

Forensic Link Adapter Users Manual

Synercon Technologies LLC

For Software Version 1.2

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Disclaimer

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About this Document

This manual is intended to teach the operator the features and use of the Forensic Link Adapter (FLA). This manual is designed as a teaching tool, rather than a reference guide. There are many acronyms and terminology used throughout this document; the reader is advised to familiarize themselves with the Terminology section before reading. It is suggested that operators examine this document entirely before using the FLA to help ensure that the most data, and the most accurate data are retrieved.

Part I

Introduction to Synercon Products

1

Synercon Products

There are four main Synercon Technologies products. They will be referred to in the rest of this manual, so readers are advised to familiarize themselves with these components to better understand the rest of this manual.

The 4 Synercon products are

- The Forensic Link Adapter (FLA)
- The FLA Preview
- The FLA Portal
- The Smart Sensor Simulator (SSS)

All of these products work together to create an easy, secure system to extract data from heavy vehicles. or an RP1210 interface to allow the operator to use OEM software.



1.1 The Forensic Link Adapter (FLA)

The FLA is the device used to extract data from Engine Control Modules (ECMs). The FLA is designed to extract data from ECMs in a forensically secure way. The FLA uses the SAE J1939 and SAE J1587 standard protocols to communicate with ECMs. The FLA can extract data from ECMs by itself for select ECMs, meaning there is no need to carry a computer with OEM software to obtain data. For ECMs that the FLA cannot directly support, the FLA can be an RP1210-compliant diagnostic connector. This allows the operator to use OEM software to collect data through the FLA.

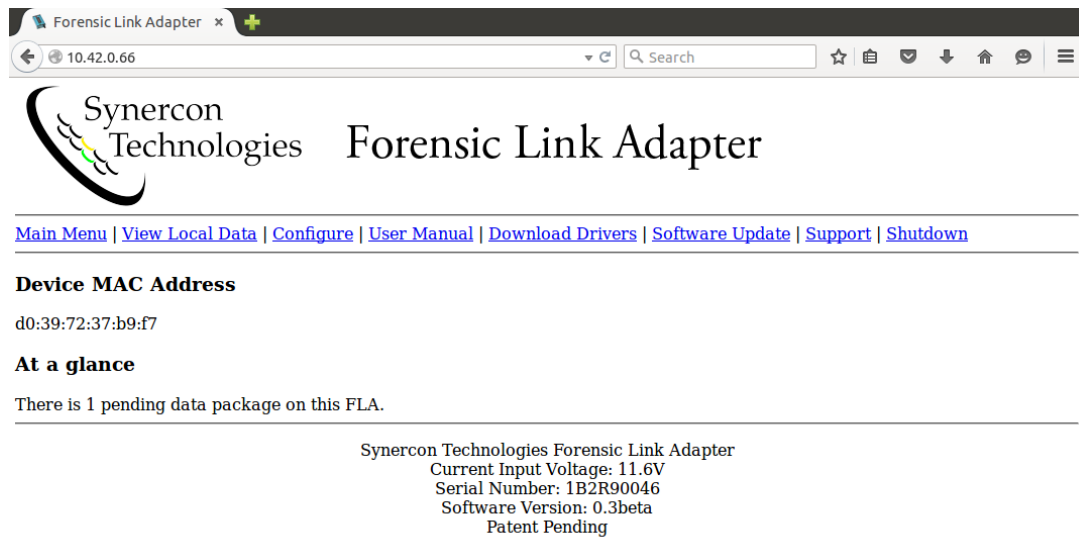


FLA Features

- Forensically secure data collection
- Stand alone data collection for select ECMs
- Easy to read OLED screen
- Simple and durable two button interface
- Built in GPS antenna

1.2 The FLA Preview

The FLA Preview provides an expanded interface to the FLA while out in the field. The FLA Preview is used to preview reports while in the field to confirm the operator has the data they wish to obtain. The FLA Preview is a website hosted by each FLA. It is accessed by entering the IP address of the FLA into a web browser. The FLA Preview can be accessed without an Internet connection, though the computer on which the FLA Preview site is accessed must be on the same Local Area Network as the FLA.

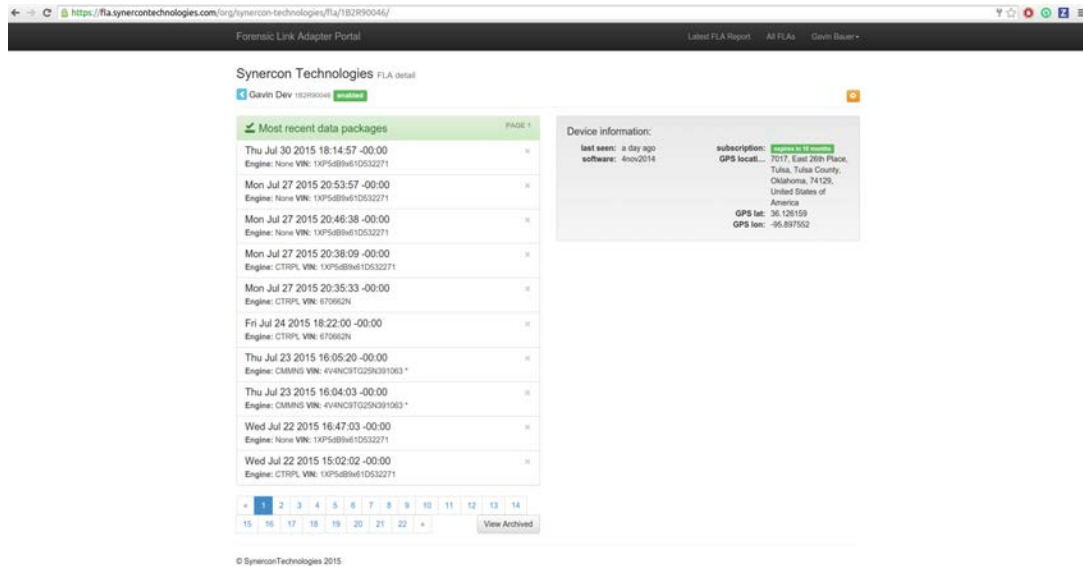


FLA Preview Features

- Ability to preview data in field
- Ability to download event data from select ECMs
- Ability to view old data that has been uploaded

1.3 The FLA Portal

The FLA Portal is also referred to as Synercon's Servers. It is located at the URL <https://fla.synercontechnologies.com>. Data collected from the FLA is uploaded to this site, and operators are able to view full reports there.



FLA Portal Features

- View full reports with all available event data
- View the FLAs last known location
- Check subscription status

1.4 The Smart Sensor Simulator (SSS)

The SSS simulates sensors of a typical vehicle for ECMs. It is used when the FLA cannot communicate with the vehicle due to damaged wiring. The SSS reduces the chance the ECM will throw a fault compared to a standard calibration harness. SSSs are specific to a type of ECM.



SSS Features

- Reduces chances of throwing new faults during download
- Provides reliable communications to ECMs
- Can be brought to the field to eliminate the need to remove ECMs from vehicles.

2

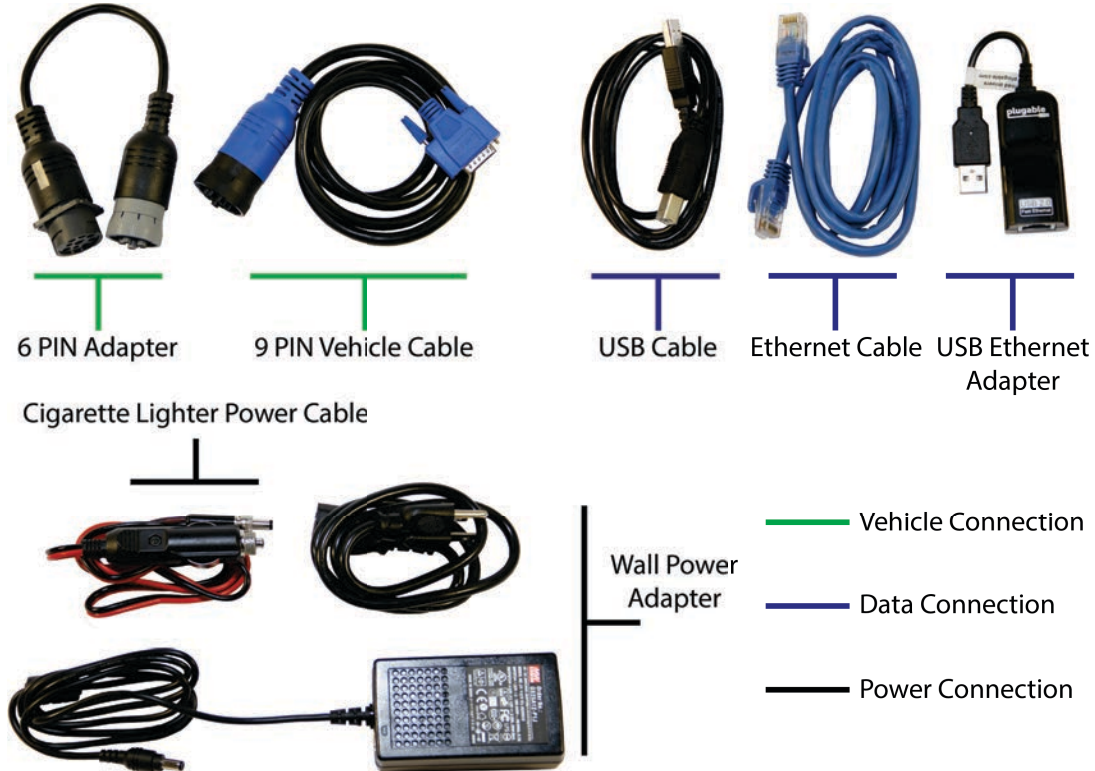
Getting Started

Congratulations on purchasing the only heavy vehicle scan tool purpose-built for examining vehicles in a forensic or investigative context. This section provides a guide to getting the FLA System set up for the first time.

2.1 What is Included with the FLA

2.1.1 The Contents of the FLA Case

The FLA Case has everything operators need to collect data from heavy vehicles. The FLA case has the following items:



2.1.2 The FLA Portal and FLA Preview

The subscription to the TruckCrypt software allows operators to access the FLA Portal and FLA Preview. These will be discussed in more detail in sections 5 and 6.

2.2 Register as an Operator

The fla-admin should send you an email to invite you to be an operator for your FLA on the FLA Portal. The fla-admin email is initiated by the Organization administrator inviting a new operator. For more details, please see Chapter 11. It will be necessary to have a FLA Portal account to view any data you collect with your FLA.

2.3 Operating the FLA

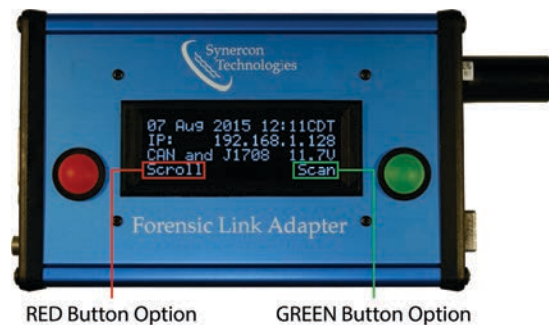
The FLA has a 4x20 character LCD screen, along with two buttons to allow the user to interact with the device.

2.3.1 Interacting with the FLA

There are two general types of screens the FLA will display.

Prompt Screens

The prompt screens will have one or two options on the last line, corresponding to the button on that side of the FLA.



Working Screens

The working screens will not have an option on the last line, but usually a percentage bar. During these screens, the FLA is performing the operation displayed. **NOTE, during these screens the RED button can cancel the current task.**



2.4 Familiarize yourself with the FLA

After the operator has performed these steps, the FLA is ready for field use. To maximize the validity and completeness of data collected, the operator is advised to continue reading this manual. After the user is familiar with this, the best way to get comfortable with using the FLA is to practice. This manual, and the other supporting documents will help guide operators through the data collection and review process.

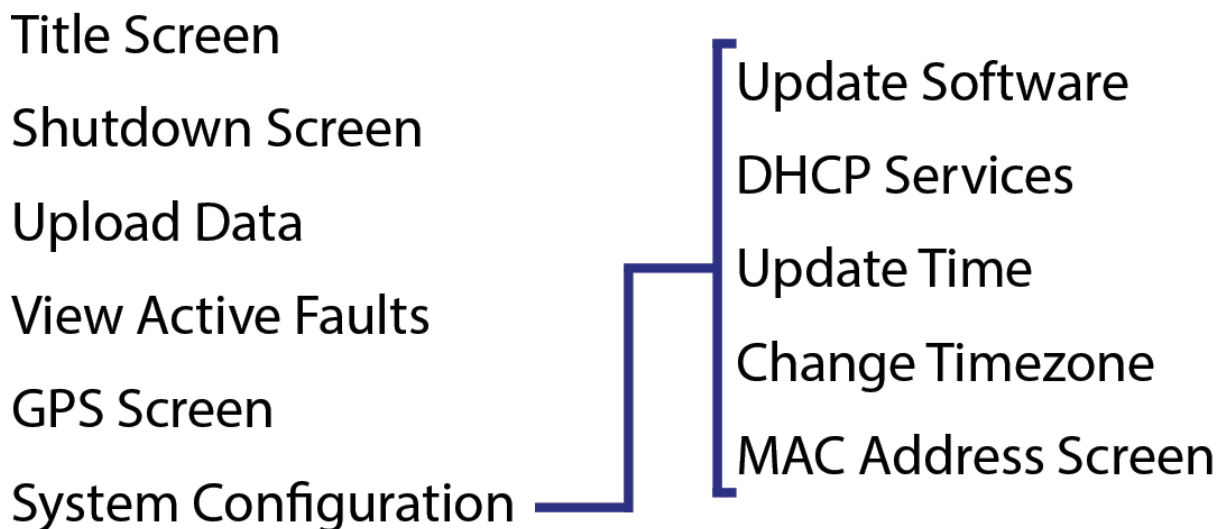
3

Using the FLA

The FLA is a powerful data extraction device, with many features. This section will teach the reader about the FLA, how to use it, and the features of the FLA.

3.1 Display Screen Menu System

Almost all of the features of the FLA can be accessed through the main menu. The only two functions that are not available are the FLA Support Mode, and previewing data, which are solely available on the FLA Preview. Once the FLA boots, the device will enter the main menu, which contains the most used functions, such as running a scan, and uploading data. The below figure describes the layout of the FLA menu system.



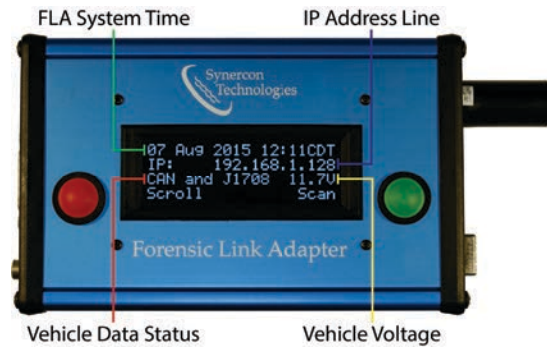
3.2 Menu Screen Descriptions

The menu system of the FLA is dynamic: it will only give the operator the option to perform an action if the FLA detects the action is possible. For example, the FLA will not allow the operator to initiate a vehicle scan if the FLA does not detect any network traffic.

3.2.1 Main Menu

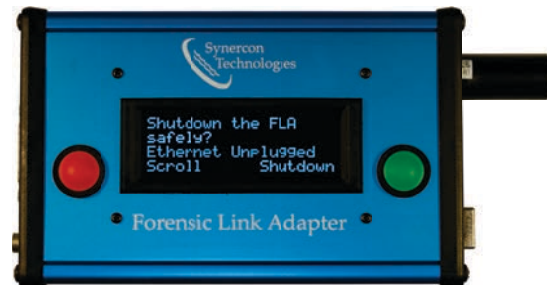
Title Screen

This is the first screen the FLA will display when it finishes booting. This screen provides the user with an overview of the FLA's state.



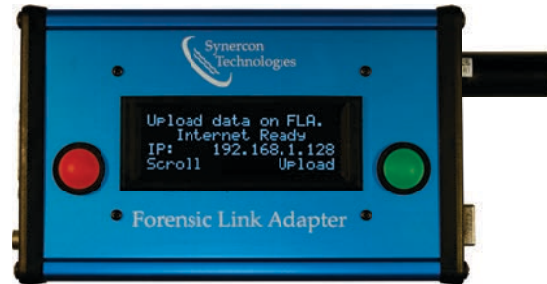
Shutdown Screen

This screen will allow the user to safely shutdown the FLA.



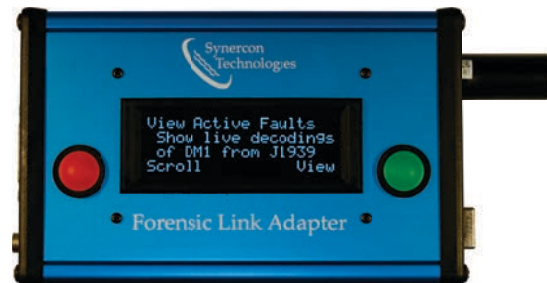
Upload Data Screen

This screen allows the operator to upload data on the FLA to the FLA Portal. If the Upload option is not available, see the troubleshooting section.



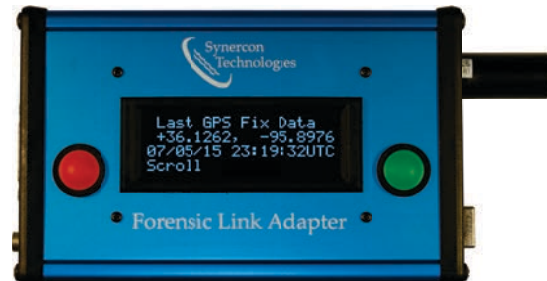
View Faults Screen

This screen allows the operator to view active faults on the J1939 network.



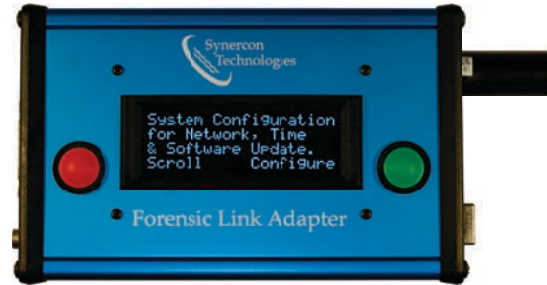
GPS Screen

This screen displays the last available GPS coordinates, and the FLA system time when they were received.



System Configuration

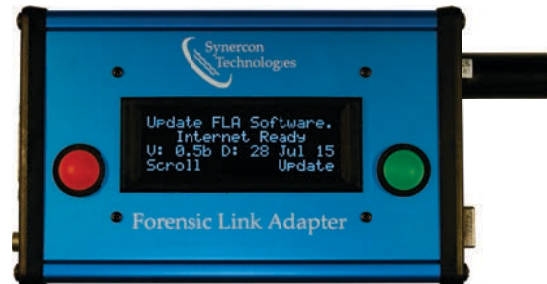
This screen allows the user to enter the system configuration menu of the FLA.



3.2.2 System Configuration Menu

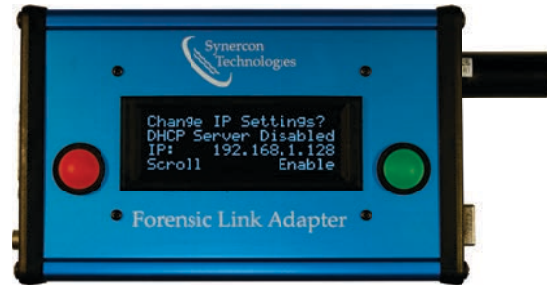
Update Software Screen

This screen allows the operator to update the FLA software to the latest version. If the update option is not available, see the troubleshooting section.



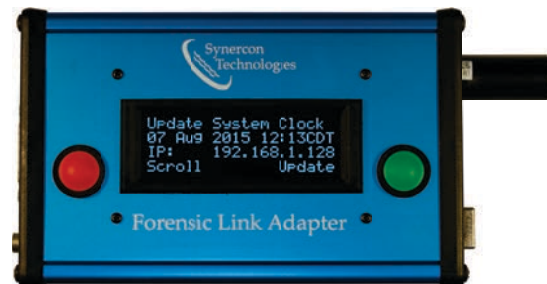
DHCP Service Configuration Screen

This screen allows the operator to enable or disable the DHCP services for the FLA.



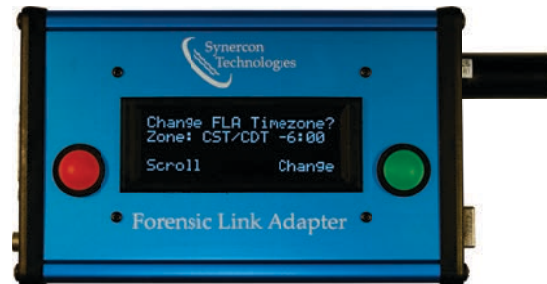
Update FLA System Time Screen

This screen allows the operator to update the FLA System time. If the Update option is not available, see the troubleshooting section.



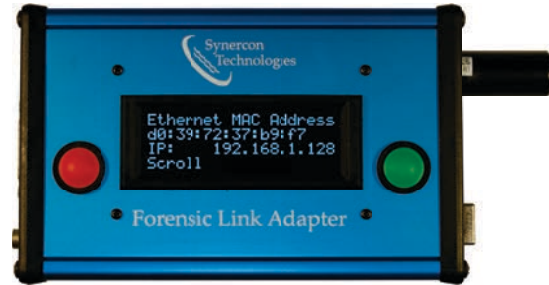
Change FLA Timezone Screen

This screen allows the operator to change the FLA system timezone.



MAC Address Screen

This screen displays the MAC Address of the FLA, as well as the IP Address.



3.2.3 Menu Screen Dynamic Lines

Certain lines of menu screens are dynamic, and display the status of various components of the FLA.

IP Address Line

The IP address Line can have the following states:

- **IP: XXX.XXX.XXX.XXX** A valid IP address. XXX can be any number between 0 and 255. An example would be 192.168.2.45
- **IP: 10.0.0.1** The IP address when the FLA's DHCP server is activated. See the DHCP section for more information.
- **Ethernet Unplugged** The FLA cannot detect a live Internet connection. If this screen persists for more than 60 seconds on a known good Ethernet port, refer to the troubleshooting section.
- **Finding IP Address** The FLA detected a live Internet connection, and is searching for an IP address. If this screen persists for more than 60 seconds on a known good Ethernet port, refer to the troubleshooting section.

Vehicle Connection Line

The vehicle connection line displays the status of the vehicle busses. This line can have the following states:

- **No Vehicle Net / Check Ign. Key** The FLA is not able to detect any traffic on the vehicle networks. If this screen persists for more than 10 seconds, refer to the troubleshooting section.
- **CAN Bus only** The FLA only detects traffic on the CAN bus.
- **J1708/1587 only** The FLA only detects traffic on the J1708/1587 bus.
- **CAN and J1708** The FLA detects traffic on both the CAN and J1708 buses.

3.3 Working with the Forensic Link Adapter

This section will explain the basics of using the FLA. This section is intended for users with little experience operating the FLA.

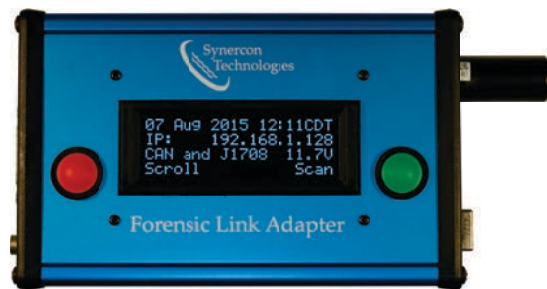
3.3.1 Powering Up

The FLA will begin to boot whenever power is supplied to the device. This can be done in one of three ways:

1. Using the vehicle connection cable to power the FLA using the battery of the vehicle
2. Using the wall adapter to power the FLA using a wall outlet
3. Using the 12v cigarette adapter to power the FLA, either from a vehicle battery or a portable battery pack

The FLA can accept power from both the wall adapter or 12v cigarette adapter and the vehicle connection cable at the same time. This is useful if an operator needs to perform several downloads in the same area.

