



Eaton® ServiceRanger

Roadranger®

More time on the road®

User's Guide

ServiceRanger version 3

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February 2011

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Welcome!

Eaton has become an innovator and technology leader in diagnostic and service tools for the commercial vehicle market. ServiceRanger is the only recommended tool for servicing the Roadranger System, an unbeatable combination of the best products from Eaton, Dana and other trusted partners.

ServiceRanger is a PC-based electronic service diagnostic program that provides access to your electronic Roadranger products. With ServiceRanger, you can reduce downtime, save money, perform accurate repair procedures, all while increasing productivity and profits.

The following are some of the major benefits of using ServiceRanger:

- View information about the connected ECUs
- View active and inactive diagnostic fault codes
- View data parameters in real time
- View the current configuration of a product
- Change product configurations
- Program (reflash) product software
- Print reports and diagnostic results

Introduction to ServiceRanger

Introduction to ServiceRanger

ServiceRanger is a PC software program developed by Eaton Corporation to diagnose and service Roadranger supported commercial vehicle components. ServiceRanger is designed to communicate with vehicle component controllers via the vehicle's diagnostic link connection. ServiceRanger complies with the SAE Surface Vehicle Recommended Practices for J1587 and J1939 vehicle communications, as well as the TMC RP1210 PC communications standard developed for vehicle link adapter communications.

The following Roadranger products are supported:

- Eaton AutoShift Gen2 Transmissions
- Eaton Lightning Transmissions
- Eaton AutoShift/UltraShift Gen3 Transmissions
- Eaton UltraShift *Plus* Transmissions
- Bendix VORAD VS-400 Collision Warning System
- Eaton Hybrid Electric System

Notes:

- At this time, Eaton AutoShift Gen1 and Bendix VORAD EVT-300 are not supported by ServiceRanger 3. You will need to use ServiceRanger 2 for servicing these products.

What's New

Following are new features included in this version of ServiceRanger.

Major New Features

Following are the major new features being introduced in this version of ServiceRanger:

[J1939 Diagnostics](#)

AutoShift Gen3 and UltraShift *Plus* transmissions now fully support J1939 diagnostics. This includes fault codes, data monitor, configurations, and reprogramming functions.

[Printing/Reports](#)

The new, easy-to-use, printing and export feature makes it easier than ever to save and print information from ServiceRanger.

[Advanced Product Functions](#)

The advanced product functions have been streamlined, and now you have a new modern intuitive user interface to use.

Additional New Features

In addition to the major features, the following additional features are now available in ServiceRanger.

[Navigation Pane](#)

The new, easy-to-use Navigation pane provides centralized navigation to all parts of ServiceRanger, and makes it easy to see your information the way you want to see it.

[Go Menu](#)

The new, top-level Go menu makes it easy to quickly switch between panes in the Navigation Pane. If you prefer to navigate by using keyboard shortcuts, you can use the documented shortcut keys on the Go menu, such as CTRL+1 for Summary, CTRL+2 for Components, and CTRL+3 for Data Monitor.

[Fault Code View](#)

The fault code view has been streamlined and now you have three display choices to customize the display.

[Connection Status](#)

A new and improved connection status indicator is now located in the right hand corner of the status bar.

Getting Started

Registration and Activation

When the installation is complete and you start the ServiceRanger program for the first time the software will be locked. In order to unlock the software you must first register the software's computer ID (PCID) with Eaton. Every computer ServiceRanger is installed into must be registered before an unlock code will be granted.

Visit <http://www.roadranger.com/Roadranger/trainingsupport/ServiceRanger/Registration/home> or call 1-800-826-4357 for information about registering and unlocking ServiceRanger.

Failure to properly register this software, or any un-approved distribution or use of this software is strictly prohibited by Eaton Corporation and may be considered a violation of the Software License Agreement.

Hardware Requirements

In order to successfully install and run ServiceRanger, your PC should meet the following hardware requirements:

- Platform: IBM or 100% Compatible
- Operating System (32- and 64-bit versions):
 - Windows XP™
 - Windows Vista™
 - Windows 7™
- Processor: 1.8 GHz or greater
- RAM Memory: 1 GB or greater
- Hard Drive: 40 GB or greater
- Display: SVGA(1024 x 768 pixels) Color
- Required Software: Microsoft Internet Explorer v6.0 or higher, Adobe Acrobat Reader 7.0 or higher

In addition, the PC must also meet the hardware requirements for your communication adapter. For more information about the communication adapter hardware requirements, Please contact the communication adapter manufacturer.

Note:

- Minimum hardware will limit performance. For optimal performance use the recommended hardware or better.
- When installing ServiceRanger, you must have Windows Admin User permissions to install, run, and update software on your computer. If you are unsure about your user permissions, consult with your organization's computer support personnel before installing this software.

Communication Adapters

ServiceRanger complies with the SAE Surface Vehicle Recommended Practices for J1587 and J1939 vehicle communications, as well as the RP1210A communication standards as defined by the Truck Maintenance Council (TMC) for vehicle link adapter communications.

ServiceRanger requires a vehicle adapter that is RP1210A compliant and has device drivers that are compatible with the computer's operating system and external communications ports (ie: USB, Serial, etc). Contact your communication adapter manufacture for information on driver installation, as well as operating system and ServiceRanger compatibility questions.

Eaton will periodically post information about known communication adapter compatibility issues with ServiceRanger on the Roadranger website.

<http://www.roadranger.com/Roadranger/trainingsupport/ServiceRanger/LinkAdapters/index.htm>

Roadranger Products

ServiceRanger has features that support diagnosing the entire vehicle, but also has additional features for Roadranger products. It is important that you understand the difference between a Roadranger product and another product installed in the vehicle as you will see this term many times.

A Roadranger product is a product manufactured and sold by the Roadranger field marketing organization and is designed to work with ServiceRanger (ie AutoShift/UltraShift transmission). These products contain special, or proprietary, protocols that allow extra features above and beyond the normal SAE protocols. Examples of these features are special product tests that allow you to turn on and off actuators or view special diagnostic data such as snapshot and VPA information.

A vehicle component, such as an engine or ABS system, that complies with either the J1587 or J1939 communication links may work with ServiceRanger to an extent. Example include diagnostic codes and components information.

Getting Started with ServiceRanger

Connections to a vehicle

Before connecting to the vehicle with ServiceRanger make sure the communication adapter is properly connected to the vehicle's diagnostic connector and to the computer's communication port (i.e. USB, Comm1, etc). Turn the vehicle's ignition key to the on position and verify the communications adapter is powered. If the adapter does not have a power indicator lamp it may be necessary to use a volt meter to verify the adapter is getting power from the vehicle's diagnostic connector.

Starting ServiceRanger

Once the communications adapter is properly connected to the vehicle and the PC, start ServiceRanger by double clicking the ServiceRanger shortcut icon located on the computer's desktop screen. You can also start ServiceRanger from the shortcut located in the Eaton\ServiceRanger 3.0 folder in the Windows Start programs menu.

Connecting

Connect: When ServiceRanger has successfully started you may be prompted with the option to connect to a vehicle. Selecting the "Yes" button will automatically start vehicle communications with the currently configured communication adapter, and load the ServiceRanger main screen.

Work Offline: If the communication settings have not been configured or need to be changed, it will be necessary to start ServiceRanger in the offline mode. (See "Settings" on page 52 for information on configuring the communications adapter driver.) Selecting the "No" option will open ServiceRanger without connection to the vehicle. If you are not prompted with

Getting Started

the Vehicle Connection dialog message, ServiceRanger has been configured to always start in the offline mode. See "Settings" on page 52 for information on configuring this start up option.

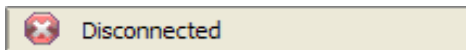
Connection Status

The vehicle communications status can be verified by the status bar located on the bottom of the screen. The status will tell you the current state of the connection to the vehicle. The following messages could be displayed and are detailed below.

Status Messages

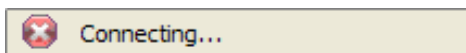
Disconnected

The disconnected message is displayed when you either first start ServiceRanger and have not yet connected OR you have disconnected manually from the vehicle by selecting "Disconnect".



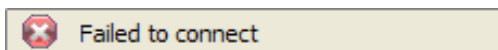
Connecting...

The connecting message will be displayed when ServiceRanger is attempting to establish a connection with the vehicle. You should wait until ServiceRanger has completed this process.



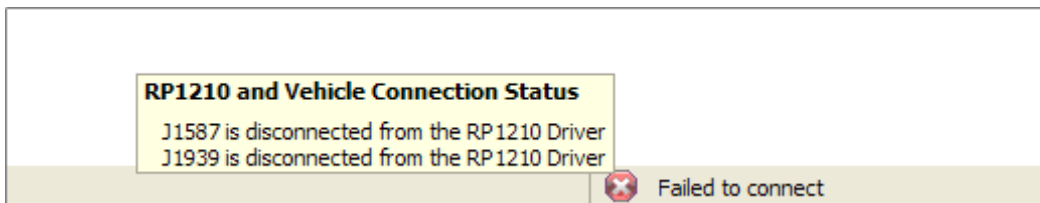
Failed to connect

The failed to connect message is displayed when you have started the connection process but ServiceRanger was unable to make a connection to the communication adapter driver or the vehicle. You can hover over the failed to connect icon to receive more information on what caused the failure.



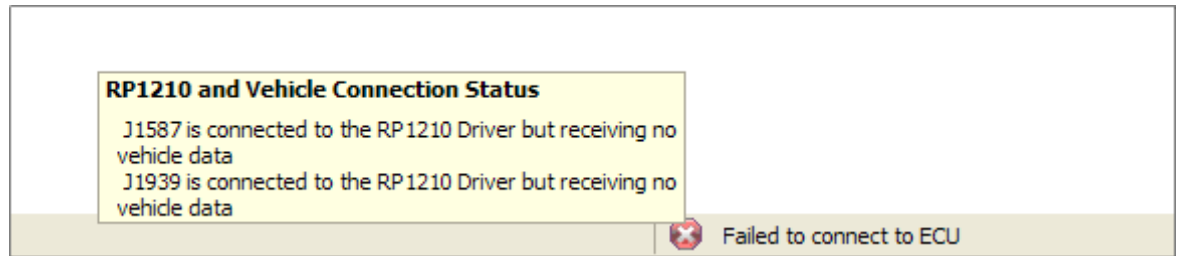
Failed to connect to the RP1210 communication driver

When this message is displayed, the issue is most likely to be between your PC and the communication adapter. Check the cable connections, make sure the box is powered, and the correct driver is configured for the adapter you are using.



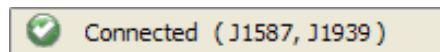
Failed to connect to ECU (vehicle)

When this message is displayed, the issue is most likely to be between your communication adapter and the vehicle. ServiceRanger was able to make a connection to the communication adapter however there was no vehicle messages. Check to make sure the ignition key is on or your vehicle communication link wiring.



Connected

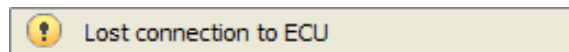
The connected message is displayed when ServiceRanger has made a successful connection to the vehicle on at least one or both (J1587 or J1939) communication links. The vehicle links that have made a connection will be displayed in the connection status within parenthesis. You can hover over the connection message to see more information about the connection.



In this example, both J1587 and J1939 communication links are connected.

Lost connection to ECU

The lost connection to the ECU message is displayed when a valid connection was established to the vehicle and then lost. The most likely cause lies between the communication adapter and vehicle.



Note:

- You can see a detailed connection message by hovering over the connection icon with your mouse pointer.
- When both links are connected, ServiceRanger will automatically determine which link to use based on the capabilities of the connected products.

Tour of the Workspace

Workspace

ServiceRanger's workspace is a flexible, modern user interface, and gives you several options to work the way that you want. It's important that you become familiar with the application. The more you learn about its potential, the better you can take advantage of its features, tools, and options.

The user interface consists of the following major sections:

Navigation Pane

The navigation pane on the left side helps you browse through the application. It consists of two sections. The lower section is made of buttons that give you single click access to major functions of the software. The second section displayed above the buttons offers options that interact with the main content window.

View Pane

The view pane (or content area) displays the content associated with each shortcut on the navigation pane. This provides the main work area that you will be accomplishing your tasks. For example, this is the area where fault codes or product software will be displayed.

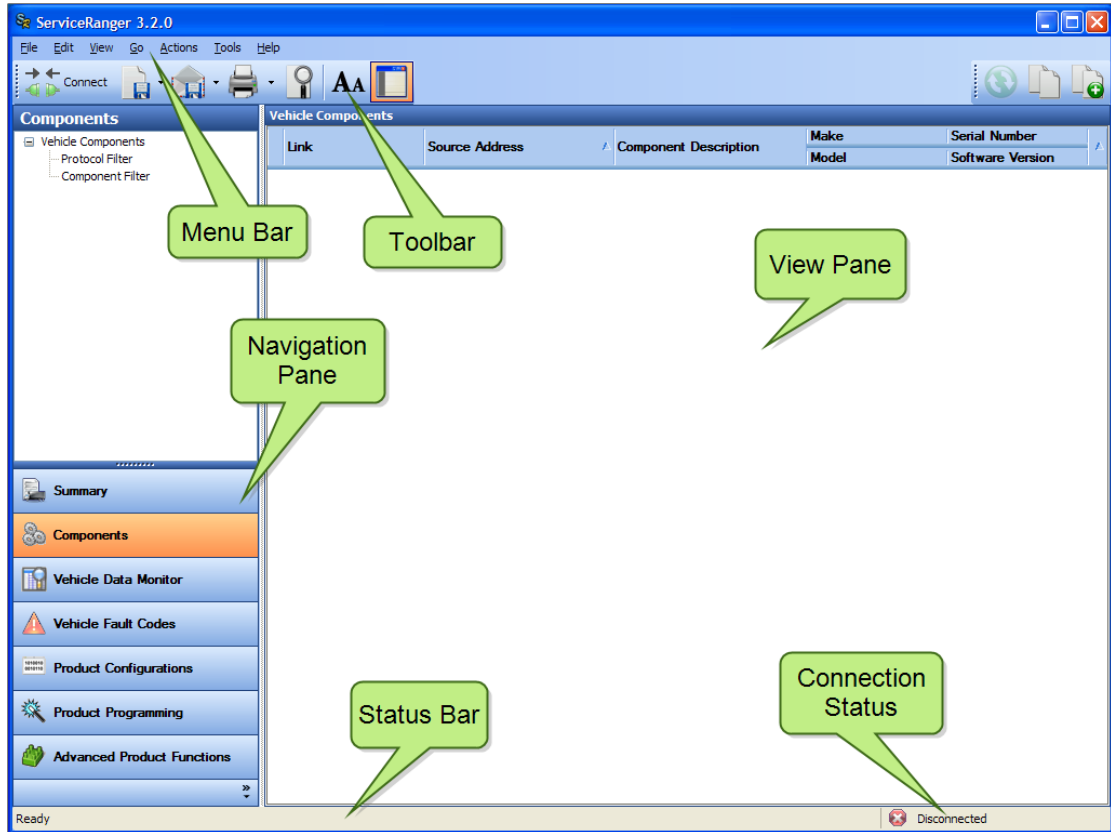
Toolbars

Located near the top of the window are toolbars that provide other controls that you can use to do your work.

Status Bar

At the very bottom of the interface is a status bar. The most notable use for the status bar is to see the vehicle connection status.

Tour of the Workspace

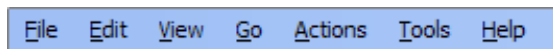


About the Status Bar

The status bar is located at the bottom of every document window and displays useful information—such as the current connection status and brief instructions. The most notable information is the current connection status between ServiceRanger and the vehicle. For more information, See "Connection Status" on page 6

Menus

ServiceRanger's user interface includes a menu bar at the top of the application window, containing several menu options. Many menu items are similar to what you might find in other diagnostic service tools.



