Button
- 5— Power Button

Figure 2-1 Front view



- 1— Mini USB Client Port
- 2— SD (secure digital) Card Port
- 3— Data Cable Port

Figure 2-2 Top view



- 4— Battery Compartment Cover

Figure 2-3 Back view with optional hand strap and stand

2.2 Technical Specifications

Processor:

Motorola

Operating System

SMX

Touch Screen

Resistive Touch Panel

Display:

5.6 inch diagonal, LCD TFT
640 x 480 resolution SWVGA
24 bit color

Batteries:

(6) 1.5V AA

DC Jack Operating Voltage

8V to 32V DC

Dimensions:

Width:

9.15 inches
232.4 mm

Height:

5.85 inches
148.6 mm

Depth:

1.85 inches
47.0 mm

Weight (including batteries):

2.0 lbs.
907 g

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; 15 VDC. 2A

2.3 Control Buttons

There are five control buttons located on the right side of the unit near the handgrip:

Button	Icon	Description
Accept, Yes		Selects a menu or program, advances to the next screen, or provides a yes answer to a question on the screen.
Directional Arrows		Moves the highlight on the display screen up, down, left, and right, as indicated by the arrows.
Cancel, No		Exits a menu or program, returns to the previous screen, or provides a no answer to a question on the screen.
Shortcut		A function button that can be programmed to provide a shortcut for performing a variety of routine tasks.
Power, On/Off		Turns the unit on and off. Also, press and hold for 5 seconds for emergency shutdown.

All other tool operations are controlled through the touch screen.

2.3.1 Accept (Y/✓) Button

The Y/✓ button is used to do the following:

- To select an item that was highlighted using the direction buttons.
- To advance to the next screen in a series.
- To answer Yes when a Yes or No choice is given.

2.3.2 Directional Buttons

The directional, or arrow, buttons move the cursor or highlight in their respective directions:

- Up (▲)
- Down (▼)
- Left (◀)
- Right (▶)

2.3.3 Cancel (N/X) Button

The **N/X** button is used to do the following:

- To exit a menu or program.
- To close an open list and return to the previous menu.
- To answer No when a Yes or No choice is given.

2.3.4 Shortcut Button

Use the **Shortcut** button to quickly perform routine tasks with a single button press. See [Configure Shortcut Key](#), on page 55, for additional information.

2.3.5 Power Button

The **Power** button powers up the tool, and turns it off.

2.4 Power Sources

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

- Internal Batteries
- AC Power Supply
- Vehicle Power

2.4.1 Internal Batteries

The scan tool can be powered from the internal batteries. New standard batteries or fully charged rechargeable batteries provide sufficient power for about 2 hours of continuous operation.

IMPORTANT:

The internal batteries are not intended to power the scan tool during vehicle testing. Make sure vehicle power is available to the scan tool when performing vehicle tests.

2.4.2 AC Power Supply

The scan tool can be powered from a standard wall socket using the AC power supply and power adapter. The power adapter fits to the data cable connector on top of the scan tool. The jack on the output cable of the AC power supply attaches to the power adapter.

2.4.3 Vehicle Power

The scan tool receives power from the test vehicle when it is connected to a powered data link connector (DLC) with the data cable. All OBD-II/EOBD compliant vehicles are required to have battery power available on the DLC. If the scan tool does not power on when connected to an OBD-II/EOBD DLC, there may be a circuit problem on the vehicle.

Certain vehicles do not provide vehicle power on the DLC. For these applications, a separate cable adapter and power cable are needed to power the unit. Optional data cable adapters are available for testing vehicle from a number of manufacturers. Contact your sales representative for availability. The optional power cable connects to a port on the cable adapter.

2.5 Optional Stand and Hand Strap

An adjustable hand strap and a collapsible stand, that attach to the back of the scan tool housing, are available as optional equipment. Contact your sales representative for availability of these and other options for personalizing your scan tool



- 1— Hand Strap
- 2— Stand
- 3— Retaining Clip

Figure 2-4 *Optional hand strap and stand*

The padded hand strap threads through mounting slots on the scan tool housing. Velcro fasteners hold the strap in place and allow for quick adjustments. The strap keeps the scan tool snug to the palm of your hand while working.

The 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 that the display is at an angle when in use.

This chapter details the initial steps required to get you new scan tool operational. Please read these instructions carefully to get started using your new diagnostic tool.

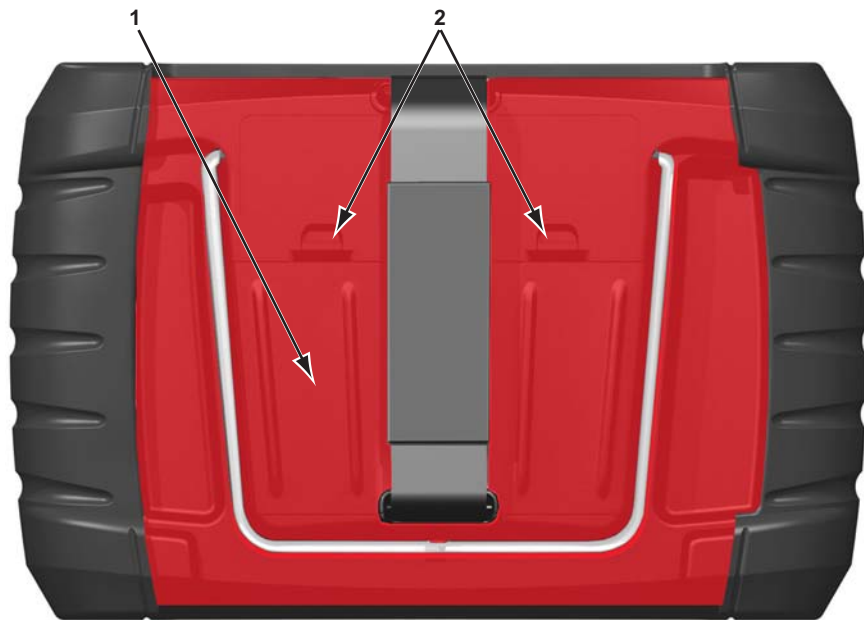
3.1 Installing the Batteries

The six AA batteries provided with your scan tool kit must be installed before using the tool.



To install the batteries:

1. Depress the two battery cover lock tabs and lift off the battery cover.



1— Battery Cover

2— Lock Tabs

Figure 3-1 Battery replacement

2. Observing proper polarity (shown on the battery slots), install six new AA batteries.

IMPORTANT:

Your scan tool can be damaged if the battery polarity is incorrect. Refer to the diagram in the battery compartment on the rear of the tool for correct battery polarity.

3. Fit the battery cover onto the housing.

3.2 Powering Up

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

3.3 Home Screen

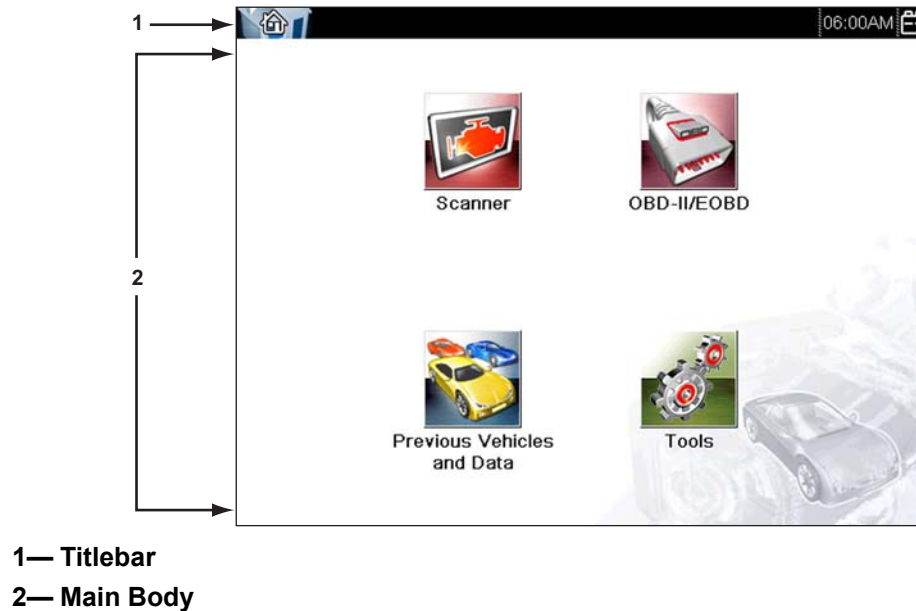


Figure 3-2 Sample Home screen

The main body of the Home screen has four selectable buttons, one for each of the primary scan tool functions. These are explained briefly in the next section and discussed in detail in the Navigation chapter.

The titlebar, which runs across the top of the screen, provides information about the current screen or a description of the defined test vehicle. The title bar contains no selectable items. A graphic indicator at the right edge of the toolbar shows the status of the tool power supply:

Table 3-1 Power supply icons (sheet 1 of 2)






Icon	Definition
	Indicates power is being supplied by the internal batteries
	Indicates the internal batteries are weak and need replacing
	Indicates power is being supplied by the AC power supply





Table 3-1 Power supply icons (sheet 2 of 2)

Icon	Definition
	Indicates power is being supplied by the vehicle
	Indicates the scan tool is actively communicating with a vehicle

3.3.1 Home Screen Buttons

The Home screen buttons allow you to select which of the primary scan tool functions to use. Table 3-2 on page 18 gives brief descriptions of the button operations.

Table 3-2 Home screen buttons

Name	Button	Description
Scanner		Select to open a list of available vehicle manufacturers and begin the process of identifying the test vehicle.
OBD-II/EOBD		Select to perform generic OBD-II/EOBD system tests without first identifying a specific vehicle.
Previous Vehicles and Data		Select to reenter the Identification of a recently tested vehicle, or to access saved data files.
Tools		Select to adjust tool settings to your personal preferences, to access scan tool system information, and perform other special operations.

Use your finger tip to select from the Home screen buttons.

3.4 Connecting to a Vehicle

The data cable is used to connect the scan tool to the data link connector (DLC) of the test vehicle. Connection instructions are provided on the scan tool screen once a vehicle has been identified.



To connect to a test vehicle:

1. Make sure the scan tool is turned on.
2. From the Home screen select **Scanner**, then highlight and make the appropriate selections for the vehicle.
3. Follow the screen prompts to identify the vehicle you are testing.
4. Fit the 26-pin end of the data cable to the connector on top of the scan tool and tighten the captive screws.

5. Connect the 16-pin end of the data cable to the DLC of the vehicle.
6. Switch the vehicle ignition on.
7. Select the menu option you wish to investigate.

3.5 The Demonstration Program

The demonstration program allows you to become familiar with many of the test capabilities of the tool without connecting to a vehicle.



To start the demonstration program:

1. Tap **Scanner** on the Home screen.
The manufacturer menu, which lists all of the makes available for testing, displays. The list also includes a Demonstration button.
2. Tap the **Demonstration** button to select it.
A confirmation message displays.
3. Select **OK** to on the confirmation screen to load the selected database.
4. Follow the on-screen instructions and select as needed until the Systems menu displays.
5. Select from any of the systems listed, then select from the submenus.

IMPORTANT:

Do not connect a vehicle to the scan tool while in the Demonstration mode.

There is also a demonstration program for OBDII/EOBD vehicles. To access the demonstration, select Training Mode from the OBD-II/EOBD main menu.

3.6 Powering Down

Use the **Power** button to turn the scan tool off.

Holding the **Power** button down for 4 seconds forces the unit to shut down in the event that it becomes nonresponsive.

IMPORTANT:

Vehicle communication must be terminated before shutting down the scan tool. A warning message displays if a shut down is attempted while the scan tool is communicating with the vehicle. Forcing a shut down while communicating may lead to ECM problems on some vehicles. Always exit vehicle communications before powering down.



To power off the unit:

1. Press the **Home** button on the toolbar, or press **N/X** until you reach the Home screen.
A stopping communication message appears briefly before the Home screen displays.
2. Disconnect the test adapter from the vehicle connector.
3. Press the **Power** button.
The Turn off dialog box displays.
4. Press **Y/✓** to turn the power off, or press **N/X** to cancel and test a different vehicle.

3.6.1 Emergency Shutdown

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

This chapter describes the scan tool screen layout, how to navigate the interface, and how to make selections using screen menus and buttons. The various types of messages that display while using the tool are also explained here.

4.1 Screen Layout

Scan tool screens (Figure 4-1) typically include the following sections:

- 1— **Title bar** shows test and tool status
- 2— **Toolbar** contains test controls
- 3— **Main body** displays menus and test data

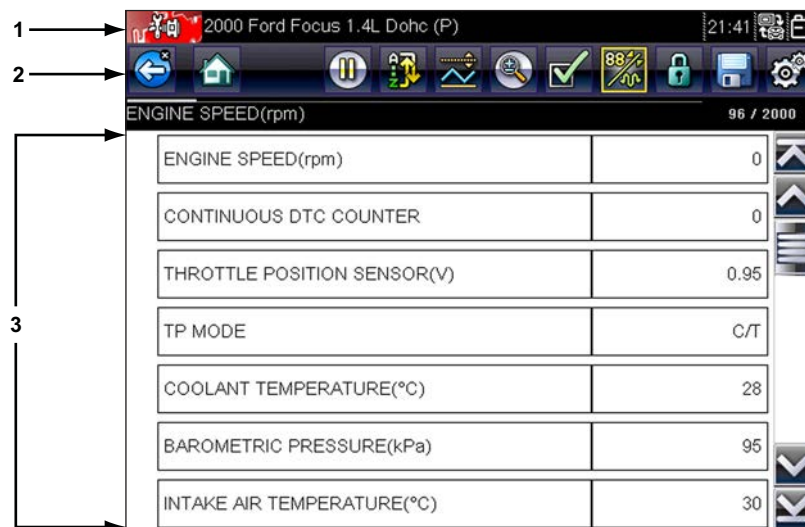


Figure 4-1 Sample scan tool screen

4.1.1 Title Bar

The title bar at the top of the screen, provides basic information about current tool operating conditions. Title bar options vary depending upon vehicle make and model, what test is being performed or what menu is selected. Title bar information may include:

- The identification (ID) of the test vehicle
- The name of the active menu or database
- A power source indicator
- A vehicle communication indicator

Depending upon what is being displayed in the main body of the screen, either the vehicle ID or the active menu is shown at the left side of the title bar.