Once the FLA is finished booting, the device will display the title screen.



When this screen appears, the device is ready to operate. If the device does not reach this screen in 60 seconds, see the troubleshooting section of this manual.

Once an investigator has established permission to download the data from a vehicle, the key needs to be turned to the on (not start) position for the FLA to communicate with the Electronic Control Modules (ECMs).

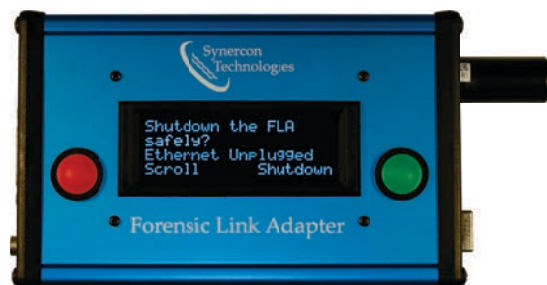
The FLA can be plugged into the 9-pin diagnostic connector, which is usually located below the dash on the left side or to the left of the driver's seat. If the ECM was removed, then it should be connected through a Smart Sensor Simulator that emulates a truck.

3.3.2 Shutting Down

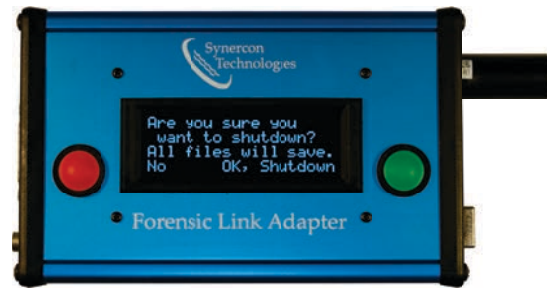
Failure to shut down the FLA correctly can cause loss of data. To shutdown the FLA properly, follow these steps:

1

Scroll to the Shutdown screen, and select "Shutdown."



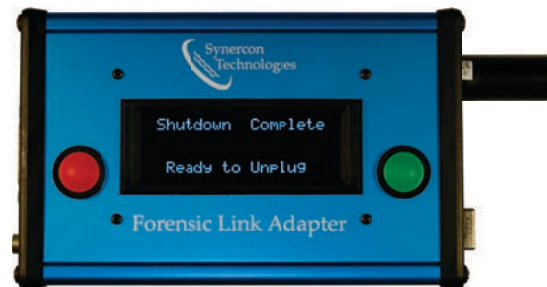
2
Confirm the shutdown.



3
Wait until the FLA indicates it is safe to remove power.



4
When the FLA displays this screen, it is safe to remove power.



3.3.3 Connect the FLA to the Internet

Connecting the FLA to the Internet allows the device to get updates, set the system time, and upload data to the FLA Portal. To connect the FLA to the Internet, follow these steps:

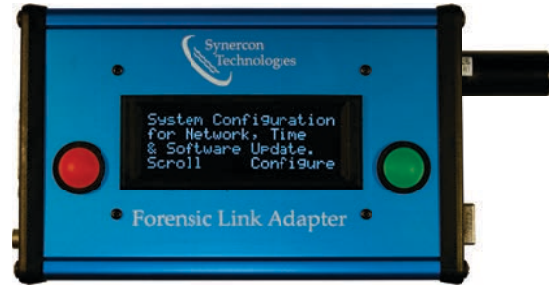
1. Plug the FLA into a functional Ethernet port using the included Ethernet cable.
2. The FLA should display an IP address on the second line of the title screen, the screen that is displayed right after the FLA finishes booting.
3. If the FLA displays "Ethernet Unplugged" or "Finding IP Address" for more than 60 seconds, consult the troubleshooting section.

3.3.4 Setting the Time

Once connected to the Internet, the Forensic Link Adapter can synchronize with universal time using a dedicated time server. This step is only necessary if the time displayed on the title screen is not the correct time. To correct the FLA time, follow these steps:

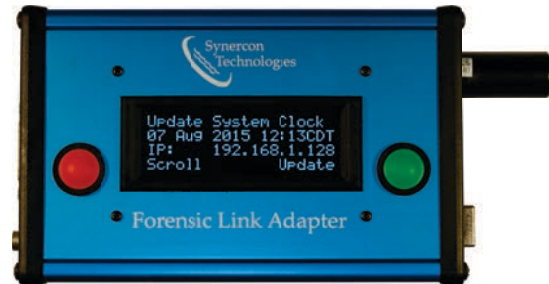
1

Scroll to the System Configuration screen on the FLA, and select “Configure.”



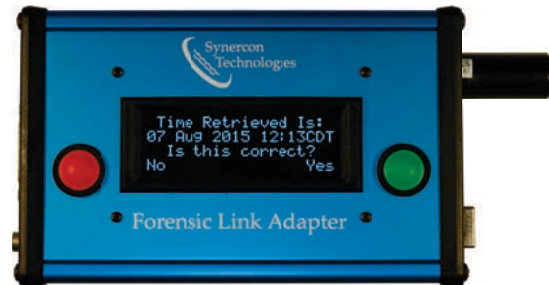
2

Scroll to the Update System Clock screen, and select “Update.”



3

Once the FLA retrieves the current time, it will confirm the new time with the operator before setting the time. The FLA will continue to update this time, so the user does not need to immediately confirm the time.

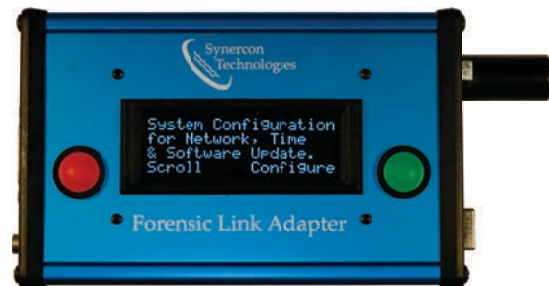


3.3.5 Setting the Timezone

The timezone for the FLA can be set without an Internet connection. To set the system timezone, follow these steps:

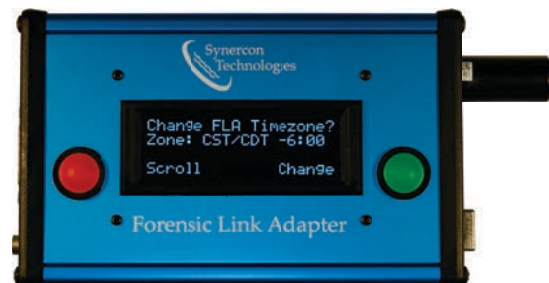
1

Scroll to the System Configuration screen on the FLA, and select “Configure.”



2

Scroll to the Change FLA Timezone screen, and select “Change.”



3

Select "Next" to view the next timezone, and select "Set" to set the timezone

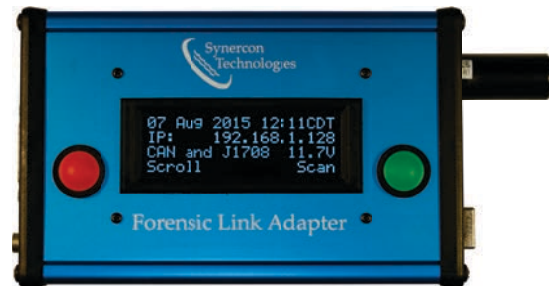


3.3.6 Updating the FLA

Updating the FLA provides the latest software, with the most features and highest chance of getting the most data. It is good practice to perform an update before downloading a vehicle, or before going out in the field to download. To perform an update, follow these steps:

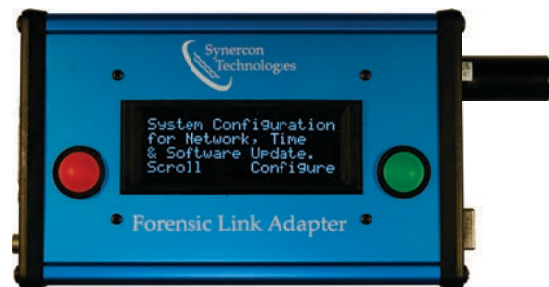
1

Ensure the FLA is plugged into an Ethernet jack, and has an IP address.



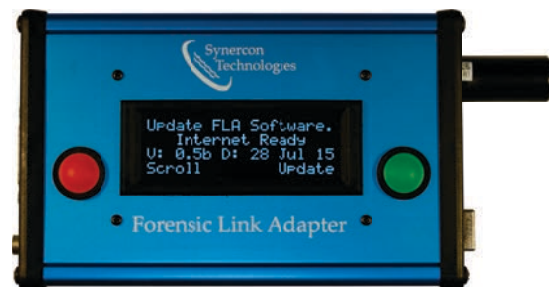
2

Scroll to the System Configuration screen, select "Configure."



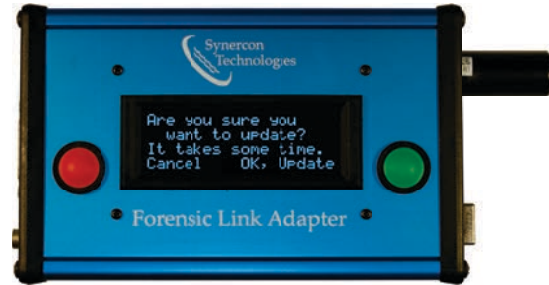
3

The FLA will now display the Update FLA Software screen. If the FLA does not have the Update option, consult the troubleshooting section. Select "Update."



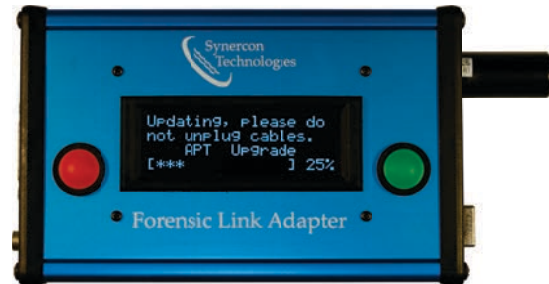
4

Confirm the update.



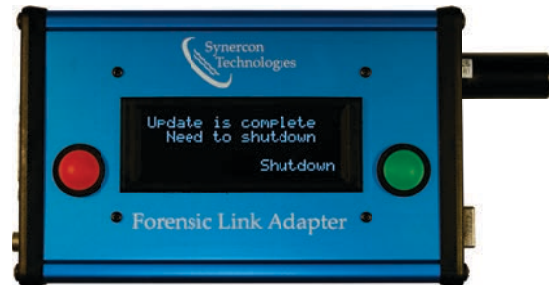
5

Wait for the FLA to perform the update. This can take several minutes.



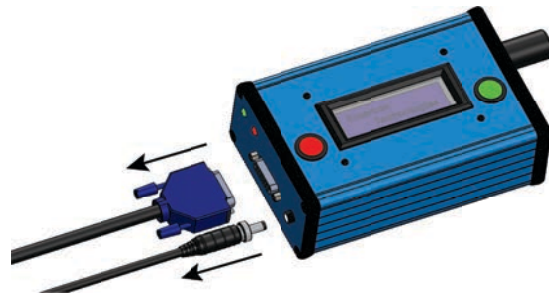
5

When the FLA is finished updating, it will need to shutdown and be rebooted for the updates to be applied. Select "Shutdown."



5

After the FLA has completed the shutdown, unplug all sources of power. If the operator wishes to continue interacting with the device, wait 10 seconds before plugging in power.

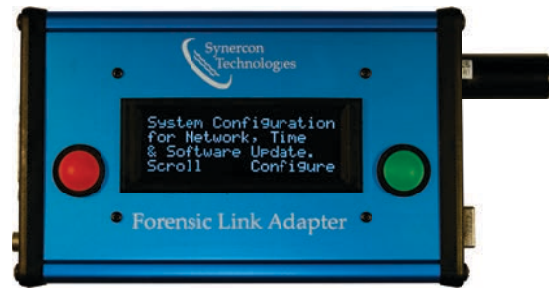


3.3.7 Turning DHCP ON

Enabling DHCP allows the FLA to communicate with computers when an Internet connection is not present. One example usage is to preview data in the field. Do not enable DHCP services while the FLA is plugged into an active network, as this may create issues with the network.

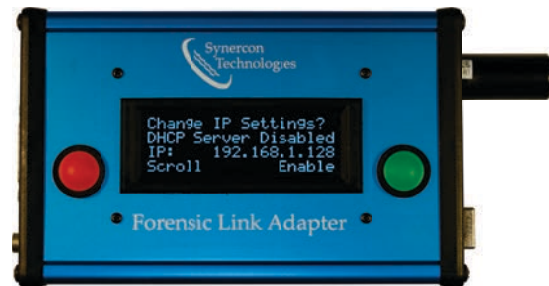
1

Scroll to the system configuration screen.



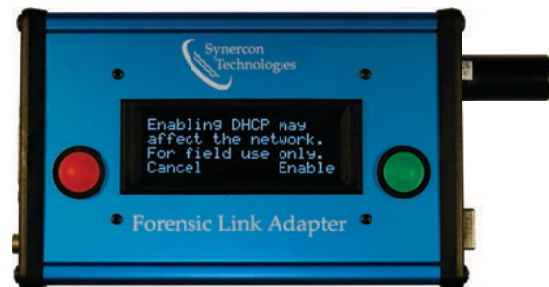
2

Scroll to the Change IP Settings screen, and select "Enable."



3

Confirm the request.



3.3.8 Turning DHCP OFF

Disabling DHCP allows the FLA to communicate with an active network. DHCP is disabled when the FLA boots.

1

Scroll to the system configuration screen.



2

Scroll to the Change IP Settings screen, and select "Disable."



4

Setting Up the FLA

4.1 In the Office Use

When the FLA is in use at the office, ensure that the DHCP server is off. If left on, this can cause problems with the network the FLA is connected to.



When the FLA is being used with a foreign network, such as any network that is not your home or work network, extra caution must be taken. The local site can be accessed by anyone on the same network. It is not recommended to plug the FLA into an unknown network.

4.2 At Home Use

When the FLA is in use at a home, or another non-commercial site with an Internet connection, the DHCP server should be turned off. If left on, it can cause problems with the network the FLA is connected to.



4.3 In Field Use

When the FLA is being used in the field, the DHCP service may be turned on. This service allows the user to connect a computer directly to the FLA using the provided Ethernet connection. For more information on enabling DHCP services, refer to section 3.3.7.



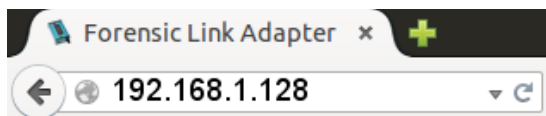
5

The FLA Preview

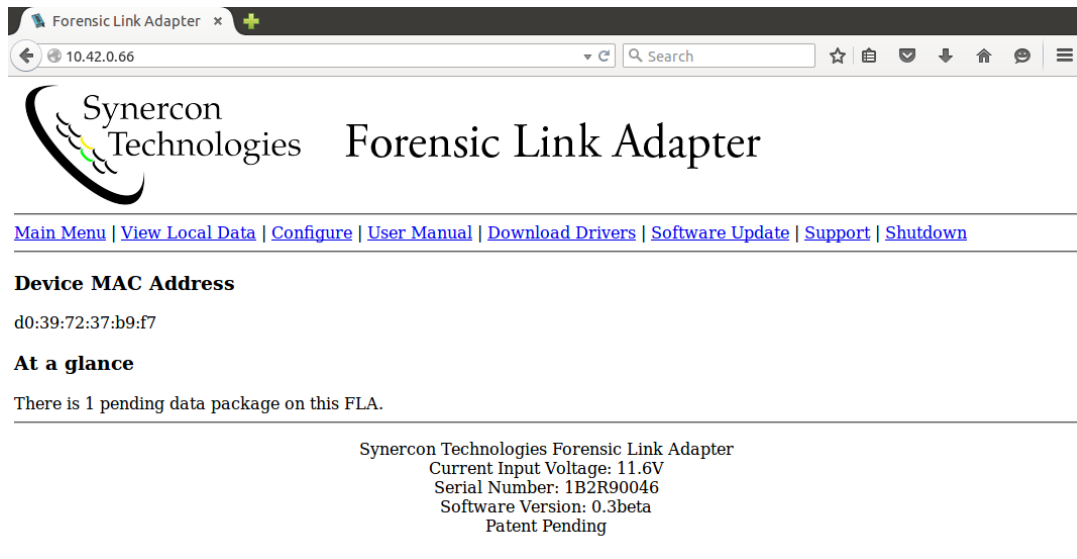
The FLA Preview is a website that each FLA hosts. This allows operators to interact with the FLA in ways the front panel is not able to support, such as previewing reports.

5.1 Accessing the FLA Preview

Accessing the FLA Preview is done by entering the IP address of the FLA into a web browser. Please see the requirements section for more information about supported web browsers. As shown below, enter the IP Address exactly as it appears on the IP Address line.



This will load the FLA Preview main page, shown below.



This page provides an overview of the current status of the device. The “At a glance section” will display the number of pending data packages, that is the number of data packages that have been downloaded to the FLA but not yet uploaded to the FLA Portal, and if there is a download in progress.

5.2 Using the FLA Preview

The FLA Preview has many uses, including allowing operators to preview data in the field, download the User Manuals, download RP1210 drivers, and many other useful tasks we will cover in this section.

5.2.1 View Local Data

Under the View Local Data page, the operator is able to view data on the FLA. There are two sections to local data, Pending Uploads, and Archived Data. Pending Uploads will show any data packages that are ready to be uploaded to the FLA Portal.

Synercon Technologies Forensic Link Adapter

Main Menu | View Local Data | Configure | User Manual | Download Drivers | Software Update | Support | Shutdown

Pending Uploads

Data packages that have not yet been uploaded to the server.

FLA	Vehicle Information			Standards-Based totals						
	Time downloaded	Make	Model	VIN	J1587 Messages	J1587 Faults	J1939 Messages	J1939 Faults	Freeze Frames	OEM data
	2015-07-28 14:34:06		In Progress							
View Data	2015-07-28 14:19:57	CTRPL	C-15	1XP5dB9x61D532271	34	2	14	2	0	No
View Data	2015-07-27 15:53:57	CTRPL	C-15	1XP5dB9x61D532271	33	2	12	2	0	Yes

[View Archived Files](#)

Synercon Technologies Forensic Link Adapter
 Current Input Voltage: 11.6V
 Serial Number: 1B2R90046
 Software Version: 0.3beta
 Patent Pending

This page will give an overview of each pending data package. The value in the OEM data column will be YES if the FLA was able to recover OEM data for that download, and NO if the FLA could not. The yellow Archive button will remove the data package from being uploaded, and move it to the archived section. If an archive is unintentionally archived, the FLA will have to be serviced to retrieve the data. For more information about servicing the FLA, see the Service section.

When a download is in progress, the row for that entry will indicate the download is in progress, and will not provide the “View Data” button. Once the user finishes the download, the operator can refresh the page, and will see the “View Data” button. For more information about when a download is finished, and how to perform a download, refer to the Field Guide.

Selecting the “View Data” will provide the user with a preview of the report. This preview includes all of the standards-based information, the components found, and any identification information, as well as any in-field non-standards-based previews. Non-standards-based information is any data that is provided by OEM software, such as DDEC reports’ XTR files, and CAT Snapshots. The operator will get a preview of this data here in accordance with the type of ECM being analyzed. The full reports will be available through the FLA Portal when the operator uploads the data. Typically, the following will be available:

Preview of DDEC ECMs

If non-standards-based data is collected from a DDEC ECM, an XTR file will be available for download.

Synercon Technologies Forensic Link Adapter

Main Menu | View Local Data | Configure | User Manual | Download Drivers | Software Update | Support | Shutdown

Pending Uploads

Data packages that have not yet been uploaded to the server.

FLA	Vehicle Information			Standards-Based totals						
	Time downloaded	Make	Model	VIN	J1587 Messages	J1587 Faults	J1939 Messages	J1939 Faults	Freeze Frames	OEM data
	2015-07-28 14:34:06		In Progress							
View Data	2015-07-28 14:19:57	CTRPL	C-15	1XP5dB9x61D532271	34	2	14	2	0	No
View Data	2015-07-27 15:53:57	CTRPL	C-15	1XP5dB9x61D532271	33	2	12	2	0	Yes

[View Archived Files](#)

Synercon Technologies Forensic Link Adapter
 Current Input Voltage: 11.6V
 Serial Number: 1B2R90046
 Software Version: 0.3beta
 Patent Pending

Preview of CAT ECMs

If non-standards-based data is collected from a CAT ECM, a CSV file will be available containing 5 frames around the trigger for any quick stop records.

[Download Diagnostic_1.csv](#)

[Download Diagnostic_2.csv](#)

[Download Quick_Stop_1.csv](#)

The preview will also contain a SHA 256 Sums file for the operator to download. This file contains the SHA 256 sums of all data files the FLA has created. The operator can download this file, and confirm the data uploaded to the FLA Portal was the same data the FLA created. For more information on SHA 256 sums, as well as recommended use, see the SHA 256 sums of suggested practices.

The operator can also click on the “Archived Data” button on the View Local Data page to view data packages that were archived. Data packages that are uploaded to the FLA Portal are automatically archived. From here the user can access all of the same downloads and information as when the data package was pending uploading. Meaning, once the data is uploaded, the user can still download XTR, CSV, or SHA 256 Sum files, as well as any standards-based data acquired. If the FLA has a large number of archived data packages, the archived page may take several moments to load.

The screenshot shows the Synercon Technologies Forensic Link Adapter web interface. The browser address bar shows the URL 10.42.0.66/index.php?pageview_data_main. The page title is "Synercon Technologies Forensic Link Adapter". The navigation menu includes: [Main Menu](#) | [View Local Data](#) | [Configure](#) | [User Manual](#) | [Download Drivers](#) | [Software Update](#) | [Support](#) | [Shutdown](#).

Pending Uploads

Data packages that have not yet been uploaded to the server.

	FLA		Vehicle Information			Standards-Based totals					
	Time downloaded	Make Model	VIN	J1587 Messages	J1587 Faults	J1939 Messages	J1939 Faults	Freeze Frames	OEM data		
View Data	2015-07-28 14:34:06	In Progress									
View Data	2015-07-28 14:19:57	CTRPL C-15	1XP5dB9x61D532271	34	2	14	2	0	No	Archive	
View Data	2015-07-27 15:53:57	CTRPL C-15	1XP5dB9x61D532271	33	2	12	2	0	Yes	Archive	

Archived Data

Data packages that have been uploaded to the server.