Tour of the Workspace

File Menu

Connect/Disconnect	Provides a way to start or stop communicating with the vehicle.
Export	Provides a way to save a report to your PC hard drive.
Export and Email	Provides a way to save and email a report.
Print Table	Opens the Print dialog, which lets you send a file to a printer. This will print the main content table as it is displayed on your screen.
Print Report	Opens the Print dialog, which lets you send a file to a printer. Make sure you select the options you want to include on the report.
Print Report Preview	Opens the Print Preview dialog, which lets you see how a document looks before you send it to a printer.
Exit	Closes the application.

Edit Menu

Cut	Cuts the selection and sends it to the clipboard.
Copy	Copies the selection and sends it to the clipboard.
Copy All	Copies the contents of the table and sends it to the clipboard.
Paste	Pastes the selection from the clipboard to the place where the cursor is inserted.

View Menu

Font Size	Toggles the size of the text being displayed on your screen.
Navigation Pane	Hides or shows the Navigation Pane.
Current view	Displays a sub menu, which allows you to change the way the content area is displayed. Only available on certain functions.
Zoom	Not available at this time.

Go Menu

Summary	Opens the summary screen.
Vehicle Components	Opens the vehicle components screen.
Vehicle Data Monitor	Opens the vehicle data monitor screen.
Vehicle Fault Codes	Opens the vehicle fault codes screen.
Product Configurations	Opens the product configuration screen.
Product Programming	Opens the product programming screen.
Advanced Product Functions	Opens the advanced product function screen.

Actions Menu

The actions menu is a dynamic menu that will change based on the feature or function currently being displayed.

Fault Codes	<ul style="list-style-type: none"> ▪ Refresh - Refreshes the data being displayed from the vehicle. ▪ Clear All Fault Codes - Clears fault codes from the vehicle.
Data Monitor	<ul style="list-style-type: none"> ▪ Screen Capture - Takes a snapshot of parameter values. ▪ Pause - Pauses the display from being updated with new parameter values.
Components	<ul style="list-style-type: none"> ▪ Refresh - Refreshes the data being displayed from the vehicle.

Tools Menu

Sync	Not available at this time.
View Current Downloads	Not available at this time.
Settings	Opens the Settings dialog, which lets you set various options. For more details, see See "Settings" on page 52

Help Menu

Contact Us	Provides a list of phone numbers for contacting the Roadranger call center.
Roadranger Online	Opens your default Internet browser and displays the Roadranger home page.
System Info	Provides information about your PC and installation of ServiceRanger to aid in a troubleshooting an issue with the Roadranger call center.
Check for Updates	Displays the check for updates dialog that will allow you to download and install updates.
About	Displays a popup that shows information about the current version of ServiceRanger.

Notes:

- Not all options will be available to you depending on your user level privileges.
- Functions maybe disabled (grayed out) if the function is not currently available or does not apply to the function being performed.

Toolbars

ServiceRanger's user interface includes one or more toolbars at the top of the application window, containing several options. Many items are similar to what you might find in other diagnostic service tools.



Tour of the Workspace

Global Toolbars

ServiceRanger has global toolbars ("global" meaning they are always available at the top of the user interface, regardless of what you are currently doing). The most notable global toolbar is the standard toolbar described below.

Standard Toolbars




Tools in the Standard toolbar let you perform basic functions, such as connect, export, print, hide/show navigation pane.

	Connect/Disconnect - Provides a way to start or stop communicating with the vehicle.
	Export - Provides a way to save a report to your PC hard drive.
	Export and Email - Provides a way to save and email a report.
	Print - Opens a sub menu with the following options: <ul style="list-style-type: none">• Print Table - Opens the Print dialog, which lets you send a file to a printer. This will print the main content table as it is displayed on your screen.• Print Report - Opens the Print dialog, which lets you send a file to a printer. Make sure you select the options you want to include on the report.
	Print Preview - Opens the Print Preview dialog, which lets you see how a document looks before you send it to a printer.
	Font Size - Toggles the size of the text being displayed on your screen.
	Show/Hide Navigation Pane - Hides or shows the Navigation Pane.



Local Toolbars

These are toolbars that are intended for a particular feature or function. For example, the fault code viewer contains a local toolbars that allows you to clear faults, change views, and copy the contents of the fault code table. Most viewers and functions in ServiceRanger contain at least one local toolbar. The following section details each of them.





Vehicle Components

	Refresh - Refreshes the data being displayed from the vehicle.
	Copy - Copies the selection and sends it to the clipboard.
	Copy All - Copies the contents of the table and sends it to the clipboard.

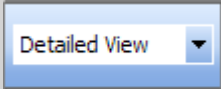
Vehicle Data Monitor

	Pause - Refreshes the data being displayed from the vehicle.
	Screen Capture - Takes a snapshot of parameter values.



Vehicle Fault Codes

	Refresh -Refreshes the data being displayed from the vehicle.
	Clear All Faults - Clears fault codes from the connected products.
	Copy - Copies the selection and sends it to the clipboard.
	Copy All - Copies the contents of the table and sends it to the clipboard.



Tour of the Workspace

	View - Changes the display options of the fault code table.
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Product Configurations

	Refresh - Refreshes the data being displayed from the vehicle.
	Download - Begins to update the product with the selected configuration changes.

Product Programming

	Refresh - Refreshes the data being displayed from the vehicle.
	Download - Begins to update the product with the selected update.

Notes:

- Not all options will be available to you depending on your user level privileges.
- Functions may be disabled (grayed out) if the function is not currently available or does not apply to the function being performed.

Customizing the Work Area

Navigation Pane

The Navigation Pane is an area of the workspace that acts as a table of contents. This allows you to quickly access different areas of the application quickly and efficiently.

To open/close the navigation pane, do one of the following:

- Click the **Navigation Panel Icon** on the main toolbar.
- Choose **View | Navigation Pane**.

Note:

- With the Navigation Pane hidden, you can navigate by using the **Go** option in the menu bar.

Toolbars

Toolbars reduce clutter in the work area by arranging tools in task-related groups. For example, the Fault Code toolbar includes buttons for working with diagnostic faults. The Programming toolbar contains tools for updating product software.

Any toolbar can **float** or be **docked**. Docked toolbars appear in the toolbar area. Floating toolbars appear as independent panels that you can move anywhere in the work area.

Each toolbar has a **grabber bar**, which is a vertical gray stripe at the left end of the toolbar.

- When you position the pointer over a grabber bar, a tool tip displays the name of the associated toolbar.
- When you drag a grabber bar, the toolbar moves. You can drag toolbars off the toolbar area (so that they float), dock them in the toolbar area, or rearrange them in the toolbar area.

Notes:

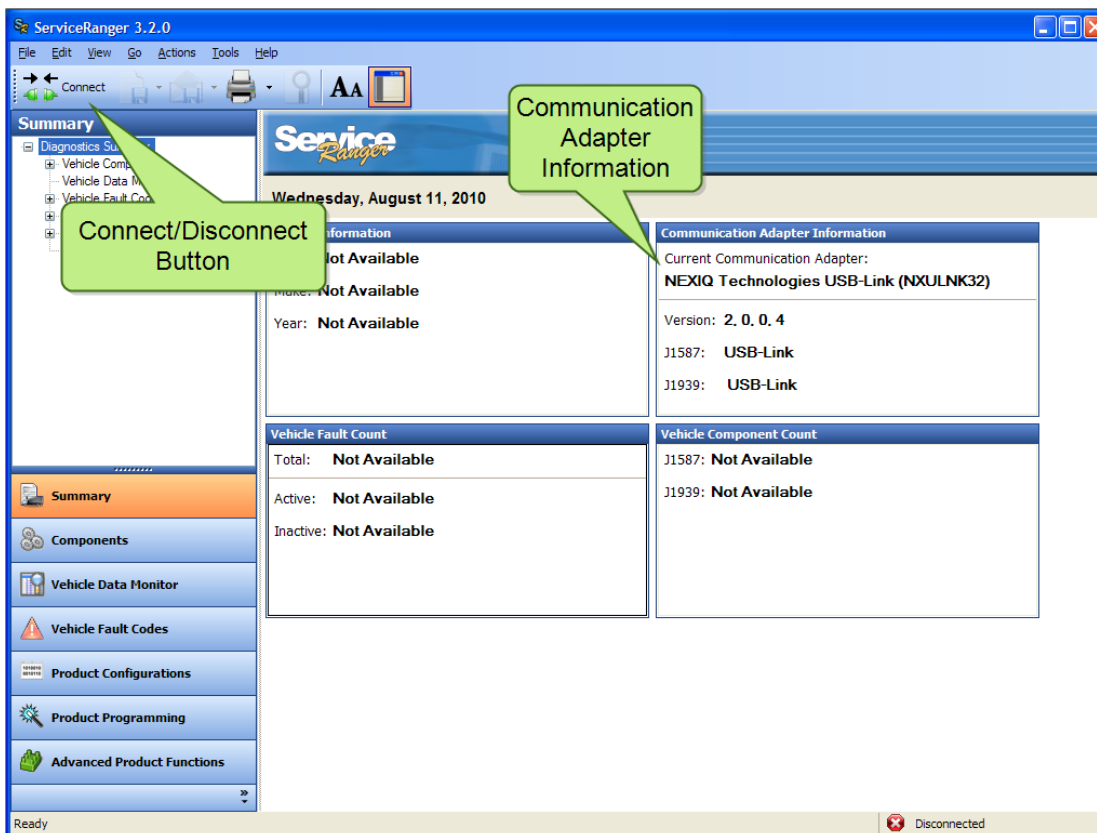
- Some toolbars will only be displayed on its related content area.

Features

Using ServiceRanger Overview

When ServiceRanger first opens, you will first see the summary screen. The Summary Screen is a handy window pane consisting of four sections (Vehicle Information, Fault Code Count, Communication Adapter, and Component Count), which contain high-level information that may interest you.

- Vehicle Information - The vehicle information panel provides basic chassis information that is broadcast by the vehicle's chassis or engine controller. Note that not all vehicles broadcast chassis information. If one or more of the fields in the vehicle information window are blank or displays "unknown", then the information is not available from the vehicle.
- Communication Adapter Information - The Communication Adapter Information panel displays information about the currently configured communications adapter, as well as which data link device drivers are configured.



Main Functions of ServiceRanger

The following information provides an overview of each major feature of ServiceRanger:

Fault Codes

The Fault Code function in ServiceRanger will display all active and inactive SAE fault messages being broadcast by all Roadranger components on the J1587 and J1939 data links, along with their Roadranger product fault codes.

Data Monitor

The Data Monitor function allows you to monitor parameter values from different vehicle component ECU's.

Product Configurations

The Product Configuration function allows you to view the current configuration of each of the detected Roadranger products on the vehicle.

Product Programming

The Product Programming function allows you to update the component's ECU application software over the vehicle's diagnostic data link.

Advanced Product Functions

Advanced Product Functions are functions that apply to a specific Roadranger product family. Some functions may be upload utilities to extract data files from the product ECU, or to perform specific product functional tests

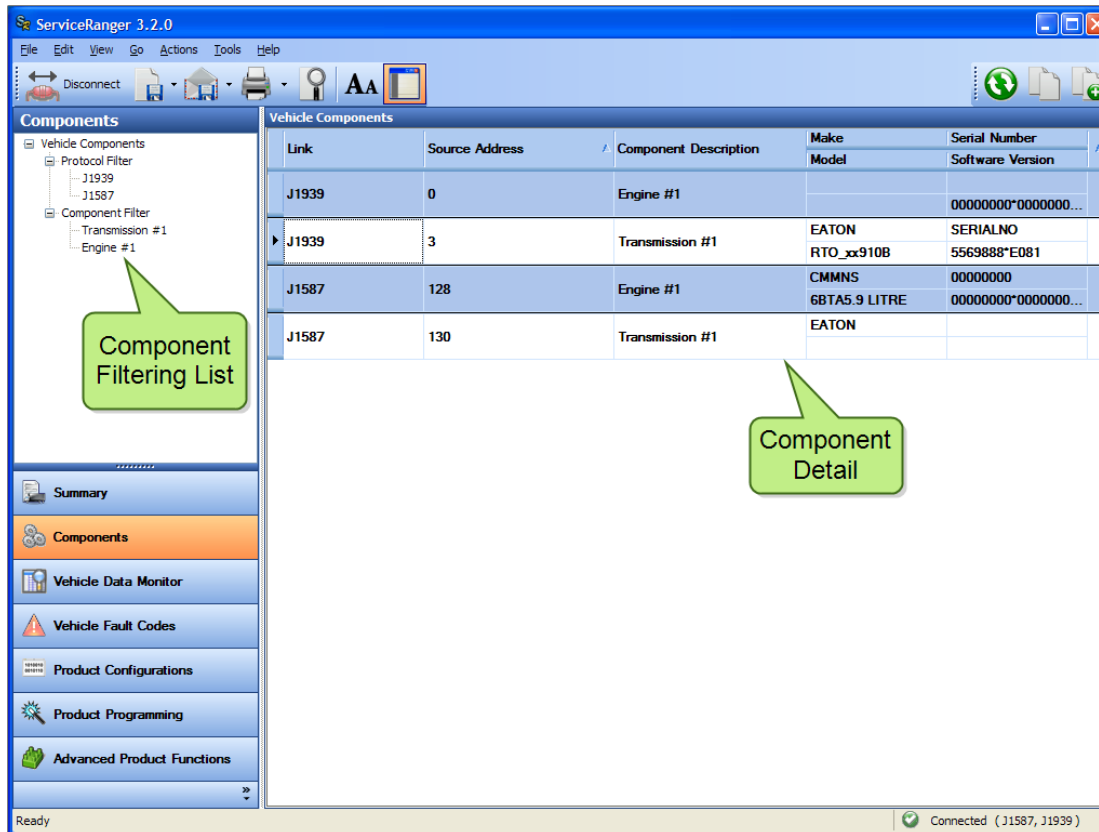
Vehicle Components

Vehicle Components

The Vehicle Components function is used to view basic information about each component on the vehicle that is being detected by ServiceRanger. This function can be used to determine if all vehicle components are powered up and which data links the component's are communicating on.

The following information is displayed:

- Link - the data link the component is communicating on (J1587 or J1939). Most vehicle components will be detected on both data links.
- Source Address - Source address of the component (J1587 MID or J1939 Source Address).
- Component Description - SAE Component Description of the component's source address.
- Make, Model Serial Number, and Software Version - This is the component identification information provided by the component ECU manufacture. Not all component manufacturers support broadcasting component identification information. If one or more of these fields are blank, then the component does not support it.



Notes:

- A component will be grayed out if it does not communicate with ServiceRanger every ten seconds.
- Some components will broadcast on multiple links and as a result, ServiceRanger will display those components twice.

Filtering Components

You can filter, or limit, the components (ECUs) being displayed. This makes it easy to find the information you want quickly. There are two options available, protocol and component filter. The component filter will display information from the selected component. The protocol filter will display components from the selected vehicle link (protocol).

Filtering by

1. View vehicle components.
2. In the Navigation Pane filter control, select one of the following:
 - Expand component filter in the tree control, and select a component
 - OR
 - Expand protocol filter in the tree control, and select a vehicle link.
3. The components display will only show fault codes matching the filter criteria.

Notes:

- Only one filter can be selected and applied to the component display at one time.

Copying Components

You can copy the contents of the vehicle components display to the system clipboard. This allows you to easily transfer the information to other software applications such as a shop maintenance system.

Copying selected components

1. View vehicle components.
2. Select a component displayed in the table.
3. Do one of the following:
 - Select **Copy** icon from the component's toolbar.
 - OR
 - Select **Edit| Copy**.
4. The selected component will be copied to the system clipboard.

Notes:

- The contents are copied as a tab-separated list.

Copying all components

1. View vehicle components.
2. Do one of the following:
 - Select **Copy All** icon from the Fault Code toolbar.
 - OR
 - Select **Edit| Copy All**.
3. All components will be copied to the system clipboard.

Notes:

- The contents are copied as a tab-separated list.