An icon at the far right side of the title bar indicates whether the tool is being powered by the internal batteries, the test vehicle, or the AC\DC power supply.

A communication icon displays to the left of the power source indicator whenever the scan tool is actively communicating with a test vehicle or a personal computer.

4.1.2 Toolbar

The toolbar, located under the title bar, contains a number of selectable buttons that control tool functions. What buttons appear on the toolbar varies, as only buttons that are active or available for the current screen and test mode display. A brief description of common toolbar button operations are shown in Table 4-1. Additional buttons appear on the toolbar when special operations are available. These buttons are explained in the Operations chapter.

Table 4-1 Data toolbar buttons (sheet 1 of 2)














Button	Icon	Function
Back		Returns to the previously viewed screen. This button is always at the left-hand edge of the toolbar.
Home		Returns to the Home screen. This button is always alongside the Back button on the left side of the toolbar.
Pause		Indicates live data from the vehicle is being displayed.
Play		Indicates the data being displayed is paused when reviewing a movie.
Sort		Determines the order in which the data parameters are listed on the screen.
PID Triggering		Allows you to set, arm, and clear threshold values to automatically begin recording data.
Zoom		Increases and decreases the scale of the data graphs.
Custom Data List		Allows you to select which parameters to display from the list. This button displays when viewing a data list.
View		Switches between text and graph display modes. This button displays when viewing a data list.

Table 4-1 Data toolbar buttons (sheet 2 of 2)

Button	Icon	Function
Lock/Unlock		Locks or unlocks the highlighted parameter. This button displays when viewing a data list.
Save		Saves the current datastream information to tool memory. Selecting open a menu of options.
Tools		Opens the tools menu, which allows you to adjust basic tool settings.
Previous Frame		Moves back one frame when viewing recorded or paused data.
Next Frame		Moves forward one frame when viewing recorded or paused data.

A color-coded frame around the toolbar buttons indicates the status of the button function:

- Blue; available but not currently in use
- White; currently active
- Yellow; currently in focus
- Red; currently selected.

4.1.3 Main Body

The main body of the screen is the lower portion, which displays either a menu of available tests or data from the vehicle. A scroll bar appears on the main body of the screen when there is additional data above or below what is currently shown on the screen (Figure 4-2).



Figure 4-2 Sample scroll bar

Touch and drag the slider in the center of the scroll bar to quickly move through the data. Tap the arrowheads at the ends of the scroll bars to move in the direction of the arrow one line or frame at

a time. Selecting an arrowhead that points to a line moves you directly to the top, bottom, beginning, or end of the data.

4.2 Screen Messages

There are four types of on-screen messages:

- Loading and connecting
- Confirmations
- Warnings
- Errors

4.2.1 Loading and Connecting Messages

Loading and connecting messages display when the scan tool is performing an internal operation, such as loading a database, initiating a test, or establishing communications with the vehicle. The message automatically clears once the internal operation is complete.

4.2.2 Confirmation Messages

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

When a response is not required, the message displays briefly, then disappears.

4.2.3 Warning Messages

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

4.2.4 Error Messages

Error messages inform you when a system or procedural error has occurred.

Examples of possible errors include:

- A cable is disconnected.
- A peripheral, such as a printer is powered off.

The scan tool establishes a data link to the electronic control systems of the vehicle being serviced. This allows you to retrieve diagnostic trouble codes (DTCs) view live data parameters, and perform tests. Vehicle testing requires connecting the scan tool to the test vehicle using the data cable and test adapters. On screen instructions tell you how to connect the scan tool. Additional connection information can be found in the appropriate vehicle communication software manual for the test vehicle.

5.1 Vehicle Identification

The scan tool information presented is provided by the ECM of the vehicle being tested. Therefore, certain attributes of the test vehicle must be entered into the scan tool to ensure the data displays correctly. This vehicle identification sequence is menu driven, simply follow the screen prompts and make a series of choices. Each selection advances you to the next screen. Exact procedures may vary somewhat by the make, model, and year of the test vehicle.



To identify a vehicle for testing:

1. Tap the **Vehicle Manufacturers** button from the Home screen.
A list of manufactures displays ([Figure 5-1](#)).

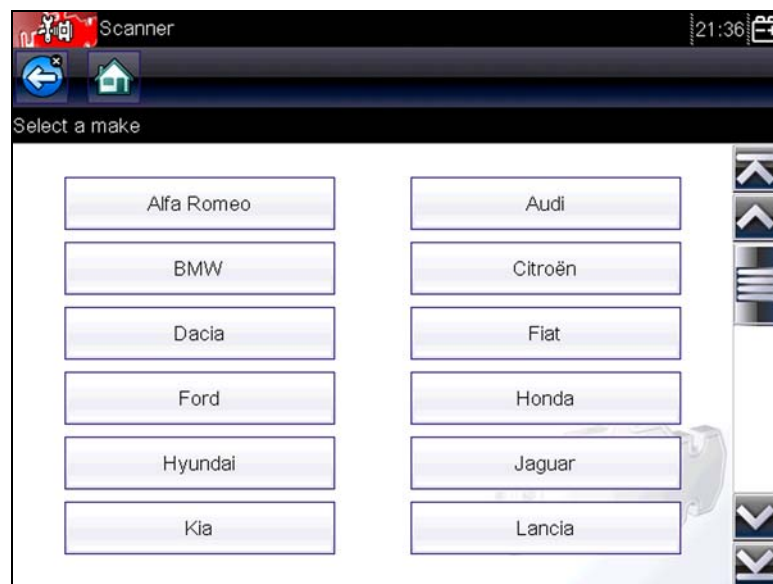


Figure 5-1 Sample manufacturer list

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 displays once all the required data has been entered (Figure 5-2).

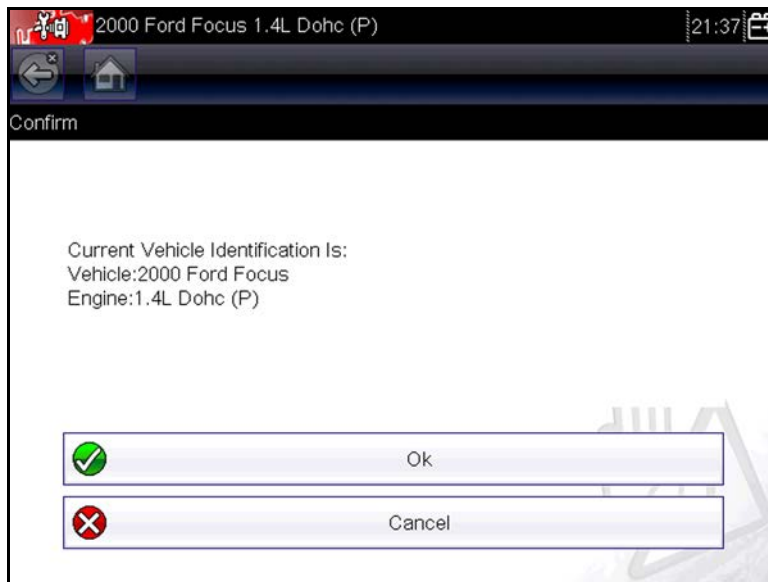


Figure 5-2 Sample confirmation dialog box

4. From the confirmation screen, select **OK** and list of systems displays (Figure 5-3).



Figure 5-3 Sample available systems list



NOTE:

Only the systems available for testing on the identified vehicle are included in the list.

5. Select a system from the list to continue.

The identification sequence is now complete.

5.2 Connecting to a Vehicle

Make a selection from the systems available for testing list and instructions for connecting the scan tool to the vehicle with the data cable display on the screen (Figure 5-4).

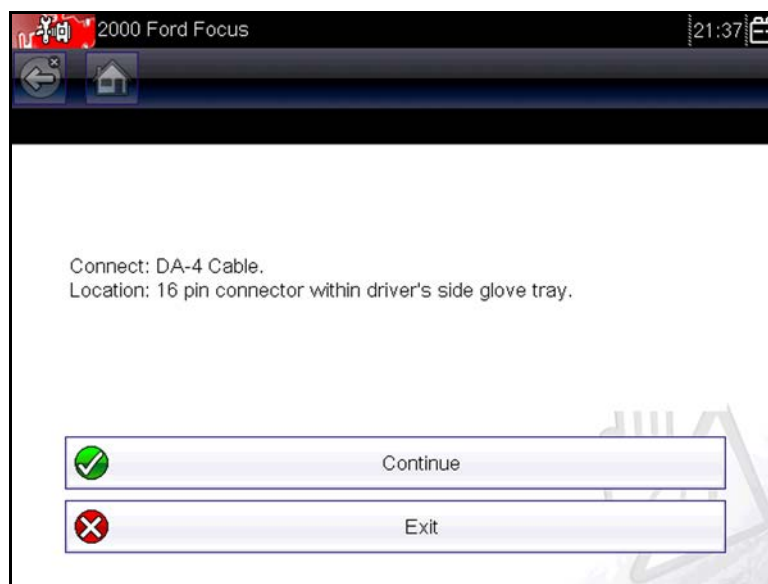


Figure 5-4 Sample vehicle connection message

If an adapter and key are needed, the instructions tell you which ones to use, and also where to locate the vehicle diagnostic connector to perform the selected tests. Refer to the appropriate *Vehicle Communication Software Manual* for additional details.

5.2.1 Cables

A data cables and a cable adapter are used to connect the scan tool to the test vehicle. The 26-pin end of the cable attaches to the data cable port on the scan tool and is secured with two captive screws. The 16-pin end of the OBD-II cable directly plugs into the adapter, which attaches to the data link connector (DLC) of the test vehicle.

On-screen instructions on the scan tool tell you how to connect the data cable once a test vehicle has been identified. The screen message also includes the location of the vehicle diagnostic connector that the cable attaches to for testing the selected system.

All OBD-II vehicles have vehicle battery power (B+) available on the DLC, and a green LED in the vehicle connector end of the cable illuminates whenever power is supplied to the cable. A replaceable 7.5 amp blade-type fuse, also on the vehicle connector end of the cable, protects the unit from high circuit voltage and current. An LED that fails to illuminate indicates either a vehicle power circuit problem or a blown data cable fuse.

The auxiliary power cable supplies power for testing non-OBD-II 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 non-OBD-II models.

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.



To connect the data cable to the vehicle:

1. Follow the on-screen instructions for connecting to the vehicle (Figure 5-4).
2. Once connected, select **Continue**.

The scan tool establishes communication then displays a list of available tests. If the scan tool is unable to establish a communications link, a no communications message displays.

3. Select an available tests to open a menu of options.

5.2.2 No Communication Message

When the screen displays a no communication message, it means the scan tool and the vehicle control module cannot communicate with each other for some reason.

The following conditions cause a no communication message to display:

- The scan tool 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.
- There is a circuit fault in the data cable or adapter.
- Incorrect vehicle identification was entered.

Refer to the Vehicle Communication Software manuals for the manufacturer of the test vehicle for additional troubleshooting information.

5.3 Operations

The scan tool allows you to establish a data link to the electronic control systems of the vehicle in order to view live data parameters, perform tests, get vehicle-specific trouble codes for the various vehicle control systems such as engine, transmission, antilock brake system (ABS), and more.

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

Main menu options vary slightly by the 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.
- **Service Codes** 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.
- **Generic Functions** lets you access certain available Generic OBD II functions from a proprietary menu (1996 and newer vehicles only).

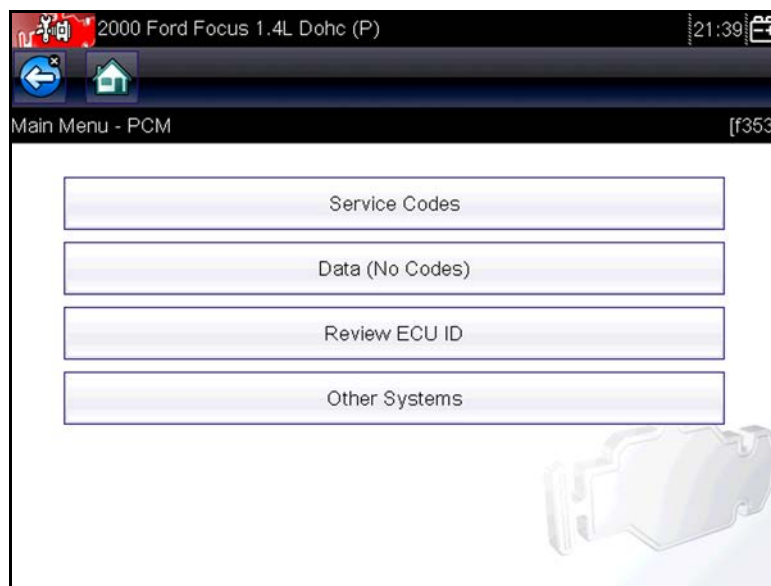


Figure 5-5 Sample Main menu



To perform a scan tool test

1. **Launch the scan tool.** Tap **Vehicle manufacturers** 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 tool unit to the test vehicle.
5. **Select the test from the scan tool main menu.** Select the desired test.