[View Archived Files](#)

Synercon Technologies Forensic Link Adapter
Current Input Voltage: 11.6V
Serial Number: 1B2R90046
Software Version: 0.3beta
Patent Pending

6

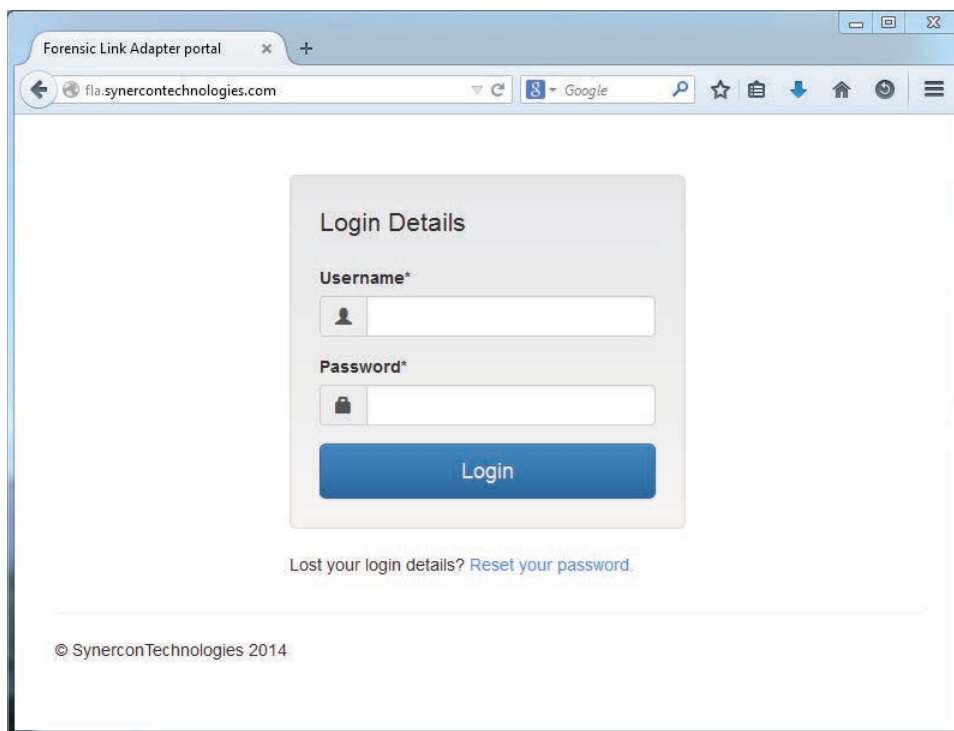
Using the FLA Portal

The FLA Portal is where operators can view full reports of the data they collected in the field. Administrators will also use the FLA Portal to manage FLAs, and users.

6.1 Accessing the FLA Portal

The FLA Portal is accessed by navigating to <https://fla.synercontechnologies.com/> in a supported web browser. For a list of supported web browsers, refer to section 15.

The FLA Portal will require the operator to login, using the username and password used when the operator created the account. Note that BOTH username and password are case-sensitive.

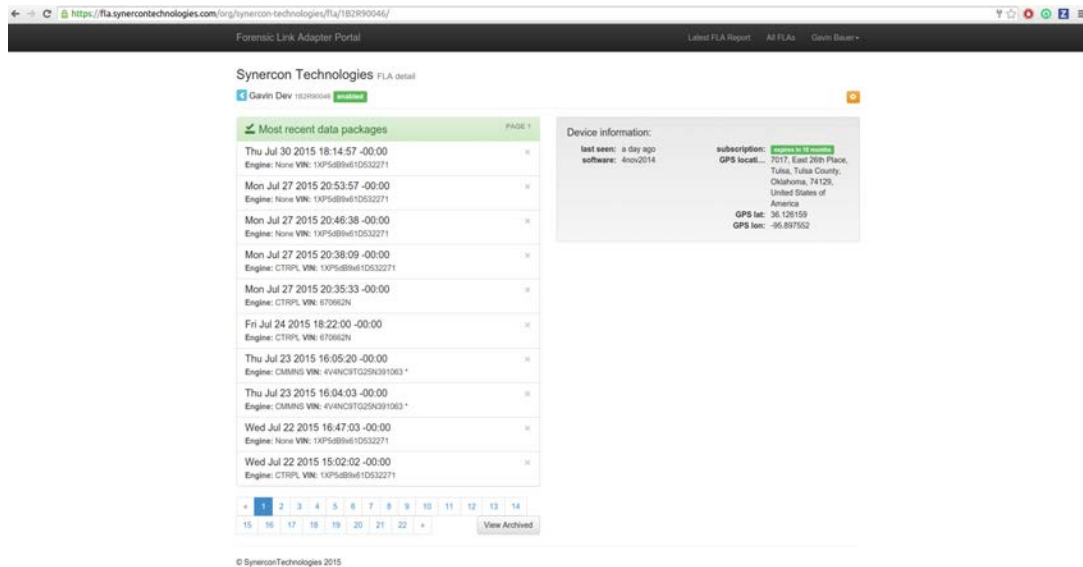


Once logged in, the operator will be able to view data acquired from the assigned FLA.

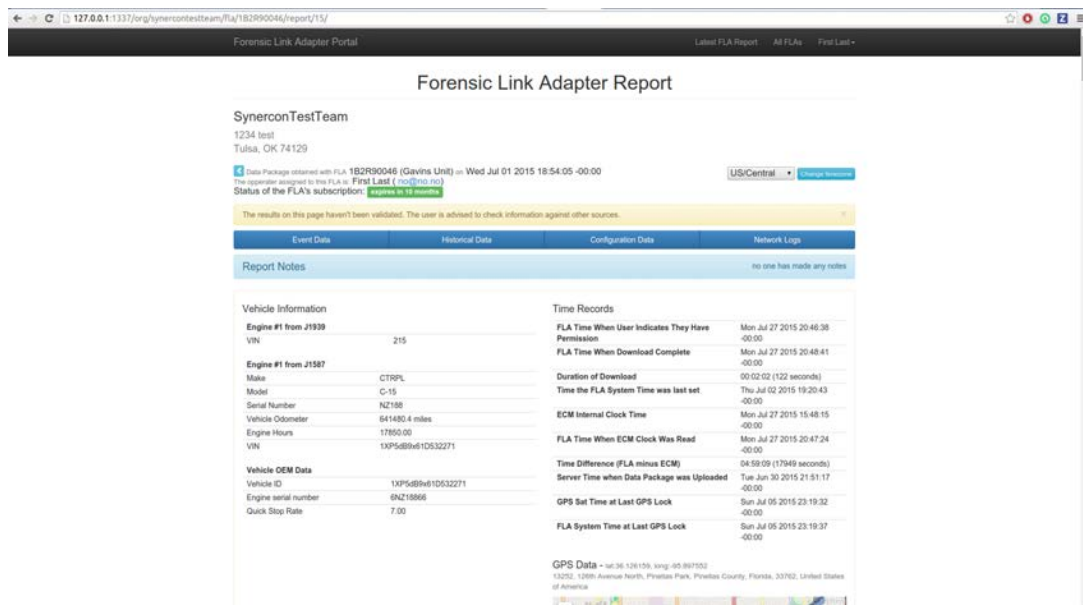
6.2 Using the FLA Portal

For operators, the main use of the FLA Portal is to view full reports. Administrators should refer to the Administrative Guide for further information about administrating on the FLA Portal.

Once an operator uploaded a data package to the FLA Portal, the data will be available for viewing by everyone in the group. A logged-in operator will be able to view all data packages uploaded to the server.



Selecting one of these reports will open the full report.



The FLA full report has many sections, including those listed in the next sections.

6.2.1 Vehicle Information

This section contains any components that responded to a component Identification request. The VIN, Vehicle Odometer, and Engine Hours will also be displayed under Engine #1 for the appropriate network. This section also contains the time records from the download, including vehicle time if available, and time of the last GPS Lock.

Vehicle Information		Time Records	
Engine #1 from J1939		FLA Time When User Indicates They Have Permission	Mon Jul 27 2015 20:46:38 -00:00
VIN	215	FLA Time When Download Complete	Mon Jul 27 2015 20:48:41 -00:00
Engine #1 from J1587		Duration of Download	00:02:02 (122 seconds)
Make	CTRPL	Time the FLA System Time was last set	Thu Jul 02 2015 19:20:43 -00:00
Model	C-15	ECM Internal Clock Time	Mon Jul 27 2015 15:48:15 -00:00
Serial Number	NZ188	FLA Time When ECM Clock Was Read	Mon Jul 27 2015 20:47:24 -00:00
Vehicle Odometer	641480.4 miles	Time Difference (FLA minus ECM)	04:59:09 (17949 seconds)
Engine Hours	17850.00	Server Time when Data Package was Uploaded	Tue Jun 30 2015 21:51:17 -00:00
VIN	1XP5dB9x61D532271	GPS Sat Time at Last GPS Lock	Sun Jul 05 2015 23:19:32 -00:00
Vehicle OEM Data		FLA System Time at Last GPS Lock	Sun Jul 05 2015 23:19:37 -00:00
Vehicle ID	1XP5dB9x61D532271		
Engine serial number	6NZ18866		
Quick Stop Rate	7.00		

6.2.2 Data sections

Data sections, such as Historical Data, Event Data, etc., are sections that contain either standards-based data, or non-standards-based data. These sections contain all of the data the FLA has decoded. Due to the wide variety of ECMs, and ECM configurations, these sections may contain different data depending on the ECM being analyzed.

6.2.3 Nomenclature

This section contains a brief overview of the nomenclature used in the report.

6.2.4 Network Logs

This section contains the logs of all of the FLA's interactions with the ECMs. These logs are provided as a means to audit the messages being sent. If the RP1210 passthrough is engaged, separate logs for any passthrough transactions will be available.

Network Logs	
Network logs are the raw data that existed on the vehicle network during the time of the inspection. The Timestamp refers to the first occurrence of the message. Any duplicate message is recorded by incrementing the count column. Network data is in hex.	
J1939 Network Log Mon Jul 27 2015 20:46:38 -00:00 duration: 00:00:27 (27 seconds)	View Network Log Download Network Log as CSV
J1587 Network Log Mon Jul 27 2015 20:46:38 -00:00 duration: 00:00:45 (45 seconds)	View Network Log Download Network Log as CSV

6.2.5 Version Information

This section provides the software versions that were used when the report was generated.

Version Information	
FLA System	3.58cross
FLA Upstart	0.92-1
FLA Network Driver	0.91-1
FLA Software	b83246c
FLA Passthrough	0.7-1
FLA Local Website	70531af
FLA Portal Revision	0.5.beta

6.2.6 SHA 256 Sums

This section provides the SHA 256 sums for all of the data files the FLA generated when the download was performed. These sums are encrypted and sent to the FLA Portal for verification. The FLA Portal will generate its own SHA 256 sums of the data files uploaded by the FLA. The FLA Portal will then compare the two, and verify the integrity of the upload.

SHA 256 Sums		
FaultData.json	a8033949607b7bbcaae0b6b0b08da225fce72fccbcfe85d74852287e76e1d72	Verified
versions.json	51654a4b832e077976196085e3daec2f351200e330b12ad882bf604ceb957b10	Verified
standards_snapshot.txt	0e668512a00fd291838bdd8eb549aa2db1e5546a3cb407523e3883117db54e7	Verified
GPSData.json	4aad81b55c07df9491cc53015566fb20775ba3bfc64621f841d57bc099c2d0d	Verified
J1939Data.json	2fb6cfeda89f6d58d08693eb36fcd0b21be3c88d4bd70bbbe0b15d00222dcf7a	Verified
metaData.json	e441716230ed43c19f645063279d1bcba472ab6c25aba617435b4fad8fb73163	Verified
J1587Data.json	ac5da7836b05b8afd3add21bd1e203dedcfe997ee1655ee2e2cfa81568247938	Verified
standards_data.json	179649386a277732f0fce9a962d1333a63f9cadd4e347a38bde218c31c73f01b	Verified
passthrough_log_4.txt	3e7c9823e6911bcf7aaa8f80f5abe6c70ea58bb2d5b782cbf1f18ca4aa7eca8f	Verified
passthrough_log_0.txt	0d8fe16e7de1afcf871a6e18cef5c2b02aa29a08166b9b19a2ce0efa50b293105	Verified
passthrough_log_3.txt	e3b0c44298fc1c149afb4c8996fb92427ae41e4649b934ca495991b7852b855	Verified
passthrough_log_2.txt	3207af08c9a350292787e7aecedb7edb76251867122bca551c6f0130ebefbecc	Verified
passthrough_log_1.txt	e3b0c44298fc1c149afb4c8996fb92427ae41e4649b934ca495991b7852b855	Verified

If there is a SHA 256 mismatch, this may suggest the data has been tampered with.

SHA 256 Sums			
FaultData.json	Server	b790a2be51bcf0e1342867b44d11136404e140a51a4b9115beb69fe859738c46	SHA 256
	FLA	a8033949607b7bbcaae0b6b0b08da225fce72fccbcfe85d74852287e76e1d72	MISMATCH
versions.json		51654a4b832e077976196085e3daec2f351200e330b12ad882bf604ceb957b10	Verified
standards_snapshot.txt		0e668512a00fd291838bdd8eb549aa2db1e5546a3cb407523e3883117db54e7	Verified
GPSData.json		4aad81b55c07df9491cc53015566fb20775ba3bfc64621f841d57bc099c2d0d	Verified
J1939Data.json	Server	f0c0f58837c669973189b936b19af7fb9dfc366cdf5045feacceeb5555ac1fc3	SHA 256
	FLA	2fb6cfeda89f6d58d08693eb36fcd0b21be3c88d4bd70bbbe0b15d00222dcf7a	MISMATCH
metaData.json		e441716230ed43c19f645063279d1bcba472ab6c25aba617435b4fad8fb73163	Verified
J1587Data.json	Server	606645ddade4974bc174b486986292c2554d83bb8eea0443f4ac406dfd205a39	SHA 256
	FLA	ac5da7836b05b8afd3add21bd1e203dedcfe997ee1655ee2e2cfa81568247938	MISMATCH
standards_data.json		179649386a277732f0fce9a962d1333a63f9cadd4e347a38bde218c31c73f01b	Verified

6.2.7 Access Information

This section provides an audit of who is currently accessing the report, and the device's IP address.

Access Details

The user logged in as **Gavin Bauer** (gavin-bauer@utulsa.edu) requested this report on **Mon Aug 31 2015 23:49:27 -00:00** from a device with an IP address of **129.244.244.213**

Part II

Using Synercon Products

7

Before Going Out in The Field

Before performing a download in the field, please perform the following steps in order to ensure the Forensic Link Adapter (FLA) is operating with accurate information. Please note that this will require a live Ethernet port and a way to power the FLA. The FLA case has an Ethernet cable, as well as a wall power unit and a car cigarette lighter adapter to power the FLA.

7.1 Perform an Update

Performing an update ensures the FLA has the latest software. To update the FLA, first plug the device in and plug in the Ethernet cable into a working Ethernet jack. If you have any questions about a working Ethernet jack, please contact your department IT services.

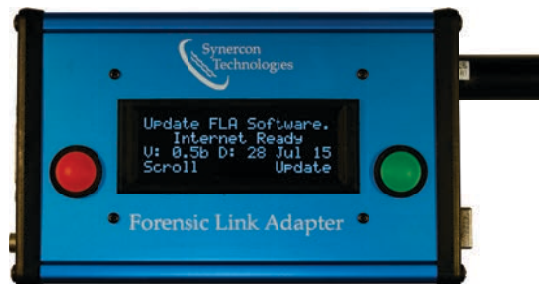
1

Once the device boots, scroll to the System Configuration screen.



2

Enter the configuration sub-menu. This will take you to the Update Software screen.



From this screen, select update. A confirmation screen will appear to prevent accidental updates.

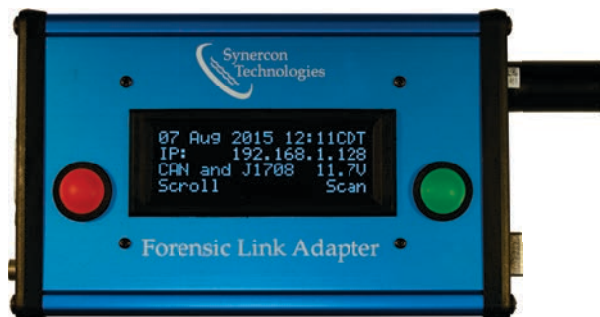
After the update completes, the FLA will require a shutdown. Select "Shutdown" to shut the device down before unplugging it. After the device indicates it is safe to do so, unplug the power supply. After waiting 10 seconds, plug the device in to continue.

If time displayed on the FLA is not correct, the time can be updated through the configuration menu. As with the update, an Internet connection is required. The timezone of the FLA can also be changed in the system configuration menu. For more information about setting the time and timezone, refer to Section 3.3.5.

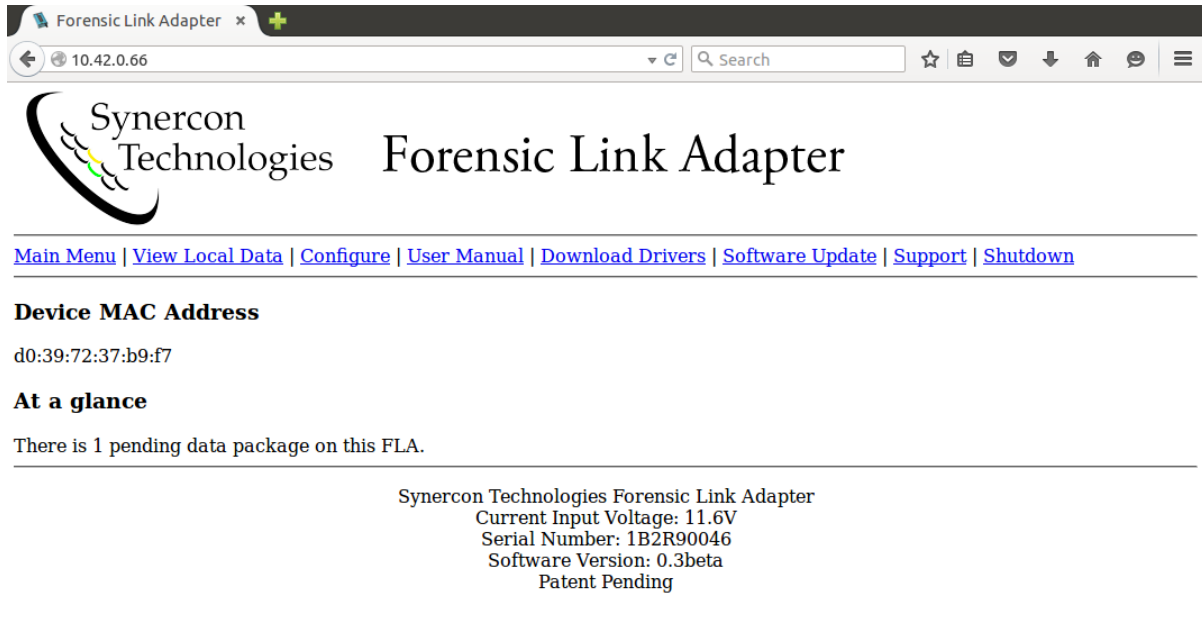
7.2 Download Appropriate Drivers

The FLA can act as an RP1210 device for using OEM software. This only required if the ECM being downloaded is not supported. For a list of supported modules, refer to the FLA User Manual. The drivers for the RP1210 feature of the FLA can be found either at Dearborn Group's website http://www.dgtech.com/product/dpa/software/DPA4P_136.zip Or on the FLA Preview site.

The FLA Preview site is a website that is generated by the FLA. To access it, first ensure it is powered on, and has an IP address. This can be confirmed by the title screen shown below.



On a computer connected to the same network, type the IP address into a web browser. The following page should appear.



From this page, select Download Drivers, and then the Download button. The Download Drivers page also has testing instructions to verify RP1210 is working correctly. This site can be accessed without an Internet connection, as the website is generated by the FLA. For connecting to the site in the field, see section 4.3.

7.3 Manufacturer Software

If the ECM being downloaded is not supported by the FLA, please ensure a computer has a working copy of the OEM software, and also the RP1210 drivers discussed in the previous section.

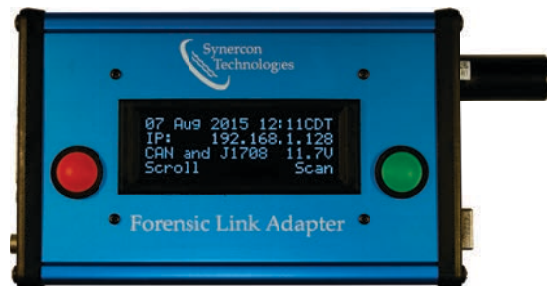
8

Downloading ECMs With the FLA

Downloading ECMs will require the FLA, the vehicle to download or the ECMs and a Smart Sensor Simulator, and permission to perform the download. These are the general steps to perform a download. Some screens may be different depending on the type of ECM being downloaded.

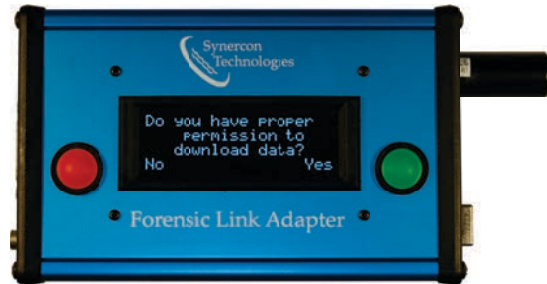
1

Start at the Title Page and select scan to begin the scan. If the scan option is not present, refer to the troubleshooting section.



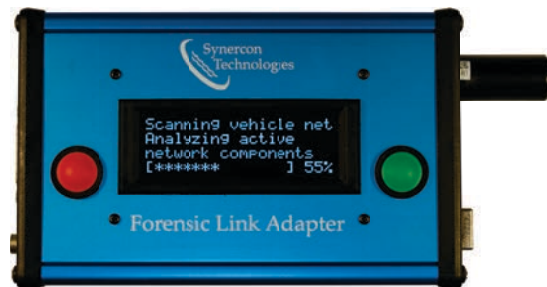
2

The device will ask if the operator has sufficient permission to perform the scan and collect data from the vehicle. When the operator continues, this action is time-stamped and rendered with the reports.



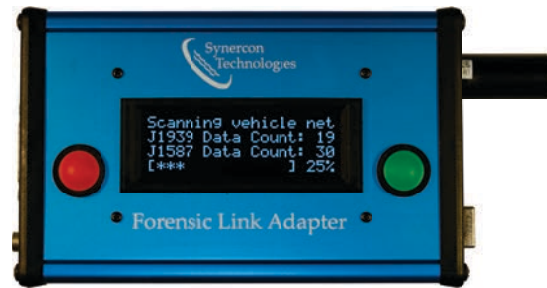
3

The FLA will first listen to the networks and build a list of all of the components on each network.



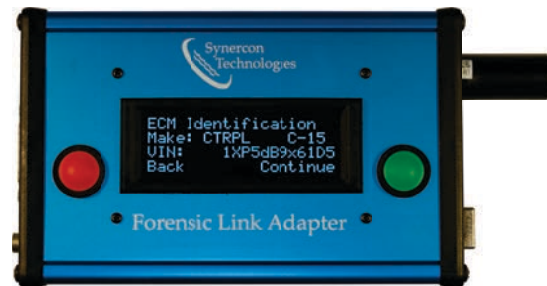
4

The FLA will then begin the standards-based scan, collecting information such as ECM Component Identification, Mileage, etc.



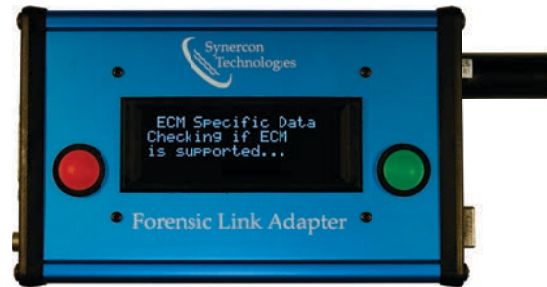
5

The FLA will display the Component Id of the engine, as well as the first 15 characters of the VIN. The full VIN will be in the report. Selecting Continue will continue the scan, Back will cancel the scan.



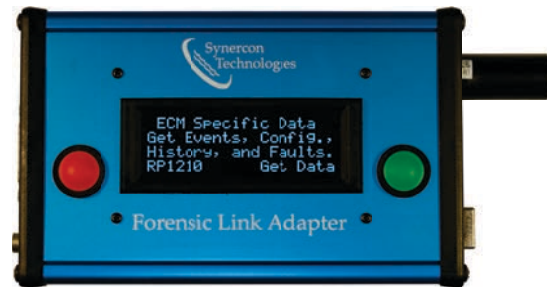
7

The FLA will attempt to detect a supported ECM to extract proprietary data.