Vehicle Data Monitor

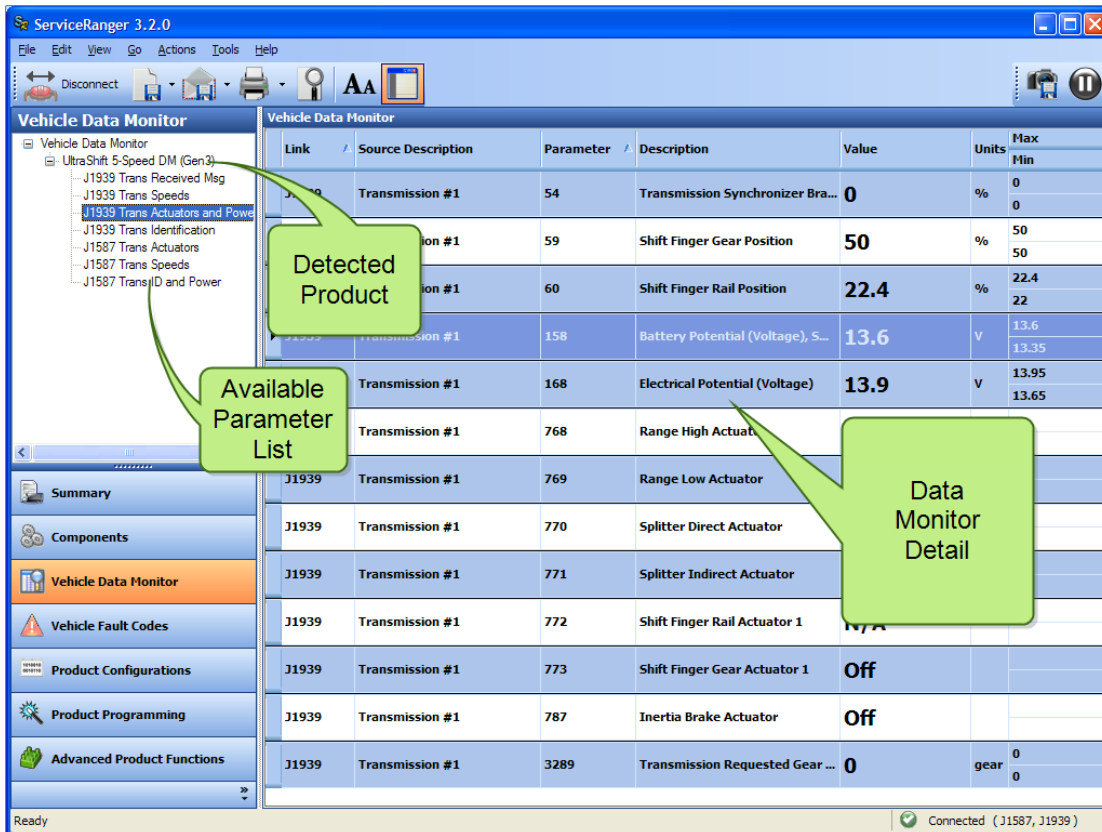
Data Monitor

The Data Monitor function allows you to monitor parameter values from different vehicle component ECU's. When the data monitor function is selected, ServiceRanger will list all the detected Roadranger products in the tree control located in the upper left hand pane. Each detected product will have pre-defined parameter lists associated with it. To view component and vehicle parameters associated with a specific product, select one of the parameter lists under that product in the tree control.

The following information is displayed:

- Link - The data link the parameter message is being broadcast (J1587 or J1939)
- Component Description - SAE or Roadranger description of the component broadcasting the parameter
- Parameter - Parameter ID value (PID, SID, or SPN)
- Description - SAE or Roadranger description of the parameter
- Value - Value of the parameter
- Units - Units that the parameter is being displayed
- Max\Min - The maximum and minimum parameter value recorded

Features



Notes:

- If a parameter is not available from the vehicle, it will appear faded, or grayed out.

Viewing Parameters

Each detected Roadranger product will have pre-defined parameter lists associated with it. To view component and vehicle parameters associated with a specific product, select one of the parameter lists under that product in the tree control.

Viewing parameter list

1. Select Vehicle Data Monitor.
2. Select a Roadranger Product in the Navigation Pane tree control.
3. Select a parameter list in the Navigation Pane tree control.
4. The data parameter list will be displayed.

Notes:

- If a component is unable to determine the value of a parameter, ServiceRanger will display the parameter value as "error".

Pausing Display

The display can be paused allowing you to evaluate data parameters that maybe updating rapidly.

Pausing the display

1. Select Data Monitor.
2. Do one of the following:
 - Select **Pause** icon from the data monitor toolbar.
 - OR
 - Select **Actions| Pause Display**.
3. The data monitor parameters will stop updating their values.

Notes:

- After pausing the display, you can re-enable the display by selecting the pause icon again.

Screen Capture

Screen capture allows you to save the instantaneous parameter values to a file on your computer.

Capturing the screen values

1. Select Data Monitor.
2. Do one of the following:
 - Select **Screen Capture** icon from the data monitor toolbar.
 - OR
 - Select **Actions| Screen Capture**.
3. The File Comments dialog is displayed.
4. Enter your comments and select **OK**
5. The file save dialog is displayed.
6. Choose a location to save the file and rename it as necessary.
7. The file will be saved. You can view the file by selecting "Yes" on the view file dialog.

Notes:

- At this time, only instantaneous values can be saved. Time series data acquisition is not supported.

Vehicle Fault Codes

Fault Codes

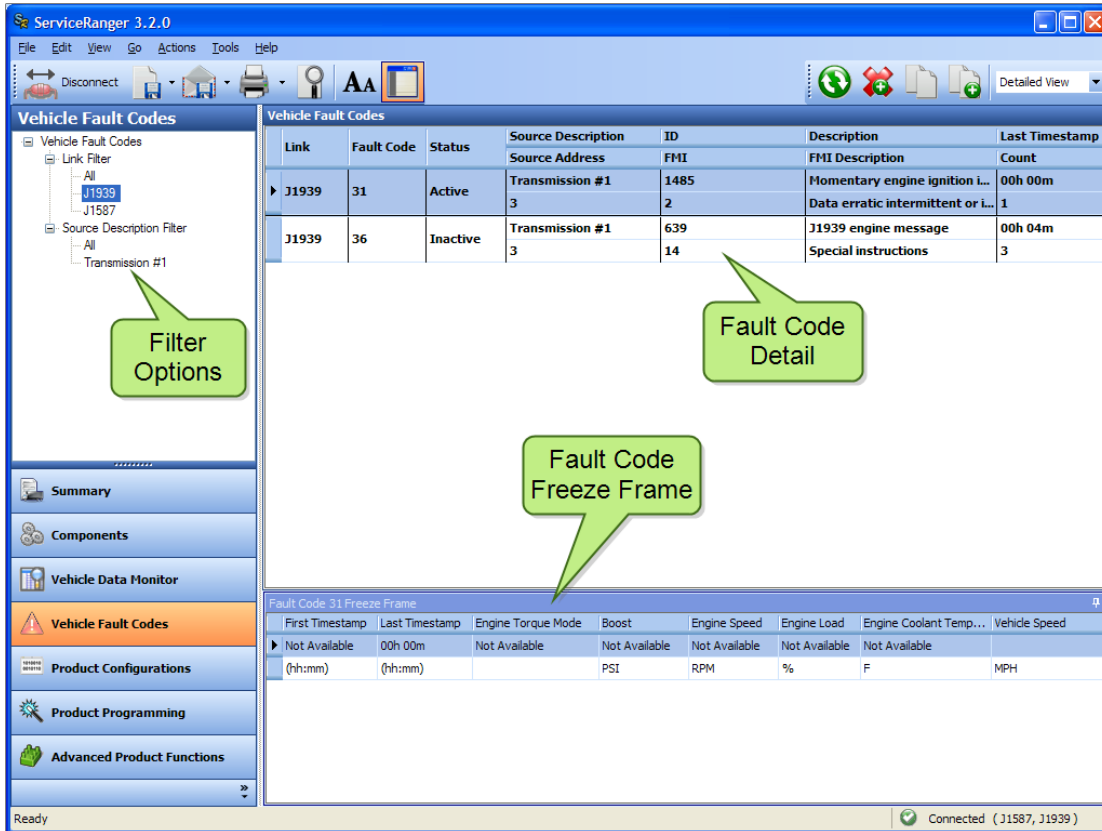
The Fault Code function in ServiceRanger will display all active and inactive SAE fault messages being broadcast by all Roadranger components on the J1587 and J1939 data links, along with their Roadranger product fault codes.

The following information is displayed:

- Status - Status of the fault (Active or Inactive)
- Link - The data link the fault message is being broadcast on (J1587 or J1939)
- Fault Code - The Roadranger fault code assigned to the broadcasted fault message. ServiceRanger only displays fault codes for supported Roadranger products. This field is blank for unsupported components or unrecognized fault messages.
- Source Address - Source address of the component (J1587 MID or J1939 Source Address)

Features

- Component Description - SAE Component Description or Roadranger Product Description of the component's source address.
- ID - Fault Identifier (J1587 PID\SID or J1939 SPN)
- Description - SAE or Roadranger description of the fault identifier
- FMI - Failure Mode Identifier
- FMI Description - SAE description of the FMI



Notes:

- Depending on the selected view, the available information being displayed will change.
- To allow more room for fault codes to be displayed, you can minimize the fault code detail (freeze frame) pane by clicking the push pin in the upper right corner.

Clearing Fault Codes

Clearing fault codes is an important step in the troubleshooting procedures. This command will clear, or erase, fault codes from the currently connected components, or ECUs.

Clearing fault codes

1. View fault codes.
2. Do one of the following:
 - Select **Clear Faults** icon from the Fault Code toolbar.
 - OR
 - Select **Actions| Clear All Faults**.
3. All fault codes will be cleared.

Notes:

- At this time, ServiceRanger only supports clearing all fault codes from all ECUs.
- Active fault codes can not be cleared.
- Not all vehicle component manufactures support the SAE clear fault command.

Filtering Fault Codes

You can filter, or limit, the fault codes being displayed. This makes it easy to find the information you want quickly. There are two options available, protocol and component filter. The component filter will display fault codes from the selected component, or ECU. The protocol filter will display fault codes from the selected vehicle link (protocol).

Filtering by

1. View fault codes.
2. In the Navigation Pane filter control, select one of the following:
 - Expand component filter in the tree control, and select a component
OR
 - Expand protocol filter in the tree control, and select a vehicle link.
3. The fault code display will only show fault codes matching the filter criteria.

Notes:

- Only one filter can be selected and applied to the fault code display at one time.

Changing the Fault Code View

A view is a collection of parameters and display options. ServiceRanger allows you to choose from several views to suite your preferences.

Changing the fault code view

1. View fault codes.
2. Do one of the following:
 - Select an option from the **view** drop down list on the fault code toolbar.
OR
 - Select **View | Current View** on the menu bar.
3. The fault code view will change.

Notes:

- The default view can be configured by selecting **Tools | Settings** on the menu bar.

Copying Fault Codes

You can copy the contents of the fault code display to the system clipboard. This allows you to easily transfer the information to other software applications such as a shop maintenance system, word processor, or spreadsheet.

Copying a selected fault code

1. View fault codes.
2. Select a fault code displayed in the table.
3. Do one of the following:
 - Select **Copy** icon from the Fault Code toolbar.
OR

- Select **Edit| Copy**.
4. The selected fault code will be copied to the system clipboard.

Notes:

- The contents are copied as a tab-separated list.

Copying all fault codes

1. View fault codes.
2. Do one of the following:
 - Select **Copy All** icon from the Fault Code toolbar.
 - OR
 - Select **Edit| Copy All**.
3. All fault codes will be copied to the system clipboard.

Notes:

- The contents are copied as a tab-separated list.

Product Configurations

Product Configurations

The Product Configuration function allows you to view the current configuration of each of the detected Roadranger products on the vehicle. When the Product Configuration Function is selected, ServiceRanger will display all detected Roadranger products in the tree control located in the upper left hand corner of the screen.

Do not change any configurations or update software without first contacting Eaton. All Roadranger products are configured by the vehicle OEM for optimal performance.

Viewing a Configuration:

To view the configuration of any of the detected Roadranger products, select the product in the control tree. ServiceRanger will automatically upload the product's configuration and display it in on the screen. To view a different product, select another product in the Roadranger Product list.

Screen Overview

The main screen in Product Configuration is split into two sections, Product Identification and Product Configuration. They are detailed below.

Product Identification:

The Product Identification displays basic information about the product family and ECU application software. The values in the Product Identification section are read-only.

- Product Family - Roadranger Product Family
- Secondary Software Version* - Software version of any secondary controllers
- Primary Software Version - Software version of the primary controller
- Secondary Hardware Version* - Hardware version of any secondary controllers
- Primary Hardware Version - Hardware version of the primary controller
- Sub-Product ID - Sub Product Hardware Type

Note:

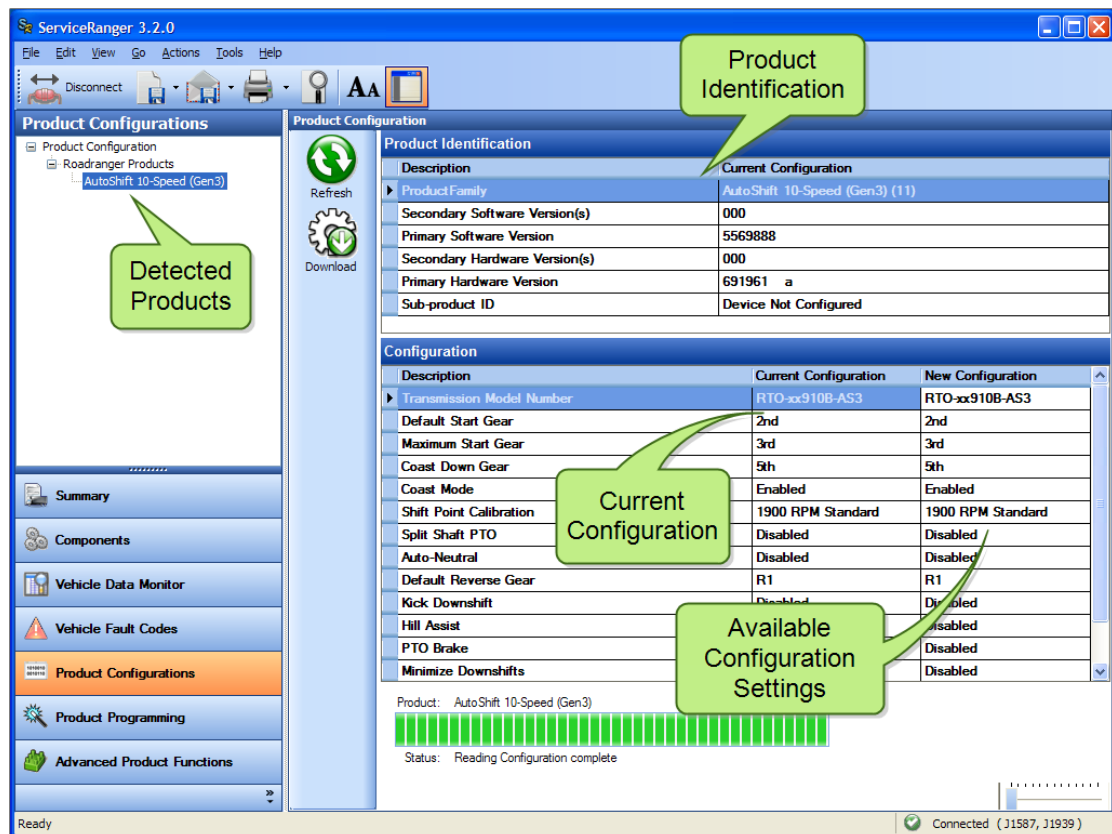
- *Not applicable for all Roadranger products

Product Configuration:

The Product Configuration section displays specific information about the product ECU configuration settings. The Current Configuration column displays how the ECU is currently configured, and the New Configuration column provides optional configuration selections that may be available for the product.