5.3.1 Service Codes

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

- [Display Codes](#)
- [Clear Codes](#)
- [Freeze Frame/Failure Records](#)
- [DTC Status](#)


Display Codes

Selecting either opens a list of diagnostic trouble codes (DTCs) stored in the 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 list of all failed tests.
- **Test Failed Since Code Cleared** displays a list failed tests that failed since the last time codes were cleared from ECM memory.

A code list includes the DTC and a description ([Figure 5-6](#)).



DTC	Description
P0101	Mass Air Flow Circuit Range Or Performance
P0122	Throttle Position Sensor A Circuit Low Input
P0123	Throttle Position Sensor A Circuit High Input

Figure 5-6 Sample code list

Clear Codes

The scan tool 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 on the menu.



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.

Freeze Frame/Failure Records is an OBD-II/EOBD function, see [\(\\$02\) Display Freeze Frame Data](#), on page 46, for additional information.

DTC Status

This selection allows you to see if a particular DTC caused the MIL to turn on.



To check DTC status

1. Select **DTC Status** from the Codes Menu.
The DTC Status screen displays with the cursor at the second character of the code.
2. Use the up ▲ and down ▼ arrows to enter the second character.
3. Press **Y/✓** and the cursor moves to the third character.
4. Use the up ▲ and down ▼ arrows to enter the third character.
5. Press **Y/✓** and the cursor moves to the fourth character.
6. Use the up ▲ and down ▼ arrows to enter the fourth character.
7. Press **Y/✓** and the cursor moves to the fifth character.
8. Use the up ▲ and down ▼ arrows to enter the fifth character.
9. Press **Y/✓** and the status of the selected DTC displays.
10. Press **N/X** to return to the DTC status entry screen.
11. Press **N/X** again to return to the Codes menu.

5.3.2 Code Scan

One of the benefits of performing a code scan is that you can quickly show your customer diagnostic related issues with a pre scan report, and then after repairing the issues you can use the post scan report to show that the repairs were completed ([Figure 5-7](#)). In addition, by using ShopStream Connect the reports can be given to the customer and also saved for your own records, for more information, see [ShopStream Connect](#), on page 67,.

IMPORTANT:

PRE / POST Scan Importance - As many systems do not turn on the check engine light or other indicator, performing a vehicle code scan before making any repairs may help in troubleshooting, by identifying possible unknown issues that may be related to the present symptoms.

Performing pre and post scans also allows you to record in report format the pre-condition of the vehicle and compare the post scan after work is complete to confirm the repairs were completed properly.

Pre and post scan is required by some manufacturers for pre and post collision work as well as by some insurance companies.

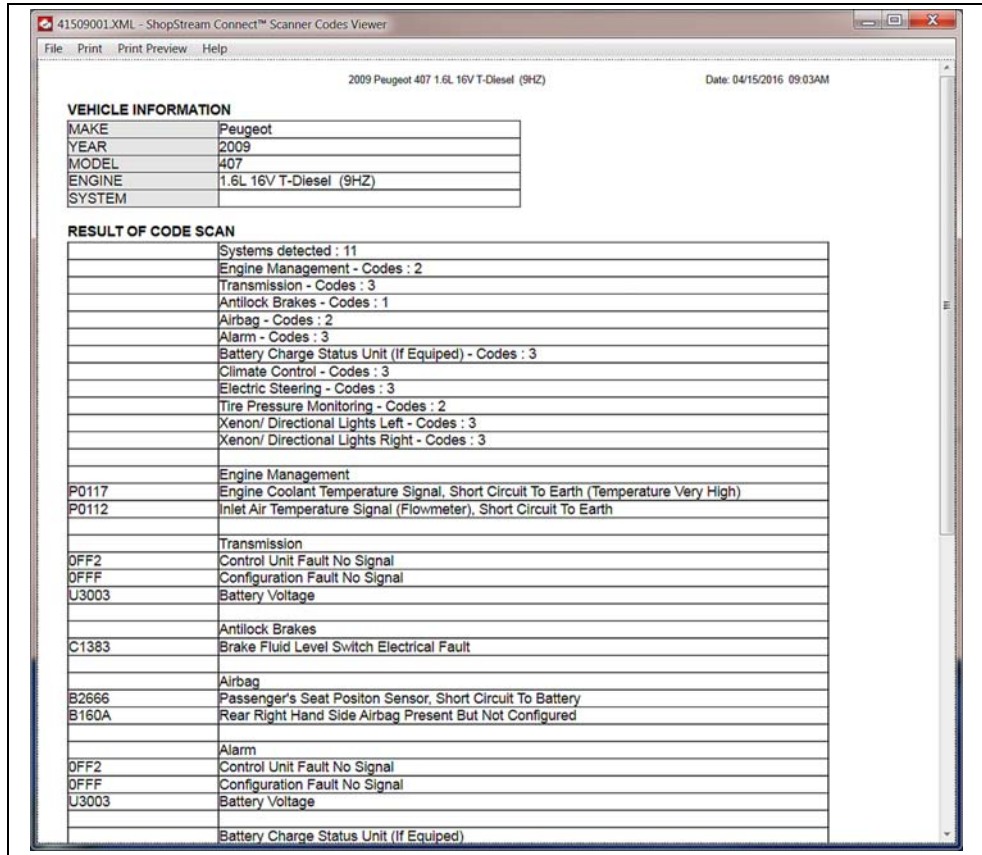




Figure 5-7 Typical Code Scan Report in Shopstream Connect

Depending on the vehicle, Code Scan (if supported) may be available from the Systems menu. Selecting **Code Scan** starts an active scan of vehicle control modules, and opens the Code Scan results screen (Figure 5-8). A progress indicator is shown at the top indicating the active scanning progress. Once completed, the results are displayed by system category.

The following Code Scan related control icons are used:

Icon	Function
	Refresh - Restarts the code scan
	System - Opens the main menu of the system selected

The following results are displayed progressively as the modules are scanned:

- **The total number of systems (modules) detected** (Figure 5-8).

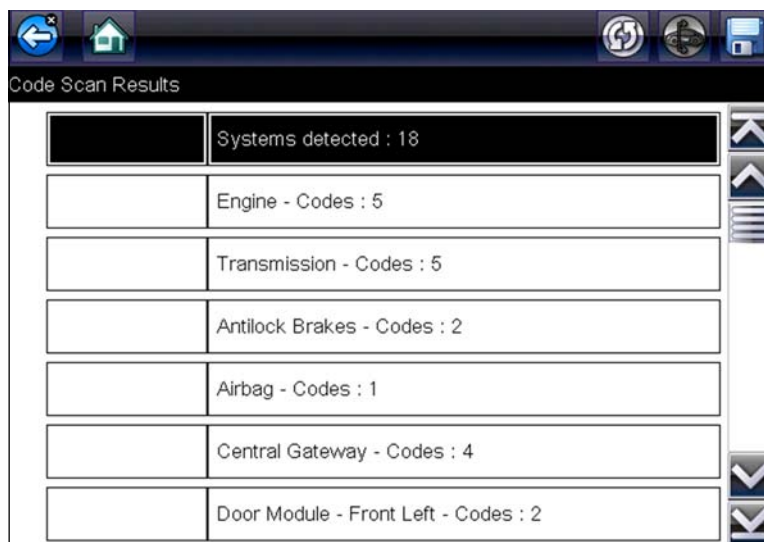


Figure 5-8 Code Scan systems analyzed result total

- **A list of all the systems analyzed with DTCs totals.** A categorized system list with DTC totals is displayed in the order they are scanned. To view the main menu for a system in the list, select the system, then select the **System** icon (Figure 5-9).

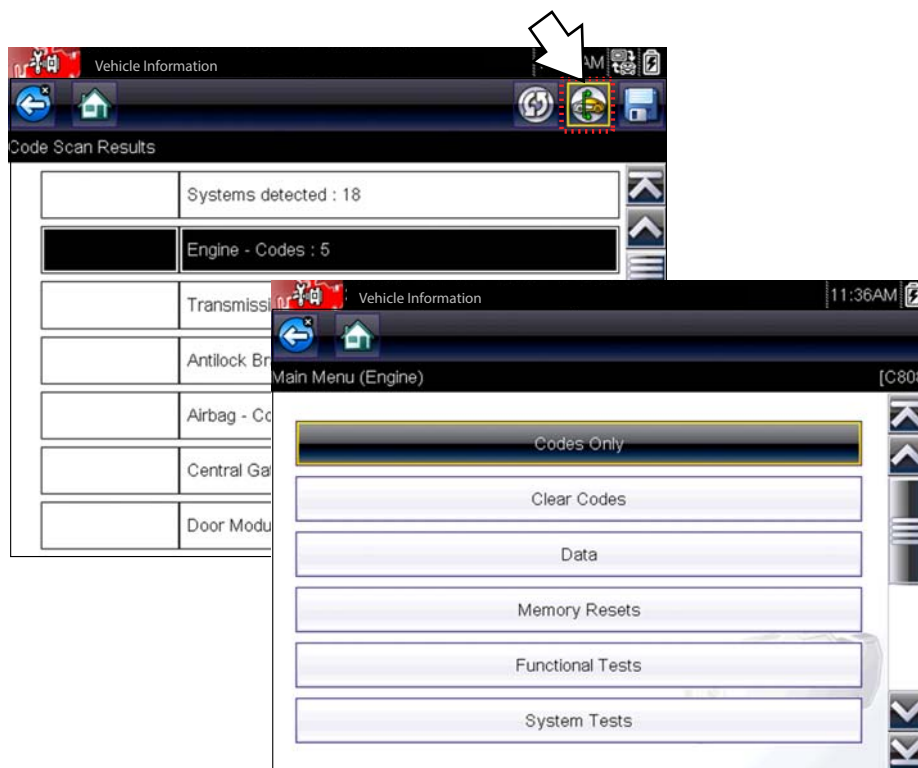


Figure 5-9 System icon (opens Main Menu)

Saving Codes, and Code Scan Results)

When using the code scan feature, or when viewing individual system codes (e.g. engine, transmission) selecting the **Save** icon from the toolbar saves the results as a data file.

The saved file(s) can be viewed using two methods:

- On the diagnostic tool - See [View Saved Data](#), on page 50,.
- Using ShopStream Connect - See [ShopStream Connect](#), on page 67,.

Printing the Code Scan Report

The vehicle system report can also be customized and printed using ShopStream Connect - See [Printing the Code Scan Report](#), on page 71,.

Clear All Codes Read by Code Scan

Selecting **Clear All Codes Read by Code Scan** erases all DTCs from all vehicle system modules that were read by Code Scan.

**NOTE:**

Clear All Codes Read by Code Scan may not clear global OBD-II codes on some vehicles.

5.3.3 Data Display

This selection may appear as Data, Data (No Codes), Data Display, Data Menu, or something similar on the menu. Select **Data** to view live datastream parameters from the vehicle ECM. In this mode parameters from the vehicle ECM display in the main body of the screen, and a toolbar displays at the top of the screen (Figure 5-10).

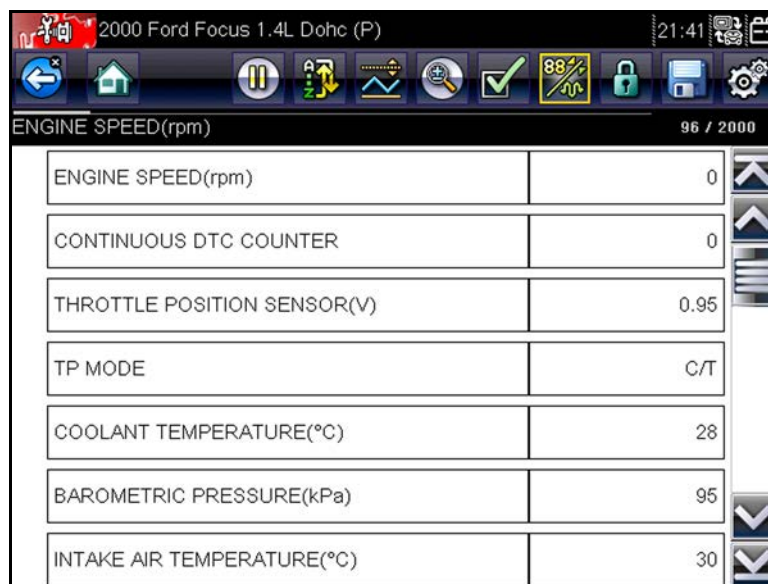


Figure 5-10 Sample data display screen

Toolbar

The buttons on the toolbar operate as shown in Table 4-1 on page 22 while viewing data.

Main Body

During data display the main body of the display is divided into two columns; the left-hand column displays a description of the parameter and the right-hand column shows the parameter value or state. Parameters are listed in the order in which they are transmitted by the ECM, so there will be variation between makes and models.