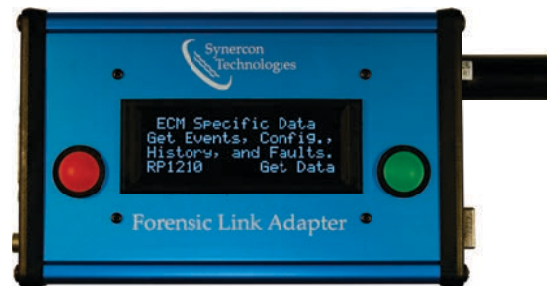
8.a

If the ECM is supported, this screen will ask if the user wishes to collect non-standards based data. See Section X to extract non-standards data with the FLA.



8.b

If the ECM is not supported, please see chapter 9 to extract data with OEM software.



8.1 Supported ECMs

The FLA can extract more data from supported ECMs, such as event data and other non-standards based data. For a list of supported ECMs, refer to the FLA User Manual. Continuing from screen 8.a from the previous section, select 'Get Data' to continue the non-standards based data extraction. During the extraction, the FLA will display the current status of the extraction. The extraction may take some time, so please wait for the FLA to indicate it is finished. Once completed, the FLA will ask the user if they wish to enable RP1210 mode, or continue to the upload screen. If desired, the FLA can also enable RP1210 mode after performing an extraction. See section 3.2.1 for more details on uploading data.

The FLA can obtain additional information from the following ECMs

- CAT
 - ADEM 3
 - ADEM 4
- DDEC
 - DDEC IV
 - DDEC V
 - Some DDEC VI
 - Some VCU/PLD

9

Downloading ECMs with OEM Software

If the FLA is not able to extract data from the ECM, the user can enable RP1210 mode and use the FLA as a passthrough device with the appropriate OEM software. There are two protocols used to communicate over a heavy truck: 1) CAN/J1939, and 2) J1708. These modes are needed to make use of the DG RP1210 embedded device used to communicate with Manufacturer's software.

9.1 Downloading Cummins ECMs

9.1.1 PowerSpec Download Protocol

1. Turn the ignition key to the on position (if it is not already on), but do not start the engine.
2. Plug in the FLA to the diagnostic connector. Ensure it powers on and boots.
3. Perform a Standards based download using FLA Diagnostics.
4. Enable J1939 Passthrough mode
5. Launch DG Adapter Validation Tool (AVT).
 - (a) Select the appropriate installed device driver.
 - (b) Switch the protocol to J1939 in the adapter validation tool.
 - (c) Click Run Test.
 - (d) If the Adapter Validation Tool passes the test, then two windows will turn green. This means the ECM and the computer are connected through the RP1210 Device. If a test fails, review the suggestions output by the Adapter Validation Tool and try again. It may require shutting down the FLA, unplugging the USB, and disconnecting the FLA from power. Similarly, the PC may need to be rebooted.
6. Open Cummins PowerSpec.
7. Click on Advanced → Settings and set the Adapter to the DPA4+
8. Click on Connect.

9. Click Read Data
10. If available:
 - (a) Press the Fault Codes button and Save the report as a PDF file.
 - (b) Press the Trip Information button and Save the report as a PDF file.
 - (c) Press the Feature Settings button and Save the report as a PDF file.
 - (d) Press the Sudden Decel button and Save the report as a PDF file.
 - (e) Press the Dataplate button and Save the report as a PDF file.
 - (f) Press the Duty Cycle button and Save the report as a PDF file.
 - (g) Press the After Treatment button and Save the report as a PDF file.
11. Exit Passthrough mode by pressing a the Update (red) button on the FLA. If an Internet Connection is available, then the data can be uploaded and archived. Otherwise, shutdown.
12. Establish Internet connection with the FLA. An IP address other than 10.0.0.1 should show up on the FLA display.
13. Scroll to the Upload to Server option on the FLA and upload the data to the server.

9.2 Downloading Detroit Diesel ECMs

9.2.1 DDEC Reports Download Protocol

1. Turn the ignition key to the on position (if it is not already on), but do not start the engine.
2. Plug in the FLA to the diagnostic connector. Record the time shown on the FLA.
3. Perform a Network Scan using the Forensic Link Adapter.
4. Enable the RP1210 network Passthrough mode.
 - (a) Use J1708 Passthrough mode for DDEC IV, DDEC V, and Pre-2008 Mercedes Engines.
 - (b) Use J1939/CAN Passthrough mode (selected from menu screen on FLA) for all newer DDEC 10 and DDEC 13.
5. Open DDEC Reports by clicking on the icon on your computer.
6. The Connection Manager may start automatically.
7. Ensure the Reset Time and Reset Trip options are not checked. Take a screen shot of these features unchecked.
8. Press Extract Data.
9. Once the data is extracted, Select File → Print and print all the data (should be over 30 pages). Print to a PDF file

10. Close DDEC Reports.
11. Navigate to the DDEC Reports directory to find the recently made .XTR file. (Default installation is C:\Detroit Diesel\DDEC Reports\Diagnostic\DATA PAGES\ Copy the .XTR file into your case file directory.
12. Exit Passthrough mode by pressing Exit\Upload on the FLA. Exiting this mode will compress log files and takes some time.
13. Establish Internet connection with the FLA. An IP address other than 10.0.0.1 should show up on the FLA display.
14. Scroll to the Upload to Server option on the FLA and upload the data to the server.

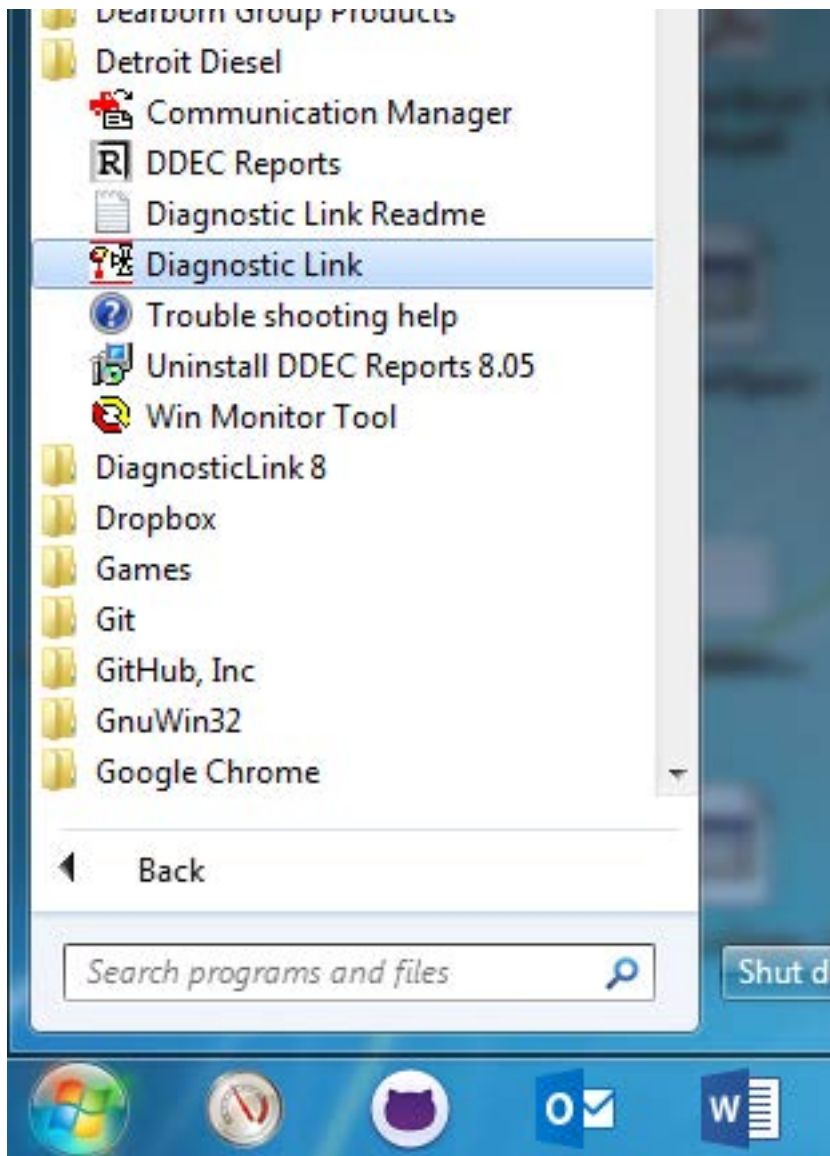
9.2.2 Diagnostic Link Download Protocol

This protocol is to support data from DDEC III, DDEC IV, and DDEC V control modules. These modules primarily communicate over the J1708/J1587 network. This protocol was written for verison 6.50. Other versions may have a different method.

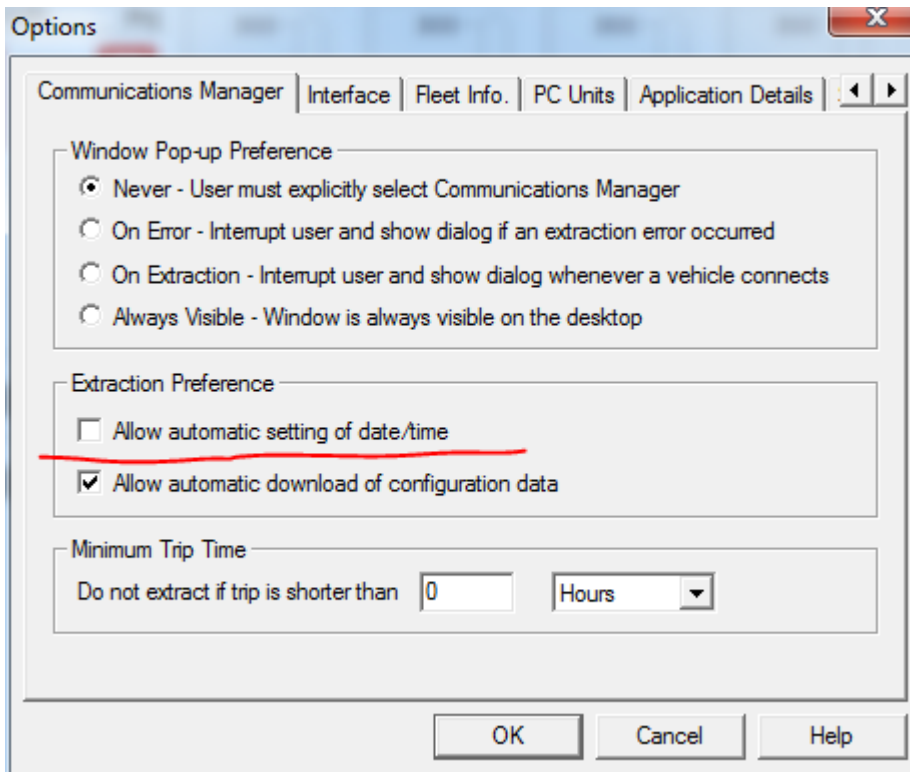
Setup

Before proceeding, please be sure to not automatically reset the time.

1. Open Diagnostic Link.



2. Select Options and deselect Allow automatic setting of date/time

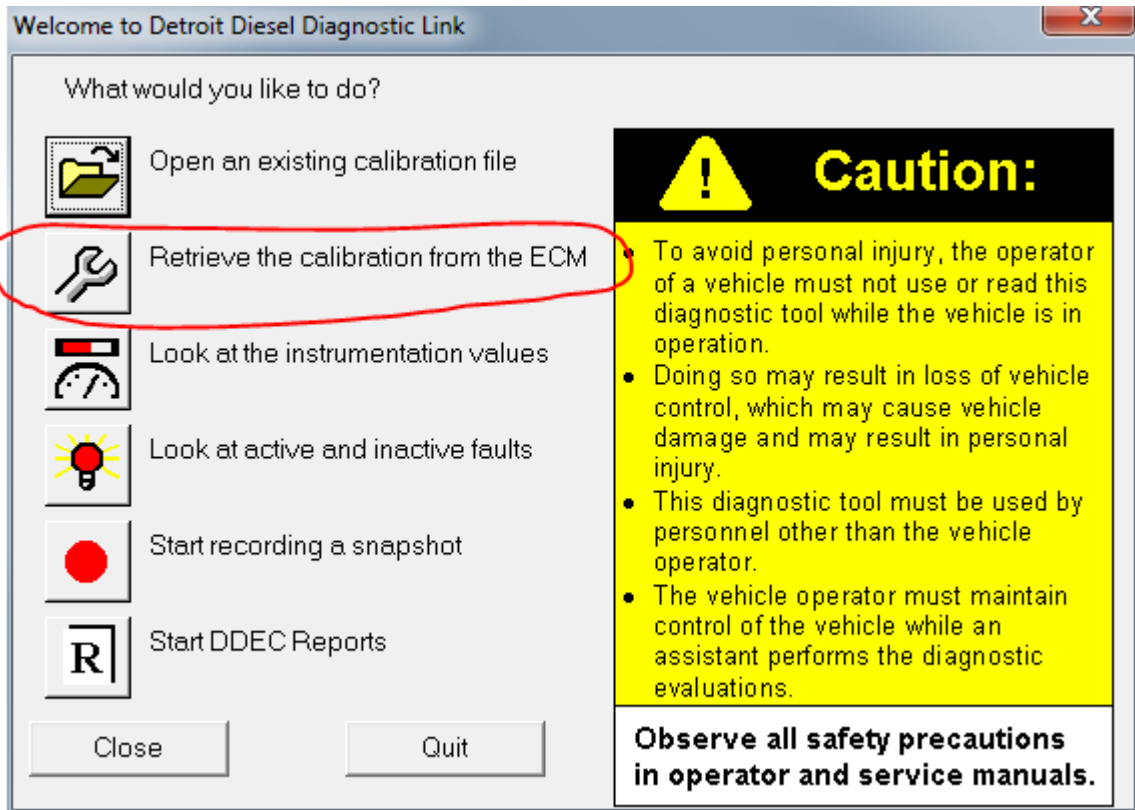


3. Set the Local Communications Interface to the DG DPA4 Plus.

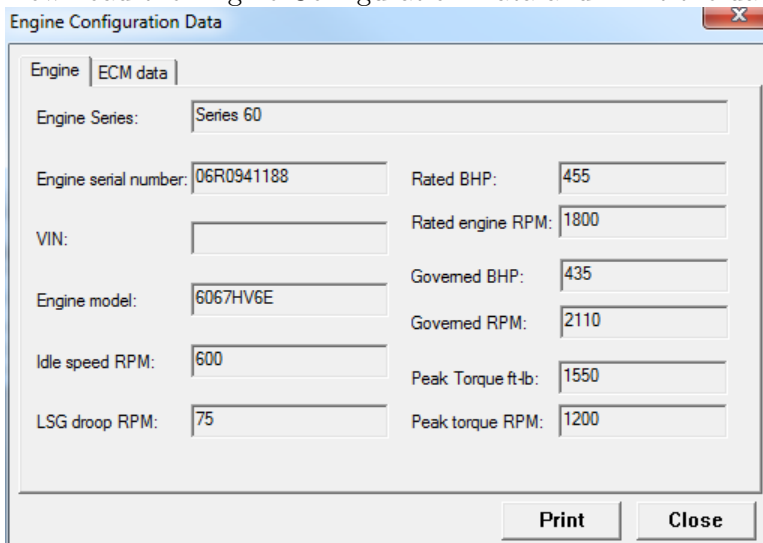
4. Restart DDDL 6

Download

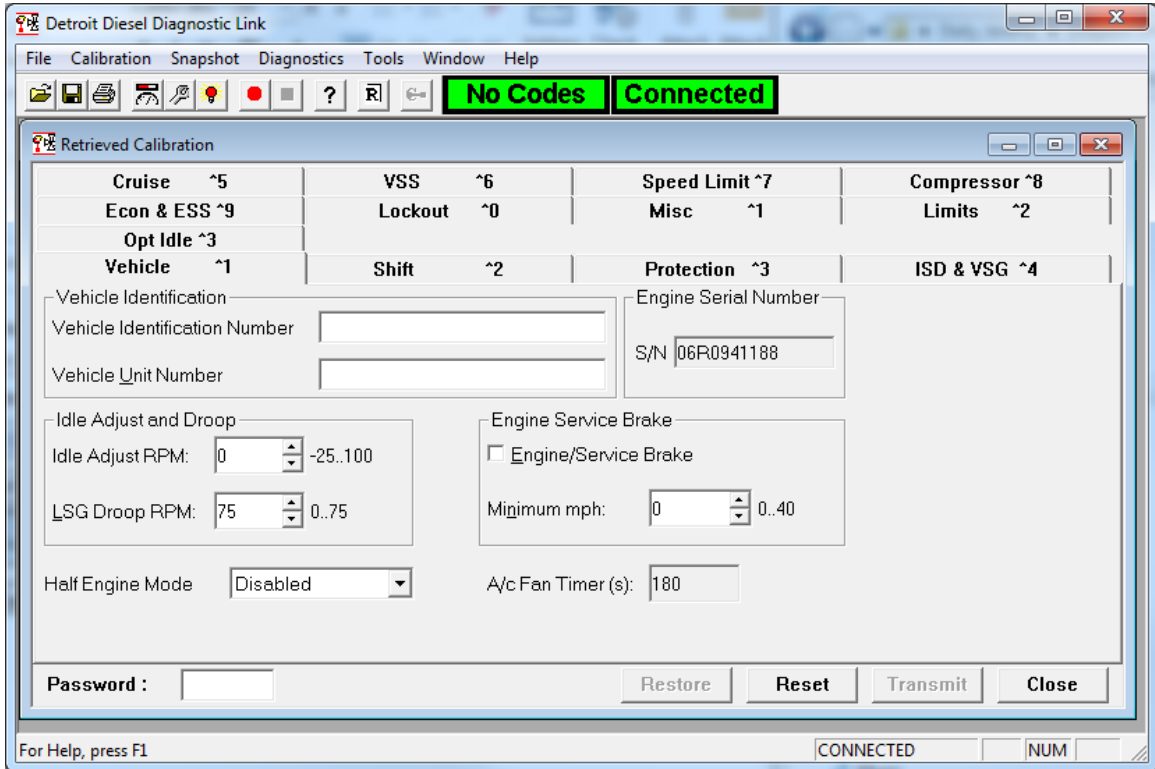
1. After obtaining data with the Forensic Link Adapter, connect to the ECM with the RP1210 mode in J1708 and connect the USB cable to your computer.
2. Be sure the the ignition key is still in the the on position, but do not start the engine.
3. A popup Welcome Screen should appear. Press the Retrieve the calibration from the ECM button.



4. Download the Engine Configuration Data and Print the data.



5. Retrieve the Calibration Data and Print it from the file menu.



6. Gather and Print Injector Calibration

Injector Calibration

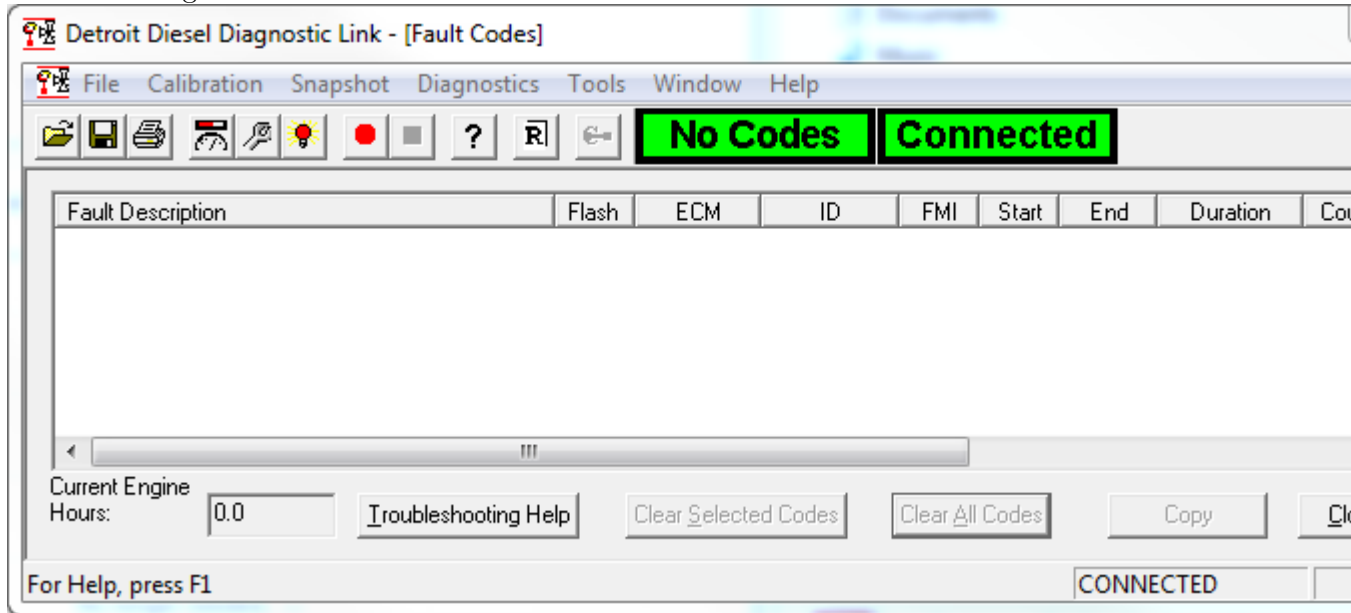
Cylinder #1	66	<input type="button" value="Change Password"/> Password <input type="text"/> <input type="button" value="Transmit"/> <input type="button" value="Print"/> <input type="button" value="Close"/>
Cylinder #2	72	
Cylinder #3	72	
Cylinder #4	66	
Cylinder #5	64	
Cylinder #6	64	

7. Select Audit Trail from the Calibration Menu and then Print.

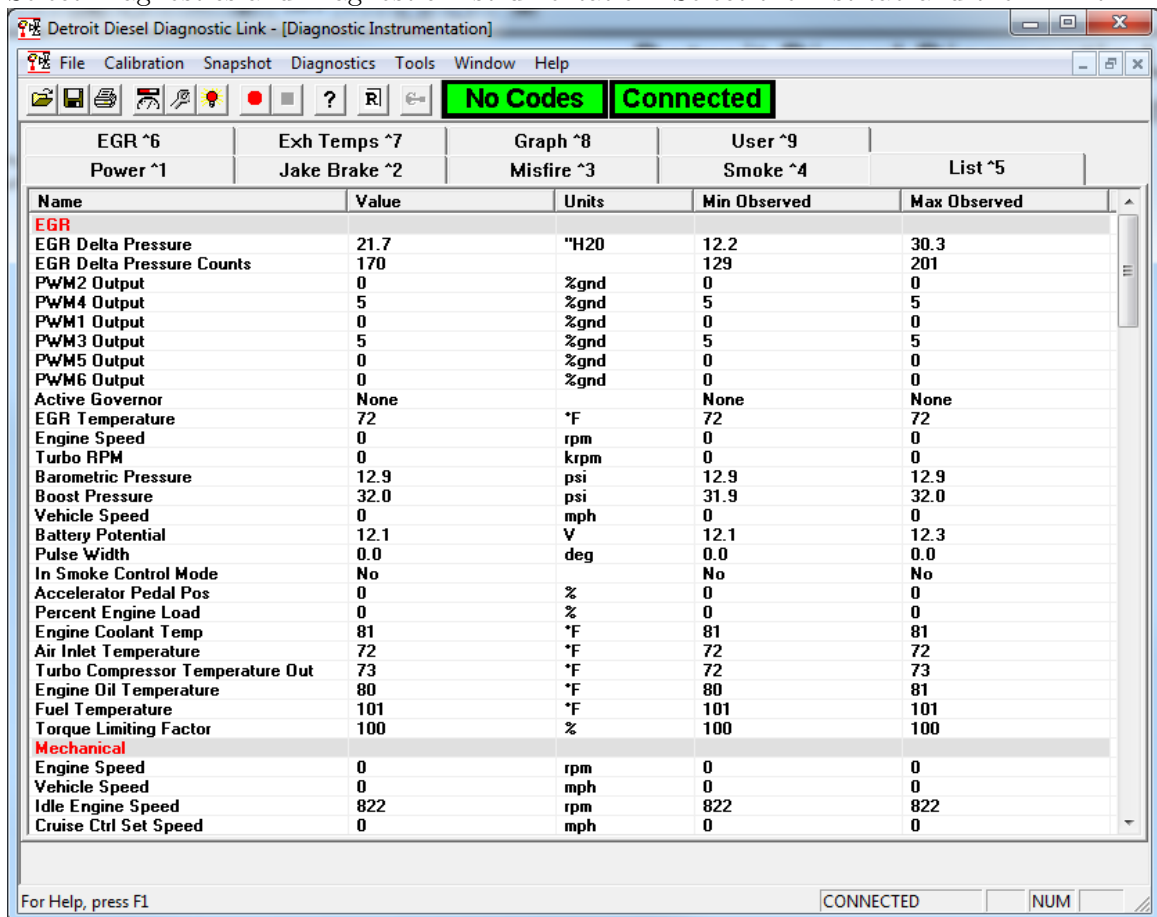
Audit Trail

Calibration	Injector	Clock/Calendar	Vehicle Speed
Date	Tool ID	Engine Hours	
Last Change			
Not Available			
Next Most Recent Change			
Not Available			
Second Most Recent Change			
Not Available			