Note:

- Not all product configurations can be changed. If the New Configuration column is blank, then no options are available for that configuration.



Changing a Product Configuration

To change a configuration value, select the new configuration field that you want to change. If the configuration has optional values, a selection control or drop down list will be displayed with all optional values. If no options are displayed, then either there are no options for that configuration or you do not have the necessary user level to change the configuration. When the new configuration is successfully downloaded, ServiceRanger will read the ECU's updated configuration. The current configuration values should now match the new configuration values.

To change a product configuration

1. Select Product Configuration.
2. Select a Roadranger Product in the Navigation Pane tree control.

3. The current configurations are downloaded from the Roadranger product and displayed in the configuration window.
4. In the **New Configuration** column, select a new value for the configuration you are changing.
5. Select **Download**.

Notes:

- You should check for updates to ServiceRanger often, as new configurations may become available.
- Not all configurations can be changed, some are read only.

Product Programming

Product Programming

The Product Programming function allows you to update the component's ECU application software over the vehicle's diagnostic data link. The model or version of the component will determine which data link the ECU will be re-programming on. ServiceRanger will automatically detect which data link, J1587 or J1939, is supported by the component for re-programming. Before programming Roadranger electronic products, the components of the product programming and their functions should be understood. There are two components to a product's program, they are called Application and Configuration software.

Application software

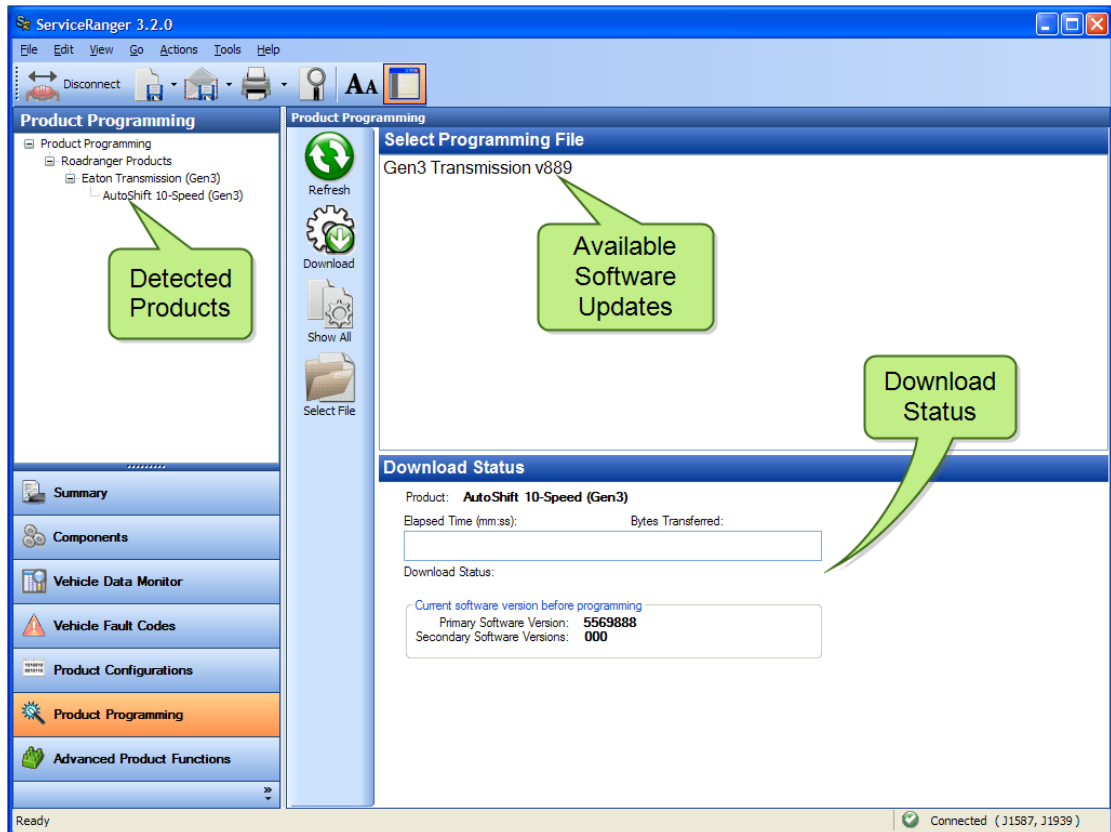
Application software is the main software that makes the product work. It contains the shift logic, self diagnostic functions, and communication functions.

Configuration software

Configuration software will tailor the product to the vehicle. Examples of configuration parameters are default start gear, maximum start gear, and shift points. Naturally, available configurations will differ for each product. For more information, See "Product Configurations" on page 24

There is typically an application program and a configuration program for each ECU on a product. The Eaton AutoShift Gen2 series of transmissions has two controllers, therefore the AutoShift will have two sets of software. One for the Shift Control and another for the Transmission Controller and each of which may needed to be updated.

It is important to only use a communications adapter that has been tested and recommended by Eaton before attempting to program application software. Some communication adapters, including some wireless models, are not well suited for application software programming and could result in permanent damage to the ECU.



Updating Product Software

When the Product Programming function is selected, ServiceRanger will display all detected Roadranger products in the tree control. Select the product ECU in the tree that you want to program. Some component systems may have multiple ECU's, in which ServiceRanger may display each ECU individually.

Downloading the Application File

After a component has been selected, ServiceRanger will display any software updates for the currently selected component ECU. Select the application file that you want to program into the component ECU by selecting the update in the list (highlighting the file). To begin the download, select the 'Download' button located in the center column to begin the download. Follow all instruction prompts during the download process.

Interrupting the ECU download process once it has begun can result in permanent damage to the ECU.

Updating Product Software

1. Select Product Programming.
2. Select a Roadranger Product in the Navigation Pane tree control.
3. Select a software update from the main content window.
4. Select **download**.
5. Depending on the product, you may be asked to cycle the ignition key. Follow the on screen prompts to continue.
6. The product software is downloaded to the ECU.

Notes:

- If ServiceRanger detects that the component has the most current application software compared to the files that are stored in the ServiceRanger product database, ServiceRanger will display that no files are available for the selected product.
- Make sure vehicle battery voltage is at normal operating levels.
- Verify 'good' wiring connections.
- Make sure the service PC has sufficient battery power.

Troubleshooting Product Programming

If something causes a product update to fail, all may not be lost. Depending on the product, the ECU may be left in a state where it can still be updated using ServiceRanger. When an ECU is in its 'programming' state, it can not identify itself automatically to ServiceRanger. You must tell ServiceRanger what product you are working with by selecting a product using the **Show All** function. Its important to remember that selecting the correct product is **very important** when performing this procedure. However, this function is very useful as it may save you from replacing an ECU on the vehicle.

You should only use the show all function after a failed download attempt. Otherwise, permanent damage to the ECU may result.

Troubleshooting Steps

Each product differs slightly in how to recover an ECU after a failed download. The following sections detail the steps needed for each product.

AutoShift Gen2

The AutoShift Gen2 transmission has two ECUs, the shift controller and transmission controller. If the shift control programming failed, you will not be able to communicate with either ECU.

- **Shift Controller**

If the ignition key has been turned off since the programming attempt failed, the ECU must be replaced. Otherwise, continue to the next step.

1. Key on.
2. Start ServiceRanger and connect to the vehicle.
3. Go to the programming screen and select **Actions | Show All** from the menu bar.
4. From the Navigation Pane tree control, select "Eaton Transmission (Gen2) -> [Transmission Model]".
5. Select the software update.
 - Select 16-bit software for assembly number less than A-6877.
 - Select 24-bit software for assembly number equal to or greater than A-6877.
 - **Note:** The assembly number can be found on a sticker located on the back or side of the shift controller.
6. Select **Download**.
7. Follow the on screen prompts.
8. The download will begin and the product software will be updated.

- **Transmission Controller**

1. Key off.
2. On the transmission controller 18-way connector, ground pin D1.
3. Key on.
4. Start ServiceRanger and connect to the vehicle.
5. Go to the programming screen and select **Actions | Show All** from the menu bar.
6. From the Navigation Pane tree control, select "Eaton Transmission (Gen2) -> Gen2 Transmission ECU".
7. Select the software update.
8. Select **Download**.
9. Follow the on screen prompts.
10. The download will begin and the product software will be updated.

AutoShift/UltraShift Gen3

The AutoShift/UltraShift Gen3 has only one ECU, the transmission controller.

1. Key on.
2. Start ServiceRanger and connect to the vehicle.
3. Go to the programming screen and select **Actions | Show All** from the menu bar.
4. From the Navigation Pane tree control, select "Eaton Transmission (Gen3) -> [Transmission Model]".
5. Select the software update.
6. Select **Download**.
7. Follow the on screen prompts.
8. The download will begin and the product software will be updated.

UltraShift Plus

The AutoShift/UltraShift Gen3 has two ECUs, the transmission controller and electronic clutch actuator (ECA). At this time, the ECA is not supported by programming.

- **Transmission Controller**

1. Key on.
2. Start ServiceRanger and connect to the vehicle.
3. Go to the programming screen and select **Actions | Show All** from the menu bar.
4. From the Navigation Pane tree control, select "Eaton Transmission (Performance/Vocational) -> [Transmission Model]".
5. Select the software update.
6. Select **Download**.
7. Follow the on screen prompts.
8. The download will begin and the product software will be updated.

VORAD VS-400

The Bendix VORAD VS-400 system has two ECUs, the driver interface unit (DIU) and the forward looking radar (FLR).

Features

- **DIU**

1. On the DIU, depress and hold the up and down arrow simultaneously.
2. Key on.
3. Wait 5 seconds, then release up and down arrows.
4. Start ServiceRanger and connect to the vehicle.
5. Go to the programming screen and select **Actions | Show All** from the menu bar.
6. From the Navigation Pane tree control, select VORAD VS-400 DIU.
7. Select the software update.
8. Select **Download**.
9. Follow the on screen prompts.
10. The download will begin and the product software will be updated.

- **FLR**

You have an 8 second window to key on and start programming for this procedure to work correctly.

1. Key on.
2. Start ServiceRanger and connect to the vehicle.
3. Go to the programming screen and select **Actions | Show All** from the menu bar.
4. From the Navigation Pane tree control, select "VORAD VS-400 FLR".
5. Select the software update.
6. Select **Download**.
7. Follow the on screen prompts.
8. The download will begin and the product software will be updated.

If you are unable to recover a failed download, call the Roadranger call center at 1-800-826-HELP for further instructions.

Advanced Product Functions

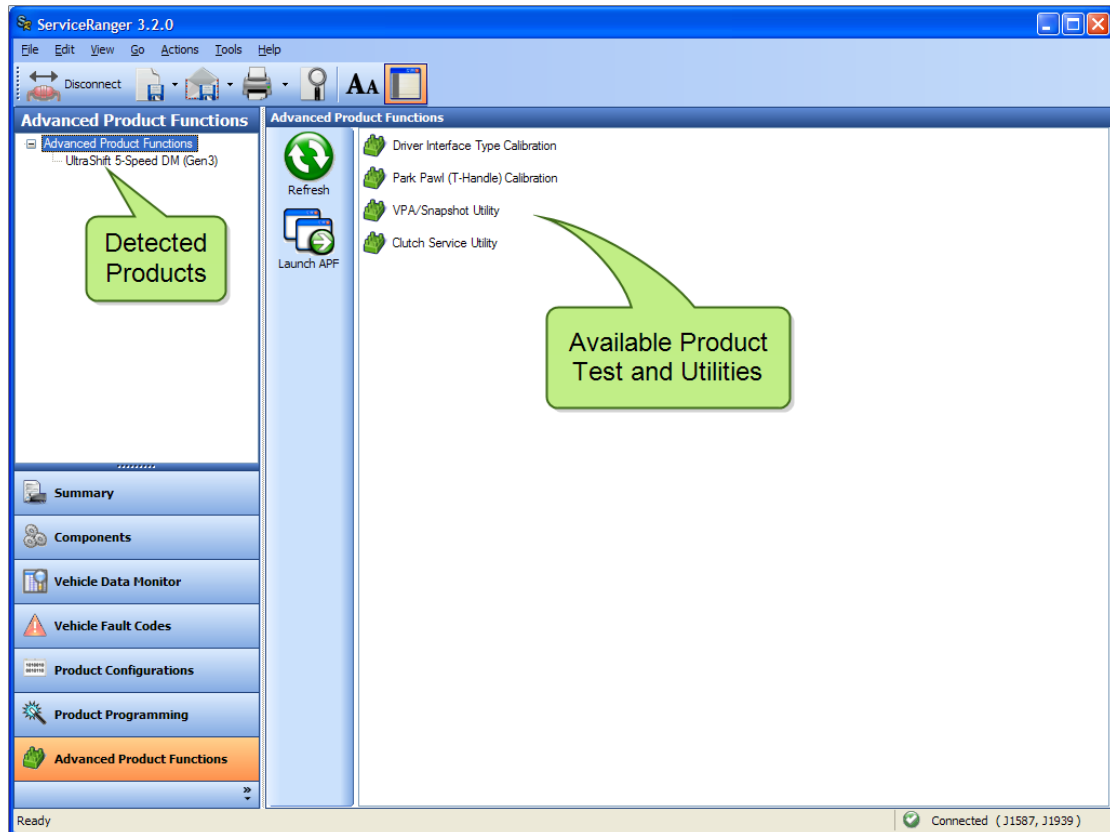
Advanced Product Functions

An advanced product function (APF) extends the functionality of ServiceRanger beyond normal everyday service routines. Some of the advanced functions include uploading data from a vehicle ECU, running a product test, or recalibrating an internal software variable.

When connected to a vehicle, ServiceRanger will display a list of detected products in the navigation tree. Selecting a product from this list will display a list of APFs available for that product.

Launching an Advanced Product Function

Select the APF you want to run, and select the "Launch APF" button located on the APF toolbar. You can also double click on the name to launch the APF.



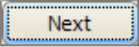

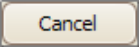

The following APFs are available by product family:

- AutoShift Gen2
 - Clutch Abuse Utility (DM and ASW models)
- AutoShift Gen3
 - Clutch Service Utility (DM and ASW models)
 - Snapshot/VPA Utility
 - Park Pawl (T-Handle) Calibration
 - Driver Interface Reset Utility
- UltraShift Plus
 - Clutch Service Utility
 - Snapshot/VPA Utility
 - Grade Sensor Calibration
- Electric Hybrid Powertrain
 - Clutch Service Utility
 - Snapshot/VPA Utility
 - Hybrid Output Override Test
 - Grade Sensor Calibration
- VORAD VS-400
 - Forward Looking Radar Alignment Utility



Features

Overview

Each APF will consist of an introductory 'Description and Instructions' section. This section will display important information regarding the product function and steps to be performed. This section will be followed by the product functions and any pass or fail results. You can navigate through each product function using the following standard commands.