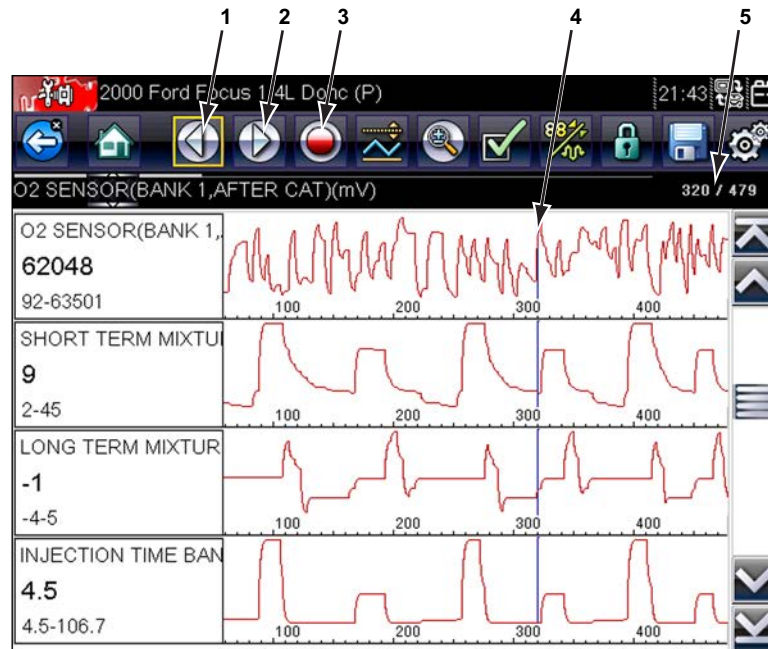
Pausing Data Collection

You can pause the collection of data being transmitted from the vehicle ECM. When data is paused, a number of previous frames of vehicle data, before pause was selected, are stored in the tool and are available for review. If pause is selected while viewing data in text mode the screen automatically changes to display data graphs.



To pause data collection:

1. Tap the **Pause** button while viewing data (Figure 5-11).
On the toolbar, the Pause button replaces the Record button and the Previous Frame and Next Frame buttons display. A frame counter displays in main screen.



- 1— Previous Frame button
- 2— Next Frame button
- 3— Play button
- 4— Position indicator
- 5— Frame counter (current frame/total frames)

Figure 5-11 Sample paused frame of data

2. Scroll to review the data in the frame.
3. To switch frames, touch **Previous Frame** or **Next Frame**. Each button touch moves one frame in the selected direction.



To resume collecting data:

- Touch the **Record** button.

The display changes to live data and the **Pause** icon is shown on the toolbar. The display also returns to text mode if that was the mode being used before data collection was paused.



NOTE:

The **Shortcut** button can be set to perform the Pause/Play function. See [Configure Shortcut Key](#), on page 55, for additional information.

Sorting Data

The Sort button on the toolbar allows you to arrange the parameter list three ways:

- Factory Sort—lists parameters in the order they are transmitted by the ECM
- A-Z Sort—lists parameters alphabetically in ascending order
- Z-A Sort—lists parameters alphabetically in descending order



To sort the data list:

1. Select the **Sort** button on the toolbar.
2. Select from the dropdown menu using either the touch screen or the arrow and **Y/✓** buttons.



NOTE:

Any locked parameters are unlocked whenever a selection is made from the Sort button.

Customizing the Data List

The **Custom Data List** button on the 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 symptomatic data parameters. Most parameters can be removed from the list. Certain vital parameters, such as RPM, cannot be removed. These appear in gray at the top of the list along with a lock icon and cannot be selected.

IMPORTANT:

Limiting the number of parameters that display results in a faster data refresh rate, and reduces the amount of memory used for saved files.





To create a custom data list:

1. Tap the **Custom Data List** button on the toolbar.

The data selection screen displays and two new buttons appear on the toolbar.

The toolbar buttons provide options for selecting and deselecting which parameters to include or remove from the custom data list:

Button	Description
	Select/Deselect , use to mark individual parameters to hide or display.
	Select All/Deselect All , use to hide or display all of the parameters in the list. Any locked parameters cannot be hidden.

Check marks to the left of the parameter description indicates which parameters are selected for display. A second smaller check box indicates a locked parameter.

2. Create a custom data list by touching the parameters to include. A parameter that displays is highlighted, a parameter that does not display is not. Select which parameters to display:
 - a. Touching the **Select All/Deselect All** button immediately changes all of the parameters to the same condition, a second touch switches them back.

- b. Touching the **Select/Deselect** button activates it. Now you can add or remove parameters by touching individual entries in the list.

Keep the following in mind:

- Item at the top of the list that cannot be highlighted are locked and cannot be turned off.
- Drag the screen to scroll and view the entire list.
- Use the Select All button to display the complete list.
- Use the Deselect All button to remove all of the highlights.
- Use the Cancel button to return to the data display.

3. Select **OK** to display the updated data list.

Changing Screen Views

Select the **View** button to open a dropdown menu of options:

- PID List
- 1 Graph
- 2 Graph
- 4 Graph

The PID (parameter identification) List view is a 2-column display with the name of the parameters in the left column and their current values in the right column (Figure 5-10).

Graph views divide the screen horizontally to simultaneously display data graphs of the parameters in the main body of the screen (Figure 5-12).

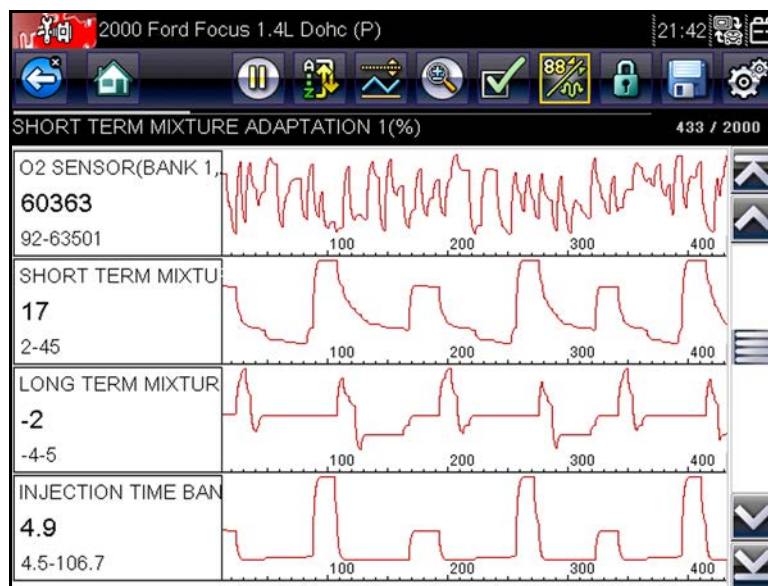


Figure 5-12 Sample Graph view screen

Any previously set conditions, such as held data or locked lines of data, remain in effect when the screen view is changed.

Locking Parameters

Use the **Lock/Unlock** button to lock selected lines of the data in place and prevent them from scrolling, or to release previously locked lines of data. Up to three lines of data may be held at a time, the bottom line of the display cannot be locked. This feature allows you to position related parameters together, making it easier to monitor their values and spot inconsistencies.

When viewing in text mode, locked data lines move to the upper frame on the main body of the display screen. When viewing in graph mode, a lock icon appears alongside the parameter name to indicate it is locked.



To lock parameters:

1. Tap the **Lock/Unlock** button on the toolbar.
The display is now in lock mode, and it remains in this mode until another button is selected.
2. Tap anywhere within a parameter frame to lock it.
The parameter is highlighted, a lock icon displays alongside it to indicate that it is locked and the parameter displays in the upper frame on the screen (Figure 5-13).
3. Select additional parameters to lock if desired.



NOTE:

If three parameters are locked, one must be unlocked before another parameter can be locked.

Parameter Name	Value
O2 SENSOR(BANK 1,BEFORE CAT)(mV)	1
O2 SENSOR(BANK 1,AFTER CAT)(mV)	56850
SHORT TERM MIXTURE ADAPTATION 1(%)	12
OPEN/CLOSED O2 SENSOR LOOP	OPEN
OCTANE ADJUST CONTROL	CLSD
CALCULATED ENGINE LOAD(%)	21
MASS AIR FLOW(g/s)	2.48

Figure 5-13 Sample locked parameters

4. Select any toolbar button to exit lock mode.
Locked parameters remain locked after exiting lock mode, they must be manually unlocked to release them.



To unlock parameters:

1. Tap the **Lock/Unlock** button on the toolbar.
The lock icon disappears and the parameter can be scrolled as before.
2. Highlight the parameter to be unlocked.

3. Select any toolbar button to exit lock mode.

Saving

The **Save** button is used to record movies of vehicle datastream values into tool memory. Saving helps when trying to isolate an intermittent problem or to verify a repair during a road test. Saved files also provide documentation that helps you explain driveability problems to your customers.

A number of data movies can be stored, which can later be opened by selecting the Tool button, or by selecting Tools on the main menu.



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.

The **Shortcut** button can be programmed to perform the Save Screen or Save Movie function. See [Configure Shortcut Key](#), on page 55, for details.

Saved files can also be downloaded from the scan tool to a personal computer through the Mini USB port.

5.3.4 Setting Trigger Levels

The PID Trigger button on the toolbar allows you to configure the scan tool to automatically capture data when a parameter value crosses a threshold value. When triggering is armed, a “trigger event” pauses data collection and records a data movie, similar to an OBD-II/EOBD freeze-frame event.

Selecting the **PID Trigger** opens a menu that includes:

- **Set Trigger**—establishes upper and lower signal values to initiate an event capture for the highlighted parameter.
- **Arm Trigger**—activates the scan tool to capture an event when the signal crosses a threshold.
- **Clear All Triggers**—deletes all previously set triggers.

If triggers are set the menu options are:

- **Clear Trigger**—deletes set trigger levels for the highlighted parameter.
- **Disarm Trigger**—de-activates event capture capability.
- **Clear All Triggers**—deletes all previously set triggers.



To set trigger levels:

1. Highlight the parameter to be used to trigger the recording.
2. Tap the **PID Trigger** button.
3. Select **Set Trigger** from the dropdown menu.

A graph of the highlighted parameter with a trigger toolbar above it fills the main body of the screen. The trigger level line displays as a solid line running horizontally across the data graph ([Figure 5-14](#)). An upper and lower trigger level must be set, the upper level is set first.

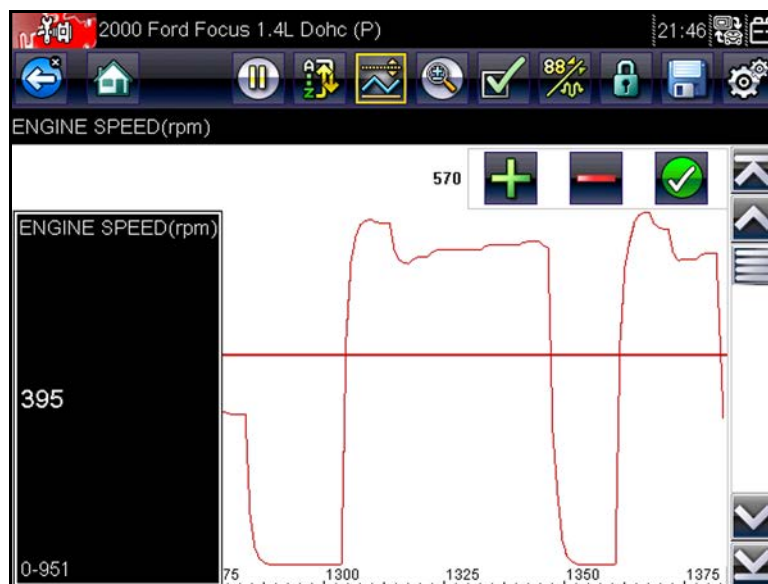


Figure 5-14 Sample trigger set screen

4. Tap the plus (+) and minus (-) buttons on the toolbar, or use the up ▲ and down ▼ arrow buttons to position the upper trigger level to where you want it on the graph.
5. Tap ✓ on the toolbar, or press the **Y/✓** button, to set the upper threshold.
A lower trigger level line now appears at the mid-point of the graph.
6. Tap the plus (+) and minus (-) buttons on the toolbar, or use the up ▲ and down ▼ arrow buttons to position the lower trigger level line to where you want it on the graph.
7. Tap ✓ on the toolbar, or press the **Y/✓** button, to set the lower threshold.
8. Set the lower trigger level using the up ▲ and down ▼ arrows and press ✓.

The display returns to live data and the trigger points appear as horizontal lines across the parameter graphs. Repeat to establish trigger points for other parameters if desired. Once armed, any data points that register outside the set conditions pause data collection and save a recording.



NOTE:

Only three parameters can have trigger levels set at one time, but only one of the conditions needs to be satisfied for triggering to occur.



To arm triggers:

1. Tap the **PID Trigger** button on the toolbar.
2. Select **Arm Triggers** from the dropdown menu.

The trigger lines on the data graphs change color to indicate an armed condition.

Triggers for all of the graphs are armed simultaneously. Once triggering is armed it remains so until you switch it off. If trigger settings are modified, or added for other parameters, they are armed as soon as you exit the setting screen.

5.4 Exiting Scan Tool Tests

The scan tool 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 scan tool tests. A warning message displays if you attempt to shut down with the scan tool communicating.

**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 scan tool tests:**

1. From an active screen, select **Exit** from the toolbar to return to the Systems Menu.
2. From the Systems Menu, select **Back**.

A stopping communications message briefly displays followed by the Main menu. Now, the scan tool is no longer communicating with the vehicle and it is safe to disconnect the data cable from the vehicle.

OBD-II/EOBD allows you to access Generic OBD-II scan tool tests without completing a vehicle identification. This option 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. OBD-II/EOBD is also used for testing OBD-II compliant vehicles that are not included in the scan tool databases.

6.1 OBD Direct

Selecting OBD Direct opens a menu with two options:

- OBD Diagnose
- OBD Training Mode

Selecting either opens a menu with these 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
- [End of Diagnosis](#) ends communication between the scan tool and the vehicle

The OBD Training Mode is a demonstration program that allows you to access OBD-II/EOBD scan tool functions without connecting to a vehicle. Operation is the same as for OBD Diagnose, however, data values are static.

6.1.1 Start Communication

Use the following procedure to conduct an OBD-II/EOBD test session:



To perform an OBD-II/EOBD Test:

1. Tap **Start Communications** on the OBD Direct menu.
A vehicle type menu with 2 option displays:
 - 12V Light Duty Vehicle
 - 24V Heavy Duty/Goods Vehicle
2. Select a vehicle type from the list.
A generic connection message displays ([Figure 6-1](#)).