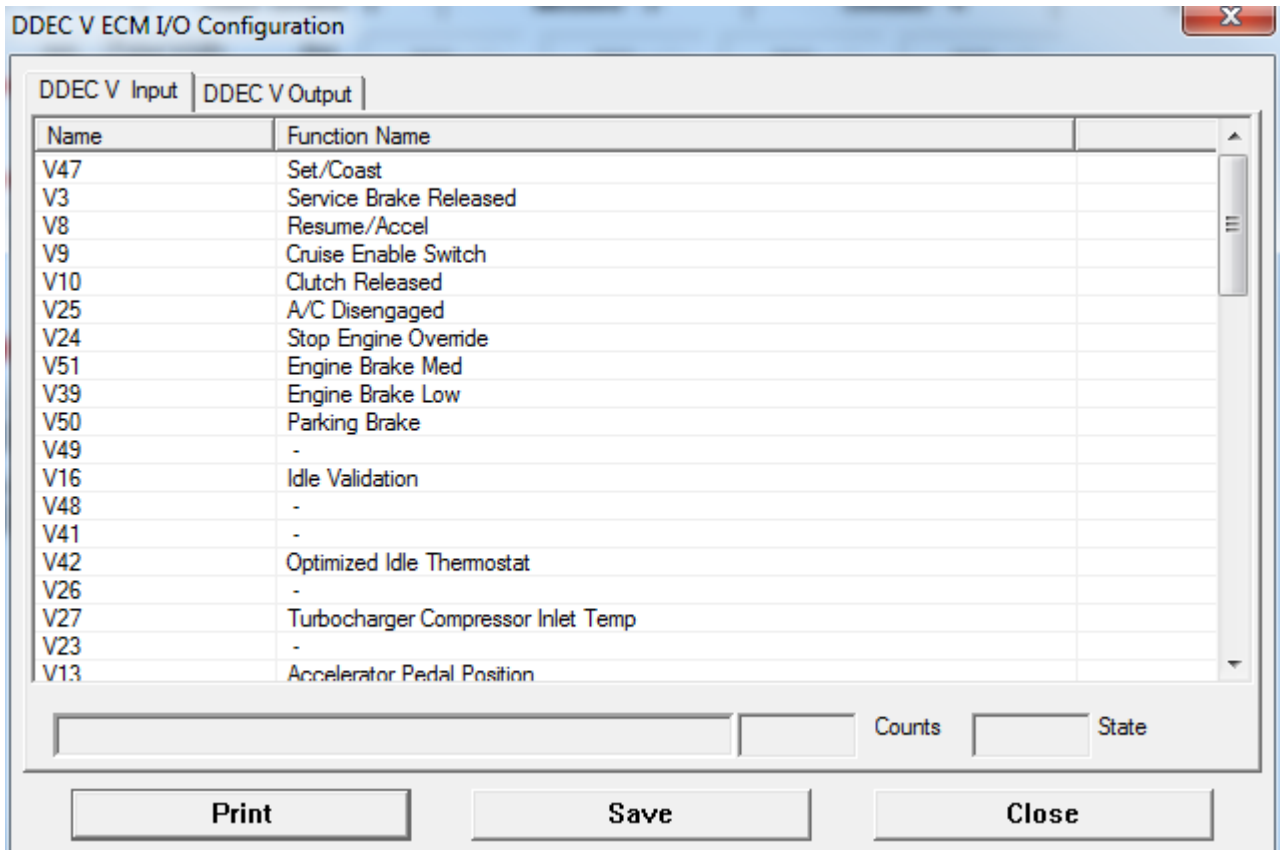
8. View and Diagnostics → Fault Codes then File → Print Fault Codes



9. Select Diagnostics and Diagnostic Instrumentation. Select the List tab and then Print.



10. Select Diagnostics → ECM I/O Configuration. This can be printed and saved to a text file. The text file may be saved to C:\Detroit Diesel\Diagnostic\IOConfig.



11. Select Diagnostics → Injector Response Times to print.

Injector Response Times

Cylinder #1	0.66	OK
Cylinder #2	0.66	
Cylinder #3	0.66	Print
Cylinder #4	0.66	
Cylinder #5	0.66	
Cylinder #6	0.66	

12. Select Diagnostics → Maintenance Alert

Maintenance Alert

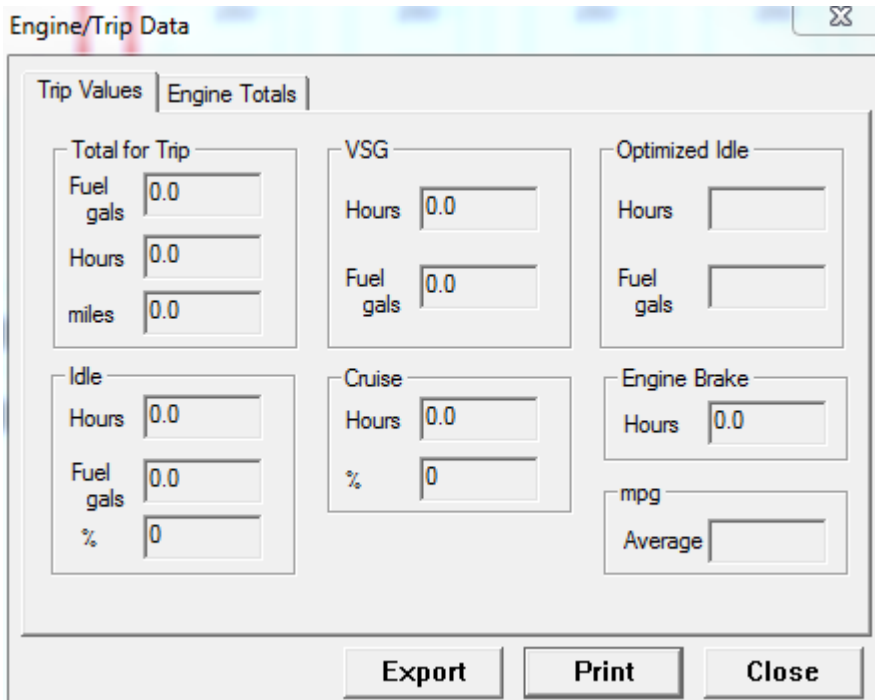
Oil Level	N/A
Coolant Level	FULL
Air Filter Restriction	N/A
Oil Filter Restriction	N/A
Fuel Restriction	N/A

Preventative Maintenance Status

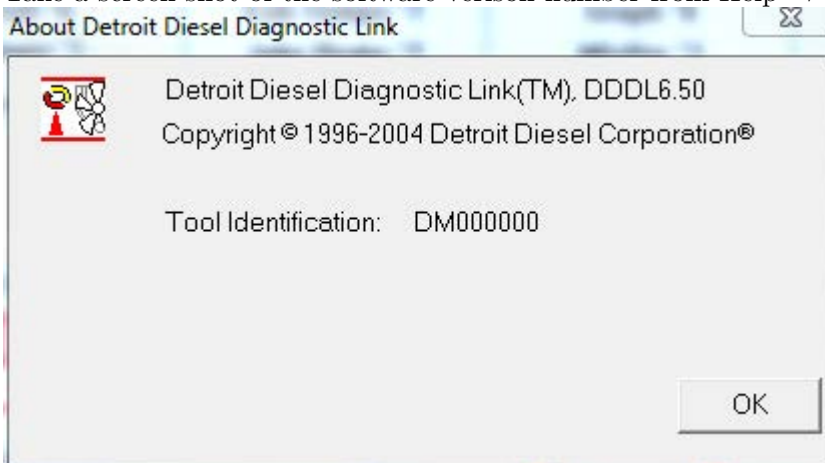
Service A	Not Configured
Service B	Not Configured
Service C	Not Configured

Clear Maintenance Codes Print Close

13. Select Tools → Engine/Trip Data



14. Take a screen shot of the software version number from Help → About



9.3 Downloading Caterpillar ET ECMs

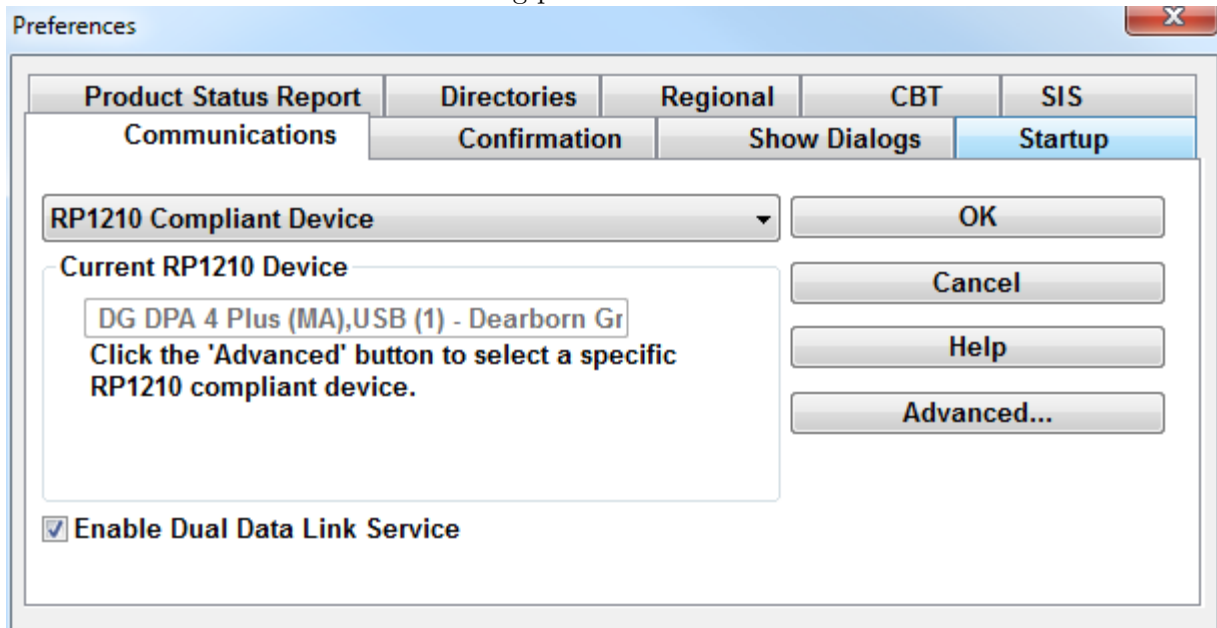
This section provides a protocol to use CatET to download Caterpillar ADEM II, ADEMIII, and ADEMIV engine control modules. These modules are found on C series engines (i.e. C-15, C-12, C-9, and C-7) and 3126.

9.3.1 Prerequisites

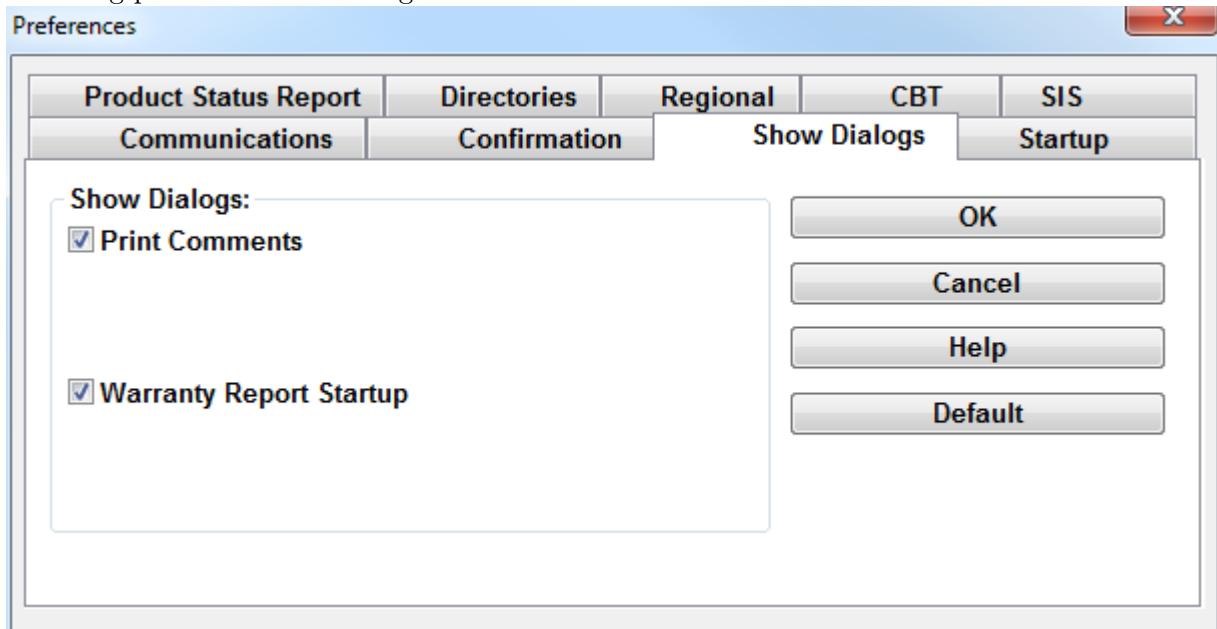
You must have the DG RP1210 drivers installed on your computer. The procedure for obtaining and installing these drivers is found in subsection 7.2

Caterpillar Electronic Technician (ET) must be installed on your computer. The procedure described in this section was based on version 2013A.

Set the preferences in CatET to use the DG DPA 4 Plus, which is the RP1210 device built into the FLA. This is shown in the following picture.



Setting the Warranty Report Startup helps with the work flow when connected, as seen in the following picture. These settings will remain from session to session.

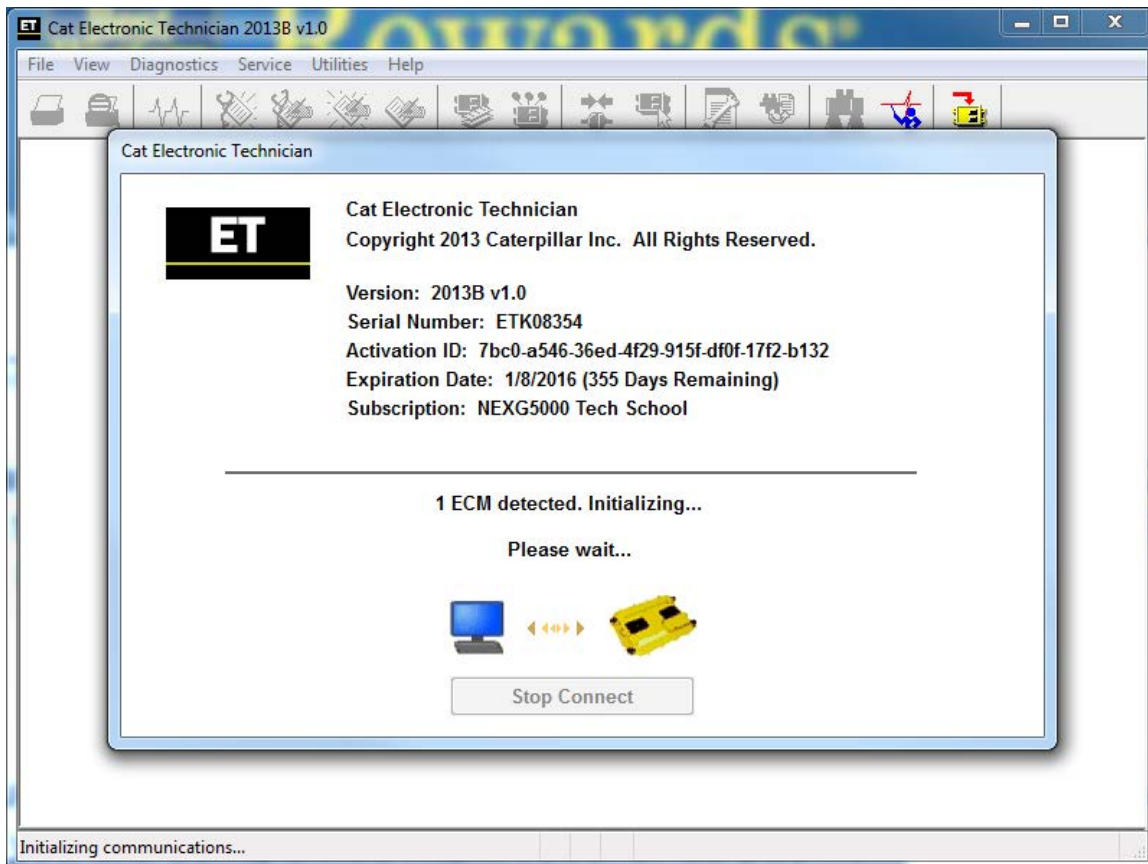


It is recommended to create a new data directory for each download to keep track of the data and not mix it with other information.

9.3.2 Connecting to an ECM

1. Turn the ignition key to the on position (if it is not already on), but do not start the engine.
2. Plug in the FLA to the diagnostic connector. Ensure it powers on and boots.

3. Perform a Standards based download using the FLA.
4. The FLA needs to be in J1708 Passthrough mode, which is screen 7. Once the FLA is in Passthrough mode, it will log and preserve network traffic for a forensically verifiable record.
5. With the FLA connected through USB, start CatET. The program should automatically connect to the ECM, as shown in the following picture. If not, then the user can press F8 to connect once CatET is running.



9.3.3 Warranty Report

1. CatET will automatically ask if you would like to create a Warranty Report. Press Yes when the following dialog appears. This can also be accessed through the Information menu.

Warranty

If you would like to create the reports required to file a claim with the factory, you can do so now.

NOTE: You can also access the Warranty Report tool under the Information menu.

Create reports at this time?

2. An information screen will appear. This can be filled out as desired. Leaving the fields blank may be the best option. Press Next to proceed.

Cat Electronic Technician 2013B v1.0 - Warranty Report

File View Diagnostics Information Service Utilities Help

C-12 Truck (MBL13232)

- User Information
- ECM Information
- Cylinder Cutout Reports
- Additional Service Tool
- Summary Information

Please provide user information in this section.

NOTE: [Dealer Code where repair performed] is a required field when submitting the report.

Warranty Report - User Information

Caterpillar Dealer Code:	<input type="text"/>	
Dealer Code where repair performed:	<input type="text"/>	* Required
Repair Date:	18 January 2015	
Part Number(s) Causing Failure:	<input type="text"/>	
Work Order# or Dealer Claim#:	<input type="text"/>	
Technician Name/CWS ID:	<input type="text"/>	

<< Back **Next >>**

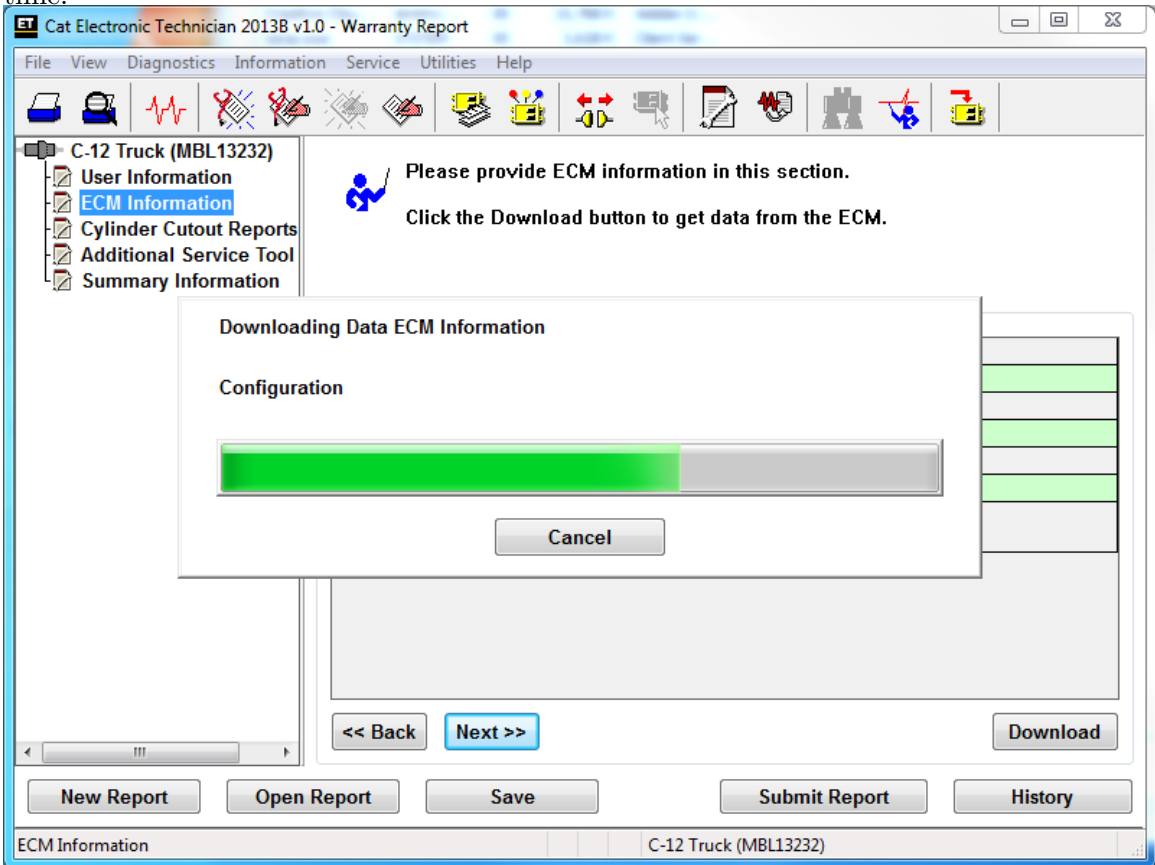
New Report Open Report Save Submit Report History

User Information C-12 Truck (MBL13232)

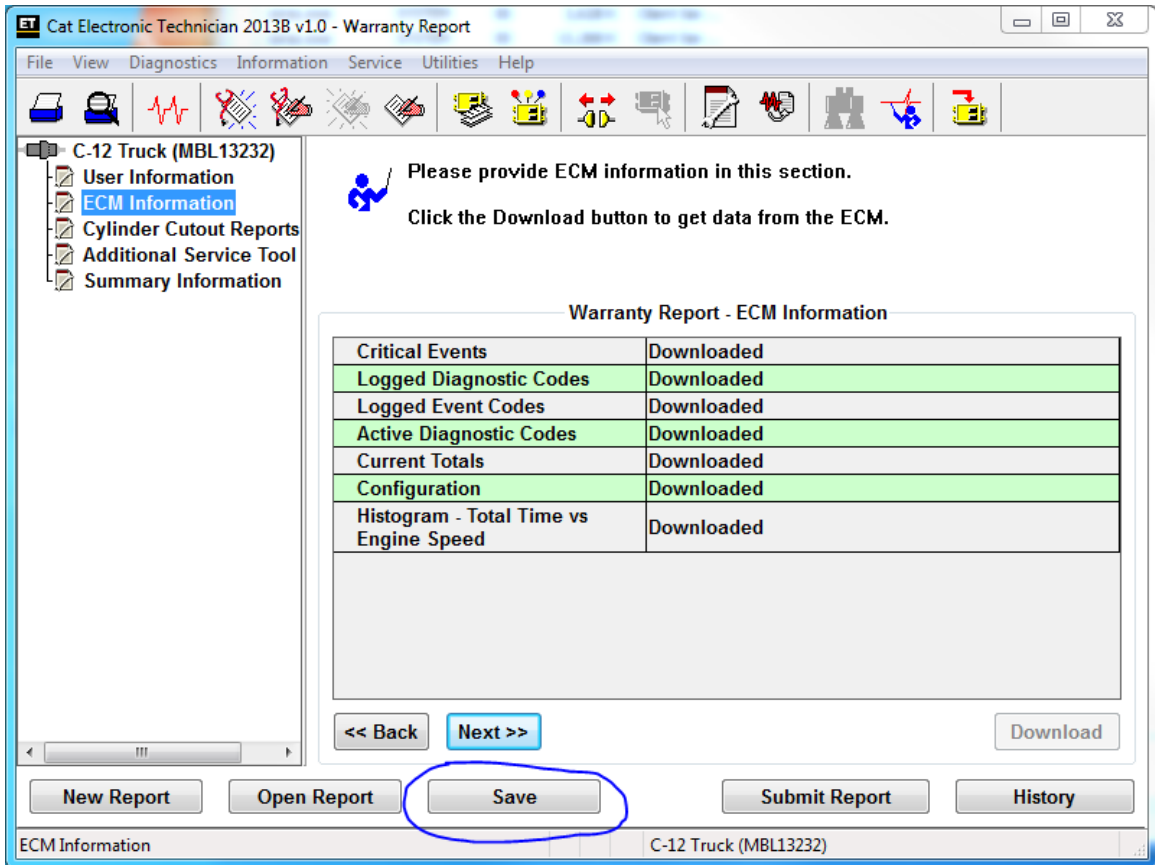
3. Press Yes when asked to download data from the ECM.