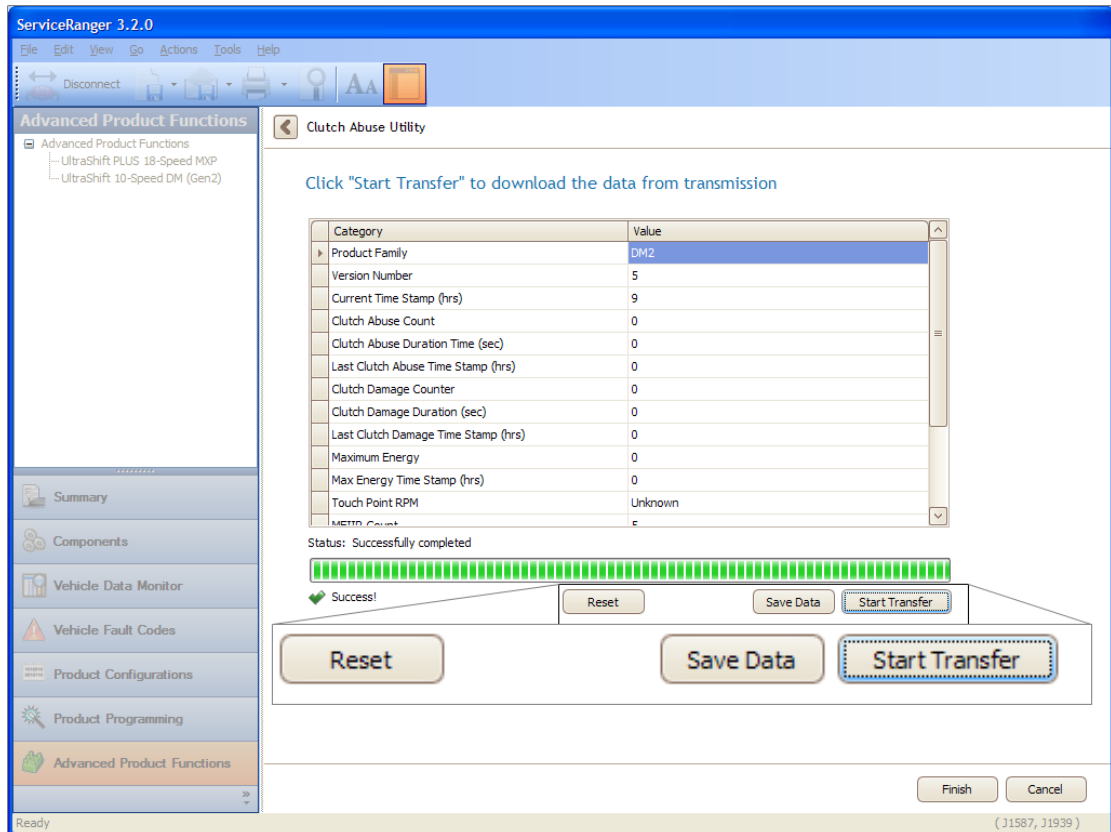
	Next - Provides a way to advanced to the next screen.
	Back - Provides a way to return to the previous screen.
	Cancel - Provides a way to cancel or exit the product function.
	Finish - This command is displayed when on the final step and will exit the product function.

In most cases, the product function will perform the system test and display a pass or fail result. In general, the following messages are used to display the results of a function.

	Success - The requested function was performed correctly or the product test passed successfully.
	Failed - The requested function was unsuccessful or the product test failed.

Clutch Abuse Utility

The transmission ECU maintains information about the history and performance of the UltraShift Gen2 DM and ASW models. This data can be viewed, downloaded, or cleared using the clutch abuse utility. When an UltraShift clutch is replaced, clearing the clutch data is part of the clutch replacement procedure.



Available Functions:

Start Transfer

This function will download the data from the transmission and display it on the screen.

Save Data

Allows you to save the extracted information to a text file on your computer.

Note: The default location is "c:\ServiceRangerData\" folder and the default file name is in year-month-day time format. (example: 20091203-082059 is Dec 03, 2009 08:20:59 AM)

Reset

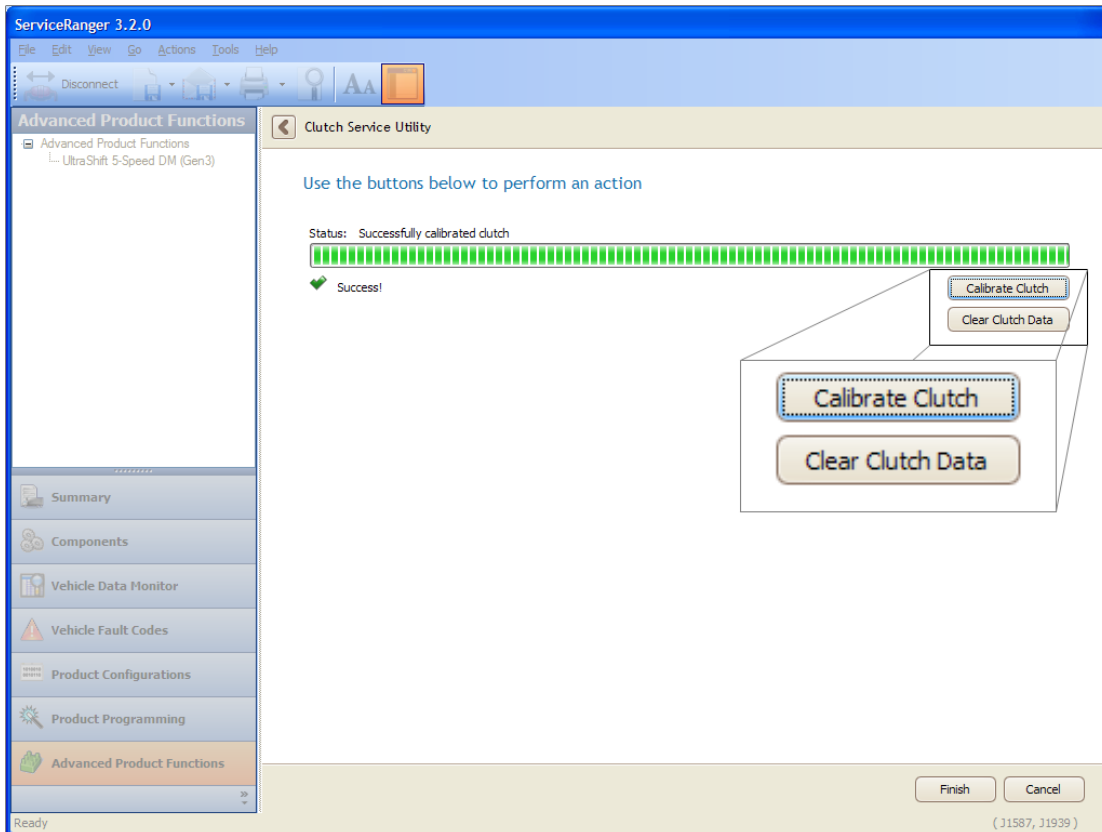
Clears the data from the transmission ECU.

Calibrate

Activates the clutch calibration routine.

Clutch Service Utility

The clutch service utility is used to calibrate the clutch and clear clutch information from the vehicle performance analysis (VPA) data. This procedure is usually done when replacing the clutch but can also be done when performing general clutch maintenance.



Available Functions:

Calibrate Clutch

This command will start the calibration routine within the ASW and DM transmissions.

Clear Clutch Data

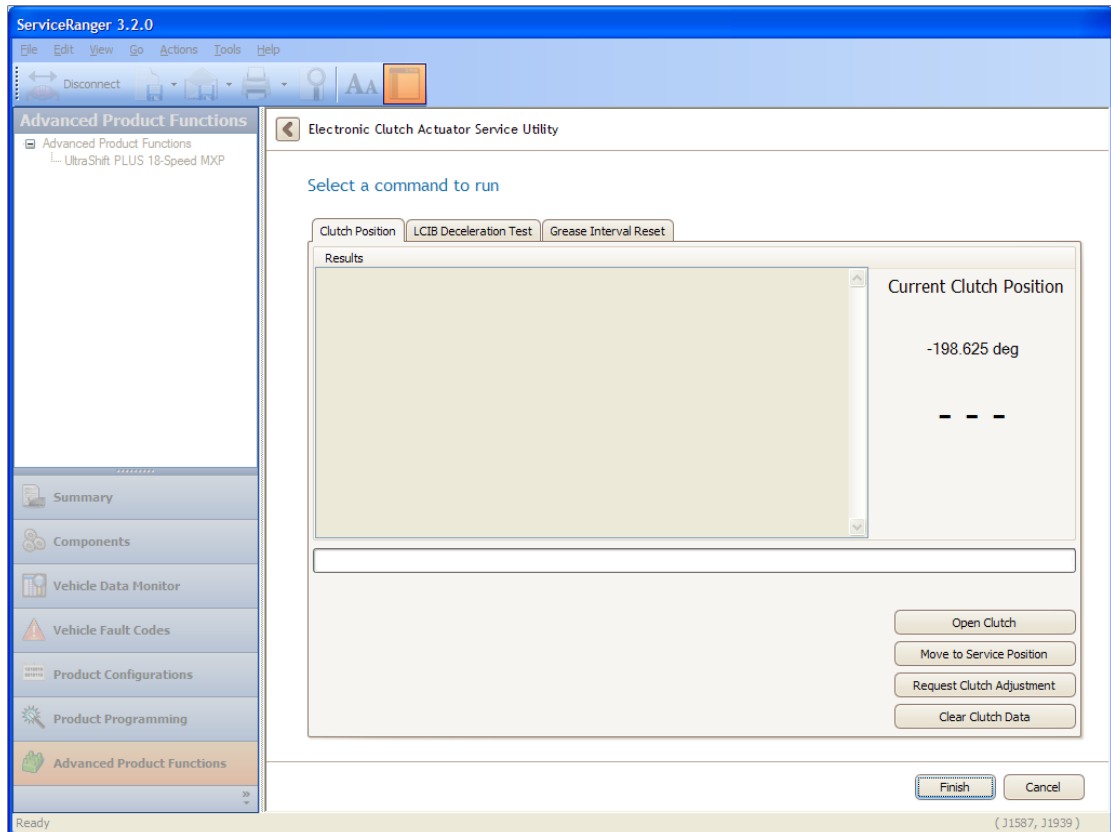
This command will request the clutch data to be cleared from the transmission's VPA data.

Notes:

- This APF is only available for ASW and DM transmission models.

ECA Clutch Service Utility

This utility is available for products that use an Electronic Clutch Actuator (ECA) to control the position of the clutch assembly. There are four functions in this utility that can be used in various service applications.



Available Functions:

Open Clutch

This command is used when a clutch needs to be opened, or released, in order to reset the ECA Clutch.

Warning: Make sure that your hands and other body parts are not inside the clutch housing while opening or closing the clutch.

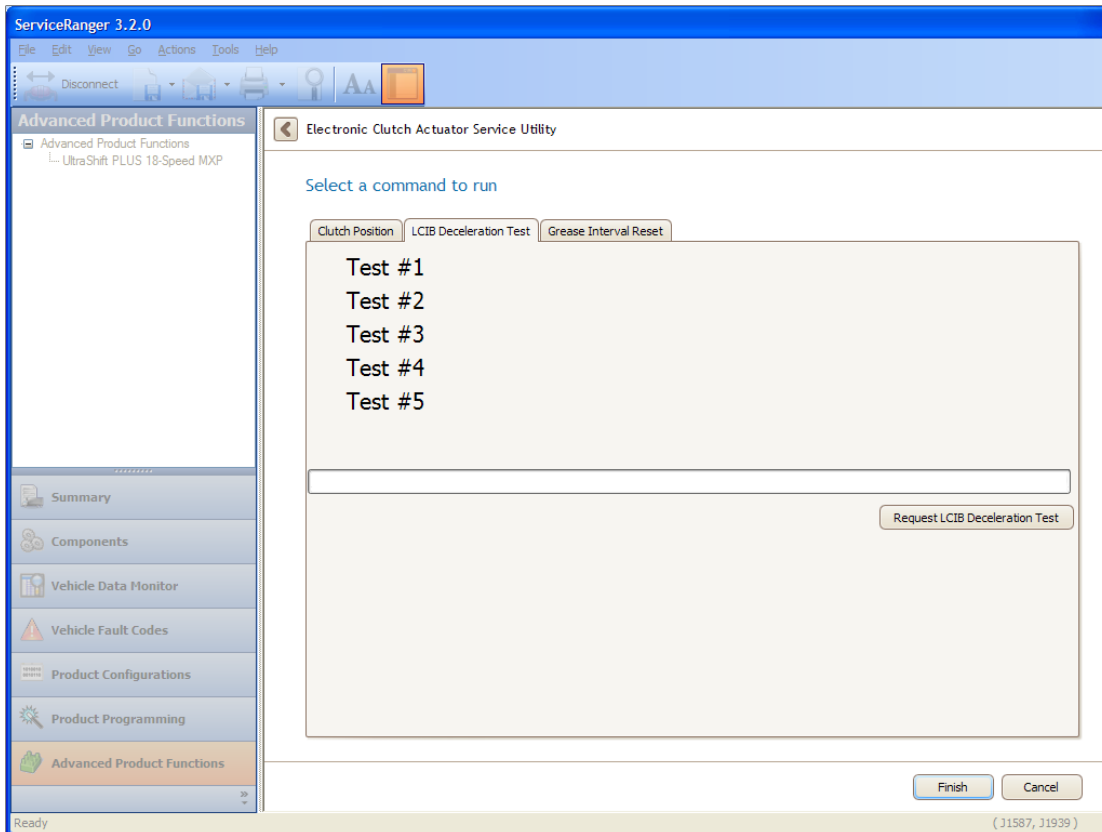
Before commanding the clutch to open, place the shift device in neutral, make sure the vehicle engine is idling, and parking brake is set. After the clutch opens, shut the ignition off while servicing the clutch. The clutch will close the next time the ignition is turned on.

Move to Service Position

This command is typically used in situations where the release fork needs to be rotated away from the release bearing during the service procedure, such as when removing the transmission. Before selecting to move the release fork to the service position, make sure that the shift device is in neutral, and the vehicle parking brake is set and engine is not running. The release fork will remain in the service position until another clutch service or operational action is commanded.

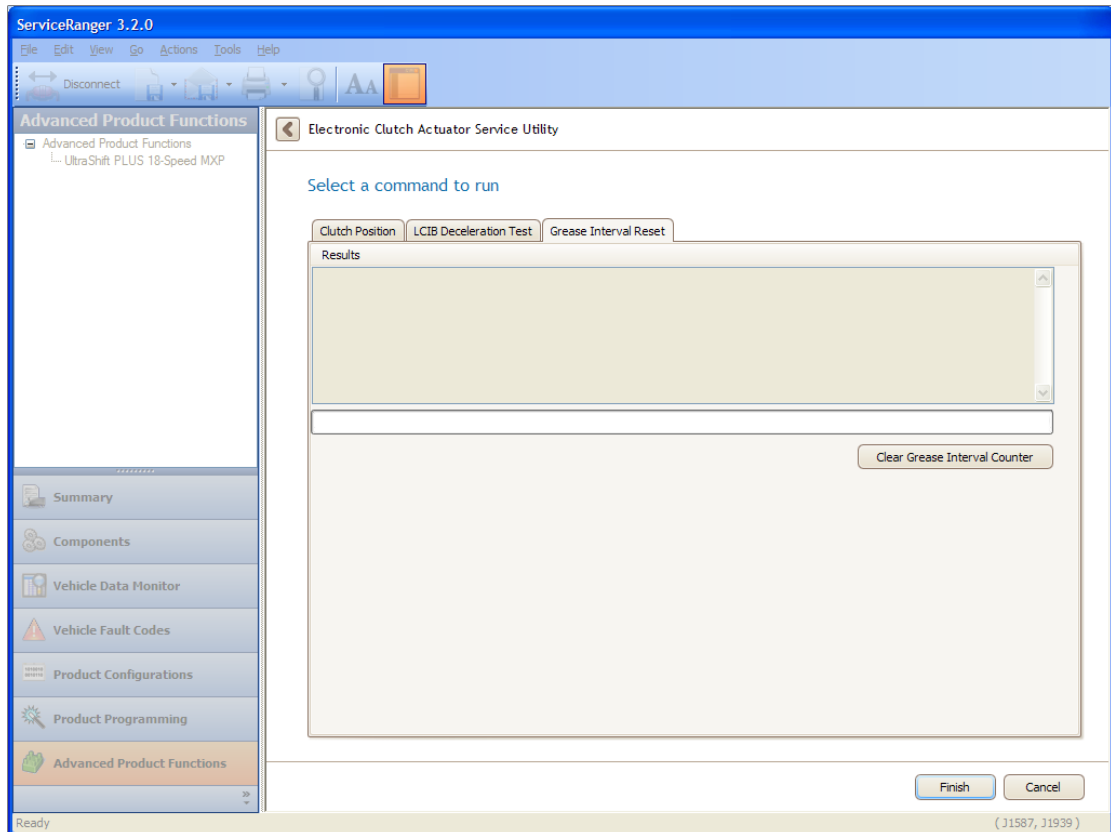
Request Clutch Adjustment

This command signals the ECA to actuate the clutch in order to set the adjustment after an ECA clutch has been reset. Before requesting the clutch adjustment, place the shift device in neutral, make sure the vehicle engine is idling, and parking brake is set.