Figure 6-1 Sample generic connection message

3. Connect the scan tool to the test vehicle according to the screen instructions.
4. 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 6-2).

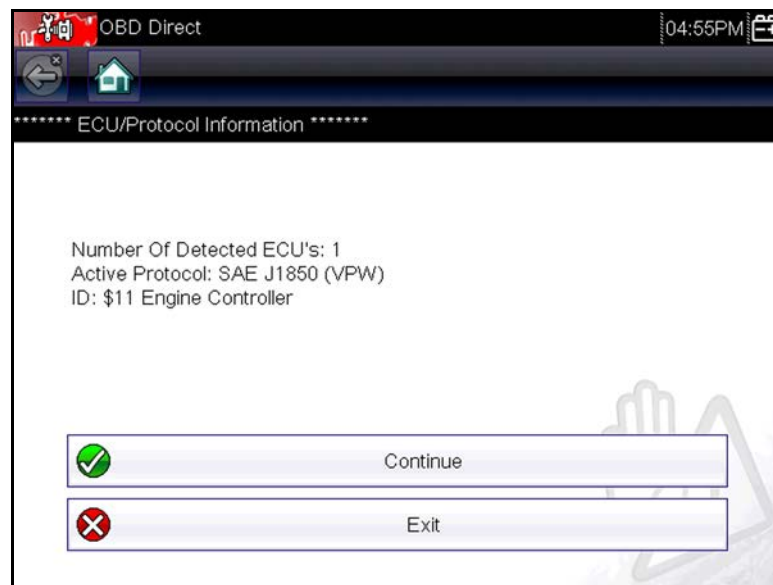


Figure 6-2 Sample communication message

5. Select **Continue**.
A menu of available tests displays (Figure 6-3):

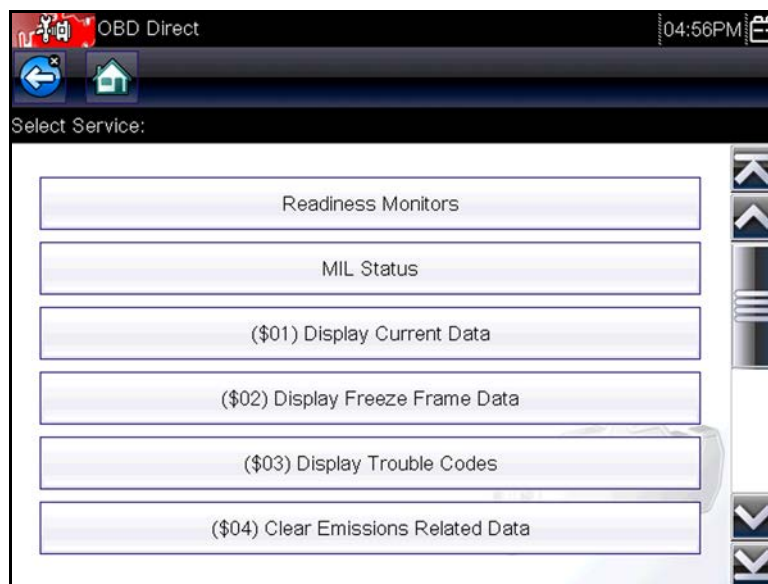


Figure 6-3 Sample Start Communication menu

6. Select a test to continue, options include (Figure 6-3):
 - Readiness Monitors
 - MIL Status
 - (\$01) Display Current Data
 - (\$02) Display Freeze Frame Data
 - (\$03) Display Trouble Codes
 - (\$04) Clear Emissions Related Data
 - (\$05, 06, 07) Display Test param./Results
 - (\$08) Request Control of On-board System
 - (\$09) Read Vehicle Identification
 - (\$09) In-use Performance Tracking
 - (\$0A) Emission Related DTC with Permanent Status

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 of choices:

- **Monitors Complete Since DTC Cleared** displays the results of all monitor tests that have run since the last time the 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 the distance driven while the MIL is on (if supported), can also be displayed. It is also possible to save the MIL Status report.

(\$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 frame data for any stored emission related diagnostic trouble codes (DTCs). 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 in memory.

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 Test Parameters and Test Results 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, that is the scan tool transmits 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.

(\$0A) Emission Related DTC with Permanent Status

This option displays a record of any “permanent” codes. A permanent status DTC is one that was severe enough to illuminate the MIL at some point, but the MIL may not be on at the present time.

Whether the MIL was switched off by clearing codes or because the setting conditions did not repeat after a specified number of drive cycles, a record of the DTC is retained by the ECM. Permanent status codes automatically clear after repairs have been made and the related system monitor runs successfully.

6.1.2 Select Communication Protocol

A communication protocol is a standardized way of data communication between an ECM and a scan tool. Touch **Select Communication Protocol** to open a menu of options (Figure 6-4).

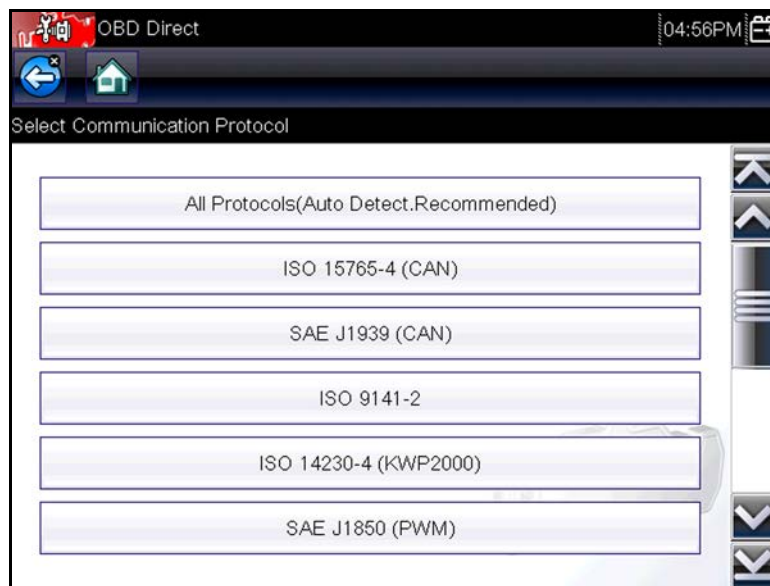


Figure 6-4 Sample communication protocol menu

Global OBD may use the following communication protocols:

- ISO 9141-2 (K-LINE)
- SAE J1850 PWM (Pulse Width Modulation)
- SAE J1850 VPW (Variable Pulse Width)
- ISO 14230-4 (Keyword Protocol 2000)
- SAE J2284/ISO 15765-4 (CAN)

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

6.1.3 Connector Information

This option opens a database of vehicle diagnostic connector locations that includes most makes and models. The menu driven interface leads you quickly to the difficult to find test connector.



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.
4. Select **Continue** and connector location information displays ([Figure 6-5](#))

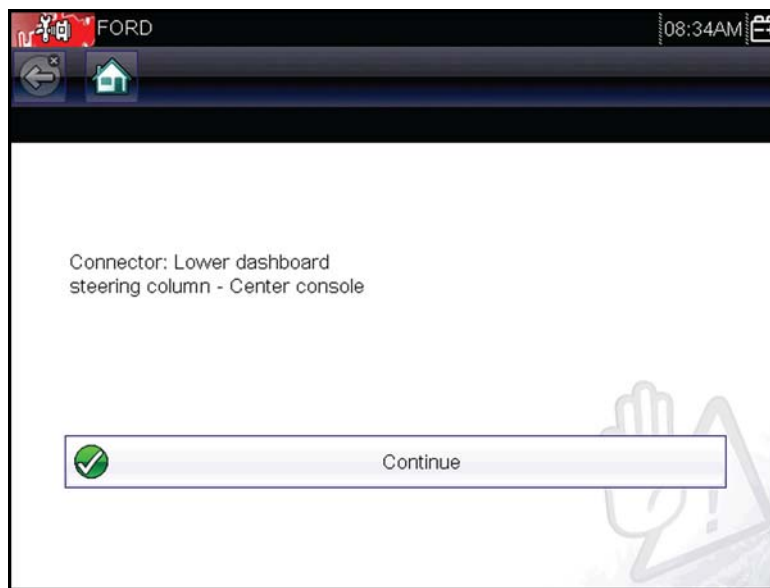


Figure 6-5 Sample connector location message

5. Select **Continue** to return to the System menu.

6.1.4 End of Diagnosis

Selecting this option terminates the communication link between the scan tool and the vehicle ECM, and returns the display to the OBD Direct menu.

The Previous Vehicle and Data Home screen selection allows you to quickly configure the scan tool to the identity of the last twenty vehicles tested, and to access saved data files. A menu with three options opens when **Previous Vehicle and Data** is selected (Figure 7-1).



Figure 7-1 Sample previous vehicles and data menu

7.1 Vehicle History

The scan tool stores the identifying characteristics of the last twenty five vehicles tested, so there is no need to go through the complete vehicle identification sequence when performing a retest after repairs have been made. The oldest vehicle record is deleted when a new vehicle is identified once there are twenty identifies on file.



To select from a vehicle in history:

1. Tap **Previous Vehicles and Data** on the Home screen.
2. Select **Vehicle History** from the menu.

A list of up to 25 previously tested vehicles displays, file names include the vehicle ID, date, and time. Use the scroll bar to view the entire list.
3. With the item to be opened highlighted, either tap the vehicle ID or press the **Y/✓** button.

The appropriate software loads and a vehicle ID confirmation screen displays.
4. Select **OK** or press **Y/✓** to continue.

A connection message displays.
5. Connect the data cable to the vehicle, then select **OK** or press **Y/✓** to continue.

The menu for the last system tested on the selected vehicle displays.

7.2 View Saved Data

Selecting the **View Saved Data** menu option opens a list of all the data movies and screen images that are stored in the scan tool memory.

Saved files can either be opened directly on the scan tool, or downloaded to a personal computer and opened using ShopStream Connect software.

Saved files are listed in chronological order by the date and time that they were created, with the most recent files are at the top of the list. The vehicle ID characteristics are included in the listings as well (Figure 7-2).



Figure 7-2 Sample saved vehicle data list



To review a movie:

1. Tap **Previous Vehicles and Data** on the Home screen.
2. Select **View Saved Data** from the menu.
3. Select a movie from the list of saved files.

The movie opens and plays in real time. The **Play** button changes to the **Pause** button at the end of the movie.

Movie reviewing tips:

- The **Pause/Play** and **View** toolbar buttons are active while a movie is playing, so you can stop the movie or switch to graph view at any time.
- The **Previous Frame** and **Next Frame** buttons are active if the data is paused.

7.3 Viewing Codes and Code Scan Results

When code scan or single system code results are saved, they are saved in (.XML) file format (Figure 7-3).




Figure 7-3 Typical - Code Results (.XML) file

The saved (.XML) file(s) can be viewed using these methods:

- On the diagnostic tool - See [Viewing Code Results on the Diagnostic Tool](#), on page 52,.

In report format using:

- ShopStream Connect - see [Printing the Code Scan Report](#), on page 71,.

 **Viewing Code Results on the Diagnostic Tool**

Selecting a system code or a code scan results file from your saved file list (Figure 7-4), opens the file onscreen. When opened, the (.XML) file displays basic vehicle information and a list of DTCs with a brief description of each.

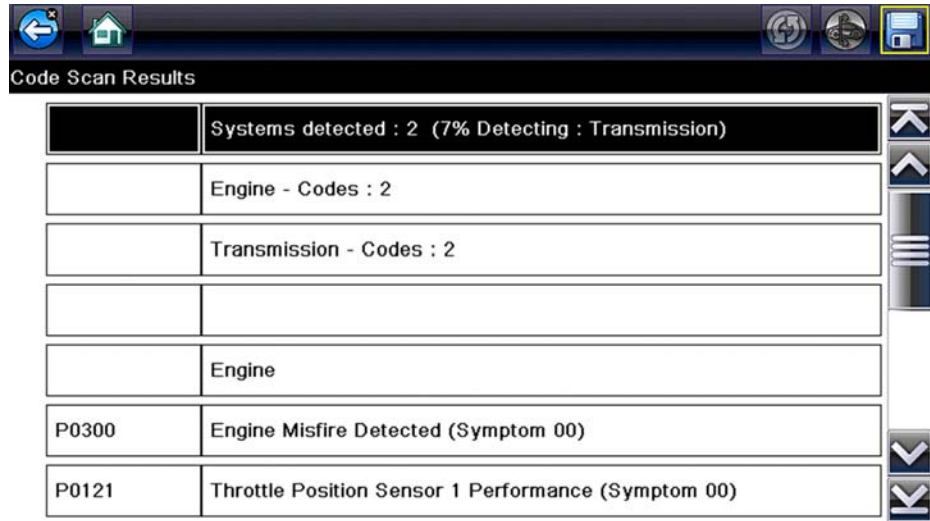


Figure 7-4 Typical - Code Scan Results (.XML file) viewed onscreen

7.4 Delete Saved Data

This menu option is used to permanently erase saved files from scan tool memory when they are no longer needed.



To delete a saved file:

1. Select **Previous Vehicles and Data** from the Home screen.
2. Select **Delete Saved Data** from the menu.

A list of saved files displays.



NOTE:

The Select/Deselect and Select All/Deselect All buttons are available on the toolbar. Use the Select/Deselect button to delete individual files, use the Select All/Deselect All buttons to clear the entire memory buffer at once.