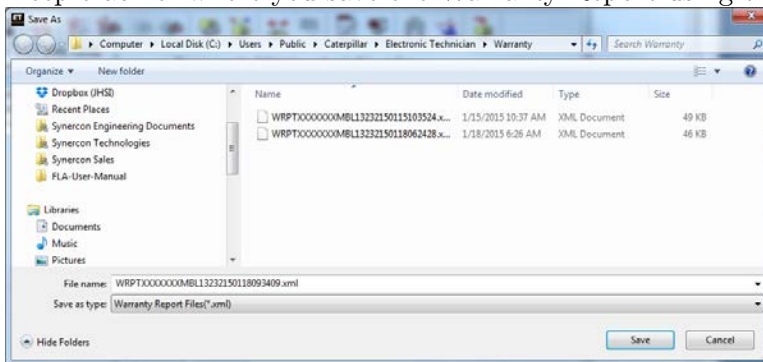
4. The software will download data for the report. The Configuration data takes the longest time.



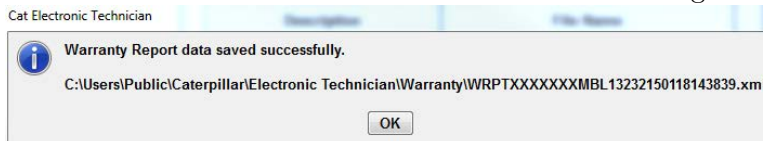
5. Once the data is downloaded, press Save to create an XML file.



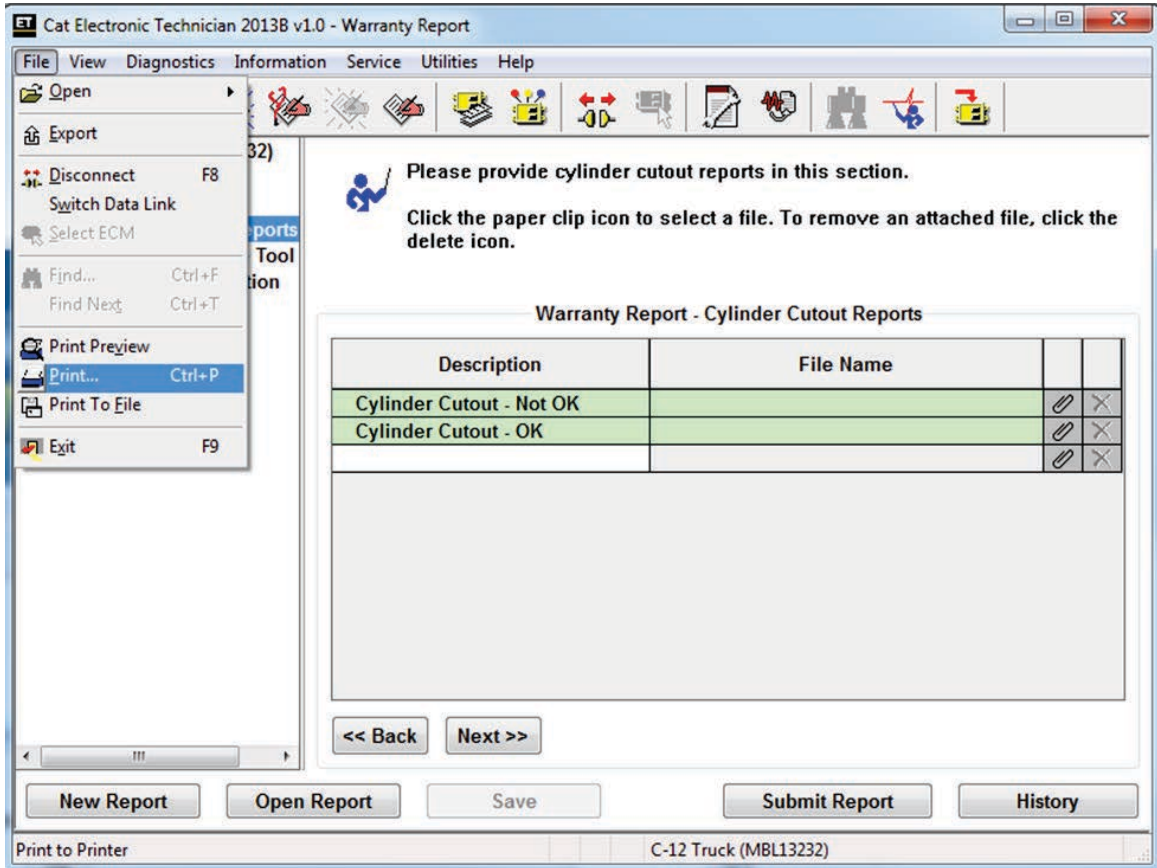
6. Keep track of where you save the Warranty Report using the Save As dialog.



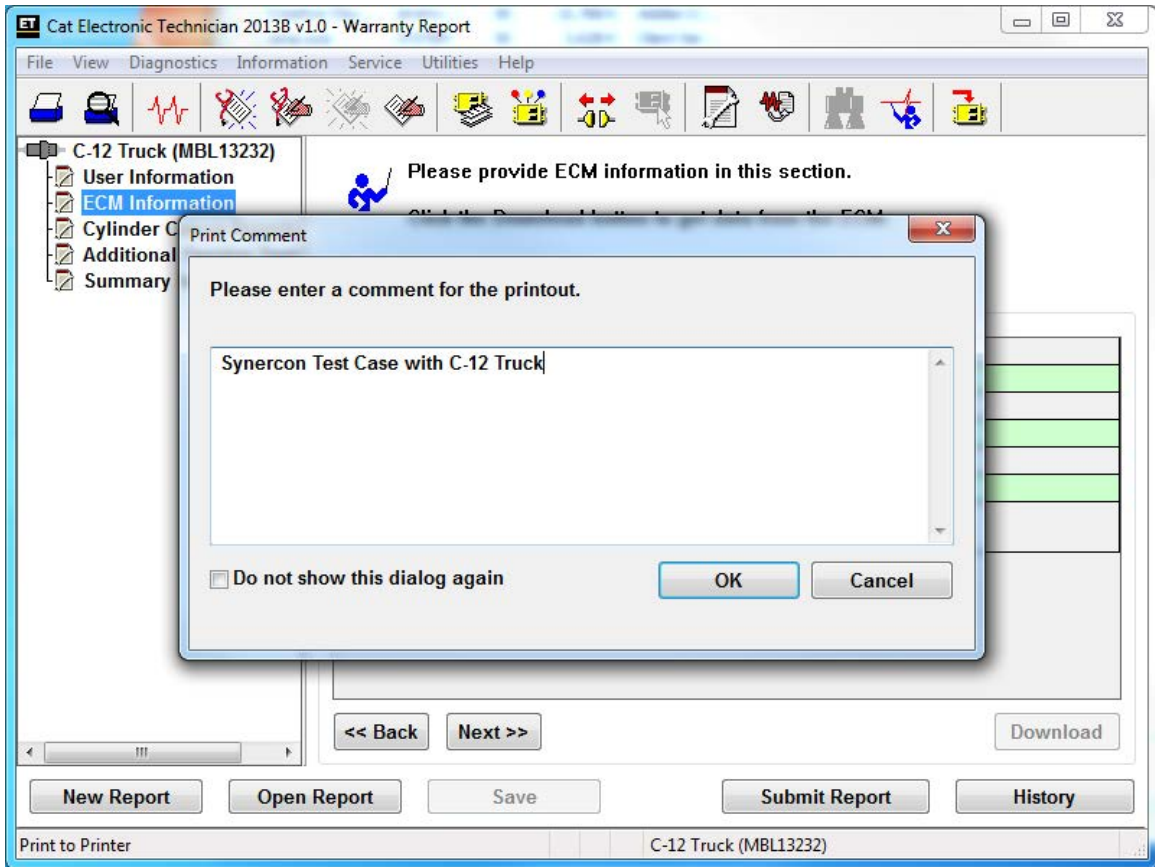
7. Record where the file was saved based off the following confirmation:



8. Print the Warranty Report using the Print menu option



9. Enter Comments that will appear on the header of the report.



10. The first page of the Warranty Report appears as follows:

**Cat Electronic Technician 2013B v1.0
Warranty Report**

1/18/2015 9:45 AM

Comments:

Synercon Test Case with C-12 Truck

C-12 Truck (MBL13232)

Parameter	Value
Vehicle ID	2HSCEAXR24C015095
Engine Serial Number	MBL13232
ECM Serial Number	21736103IK
Personality Module Part Number	2368689-00
Personality Module Release Date	may03
Personality Module Code	235
ECM Date/Time	1/18/2015 9:51:11 AM

Summary Information

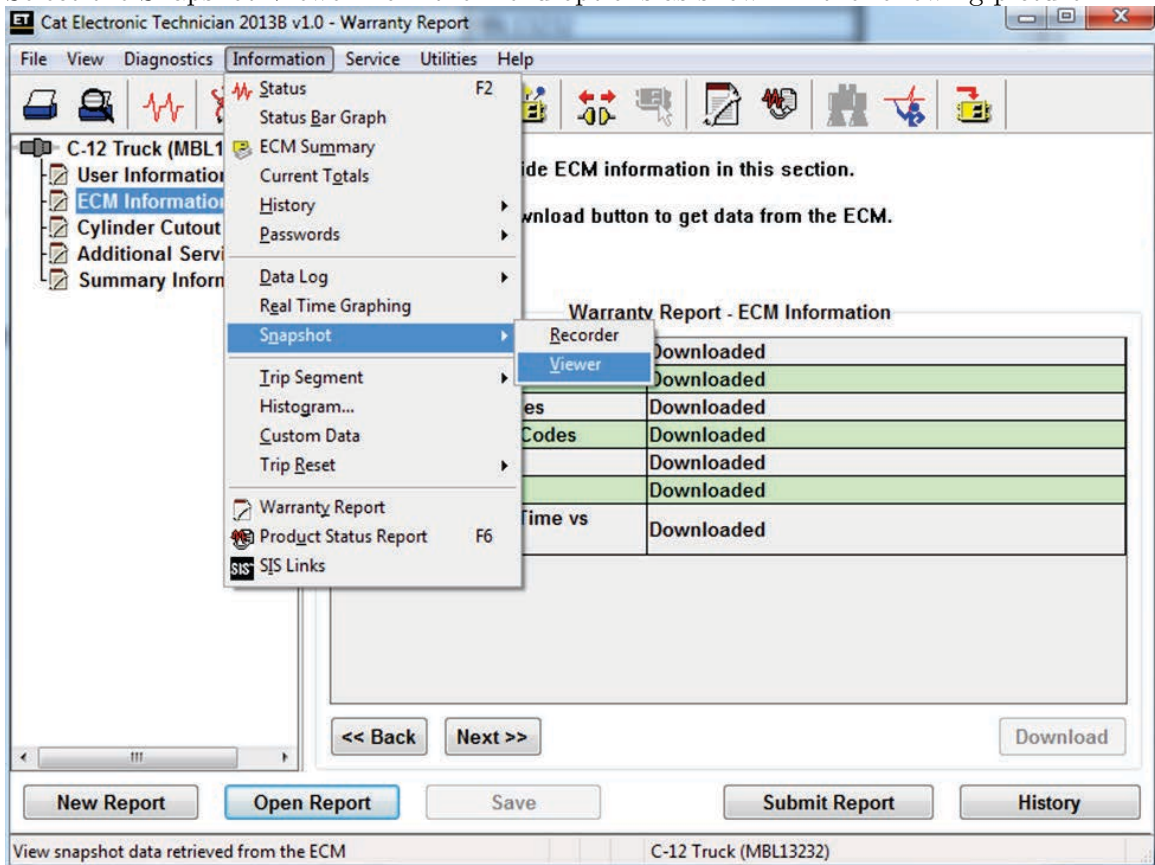
Engine Serial Number	MBL13232
ECM Date/Time	1/18/2015 9:40:47 AM
Report file Creation PC Date and Time	18/01/15 09:34:09 AM
Report file Last Modified PC Date and Time	18/01/15 09:44:32 AM
Total Distance	641486 Miles
Total Time	17850:17 hours
Total Fuel	104722 gal
Diagnostic Clock	19514 hours
Vehicle ID	2HSCEAXR24C015095
ECM Serial Number	21736103IK
Personality Module Part Number	2368689-00
Personality Module Release Date	may03
Personality Module Code	235

11. Scrolling through the Configuration data will reveal the Quick Stop Rate. If this is set to 0, then there may not be any Sudden Deceleration Snapshots.

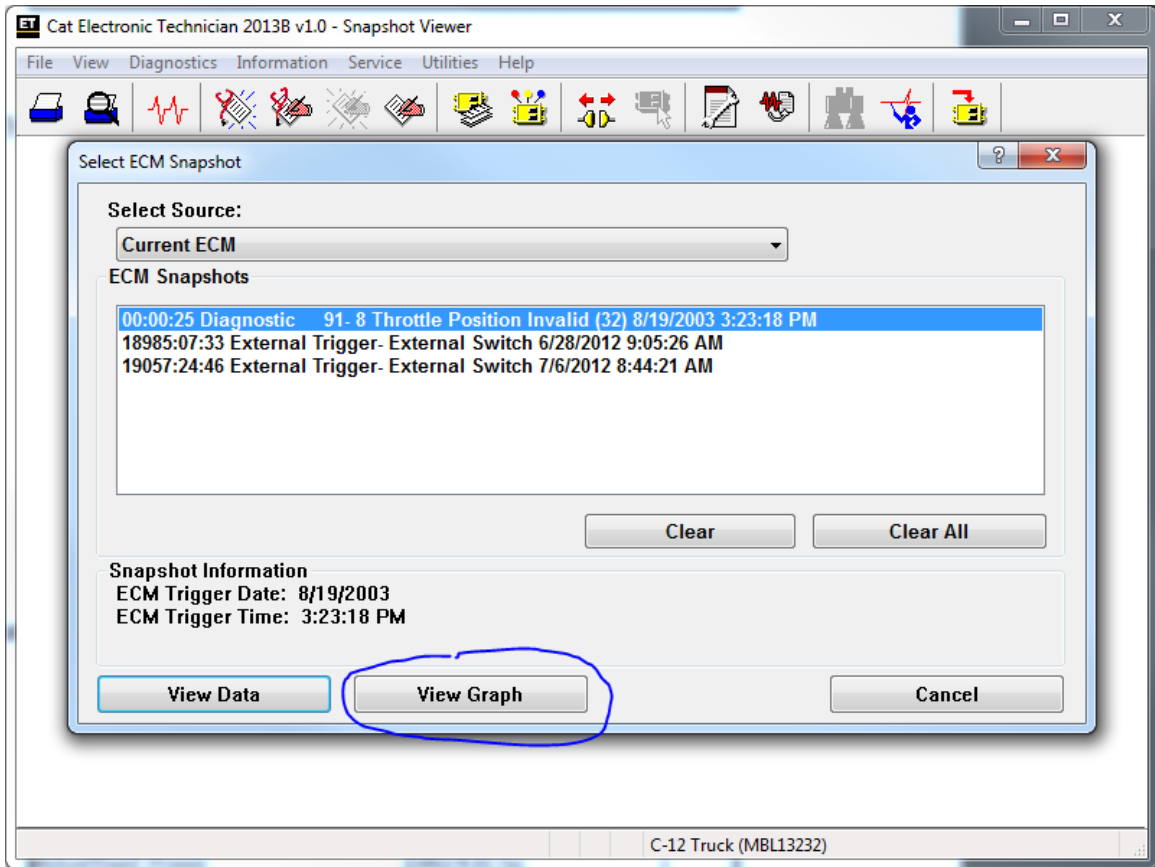
Theft Deterrent System Control	No	
Theft Deterrent Password	****	
Quick Stop Rate	7	mph/s
Minimum Idle Time (0 = Off)	5	min
Driver Reward Enable	Enabled	

9.3.4 Snapshot Data

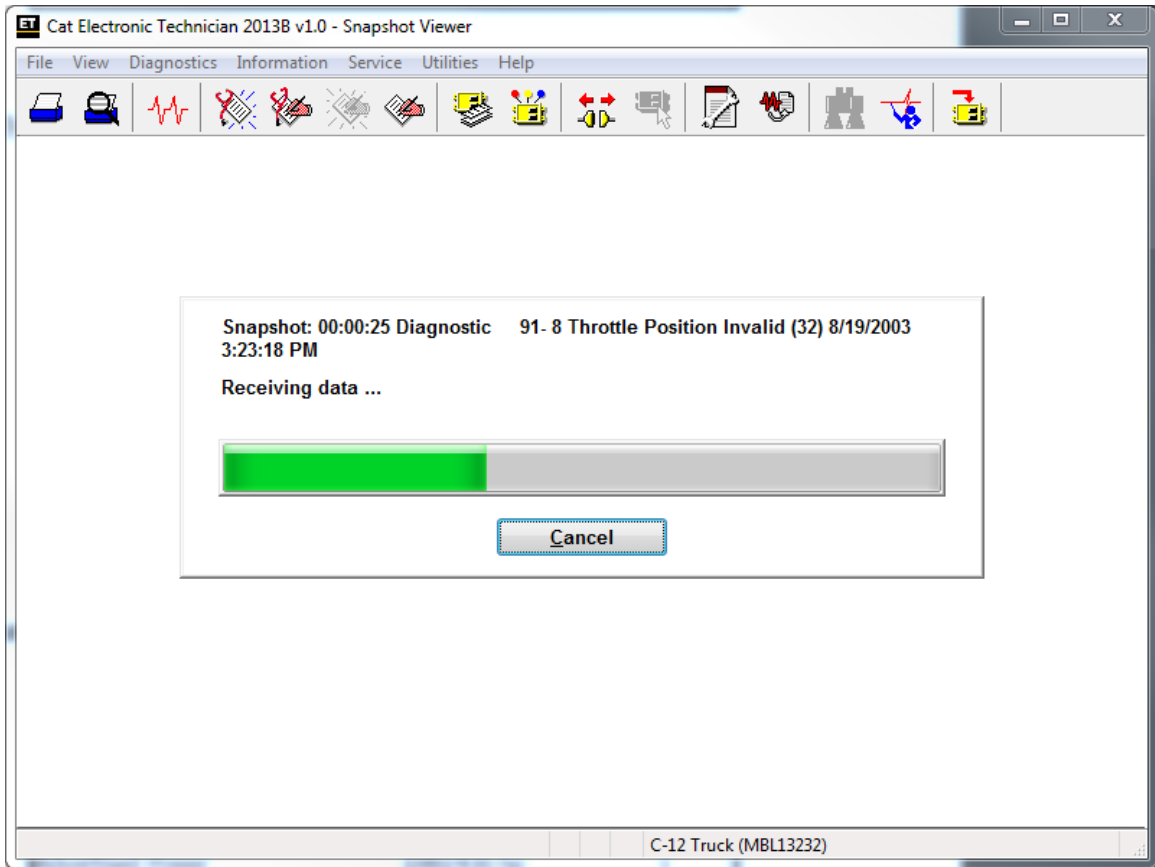
1. Select the Snapshot Viewer from the menu options as shown in the following picture:



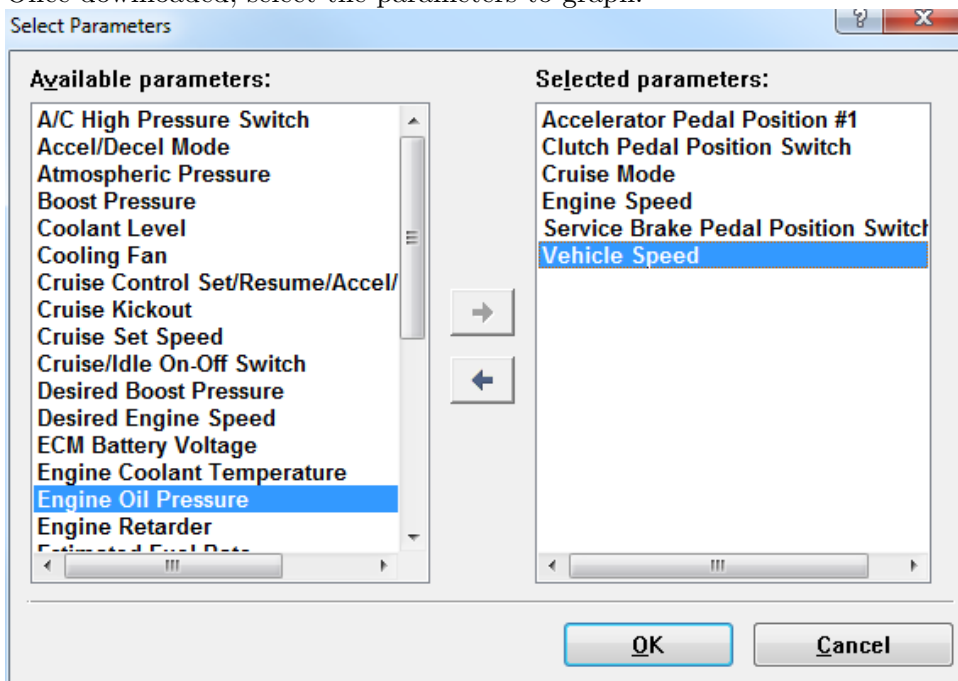
2. A menu of recorded Snapshots appear. Please select next one and press View Graph. Taking a screenshot of this dialog box is a good idea to keep track of all the available Snapshots.