Request LCIB Deceleration Test

This command signals the ECA to actuate the Low Capacity Inertia Brake five times in order to verify its function. Before initiating the LCIB test, place the shift device in neutral, make sure the vehicle engine is idling, and parking brake is set. The test fails if any one of the five readings are below 1000 rpm/sec.



Grease Interval Reset

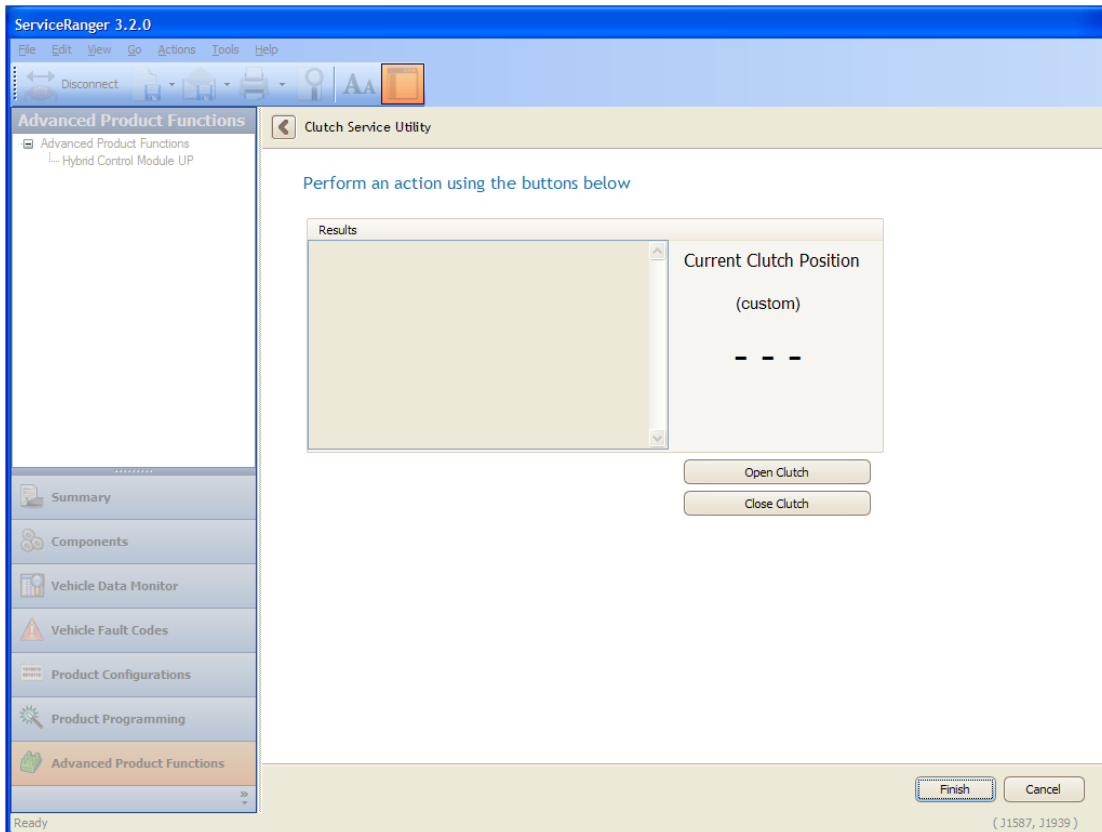
This command signals the transmission ECU to reset its clutch release bearing grease interval counter.

Notes:

- Optionally, this feature can be enabled or disabled via the product configuration option in ServiceRanger.
- At the appropriate grease interval and shortly after each engine start, "GI" will momentarily appear in the gear display, along with an audible tone. This will continue to occur at each engine start until the clutch service has been completed and the grease interval has been reset.
- The operator can choose to follow the Automated Lube Schedule or the published lube guidelines in the Lubrication Manual TCMT-0021. When enabled, it is very important to reset the grease interval count every time the release bearing is greased.

Hybrid Clutch Service Utility

This utility is available for Electric Hybrid powertrain products that use an Electric Clutch Actuator (ECA) to control the position of the clutch assembly. This utility allows you to manually control the position of the clutch actuator.



Available Functions:

Open Clutch

This command is typically used when a clutch needs to be opened, or released, in order to reset the ECA Clutch.

Warning: Make sure your hands and other body parts are not inside the clutch housing while opening or closing the clutch.

Before commanding the clutch to open, place the shift device in neutral, make sure the vehicle engine is idling, and parking brake is set. After the clutch opens, shut the ignition off while servicing the clutch. The clutch will close the next time the ignition is turned on.

Close Clutch

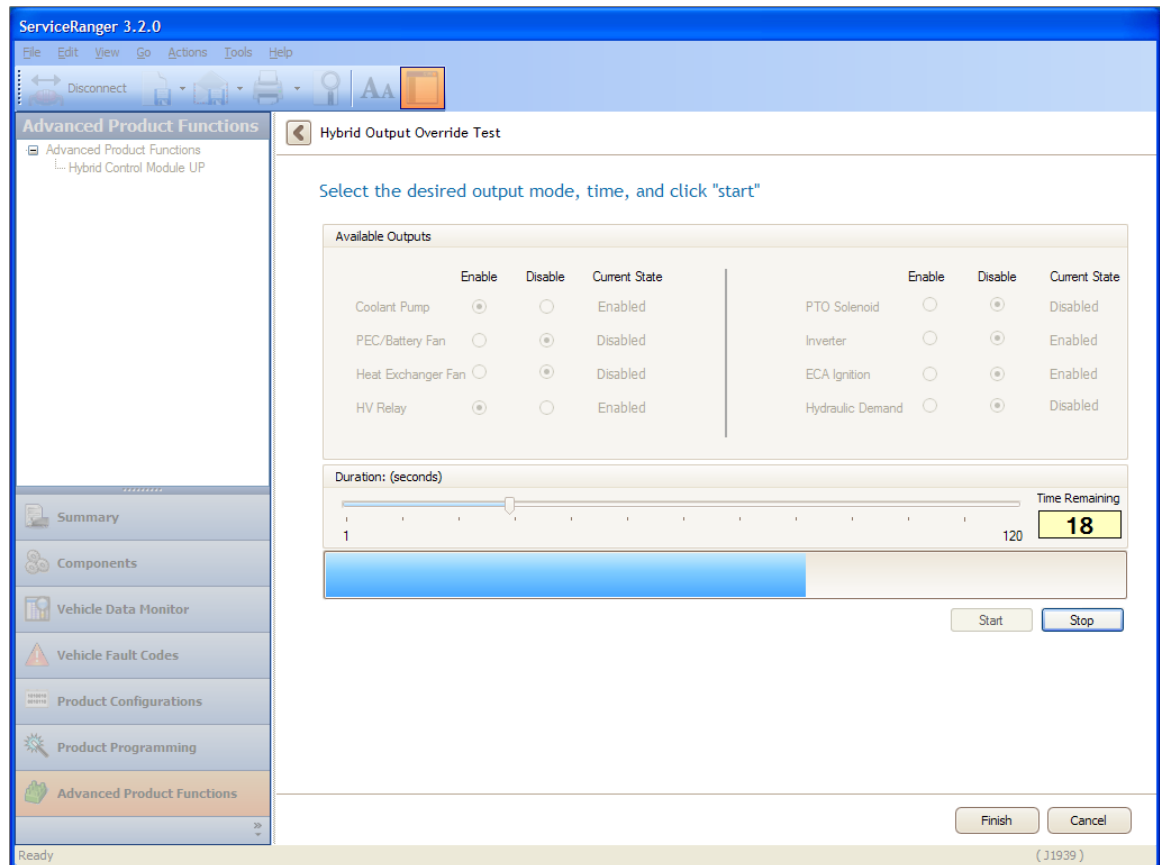
This command is typically used when a clutch needs to be closed.

Warning: Make sure your hands and other body parts are not inside the clutch housing while opening or closing the clutch.

Before commanding the clutch to close, place the shift device in neutral, make sure the vehicle engine is idling, and parking brake is set.

Hybrid Output Override Test

This product uses several outputs of the Hybrid Control Module (HCM) to control various functions of the Hybrid system. This test will allow you to override the outputs for advanced troubleshooting procedures.



Available Functions:

Available Outputs

Power Electronics Carrier (PEC) Fan

The Hybrid batteries are air cooled using a 12-volt fan, 24-volt in some applications. Enabling this function will bypass HCM temperature settings closing the OEM supplied relay, sending power to the fan located in the PEC. This test can be used to test the HCM, OEM wiring / relay and the PEC fan.

Heat Exchanger Fan

The Hybrid liquid cooling system utilizes a heat exchanger fan to cool the motor/generator, inverter and DC/DC converter on certain vehicles. Enabling this function will bypass HCM temperature settings closing the OEM supplied relay, sending power to the exchanger fan. This can be used to test the HCM, OEM wiring/relay and the exchanger fan.

Coolant Pump

The Hybrid liquid cooling system utilizes an electric pump to circulate coolant through the motor/generator, inverter and DC/DC converter on certain vehicles. Enabling this function will bypass HCM temperature settings closing the OEM supplied relay, sending power to the coolant pump. This can be used to test the HCM, OEM wiring/relay and the coolant pump.

PTO Solenoid

Enabling this function will engage the PTO on systems utilizing analog controlled ePTO activation. This can be used to test the HCM, OEM / equipment manufacture wiring and the PTO solenoid.

Duration

The duration selection determines how long the override mode will be active after selecting 'start'.

Start

This command will override the selected outputs until the selected time interval has elapsed.

Warning: Make sure that the shift device is in neutral, the vehicle parking brake is set, and engine is not running before activating an output. All outputs are reset to their normal states if you cycle the ignition..

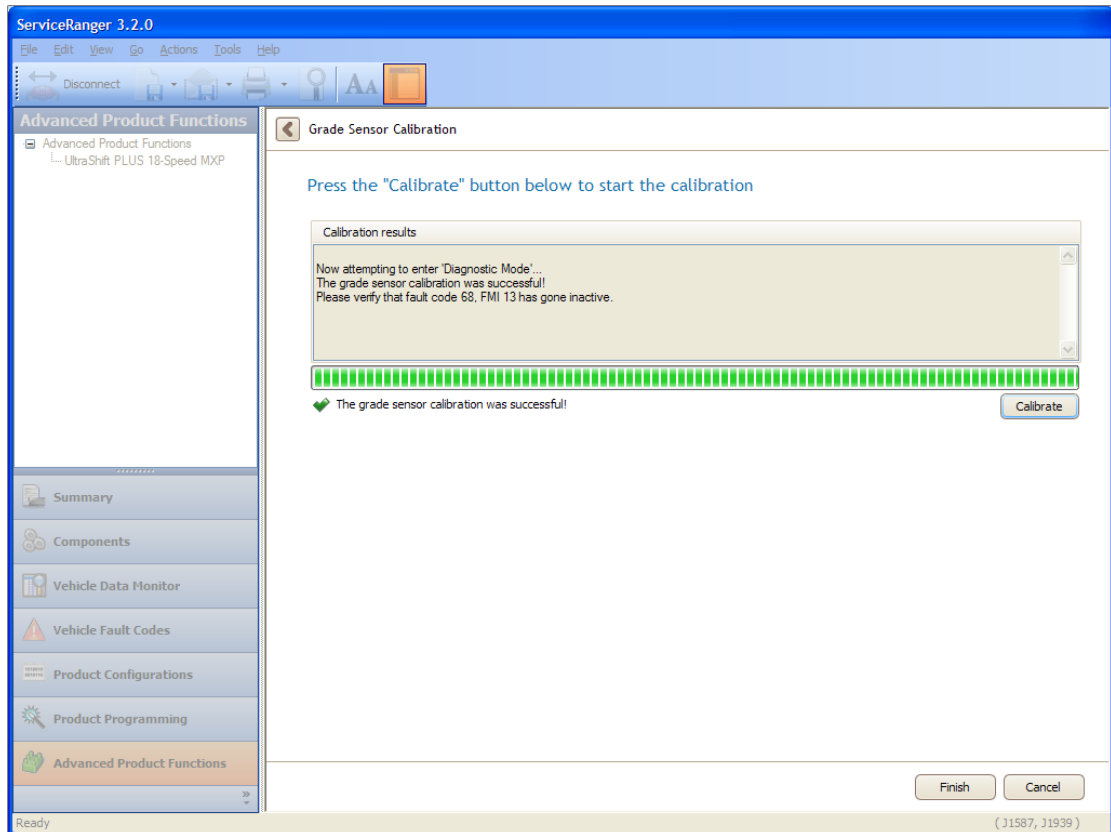
Stop

This command is will return the outputs to their normal state, canceling the override mode selected.

Grade Sensor Calibration

The Grade Sensor is mounted inside the transmission ECU and is essential for the Hill-Start-Aid feature. It also provides information to the ECU to assist in a smooth vehicle launch and also while shifting. This sensor must be calibrated initially at the OEM factory and anytime an ECU is replaced in the field.

Note: An active fault code 68 FMI 13 indicates a grade sensor calibration is needed. It will go inactive upon successful calibration.



Available Functions:

Calibrate

The following pre-conditions should be met before calibrating the grade sensor:

- The vehicle is parked on level ground.
- The suspension is fully aired.
- Verify the suspension is set to proper ride height.
 - Ground surface must be within +/-0.50% grade (0.28 deg) from level.
 - Maximum allowable grade is +/-0.87% grade (+/-0.50 deg) from level.

Selecting "**Calibrate**" will send the request for the calibration routine to begin.

Failure to adhere to ground surface conditions may lead to unsatisfactory shift performance. This condition could be misinterpreted as a product defect and could lead to unnecessary repair

Park Pawl (T-handle) Calibration

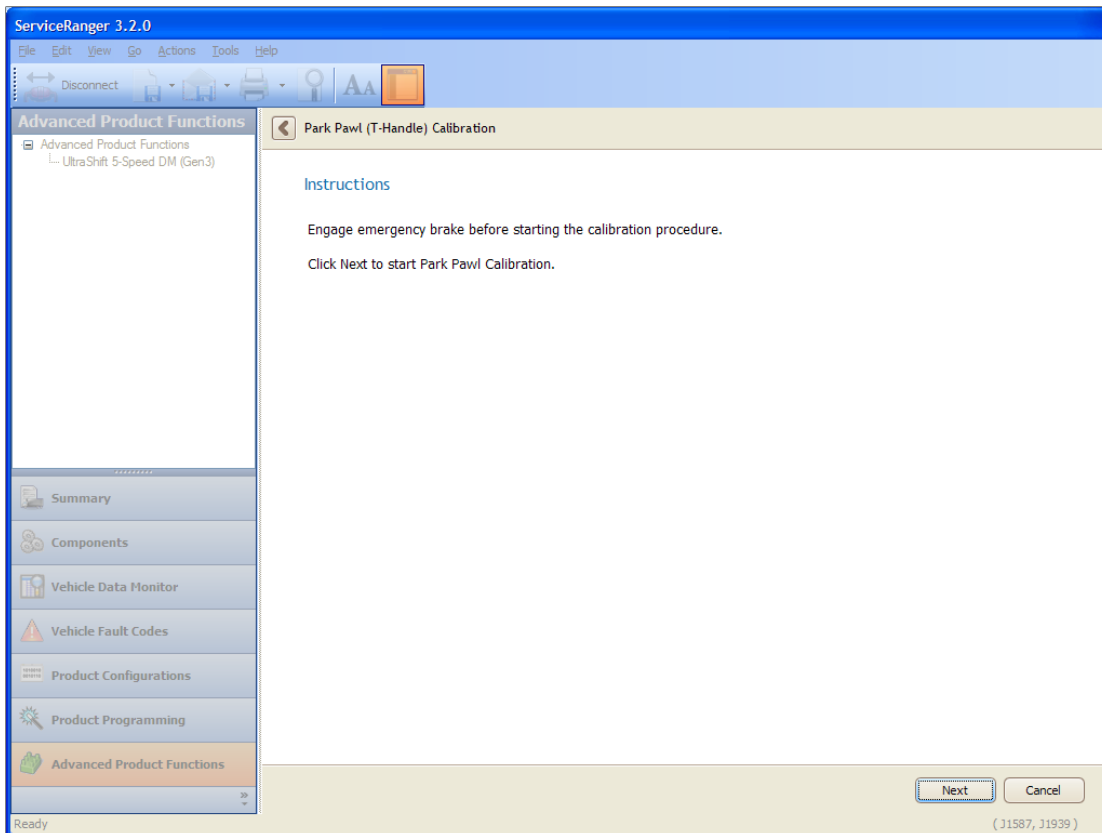
The park pawl, or T-handle, calibration procedure should only be used if it is discovered that the calibrated and actual position sensor values do not correlate for the park pawl. Additionally, the calibration procedure should be performed if any of the following conditions have happened:

- Transmission ECU is replaced.
- Park sensor is replaced.