3. Select a file to delete from the list and a confirmation message displays.
4. Select an option from the confirmation message:
 - **OK** removes the selected file and returns to display the saved files list, which no longer includes the deleted file.
 - **Cancel** returns to the saved files list without deleting the selected file.
5. Select **Back** on the toolbar to return to the Previous Vehicles and Data menu, select **Home** to return to the Home screen.

The Tools option on the Home screen is used to configure the scan tool for your personal preferences. Tap the **Tools** button to open a menu of options.

8.1 Tools Menu

The Tools menu has the following options:

- [Connect to PC](#), use to transfer and share file with a personal computer (PC)
- [Configure Shortcut Key](#), use to change the functionality of the shortcut button
- [System Information](#), use to display configuration information for your scan tool
- [Settings](#), use to configure certain characteristics of the scan tool
- [Configure Units](#), use to choose between US customary or metric units of measure

8.1.1 Connect to PC

Connect-to-PC allows you to transfer saved data files on your Diagnostic Tool to your personal computer using a USB cable.

The optional ShopStream Connect™ PC software allows you to view, print and save data files on your PC. In addition, you can download software updates from the PC to the Diagnostic Tool. These features provide an ideal way to manage saved data files. The ShopStream Connect application is available free online, see [ShopStream Connect](#), on page 67, for additional information.



To connect the diagnostic tool to a PC:

1. Connect the supplied USB cable to the diagnostic tool and then to the PC.
A USB cable, supplied with your diagnostic tool, is used to connect the diagnostic tool to the PC. When the diagnostic tool is connected to the PC a communications icon appears on the right edge of the title bar.
2. Select **Tools** from the Home screen.
3. Select **Connect-to-PC** from the Tools and Setup menu.
A screen message will display to confirm the tool is in Connect-to-PC-mode.

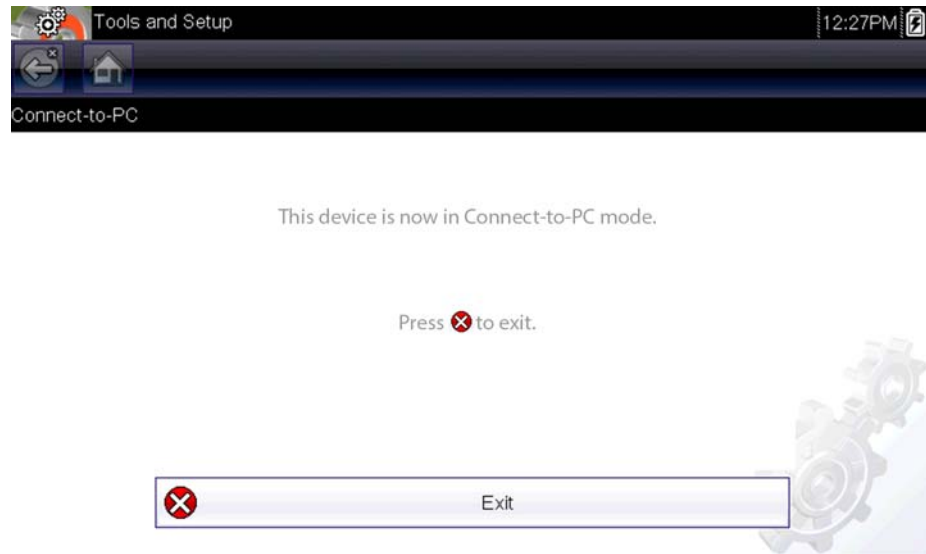


Figure 8-1

8.1.2 Configure Shortcut Key

This feature allows you to change the functionality of the **Shortcut** key. Possible function assignments include:

- **Brightness** increases the screen backlighting in incremental steps from lowest to highest, then returns to the lowest setting and continuously repeats.
- **Save Screen** takes a snapshot of the current screen as either a bitmap or jpeg image, it includes the visible screen image only.
- **Save Movie** saves a recording of a number of frames of data (buffered data plus data transmitted after triggering) for each available parameter.
- **Show Menu Shortcuts** opens the Configure Shortcuts menu when the Shortcut button is pressed so you can quickly select from any of the available functions.
- **Toggle Record/Pause** programs the Shortcut key to work as the Pause and Play buttons while viewing data, the first press pauses data collection and the second press resumes live data capture.



To assign a function to the Shortcut key:

1. Select **Tools** from the Home screen.
The Tools menu opens.
2. Select **Configure Shortcut Key** from the menu.
3. Select a function from the menu.
4. Select the **Back** button on the toolbar to return to the options menu, or select the **Home** button to return to the Home screen.

8.1.3 System Information

The **System Information** option lets you view configuration information for your scan tool.



To display the System information screen:

1. Select **Tools** from the Home screen.
2. The Tools menu opens.
3. Select **System Information** from the menu.
The System Information screen displays.



Figure 8-2 Sample system information screen

4. Select the **Back** button on the toolbar to return to the options menu, or select the **Home** button to return to the Home screen.

8.1.4 Settings

The Settings selection allows you to adjust certain basic scan tool functions to your personal preferences. Options include:

- **Brightness** is used to adjust the intensity of the screen back lighting.
- **Touch Calibration** is used to calibrate the touch screen display.
- **Time Zone** is used to set the internal clock to the local time standard.
- **Clock Settings** is used to set the real-time clock that displays on the title bar.
- **Daylight Savings Time** is used to configure the internal clock for Daylight Savings Time.
- **Time Format** is used to configure whether time is displayed on a 12 or 24 hour clock.
- **Date Format** is used to configure the month, date, and year displays.
- **High Contrast Toolbar** is used to switch the display to black and white toolbar for improved visibility under poor lighting conditions.
- **Color Theme** is used to switch the display to a black screen background for improved visibility under poor lighting conditions.
- **Font Type** is used to switch the display to bold-faced type for improved visibility under poor lighting conditions.

- **Battery Type** is used to configure the tool to operate on rechargeable or disposable batteries.
- **Backlight Time** is used to configure how long the screen remains lit when the tool is idle.

Settings options are described in the following sections.

Brightness

Selecting this option opens the brightness setting screen, which allows you to adjust the back lighting (Figure 8-9).

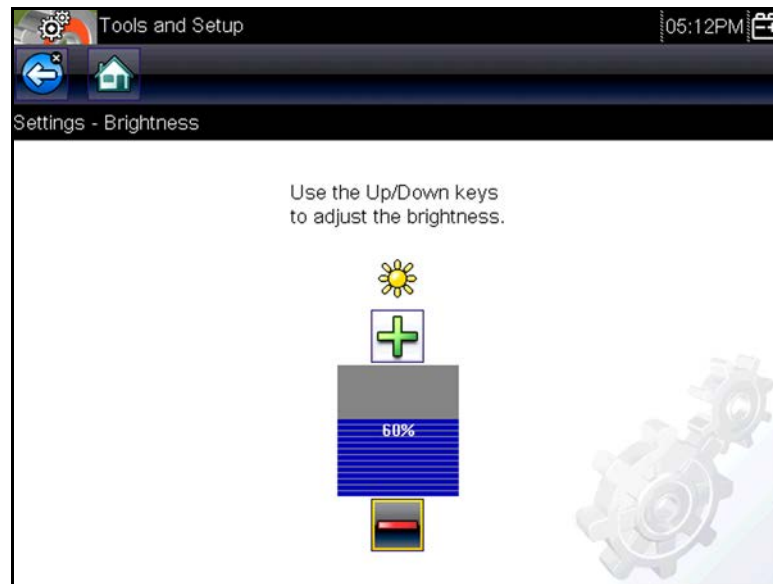


Figure 8-3 Sample brightness setting screen



To adjust brightness:

1. Tap the **Plus** button on the touch screen, or use the up (▲) arrow on the scan tool to increase the screen illumination.
2. Tap the **Minus** button on the touch screen, or use the down (▼) arrow to decrease screen the screen illumination.

Each tap or button press incrementally changes the display screen back lighting.

3. To exit: select **Back** or **Home** from the toolbar, or press the **N/X** (cancel) button.

Touch Calibration

Calibrating the touch screen maintains the accuracy of the touch-sensitive display screen. Perform the following procedure on a routine basis to keep your scan tool in good working order.



To calibrate the touch screen:

1. Select **Tools** from the Home screen to open the menu.
2. Select **Settings** from the menu.
3. Select **Calibrate Touch Screen** from the menu.

The first calibration screen opens (Figure 8-4)



Figure 8-4 Sample calibration screen

4. Touch the box as directed.
The box goes away and reappears on a different area of the screen.
5. Repeat Step 4 each time a new box displays.



NOTE:

The display returns to the Settings menu once the screen calibration procedure is complete.

Time Zone

This option opens a menu of time zone settings. Scroll to highlight, then select the local time zone. The display returns to the Settings menu once a time zone is selected.

Clock Settings

The system clock setting screen opens when this option is selected from the Setup menu (Figure 8-9).

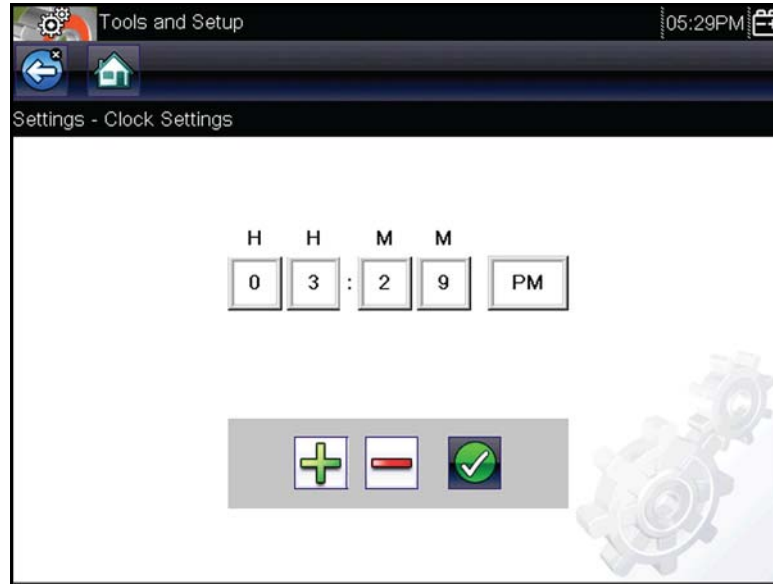


Figure 8-5 Sample system clock setting screen



To set the clock:

1. Use the **Plus** and **Minus** buttons on the display screen to change the value in the highlighted field. Each tap of a button changes the value up or down one increment.
2. Tap the ✓ (OK) button to move the highlight to the next field.
3. Repeat Step 1 until the correct time is displayed.
4. After the clock is set, select either **Back** or **Home** from the toolbar, or press the **X** (cancel) button to exit.



NOTE:

The [Time Format](#), on page 59, option is used to switch between a 12 hour and 24 hour clock.

Daylight Savings Time

This option configures the internal clock for Daylight Savings Time. Select Yes or No to return to the Settings menu.

Time Format

This option allows you to select whether time displays on a 12 or 24 hour clock. Select to return to the Settings menu.

Date Format

This option allows you to select how date information is displayed. Select from:

- Month, Day, Year (MM_DD_YYYY)
- Day, Month, Year (DD_MM_YYYY)

- Year, Month, Day (YYYY_MM_DD)

Scroll and select to return to the Settings menu.

High Contrast Toolbar

This option allows you to select between a standard and high-contrast toolbar. The high-contrast option has black and white buttons with crisp graphics that are easier to see in poor lighting conditions or bright sunlight.



Figure 8-6 Sample high-contrast toolbar

Selecting opens a menu with two choices. Make a selection and a “please wait” message momentarily displays followed by the Home screen. The new toolbar setting is now active.

Color Theme

This option allows you to select between the standard white (default) and a black (night) background for the screen. The black background can be beneficial when working under poor lighting conditions.



Figure 8-7 Sample black background with high-contrast toolbar

Selecting opens a menu with two choices. Make a selection and a “please wait” message momentarily displays followed by the Home screen. The new toolbar setting is now active.

Font Type

This option allows you to select between standard and bold faced type for the display screen. The bold type option is designed to make screen writing more legible under poor lighting or bright sunlight conditions.

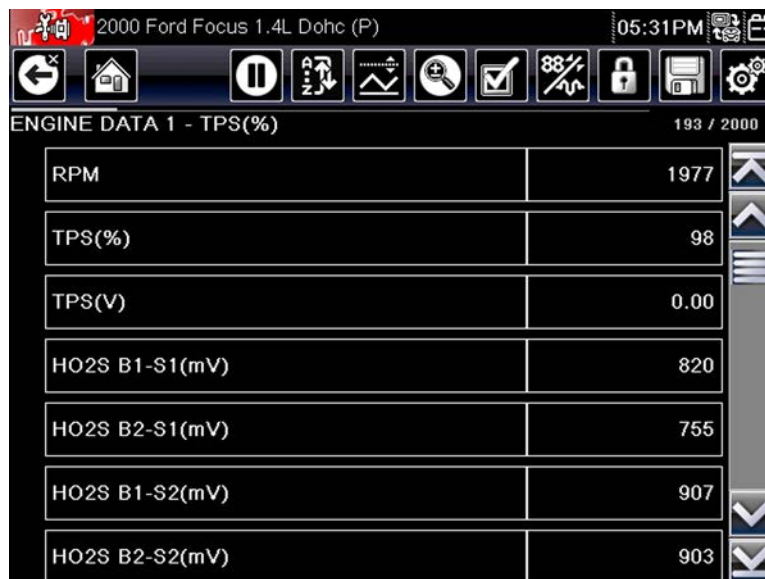


Figure 8-8 Sample bold type on a black background

Selecting opens a menu with two choices: Normal Font and Bold Font. Highlight the desired choice and Press **Y/✓**, the change is instantaneous. Select the Back or Home button from the tool bar to return to either the Settings menu or the Home screen.