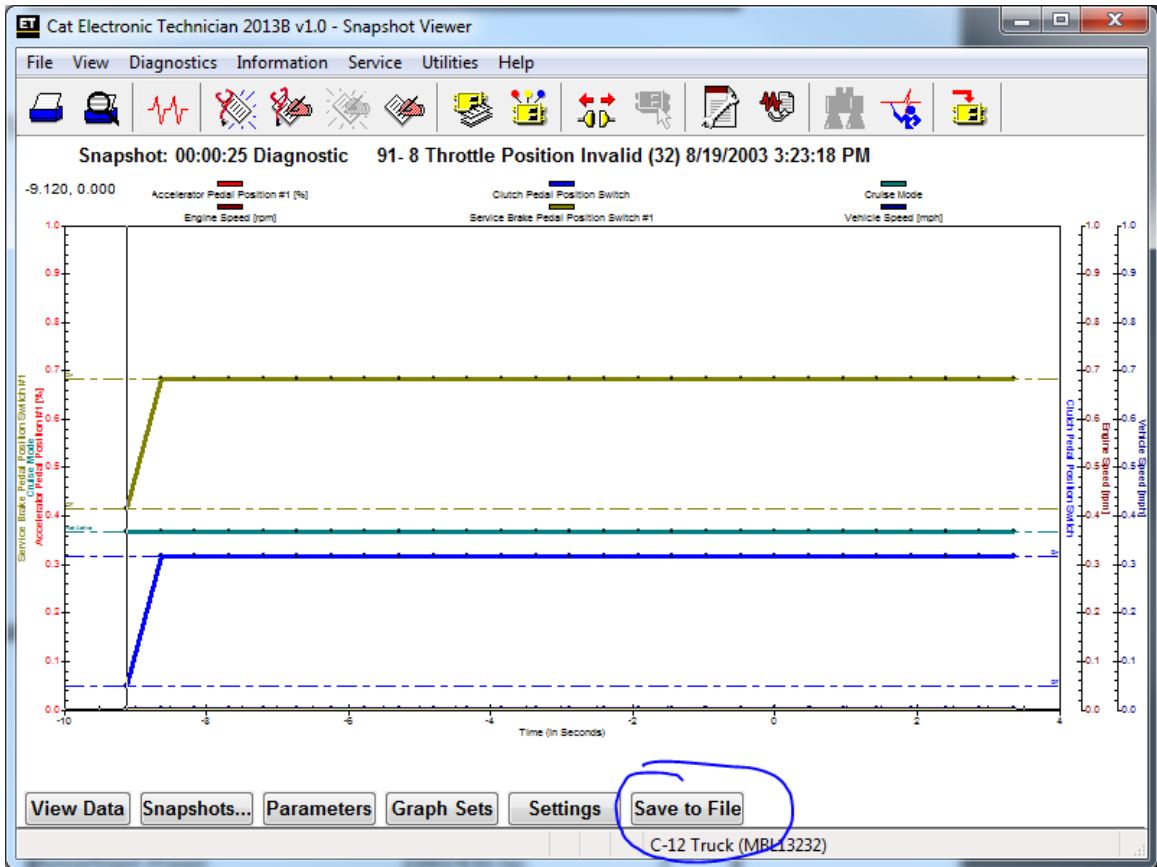
3. A progress bar will appear.



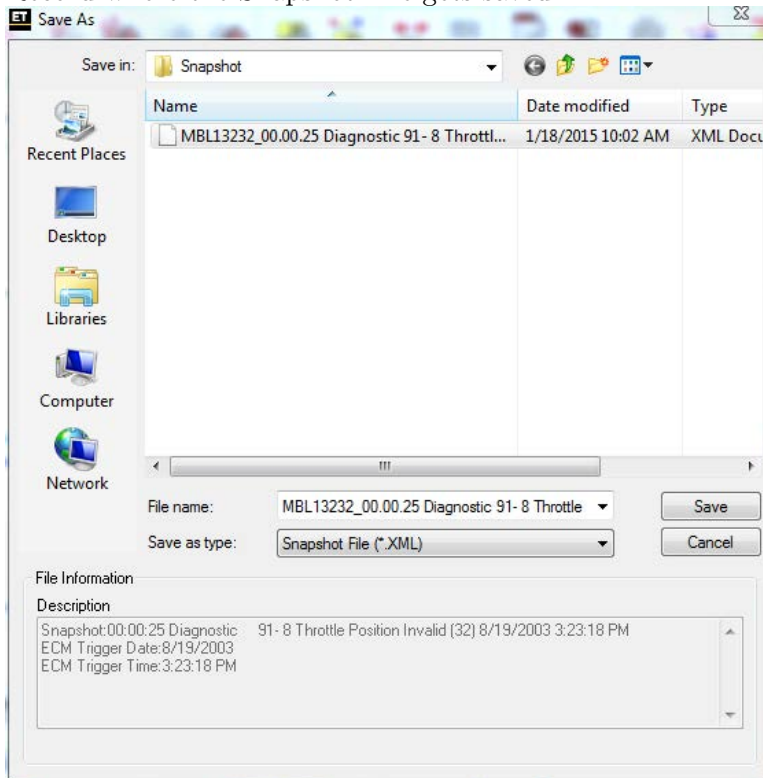
- Once downloaded, select the parameters to graph.



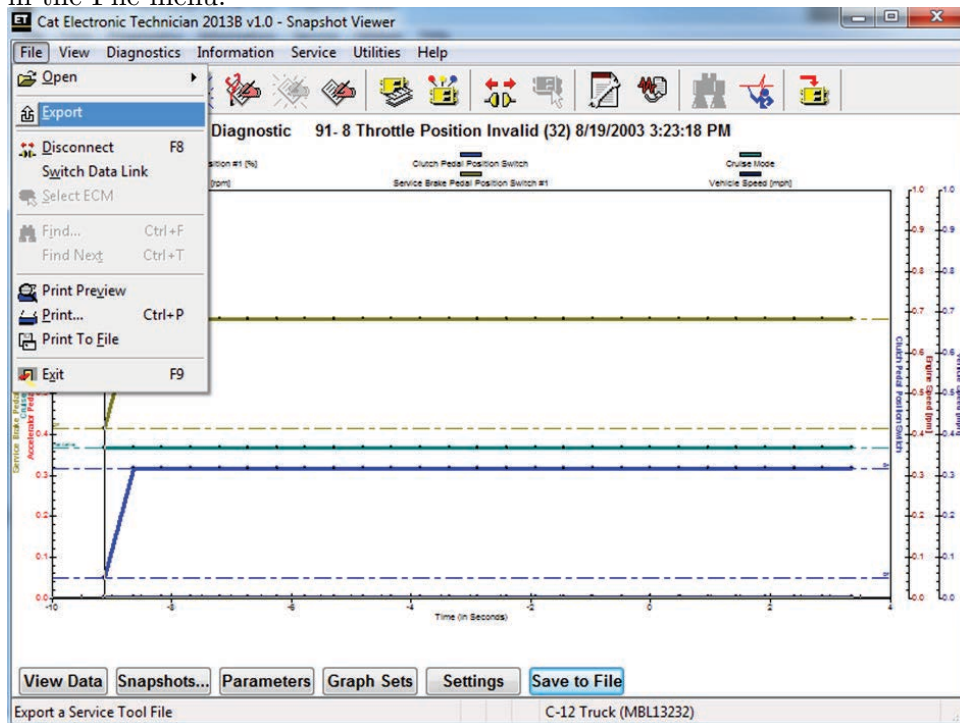
- The resulting graph will show and all the data (even the data not shown) can be saved by pressing Save to File.



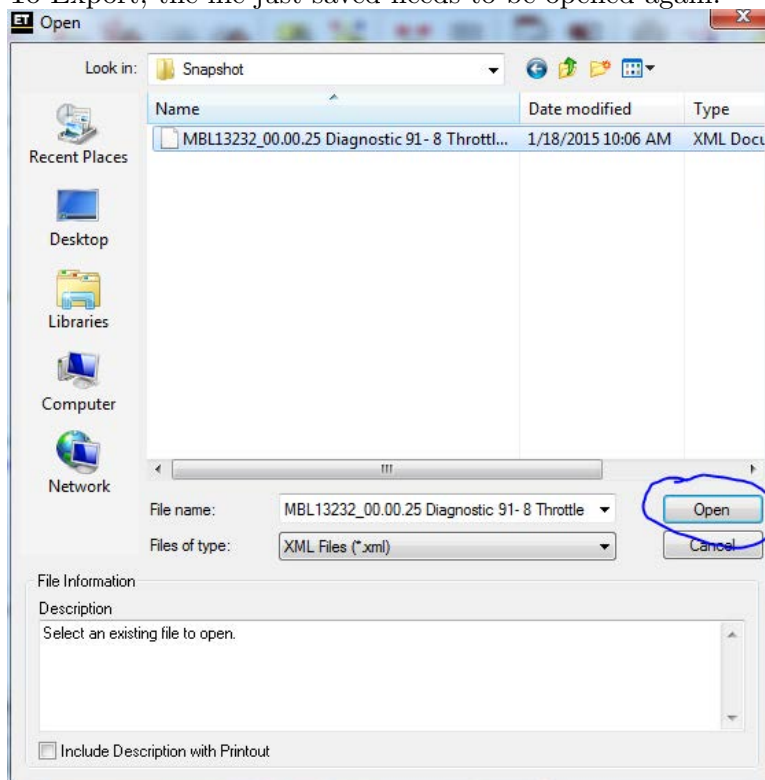
6. Record where the Snapshot File gets saved.



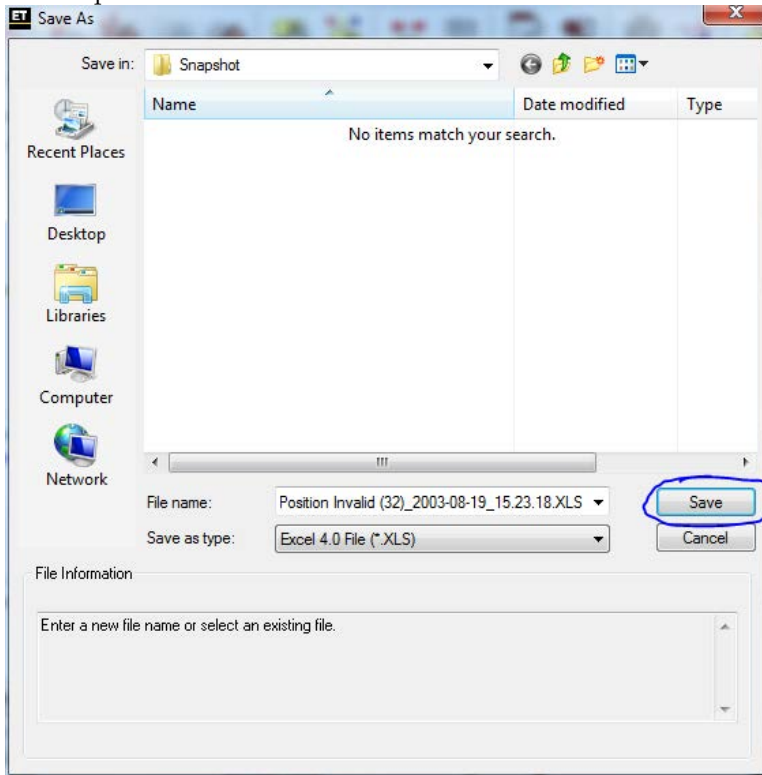
7. Print the Snapshot from the file menu.
8. Once saved, the Snapshot file can be Exported to MS Excel by pressing the Export option in the File menu.



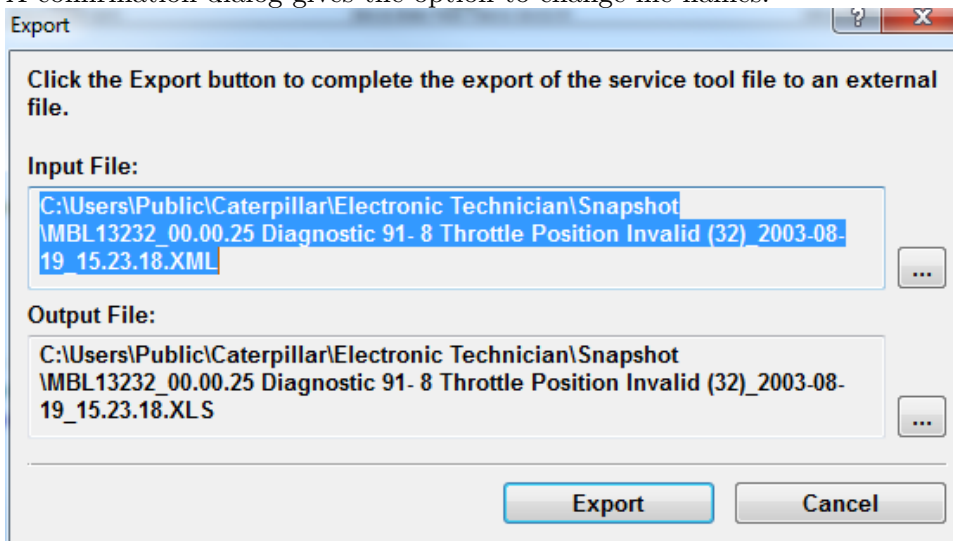
9. To Export, the file just saved needs to be opened again.



10. The exported file can be saved as an .XLS file



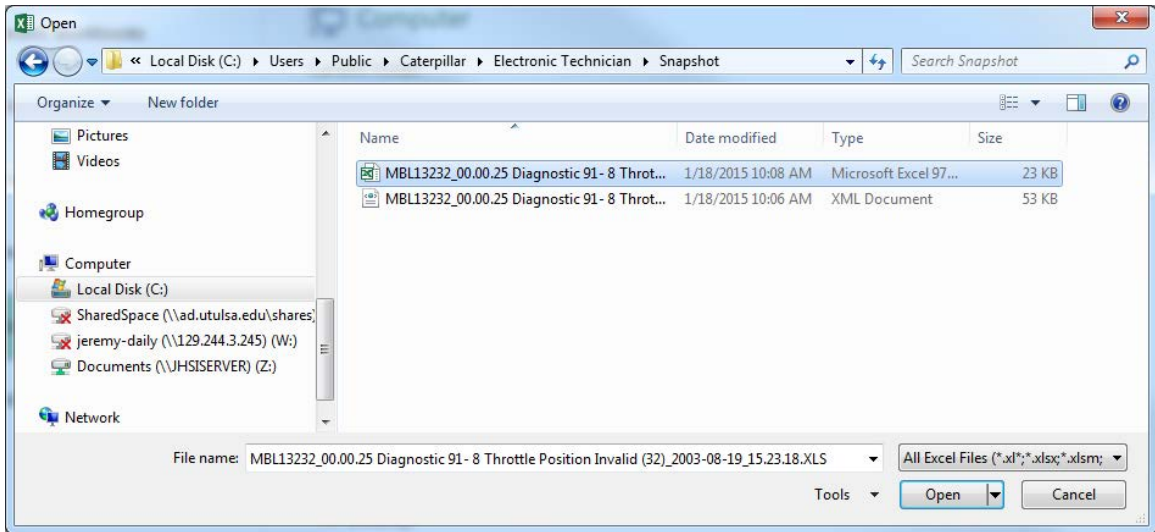
11. A confirmation dialog gives the option to change file names.



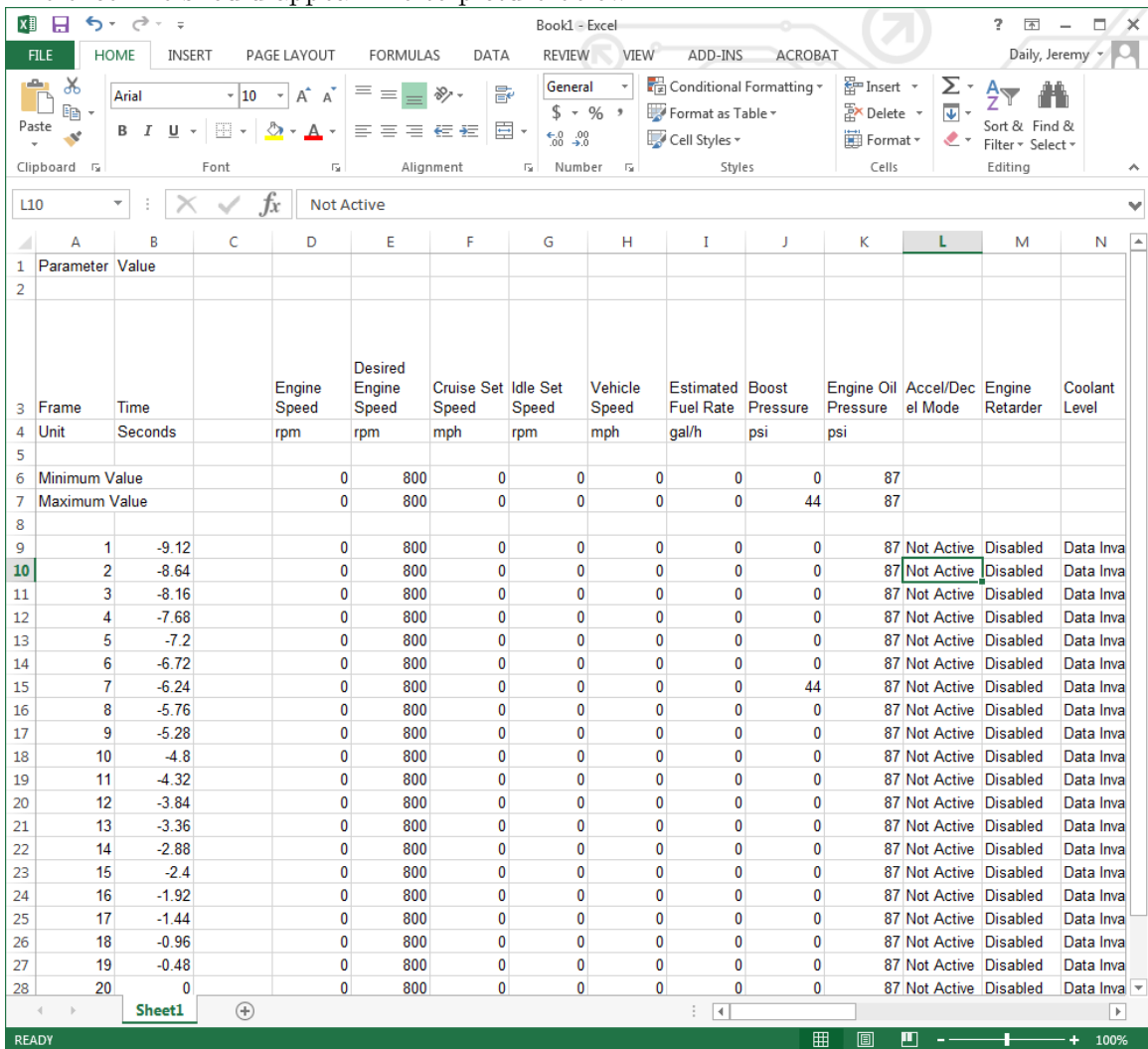
12. Record where the file was saved.



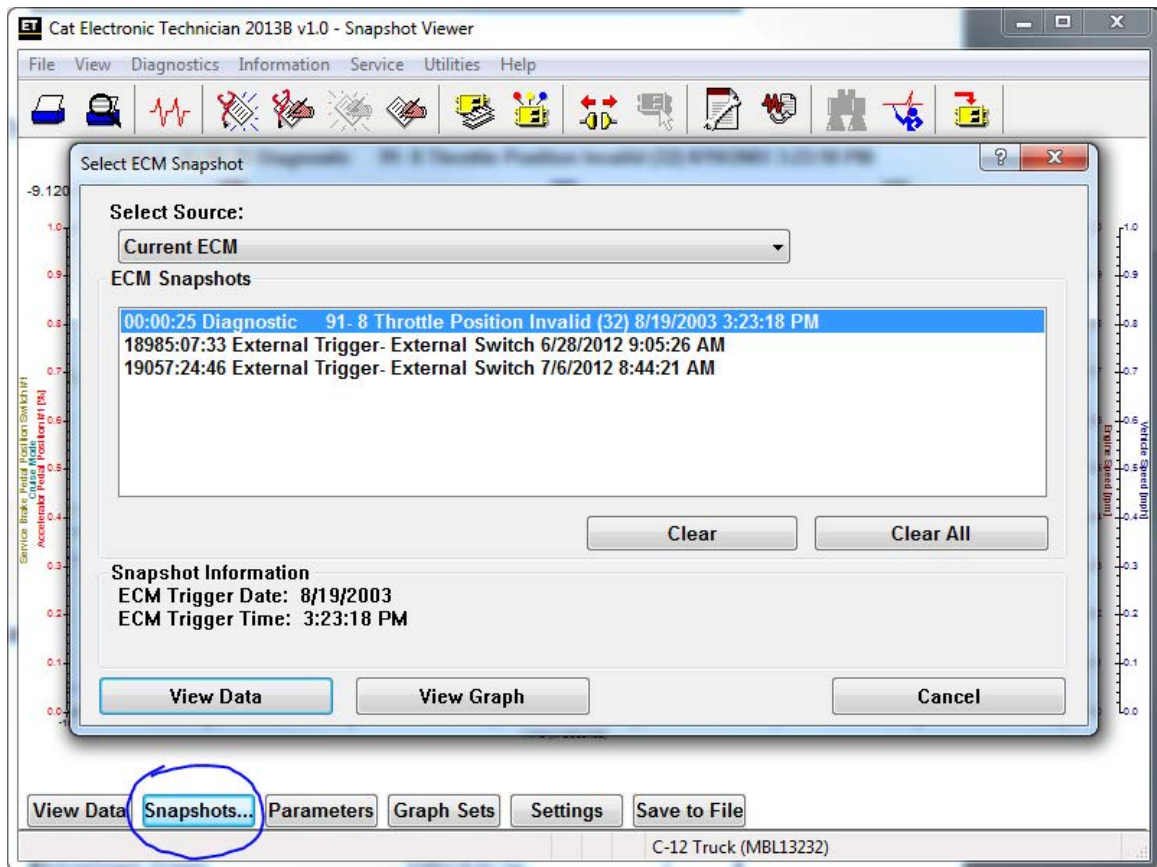
13. The Snapshot can be opened in Excel.



14. The excel file should appear like to picture below:



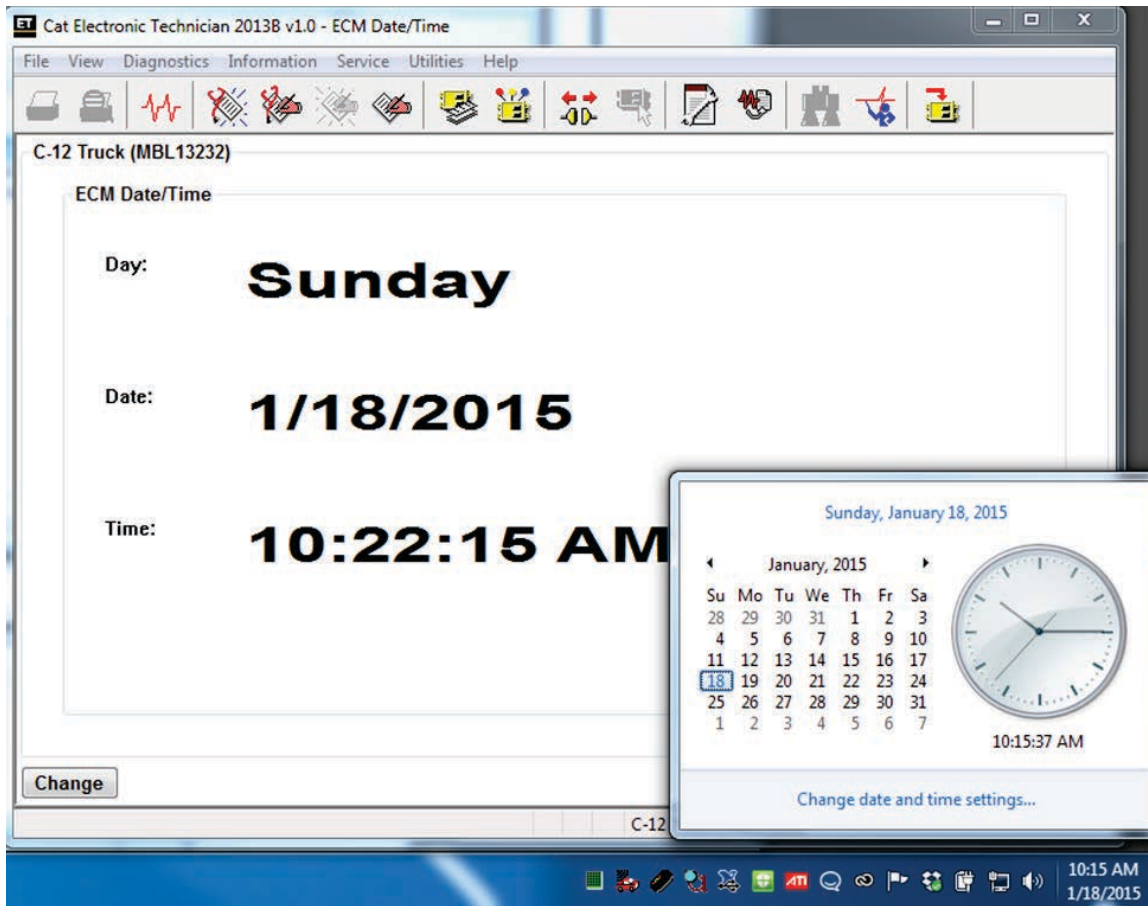
15. The additional Snapshots can be accessed by pressing the Snapshots... button in CatET.