Features

- Park pawl actuator is replaced.
- If there is an active fault code 84.

Note: All production sensors are calibrated from the factory.



Available Functions:

The park pawl calibration procedure consists of several step by step procedures presented to you in a wizard style interface. It will ask you to perform a step and select 'Next' button to move on to the next step in the sequence. It is important that you follow the procedure exactly as described to you on the screen.

Park Pawl Calibration

Engage emergency brake before starting the calibration procedure.

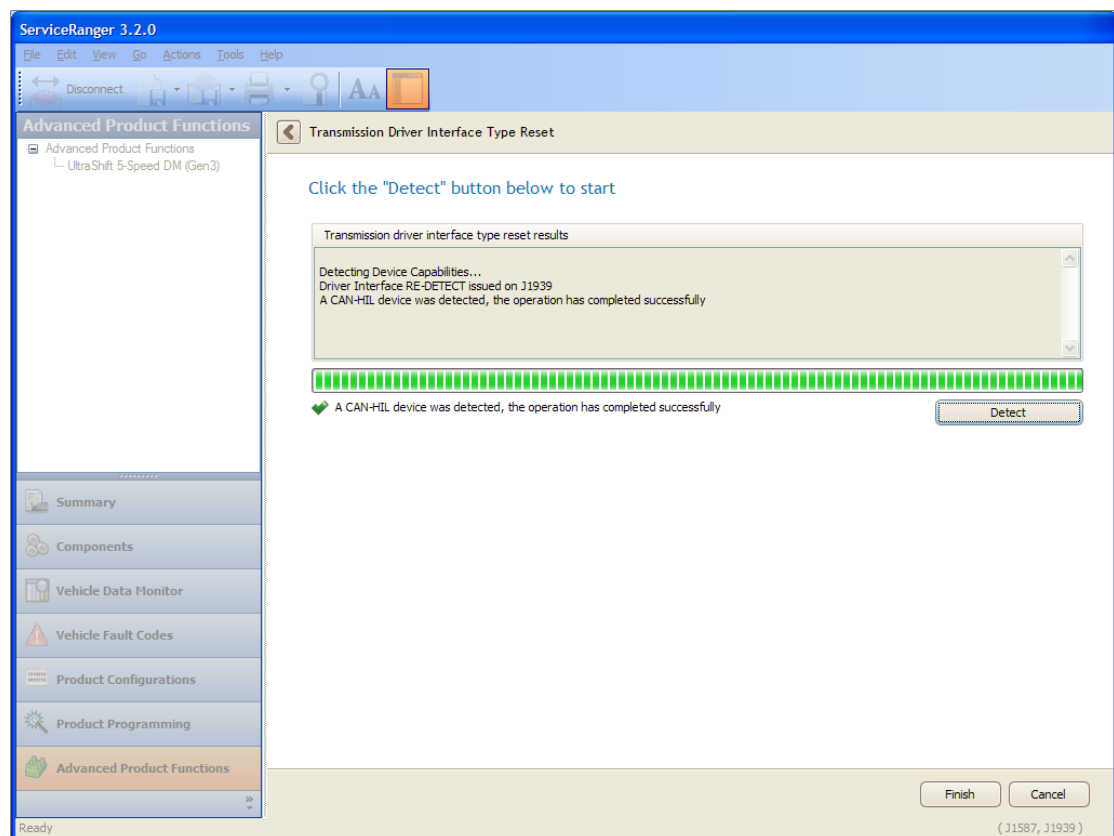
1. Open Park Pawl (T-handle) calibration APF.
2. Read the instructions and select next.
3. Put the gear selector into the Park position, then select next.
4. Put the gear selector into the Reverse position, then select next.
5. Put the gear selector into the Neutral position, then select next.
6. Put the gear selector into the Drive position, then select next.
7. Put the gear selector into the Hold position, then select next.
8. Put the gear selector into the 1st gear position, then select next.
9. Put the gear selector into the Hold position, then select next.

10. Put the gear selector into the Drive position, then select next.
11. Put the gear selector into the Neutral position, then select next.
12. Put the gear selector into the Reverse position, then select next.
13. Put the gear selector into the Park position, then select next.
14. Put the gear selector into the 1st gear position, then select next.
15. Put the gear selector into the Park position, then select next.
16. Calibration is complete, select finish.

Driver Interface Reset Utility

Various types of driver interfaces, such as shift levers and push button shifters, are used on vehicles equipped with Eaton automated transmissions. A new transmission ECU will automatically detect the driver interface device type and configure itself to operate appropriately.

If an ECU that has already been configured is later installed on a vehicle with a different type of driver interface device this utility can be used to clear the stored driver interface type from the ECU's memory and command the ECU to re-detect the new driver interface device.



Available Functions:

Detect

This command will activate the auto-detect routine within the transmission ECU.

Notes:

- Make sure that the driver interface device is properly connected before performing this function.

Snapshot and Vehicle Performance Data

Snapshot and Vehicle Performance Analysis (VPA) data files are stored in the transmission ECU. This utility is used to extract both the Snapshot and VPA files from the transmission ECU. These files may be requested by Eaton for review as part of the troubleshooting and repair process.

Snapshot

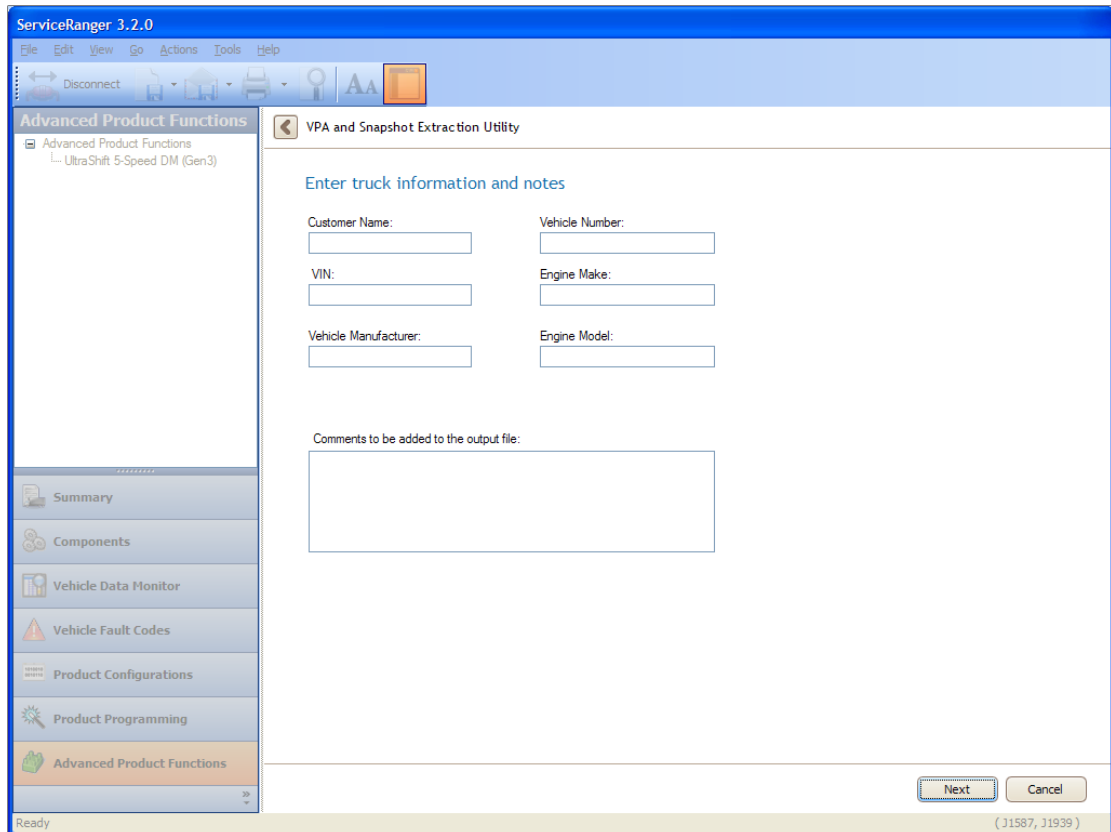
The Snapshot data log files are a specific set of vehicle and transmission parameters that are continuously monitored by the transmission ECU. When specific faults are set in the transmission ECU, or if the driver makes a request, a snapshot file is captured and stored in the transmission ECU. The snapshot will store 9-seconds of data prior to the fault or driver request, and two seconds of data following the fault or driver request. The Transmission ECU can store four data log files.

Vehicle Performance Analysis

The vehicle performance analysis (VPA) data is a historical log of the transmission's operation and performance. The VPA data stored in the UltraShift transmission models will also contain information about DM Clutch performance.

Instructions:**Enter vehicle information**

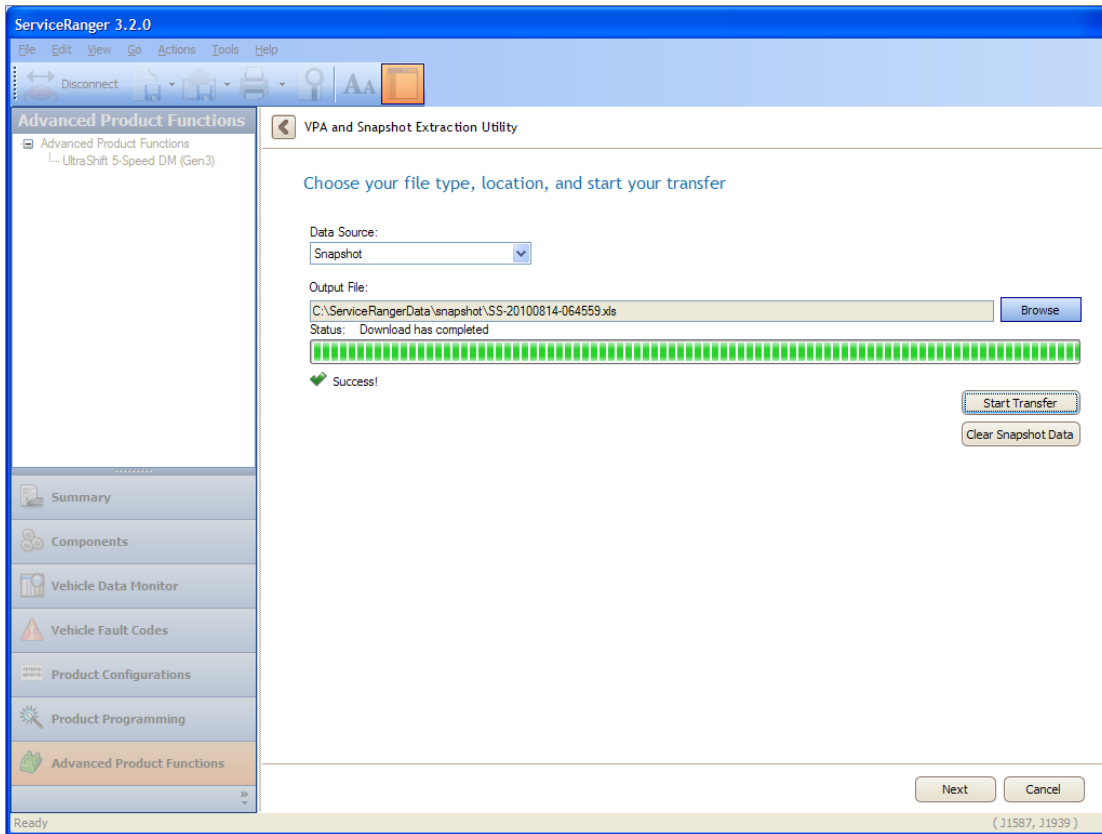
This is optional information and will be included in the saved output file.



File extraction

You can choose which data to extract from the "Data Source" drop down. Each file will need to be extracted one at a time. Once you select the file type, you can select an output file location and name by selecting the browse button. Optionally, you can use the default location and file name.

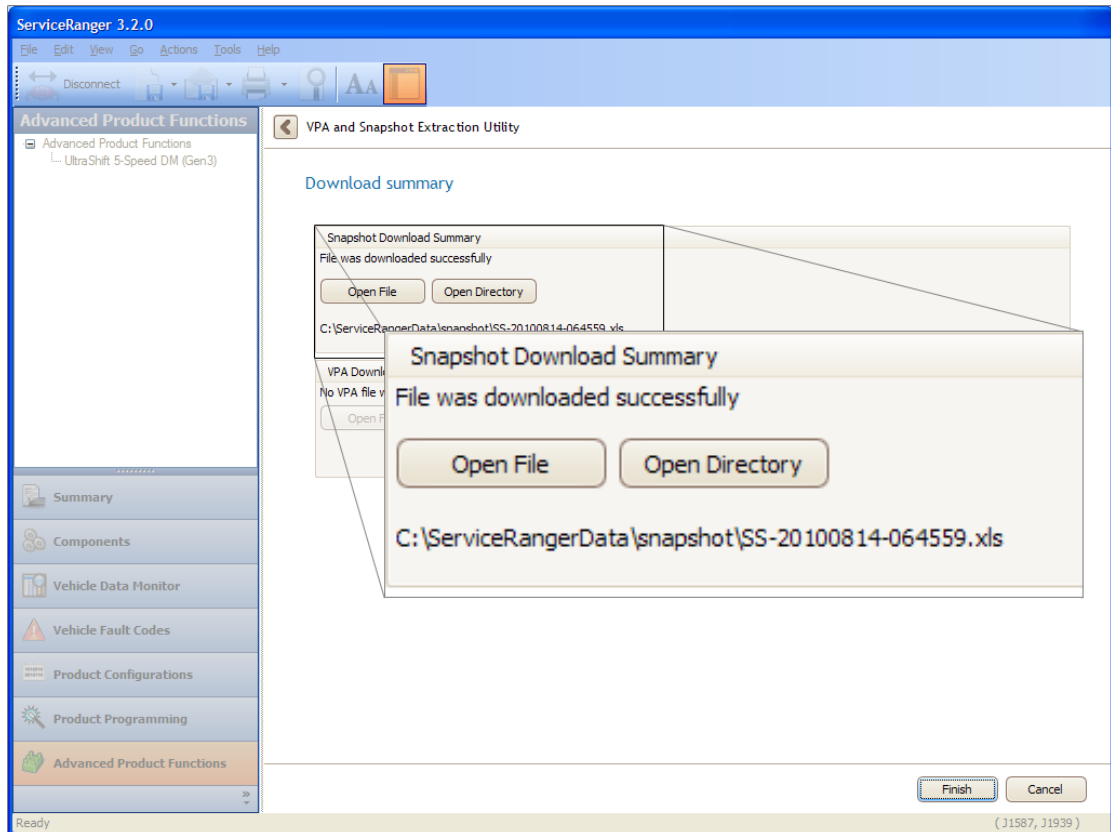
Features



Note: The default location is the "c:\ServiceRangerData" folder and the default file name is in year-month-day time format. (example: SS-20100121-065416.xls)

Summary

The summary screen will display the VPA and Snapshot files you downloaded from the product. From here you can open the file or open the folder location where the file was saved.