Battery Type

This selection allows you to configure the tool to operate on either standard or rechargeable batteries (Figure 8-9). The rechargeable setting is designed to maximize battery life. An on-screen message displays in the rechargeable mode when the batteries are in need of a charge.



Figure 8-9 Sample battery type screen

Backlight Time

This option allows you to configure how long the screen backlight remains on when the tool is inactive. The following choices are available:

- Always On
- 15 Seconds
- 30 Seconds
- 45 Seconds
- 60 Seconds

Scroll and Press **Y/✓** to make a selection. Then, select the Back or Home button from the tool bar to return to either the Settings menu or the Home screen.

8.1.5 Configure Units

This option opens a dialog box for choosing between US customary or metric units of measure for temperature, air pressure, other pressures, and vehicle speed (Figure 8-10).

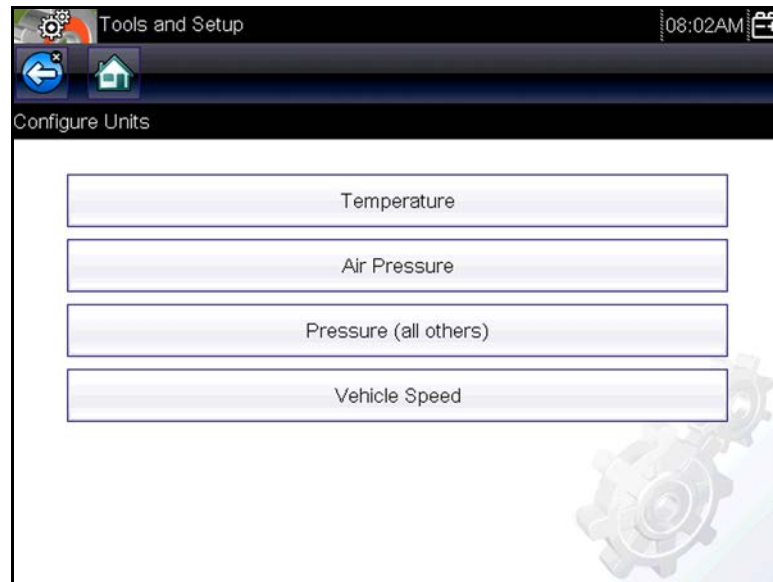


Figure 8-10 Sample configure units menu



To change the units setup:

1. Select **Tools** from the Home screen to open the menu.
2. Select **Configure Units** from the menu.
A menu of options displays:
 - Temperature
 - Air Pressure
 - Pressure (all others)
 - Vehicle Speed
3. Select an item to open a list of choices.
4. Select a setting from the list.
5. Press **N/X** or tap the **Back** button on the toolbar to return to the options menu.

This chapter covers how to care for your scan tool.

9.1 Cleaning and Inspecting

When using the scan tool perform the following tasks to keep it in top shape:

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

IMPORTANT:

Do not use any abrasive cleansers or automotive chemicals on the unit.

9.1.1 Cleaning the Touch Screen

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

IMPORTANT:

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

9.2 Battery Service

Follow all safety guidelines when handling the batteries.

 **WARNING**

Risk of electric shock.

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

Electric shock can cause injury.

9.2.1 Battery Safety Guidelines

Keep the following in mind when handling batteries:

- Do not short circuit battery terminals.
- Do not immerse the scan tool or batteries in water, or allow water to enter the unit or battery compartment.
- Do not crush, disassemble, or tamper with the batteries.
- Do not heat the batteries to over 100°C (212°F), or dispose of it in a fire.
- Do not expose the batteries to excessive physical shock or vibration.
- Keep batteries pack out of reach of children.
- Do not use a battery that appears to have suffered abuse or damage.
- Store batteries in a cool, dry, well ventilated area.

To prolong the life of your batteries, power off the unit when not in use.

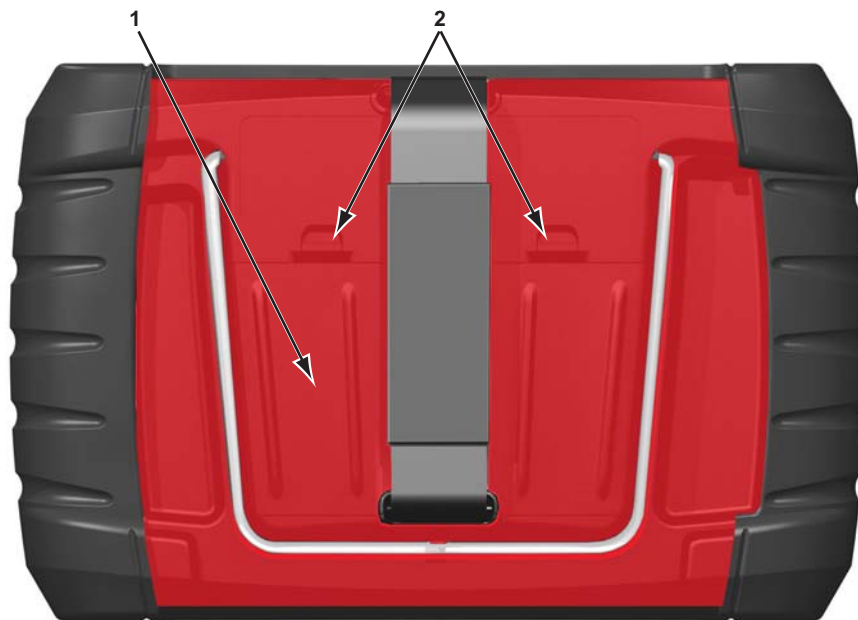
9.2.2 Replacing the Batteries

When replacing the scan tool batteries, use Alkaline or rechargeable nickel-metal hydride (NiMH) type AA batteries only. Do not use standard (lead/zinc) batteries as they do not provide sufficient power to operate the scan tool, and may leak and damage the scan tool.



To replace the batteries:

1. Depress the two battery cover lock tabs and lift off the battery cover.



1— Battery Cover

2— Lock Tabs

Figure 9-1 Battery replacement

2. Remove the old batteries.
3. Observing proper polarity (shown on the battery slots), install six new AA batteries.

IMPORTANT:

Your scan tool can be damaged if the battery polarity is incorrect. Refer to the diagram in the battery compartment on the rear of the tool for correct battery polarity.

4. Fit the battery cover onto the housing.

**NOTE:**

If installing rechargeable batteries, be sure to reset the battery type on the Tools Setup menu. This helps prolong the life of the batteries, and notifies you when it is time to recharge them.

9.2.3 Disposing of the Batteries

Always dispose of batteries according to local regulations, which vary for different countries and regions. For additional information contact:

- United Kingdom; Electrical Waste Recycling Company at <http://www.electricalwaste.com>

Products bearing the WEEE logo (Figure 9-2) are subject to European Union regulations.



Figure 9-2 sample WEEE logo



NOTE:

Always dispose of materials according to local regulations.

Contact your sales representative for details.

This chapter includes a brief introduction to some of the key features of the ShopStream Connect software. For detailed ShopStream Connect information and instructions, download the ShopStream Connect User Manual from our website:

<https://www.snapon.com/diagnostics/uk/User-Manuals.htm>

The ShopStream Connect™ (**SSC**) software is PC-based software that extends the capabilities of your diagnostic tool. Using ShopStream Connect software with your diagnostic tool allows you to do the following:

- View, Print, and Manage data saved from your Diagnostic tool.
- Move and copy your data between the diagnostic tool and your PC.
- View and Print trouble codes saved with select diagnostic tools. This allows you to share the data in a report format with vehicle owners or other technicians.
- Add or edit notes and comments to diagnostic tool data files.
- Download and install diagnostic tool software updates and upgrades.

The ShopStream Connect (SSC) software is available (free of charge) at:

ShopStream Connect -

<https://www.snapon.com/diagnostics/UK/Diagnostics/ShopStreamConnect.htm>

10.1 Using SSC (Connecting to your PC)



To connect and use SSC with your diagnostic tool:

1. Download and install SSC on your PC from:
<https://www.snapon.com/diagnostics/UK/Diagnostics/ShopStreamConnect.htm>
2. Turn your diagnostic tool on.
3. Connect the supplied USB cable from the USB jack on your diagnostic tool to your PC:
4. From the diagnostic tool Home screen, select **Tools > Connect-to-PC**.

The “**Device is now in Connect-to-PC mode**” screen message is displayed (Figure 10-1) and the ShopStream Connect software will open automatically on your PC (Figure 10-2).

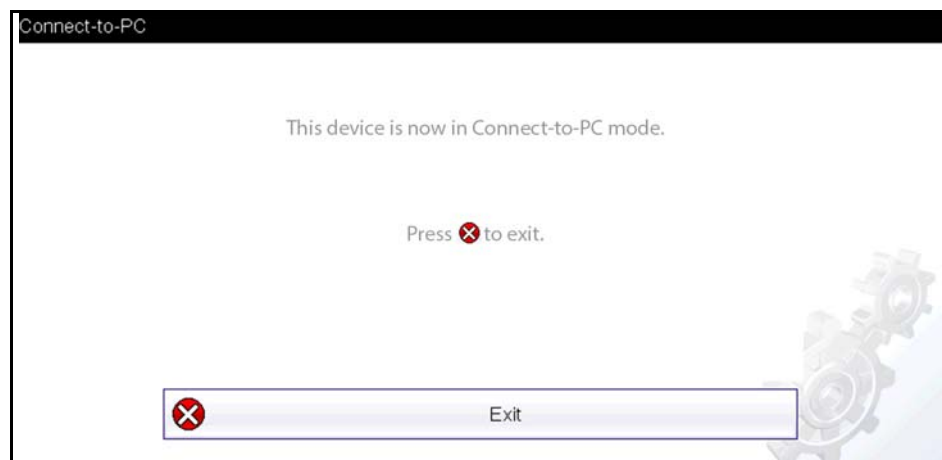


Figure 10-1

If the ShopStream Connect software does not open, open it from the Windows Start menu or use the ShopStream Connect shortcut icon on the Windows desktop (automatically created during installation).

10.2 SSC Main Screen

The ShopStream Connect software will open automatically when you connect the diagnostic tool to your PC USB connection, [Using SSC \(Connecting to your PC\)](#), on page 67,.

The following shows the main screen layout for ShopStream Connect software.

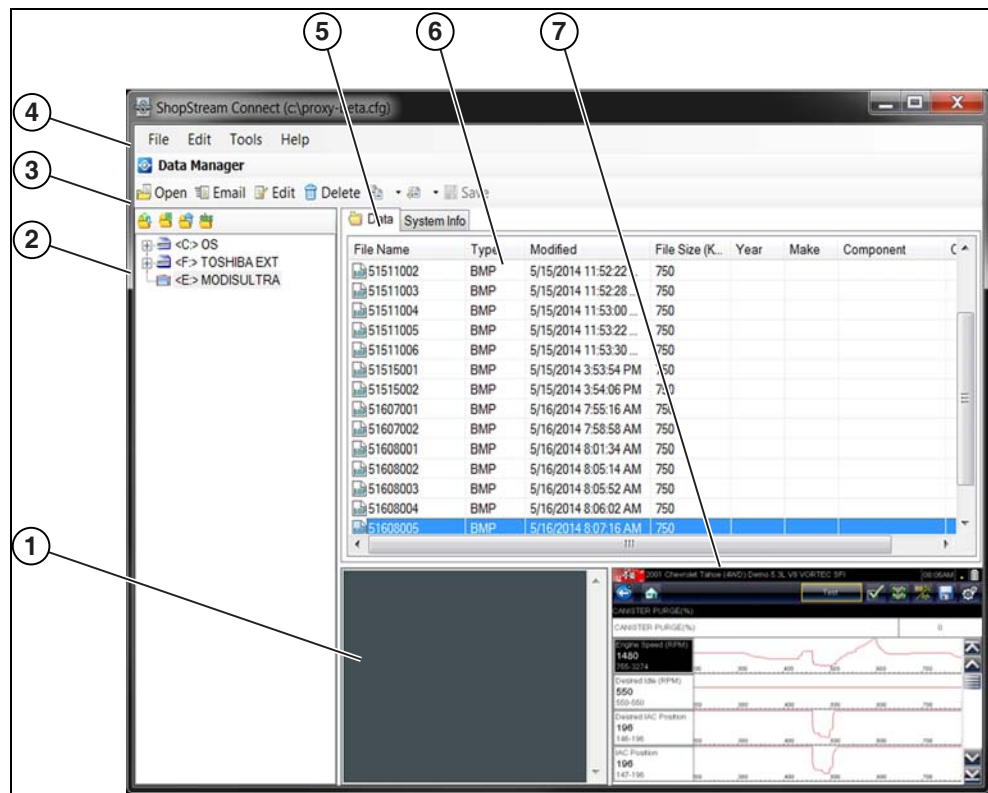


Figure 10-2

- 1— **Notes Window**—allows you add notes to select data files. Select Save from the menu bar to save your notes. *NOTE: Not all file types allow notes, the Notes window will be grayed out when a file type that does not support notes is highlighted. Some image files may display notes for reference purposes (the notes are grayed out and not editable).*
- 2— **File directory structure**—displays the file directory structure of your PC in standard Windows format, and shows any connected diagnostic tools at the bottom of the data list.
- 3— **Data Manager Toolbar**—provides control icons that perform a variety of operations on data files.
- 4— **Main Menu bar**—contains **File**, **Edit**, **Tools**, and **Help** menus.
- 5— **Tabs**—provides access to data files and presets stored on the diagnostic tool or on the PC, and also allows viewing of software revision details of the diagnostic tool.

- 6— **Main display**—shows stored data files details. *NOTE: The files listed are sortable (ascending/descending) by clicking on the column tab at the top (e.g. File Name, Type, etc.) Sort preferences are saved when the ShopStream Connect program is closed.*
- 7— **Preview**—displays a sample of the file if the selected file is a image file.

10.3 Scanner DataViewer

SSC allows you to view data files recorded with your diagnostic tool, on your PC. When a Scanner data file is selected, it opens and displays in the Scanner DataViewer (Figure 10-3). Scanner DataViewer allows you play the data file and custom configure the data in a number of ways.



- 1— **Menu bar**
- 2— **Display toolbar**
- 3— **Graph display**
- 4— **Properties icon**
- 5— **Vertical Scroll bar**
- 6— **Zoom controls**
- 7— **Slider bar**
- 8— **Navigation toolbar**
- 9— **Parameter text list**
- 10— **Highlighted PIDs** - indicates graphs currently displayed
- 11— **Parameter configuration tabs**

Figure 10-3

10.4 Image Viewer

SSC allows you to view and print .bmp, .jpg and .sps image files (screenshots) saved on your diagnostic tool, with your PC.

**NOTE:**

File extension types vary depending on the diagnostic tool. Not all the file extensions described here may be available on your diagnostic tool.



1— Exit - closes the Image Viewer
2— Print - prints the image

3— Print Preview - allows the image to be previewed before printing
4— Captured Screen Image

Figure 10-4

10.5 Printing the Code Scan Report

To print the Code Scan Report, the saved code scan .XML file must be opened using ShopStream Connect.

To print the Code Scan Report using ShopStream Connect:

1. Double-click the code scan .XML file from the file list to open the report (Figure 10-5) in the Code Scan Viewer (Figure 10-6).

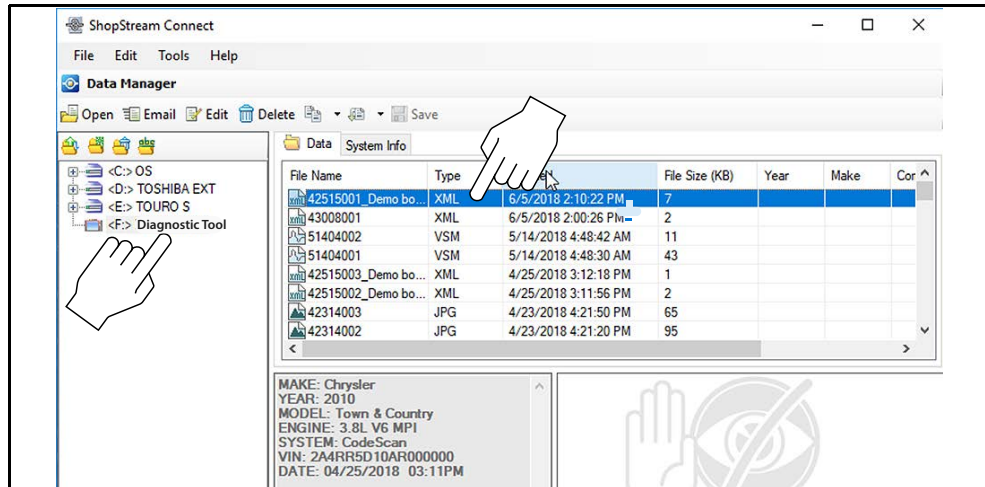


Figure 10-5

2. Select **Print** or **Print Preview** from the Code Scan Viewer menu to print or preview the report (Figure 10-6).

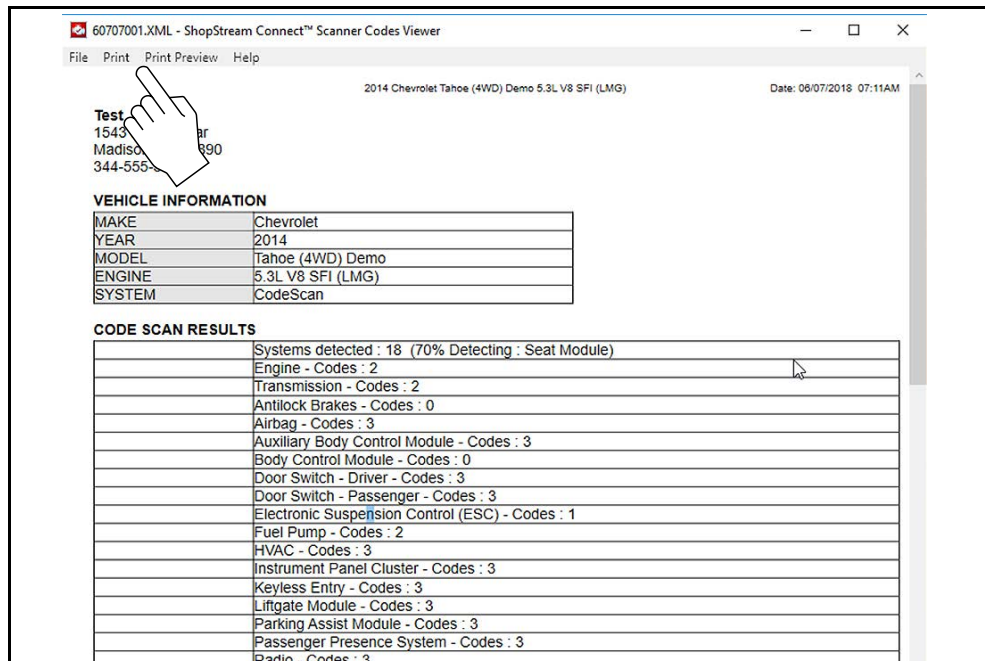


Figure 10-6

Selecting **Print** opens the Windows print dialog window (Figure 10-7). Select your printer from the list, then select **Print** to print the report.

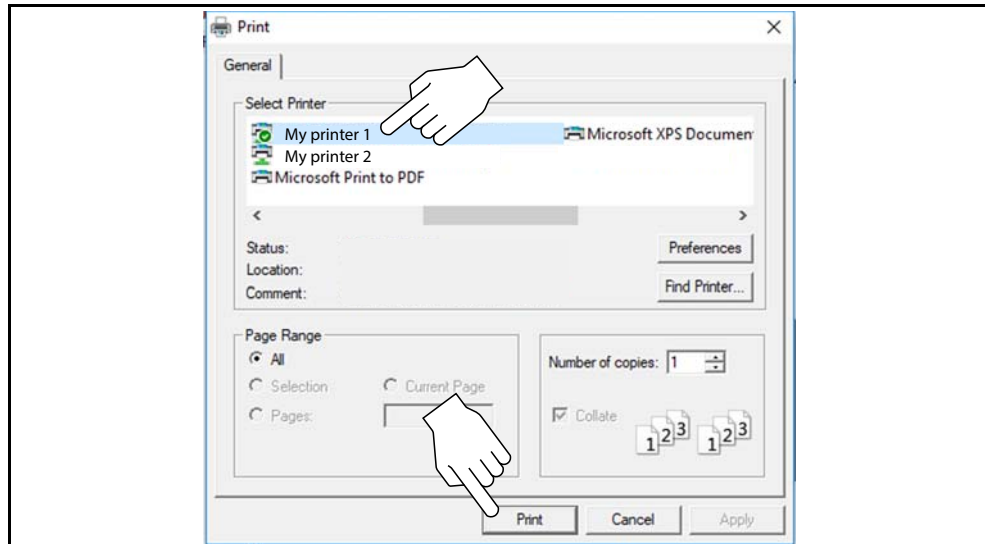


Figure 10-7

10.6 Software Upgrades and Updates

Upgrade/Update Descriptions:

- **Software Upgrade** - a software upgrade is a new software version (contact your sales representative for purchase information).
- **Software Update** - a software update is a service release for installed software. These are available free of charge, and are provided as necessary to update installed software. When your diagnostic tool is connected to a PC using SSC, the SSC software will automatically check for updates, and if an update is available, it will provide installation instructions. Follow the screen prompts to accept, download and install the software.



NOTE:

To receive updates or upgrades, SSC software must be installed on your PC and have connection to the Internet.



Example - Updating diagnostic tool software:

1. Select **Tools > Update Software > (diagnostic tool type - e.g. ETHOS Edge, MODIS Edge, SOLUS Edge, etc.)** from the Menu bar (Figure 10-8).
The software checks the Snap-on web server for available updates.

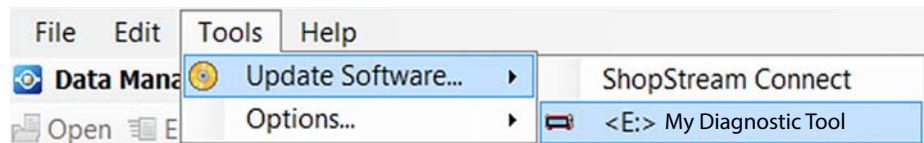


Figure 10-8

2. If service release updates are available, select **Next** to continue, then select **Download** and follow the on-screen instructions to complete the installation (Figure 10-9).

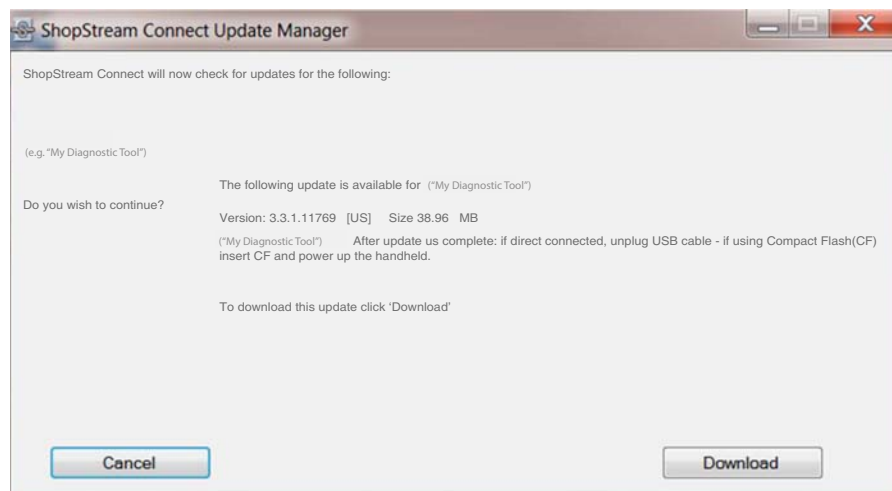


Figure 10-9

**NOTE:**

For additional information on ShopStream Connect software updates and upgrades, download the ShopStream Connect User Manual from our website:

<https://www.snapon.com/diagnostics/uk/User-Manuals.htm>

10.6.1 End User License Agreement

Before software installation at initial purchase, and before all subsequent software updates/ upgrades installations End User License Agreement (EULA) acceptance is required.

IMPORTANT:

Use of Software is governed by the terms and conditions of the End User License Agreement. The diagnostic tool should not be initially operated until the End User License Agreement is read. Use of the device acknowledges your acceptance of the End User License Agreement. The Snap-on Incorporated Software End User License Agreement is available at:

<https://eula.snapon.com/diagnostics>

To Accept: at the screen prompt (Figure 10-10) click the checkbox on the left side of the window, and then select **Agree and Continue**. The software will be installed automatically.

Figure 10-10 below represents a typical EULA acceptance agreement screen.

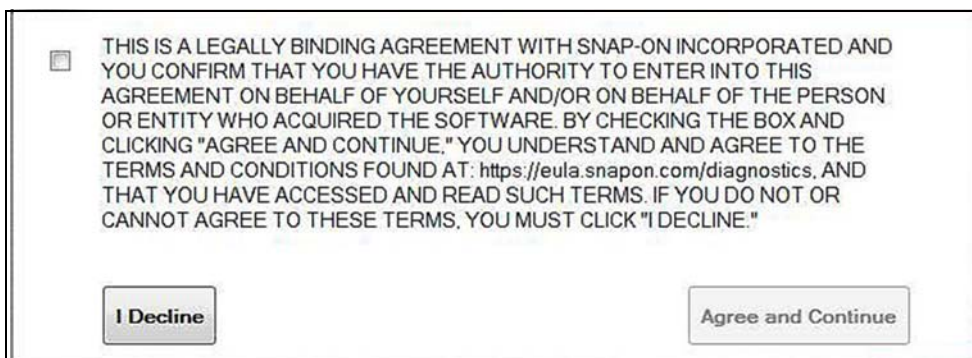


Figure 10-10 Typical EULA acceptance screen

To Decline: at the screen prompt (Figure 10-10) select **I Decline**. A confirmation message is displayed providing options to Go Back or Exit the software installation (Figure 10-11).

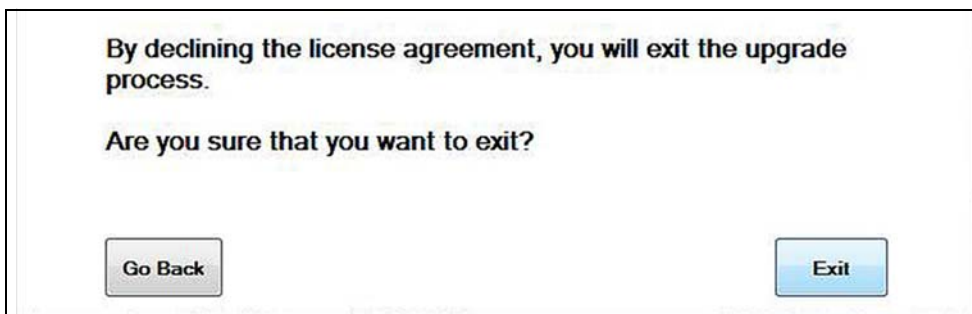


Figure 10-11 Typical EULA acceptance screen