Forward Looking Radar Alignment

Proper alignment of the Forward Looking Radar (FLR) is critical to the correct operation of the VS-400 system. Improper alignment degrades the systems ability to detect objects in the vehicle's path and will cause the system to fault. This utility guides the technician through the proper FLR physical alignment procedure and calibration. It is used primarily when the FLR has been removed or replaced.

If the FLR alignment becomes slightly off center along the horizontal axis during operation, the FLR will attempt to calibrate itself to find the true centerline of the vehicle. However if the FLR alignment is off of true center by more than $+1^\circ$, the FLR will set a fault code 91 - Radar Out of Alignment.

Note: The FLR cannot compensate for vertical misalignment.

Instructions

FLR Physical Alignment

- The vehicle must be parked on a level surface. If the vehicle is on a grade, compensations for level must be made to ensure proper alignment.

Note: The following physical alignment procedure is based on a typical Bendix standard mounting bracket. If a different type of bracket was used, contact the OEM or the system installer for the proper alignment procedure.

- Select 'Next' to continue.

Horizontal Alignment

1. Select two truck reference points that are identical and symmetrical about the truck centerline. Ensure the reference points are equally aligned and not damaged.
2. Center a 4'-6' (1-2m) straight edge across a flat surface of the FLR bracket.
3. Measure the distance between the reference points and the face of the straight edge.
4. Use a 5/32" Allen wrench to loosen the locking screws.

Note: Failure to loosen both locking screws will result in damage to the alignment bracket.

5. Adjust the alignment screw until the two measurement points are equal within +/- 0.1° (2.54mm).
6. Once the measurements are equal for both of the reference points, tighten the locking screws.
7. Check both the vertical and horizontal alignment:
 - Re-measure the reference points to make sure they are still equal.
 - Use a digital level to verify the vertical alignment is 0° from vertical +/- 0.2°.

Vertical Alignment

1. Hold a digital level against the flat surface of the mounting bracket.
2. Use a 5/32" Allen wrench to loosen the locking screws.

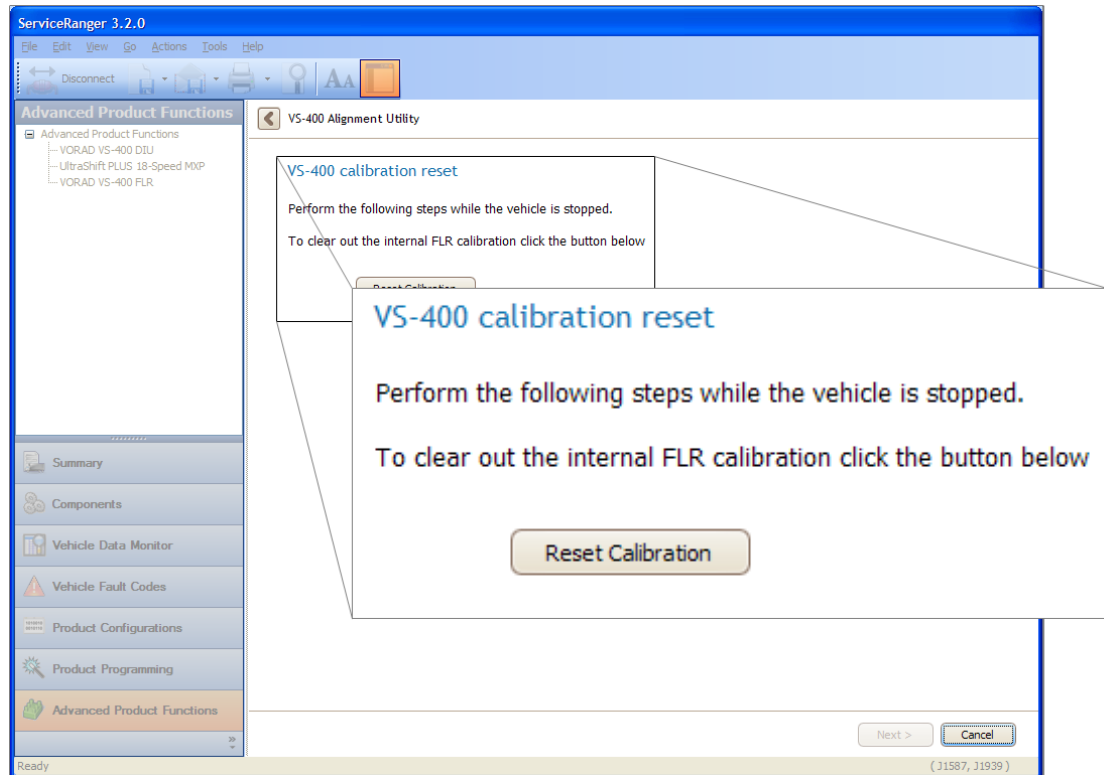
Note: Failure to loosen both locking screws will result in damage to the alignment bracket.

3. Adjust the alignment screws until the digital level reads down 0° +/- 0.2°.
4. Once aligned, tighten the locking screws.

Perform the Calibration Reset function

The reset function is performed with the engine idling and the vehicle stopped.

Select "**Reset Calibration**" to clear the previously stored alignment calibration values in the FLR. The Driver Interface Unit will tone indicating the calibration was successful.

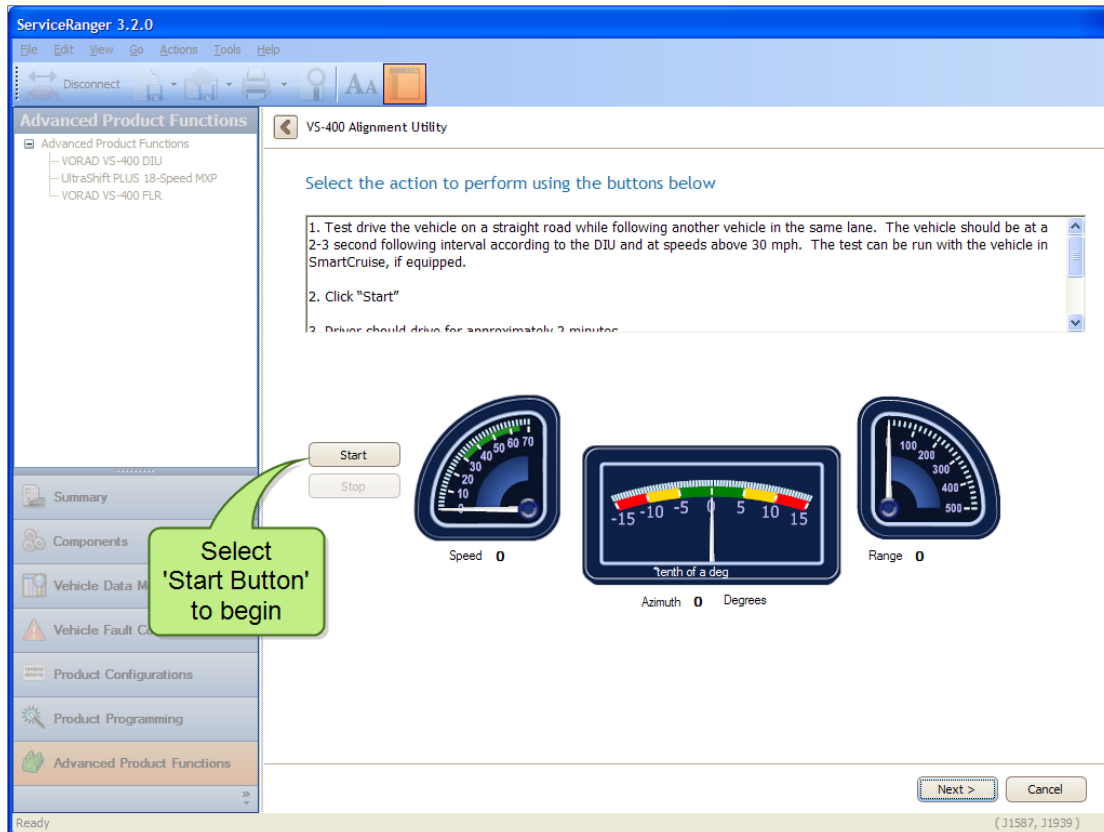


Note: Resetting the calibration values will also clear all previously stored fault codes.

FLR Azimuth Monitoring

Caution: This procedure requires two people to perform. The following steps in the calibration procedure require the vehicle to be in motion.

- The vehicle must be traveling on a straight road at a speed above 30 mph.
- Position the vehicle 200 - 300 feet behind a vehicle traveling in the same lane. If the VORAD system is SmartCruise equipped place the vehicle in SmartCruise and use the range display on the Driver Interface Unit to approximate a 2-3 second following distance behind the target vehicle.
- Select "**Start**" to begin monitoring the FLR azimuth value.
- Continue to drive the vehicle for 2-5 minutes while monitoring the azimuth.



Note: Avoid minor steering adjustments while tracking the vehicle ahead as this may cause a +/- 0.3° drift. Objects detected in adjacent lanes may also cause the reading to fluctuate and should not be interpreted as being out of the acceptable range. The reading should be steady when tracking the target vehicle ahead only.

FLR Alignment Pass/Fail Criteria

- If the azimuth value remained between -0.5 and 0.5 degrees (green range) the radar is properly aligned and needs no further adjustment, the test is complete.
- If the azimuth value remained between -0.5 and -0.9 degrees or +0.5 and +0.9 degrees (yellow range), the FLR will calibrate itself to find the true centerline of the vehicle. No further adjustment is necessary, the test is complete.
- If you prefer to re-check the horizontal alignment, proceed using the Fine-Tuning Horizontal Alignment procedure in the VORAD troubleshooting guide (VOTS-0100).
- If the FLR azimuth remained less than -1.0 or greater than 1.0 degree (red range) outside of the specification proceed to the Fine-Tuning Horizontal Alignment procedure in the VORAD Troubleshooting guide (VOTS-0100).

Printing

You can print information from ServiceRanger which allows you to have a record for future use. You can choose to print the information as it is displayed on the screen, or print a formatted report. You can also use Print Preview to see how a printed report will look and to adjust page orientation, scaling, and margins, etc.

Print Table

You can print information shown on the screen, such as fault codes. The printed output will look as it does in the table shown on your screen.

How to print a table

1. View a content area (i.e. fault code, components).
2. Do one of the following:
 - Press **CTRL+P**.
 - OR
 - Select **File | Print Table**.
3. In the Print dialog, complete the options and select **OK**.

Notes:

- You can only print one table at a time.

Print Report

You can print a report, which is formatted to fit on a standard letter sized paper. You can also select what information will be included in the report.

How to print a report

1. View a content area (i.e. fault code, components).
2. Do one of the following:
 - Press **CTRL+P**.
 - OR
 - Select **File | Print Report**.
3. In the report option dialog, choose the options to be included in the report.
4. In the Print dialog, complete the options and select **OK**.

Notes:

- You can only print one table at a time.

Print Report Preview

The Print Preview feature lets you see the report before you print it so you can avoid printing mistakes.

To preview how the contents of the report will be printed:

1. View a content area (i.e. fault code, components).
2. Do one of the following
 - Select **Print Report Preview** from the main toolbar.
 - OR
 - Select **File | Print Report Preview**.
3. In the report option dialog, choose the options to be included in the report.
4. The print preview dialog will be displayed.

Notes:

- The Print Preview window has a number of buttons and other controls enabling you to zoom the display, view different pages, etc.
- It also has a print button allowing you to send the output to the printer.

Export and Email Report

You can export, or save, information displayed in ServiceRanger. Currently, fault code and vehicle components can be exported to PDF or RTF file format. Also, there is an option to allow you to easily attach a report and send it by email.

How to export a report

1. View a content area (i.e. fault code, components).
2. Do one of the following:
 - Select **Export** from the main toolbar.
 - OR
 - Select **File | Export**.
3. In the report option dialog, choose the options to be included in the report.
4. In the save file dialog, select the location to save the report on your PC.

Notes:

- A default name is supplied based on date and time. You can change the file name.
- By default, the report is saved in the "c:\ServiceRangerData" folder.

How to export and email a report

1. View a content area (i.e. fault code, components).
2. Do one of the following:
 - Select **Export and Email** from the main toolbar.
 - OR
 - Select **File | Export and Email**.
3. In the report option dialog, choose the options to be included in the report.
4. In the save file dialog, select the location to save the report on your PC.
5. Your default email program will open and the report shall be attached.

Notes:

- A default name is supplied based on date and time. You can change the file name.
- By default, the report is saved in the "c:\ServiceRangerData" folder.

Settings

To set preferences on how ServiceRanger operates, you can change various settings to fit your needs.

To open the settings dialog

1. Select **Tools | Settings** on the menu bar.

The settings dialog has the following pages:

General

The general settings page allows you to choose various user preferences. The following options are available:

- Units - Changes the units being displayed for parameter.
- Font Size - Changes the default font size.
- Default Fault View - Selected the default display of fault codes.

Connection

The connection setting page allows you to choose what communication adapter you are using to connect to the vehicle.

To set which communication adapter is being used:

1. Select the driver in the drop down list that was provided with your adapter. If you do not see the driver for your adapter in this list, your driver may not be installed correctly. If you are unsure about how to install these drivers, or you do not know which driver to select, contact the manufacturer of your communications adapter for more information.
2. Select the PC connection method from the J1587 Device drop down list.
3. Select the PC connection method from the J1939 Device drop down list.
4. Once the connection settings have been made, click OK to save these setting and return to the main screen. ServiceRanger will remember the connection settings each time it is started.

Some vehicle communication adapter manufactures provide multiple device connection options for their adapters. Some examples are RS-232 communication ports, USB ports, Bluetooth wireless, or WiFi wireless options

Ask me to connect at startup:

When this box is checked, ServiceRanger prompts the user to "connect" at startup. By default, this box is checked.

User Levels

The user level page allows you to add/delete/edit user level permissions. User levels control what features and functions that are available to you. You should only change a user level when instructed by a Roadranger representative.

Check for Updates

You use the check for updates feature to download and install any available updates for ServiceRanger. In order to do this, the PC must be connected to the Internet.

To check for updates:

1. Select **Help | Check for Updates** from the menu bar .
2. A dialog box will be displayed while the system connects to the Internet and checks for updates.
3. If an update is found, select the update and click install.
4. The update is downloaded and the installation is started. Follow the screen prompts to finish the update.

Notes:

- The update service uses standard Internet protocols and ports to check for updates.
- Some firewall and IT services may block the website the update service needs to access to check for updates. Port 80 should be open and the following web site should be added to their white list: *.installshield.com

Contacting

Technical Support

Visit the Roadranger website at www.roadranger.com for more information about ServiceRanger, including updates, service bulletins, and other frequently asked questions.

If you need assistance you can call Roadranger Technical Assistance Call Center at 1-800-826-HELP (4357). The following information may be required to help resolve any issues you may be having, so have this information readily available before calling:

- The ServiceRanger software version numbers found in the Help\About ServiceRanger screen.
- Your Computer's Operating System.
- Your Vehicle Communications Adapter make, model, and RP1210 driver version.
- Provide the exact wording of any error or warning message you may have received from the program.
- Give the sequence of steps you took before any errors occurred.
- Describe any changes made to your computer recently, including new software or peripherals, and if the ServiceRanger program was running correctly in the past.

About ServiceRanger

Eaton Corporation

Eaton Corporation is a diversified power management company with 2009 sales of \$11.9 billion. Eaton is a global technology leader in electrical components and systems for power quality, distribution and control; hydraulics components, systems and services for industrial and mobile equipment; aerospace fuel, hydraulics and pneumatic systems for commercial and military use; and truck and automotive drivetrain and powertrain systems for performance, fuel economy and safety. Eaton has approximately 70,000 employees and sells products to customers in more than 150 countries.

Because of the pivotal role we play, Eaton is committed to creating and maintaining powerful customer relationships built on a foundation of excellence. From the products we manufacture to our dedicated customer service and support, we know what's important to you.

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