16. Repeat this Snapshots section for all the available Snapshots.

9.3.5 Preserving ECM Date and Time

1. Select ECM Date/Time from the Service Menu.
2. Open the PC System Clock and press the PrntScrn key on the PC keyboard.
3. Paste (Ctrl-v) the captured graphic into Paint or MS Word.
4. Save the document with the screenshot.



9.4 Forensic Write Blocking

There are certain messages that should not be transmitted to the ECM during a forensic examination. These messages are the kind that will change the data stored on the ECM in a meaningful way. Resetting or clearing fault codes, changing the ECM time, and resetting trip data should always be avoided.

The following messages are actively filtered and blocked by the Forensic Link Adapter. The Forensic Link Adapter will not transmit these messages to the ECM.

Message	Purpose
Time Reset	Prevent the ECM RTC from being reset.

10

Verifying Data in the Field

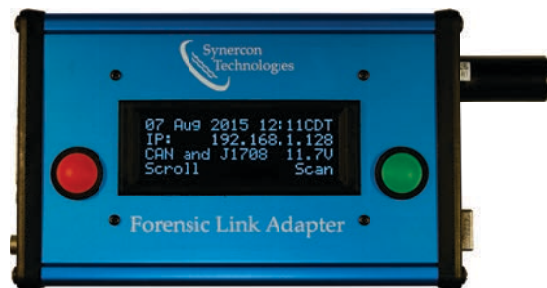
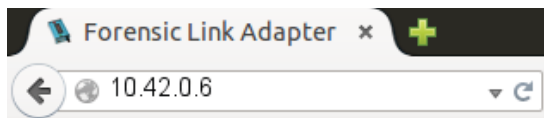
The FLA is able to give the user an overview of the data collected in the field through the FLA Preview. The FLA Preview is a website generated by the FLA that allows the user to connect to the device and examine data on it.

10.1 Accessing the FLA Preview

There are two ways to access the FLA Preview depending on what is available. If a good Ethernet port is available, connect using the at-home/in-office method. If no Ethernet port is available, connect to the preview using the in-field method.

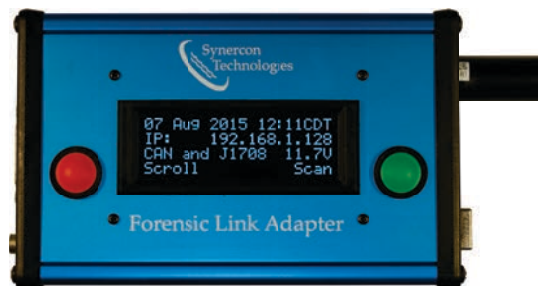
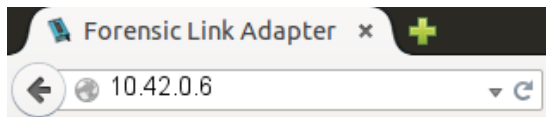
10.1.1 At-Home/In-Office

If the operator is in an office, or at home, they can set the FLA up for home use, section 4.2, or for office use 4.1. Enter the IP address from the title screen into a web browser. This will take you to the FLA Preview website. If you have trouble accessing the preview, refer to the troubleshooting section.



10.1.2 In-Field

The first step in accessing the FLA Preview is to have the FLA in the correct mode. Unless the operator wishes to place the FLA in support mode, the easiest way to access the FLA Preview is to set up the FLA for the field, as described in section 4.3. Once the FLA has DHCP enabled, and the computer is directly connected to the FLA with the Ethernet cable, enter "10.0.0.1" into a web browser. This will take you to the FLA Preview website.



10.2 Using the FLA Preview

The main page of the FLA will show the user how many pending data packages there are on the FLA, as well as if there are any downloads in progress. Under the View Local Data page, the operator can view the data packages that are not yet uploaded to the Synercon Server.

Pending Uploads
Data packages that have not yet been uploaded to the server.

FLA	Vehicle Information			Standards-Based totals							
Time downloaded	Make	Model	VIN	J1587 Messages	J1587 Faults	J1939 Messages	J1939 Faults	Freeze Frames	OEM data		
2015-07-28 14:34:06	In Progress										
View Data	2015-07-28 14:19:57	CTRPL	C-15	1XP5dB9x61D532271	34	2	14	2	0	No	Archive
View Data	2015-07-27 15:53:57	CTRPL	C-15	1XP5dB9x61D532271	33	2	12	2	0	Yes	Archive

Archived Data
Data packages that have been uploaded to the server.
[View Archived Files](#)

Synercon Technologies Forensic Link Adapter
Current Input Voltage: 11.6V
Serial Number: 1B2R90046
Software Version: 0.3beta
Patent Pending

This page gives a brief overview of each data package on the FLA that is not yet uploaded. The OEM data column indicates if the FLA has extracted data from the engine that is not a part of the standards-based extraction. From this page the operator can view the data from an individual data, view archived data packages, or archive pending data packages.

Archiving a pending data package will move the data package to the archived list, and it will NOT be uploaded to the server. This is only to be used when the operator has a pending data package they do not want to upload on the server, i.e. if it was a practice download, or it contains incomplete data due to a loose cable. Use this with care, archived data packages cannot be un-archived without Synercon support.

The View Data button will allow the operator to view a preview of the report. This will contain all of the standards-based messages, as well as standards-based faults. If the FLA

was able to collect non-standards-based data a portion of the decoded data will be available for download. The full records will be available once the operator uploads the data to the Synercon Portal.

The operator can also view archived data with the button at the bottom. Note, the archived page can take some time to load.

Under each report, the user can download the SHA256 Sums file. This file contains the SHA 256 sums of all of the files the FLA generated at the time of the download. These sums are cryptographic fingerprints of the files that can be used to determine if the file has changed since the FLA created the file. The user can save this file to perform verification of integrity of data obtained. For more information about SHA256 sums, refer to section 6.2.6.

[Download SHA256SUM file](#)

11

Administrator's Guide

This section is intended to teach administrators how to manage FLAs on the FLA Portal.

11.1 FLA Portal terminology

The FLA Portal has the following categories:

Organizations are the top level with a site administrator as the person in charge. Typically this is a highway patrol, a state police, or a company. The person in charge of the organization has the ability to oversee the data and use of the different FLAs.

Groups are a sub-level within an organization. For example, East District and West District may be groups within an State Police organization. If an organization only has a few operators and a few FLAs, it may not make sense to have different groups.

Operators are trained users of the FLA and are responsible for collecting data in the field. Operators can be assigned to different groups. Every operator in the group is able to see the data packages from all the FLAs assigned to the group, regardless of which operators downloaded the data.

Forensic Link Adapters are the hardware devices that an organization owns.

11.2 Account Overview

Forensic Link Adapters are assigned to each organization at the time of purchase. Once the organization completes the purchase, the serial numbers of each FLA will be loaded into the Organization's profile. An invitation to set up the Organization will be sent to the site administrator. For example, the Lieutenant in charge of the crash reconstruction division will become the site administrator once he or she registers by following the link sent in the invitation e-mail.

Once logged in as a Site Administrator, an account overview page will be available, much like the one shown in Figure 11.1. Many of the fields on the web page are linked to various functions. The top bar (in black) has links to your default login page, the latest FLA download if you are an operator, a list of all the organizations, FLAs, and some account access settings. The web page is set up in three distinct tables as seen in Figure 11.1.

1. Organization Groups

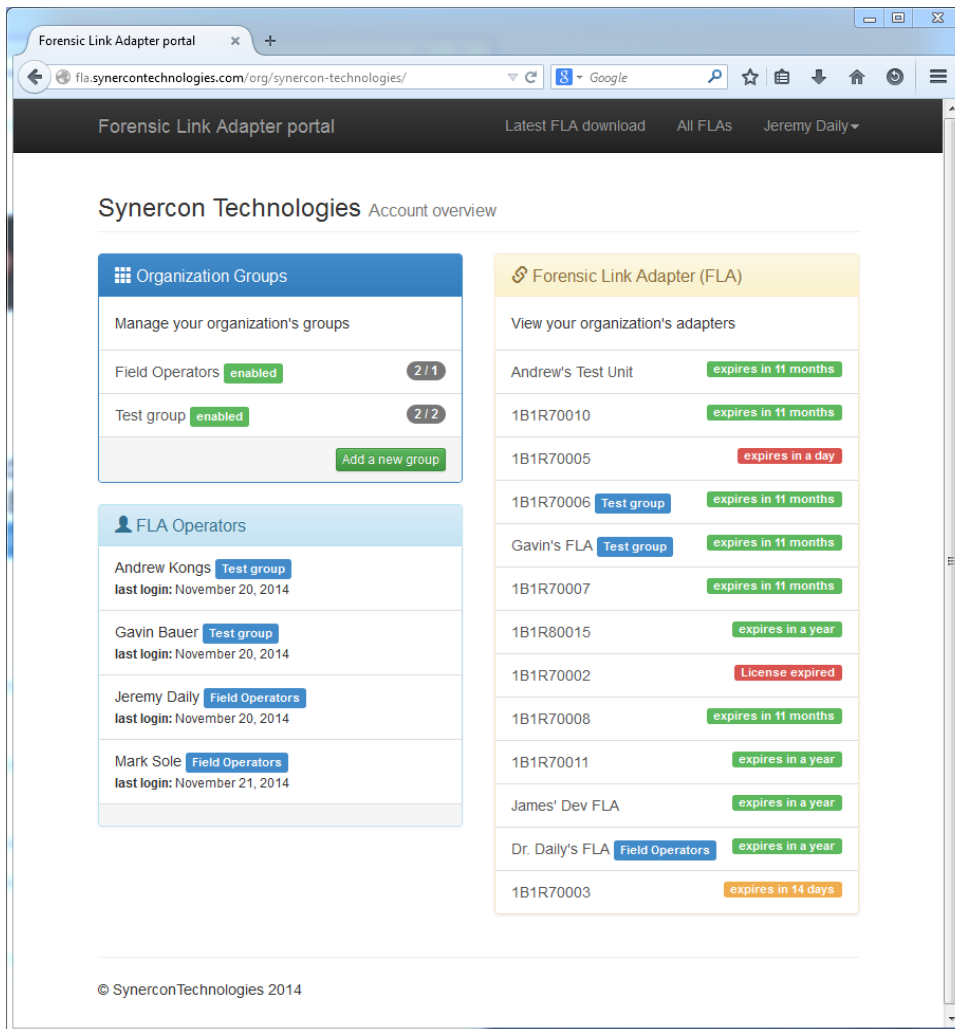


Figure 11.1: Example Forensic Link Adapter Portal web page for the Account overview

2. FLA Operators
3. Forensic Link Adapter (FLA)

11.3 Group Management

It is the responsibility of the Organization administrator to set up groups and operators according to the desired structure of the Organization. You can have operators that have access to more than one group.

11.3.1 Adding an Operator

There are two ways to get an operator access to the group's FLAs. The first is to invite a new operator and the second is to invite an existing operator. However, the existing operator must have accepted an invitation from the Organization under a unique e-mail address. By clicking on the lower left box that says 'Invite new operator' shown in 11.2, a web page similar to the

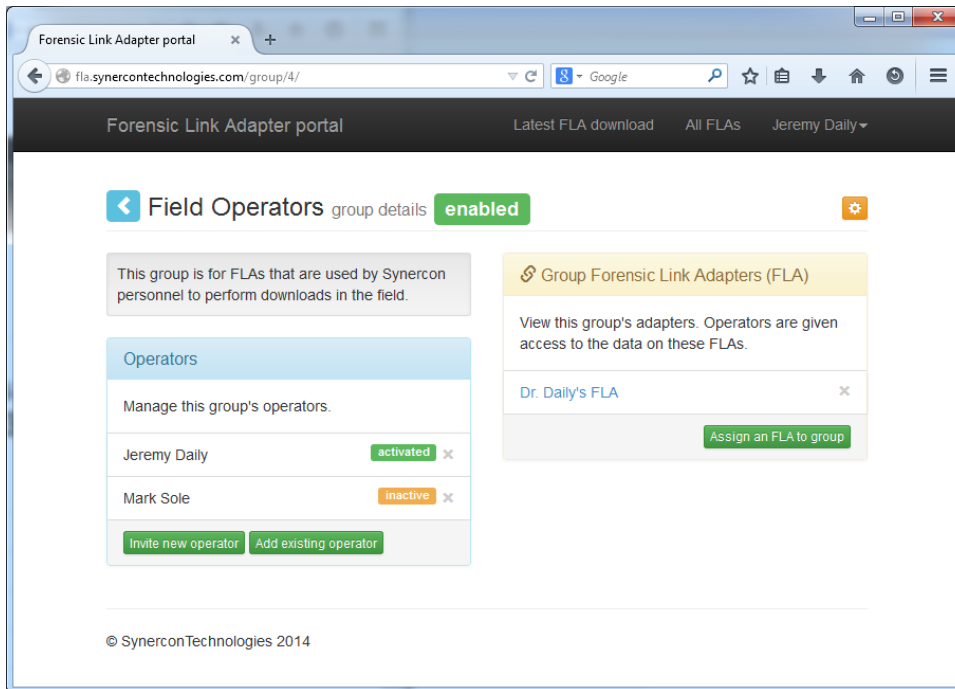


Figure 11.2: Example Group Details web page from the Forensic Link Adapter Portal.

one shown in 11.3. The required user information includes name and email address. The FLA portal uses e-mail addresses to identify operators. Therefore, if a person belongs to different organizations, they would have to use a different e-mail for each organization. New operators will get an e-mail from `fla-admin@synercontechnologies.com` with a link to register with the site. Many times this e-mail will be filtered as junk, so advising the recipient to check their e-mail filters and junk folder may be necessary.

The Work Address details on the Invite and operator page are used to fill in a report with

11.3.2 Assigning an FLA to the Group

Each group needs to have at least one Forensic Link Adapter assigned to it. To assign an FLA to a group, click the button to see a list of available FLAs for your organization. Only people in the group can see the data on the FLA assigned to that group

Forensic Link Adapter portal

Invited users are sent an email with details on how to verify their account. If they do not receive the initial email they can be resent the invitation on the group details page.

User information

First name*

Last name*

Email address*

General

Company/Organization*

Occupation Classification*

Work Address

Street address

Address line 2

City

State/Province

Zip

Country

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Figure 11.3: New Operator invitation form on the FLA portal website.

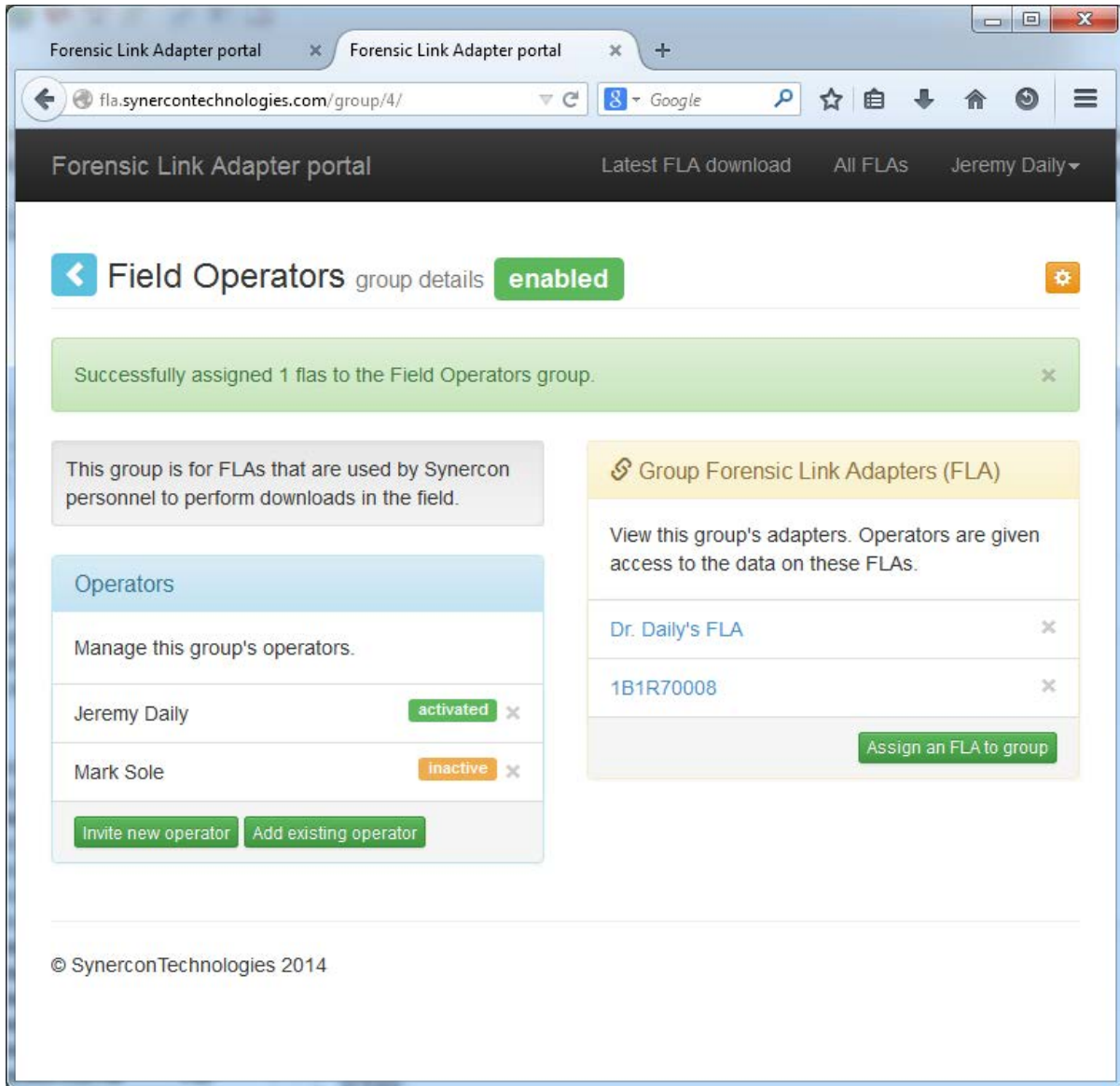


Figure 11.4: Assigned FLAs

12

Suggested Practices

This section is intended to provide a very brief overview of using the FLA, for a more in-depth guide, refer to the Field Guide.

12.1 Initiating FLA Support mode

In order to provide the quickest and most complete support, it may be necessary to place the FLA in support mode. This allows Synercon Support staff to create a secure connection to an FLA anywhere with an Internet connection. It may also be referred to as a “Support Channel”.

To place the FLA in support mode, or “Open a Support Channel”, follow these steps

1. Verify a Synercon Support representative is ready for you to initiate Support Mode.
2. Connect the FLA to the Internet as described in subsection 3.3.3.
3. Navigate to the FLA Preview site as described in section 5.
4. Select the “Support” option from the menu at the top.
5. Click the “Open the support channel” button to initiate Support Mode.
6. After a brief period, the page will change to say the connection was successful, if the connection was not successful, refer to the troubleshooting section.
7. Do not close the web page, or click the “Back” or “Refresh” buttons. It is important to stay on this page until the Synercon Support representative is finished providing support.
8. When the Synercon Support representative begins working on your FLA, the screen on the device will change to indicate a member is performing work.
9. When the Synercon Support representative is finished, the unit will display a message indicating the work is finished.
10. The FLA will automatically reboot.
11. After the device loads the Title Screen, then click the “Close Support” button to return the FLA to normal operational mode.

12.2 Installing PC Software

12.2.1 RP 1210 Drivers

The FLA can operate as an RP1210 device. This is used for connecting OEM software to ECMs. A computer does not need the RP 1210 drivers to access the FLA Preview, and the FLA Portal. You will need administrative privileges to install these drivers.

To install the RP1210 Drivers, follow these steps

1. Connect to the FLA Preview described in the above section (Either In-Field, or In-Office methods will work)
2. Select the Download Drivers option from the menu at the top of the web page
3. Select "Download Drivers"
4. Once the file is downloaded, extract the .zip file to a folder
5. Open the folder, and double-click "DPA4Plus_RP1210.exe"
6. Follow the on-screen instructions to install the drivers

After the drivers are installed, they can be tested with the following steps

1. Make sure the FLA is powered on, and connected to an ECM (It is possible to test the drivers without a live ECM, to do so see the special instructions)
 - (a) Skip steps 2,3,and 4 if not connected to a live ECM
 - (b) Begin a scan on the vehicle
 - (c) After the scan has completed and you see the "Enable RP1210 Mode" screen
 - (d) Confirm the top line of the FLA read "CAN/J1939 Pass Mode."
 - (e) Search on your computer for the program "Adapter Validation Tool" and run it
 - (f) Select "MD/HD"
 - (g) Set the Vendor to "DG1210xx - Dearborn Group RP1210" (the xx will likely be 32)
 - (h) Set the Device to "DG DPA 4 Plus USB"
 - (a) Skip to step 14 if the ECM does not support J1939
2. Set Protocol to "J1939"
3. plug the USB cable into the FLA and the computer
4. Click "Run Test"
5. The text boxes labeled "RP1210 Status Window (PC-VDA)" and "RP1210 Data Message Window (VDA-Vehicle)" should turn green
 - (a) If you are not connected to a live ECM, the "RP1210 Data Message Window" will turn red as there are no messages
6. A text box will appear and will describe the results of the test.

7. Click "Quit" on the pop-up window titled "Test Results Discussion"
 - (a) If the ECM does not support J1708, the test is complete. If it does, continue
8. Change the protocol to J1708
9. On the FLA click the Green button to enable J1708 passthrough
10. Confirm the top line of the FLA read "J1708 Pass Mode for"
11. Click "Run Test"
12. A text box will appear and will describe the results of the test
13. Click "Quit" on the pop-up window titled "Test Results Discussion"
14. Close out of the adapter validation test

12.3 Performing a download on a Heavy Vehicle

This section provides a very high level overview of a typical download.

1. Plug in the FLA to the 9-Pin Diagnostics Connector
2. Turn on the ignition key to run
3. Run a vehicle Scan
4. Download Supported Data (if available)
5. Enable RP1210 Mode (Optional depending on the ECM and user's procedure)
 - (a) Connect the USB Cable
 - (b) Run OEM Software
6. Verify the data collected via the FLA Preview
 - (a) If desired, repeat steps 3-6 until satisfied
7. Shutdown the FLA
8. Reach a location that has a working Ethernet port
9. Connect the FLA to the Internet
10. Upload the data from the field
11. View the full report on the FLA Portal

12.4 Connecting to Engine Control Modules on a Bench

When performing bench downloads, it is recommended to use a Smart Sensor Simulator to minimize the chance of throwing additional faults as compared to a traditional calibration harness. For more information about Smart Sensor Simulators, visit [\url{synercontechologies.com}](http://synercontechologies.com). Once connected, use the FLA in accordance to the recommended practices outlined in the Field Guide and accompanying Quick Start guides.

The following are typical steps taken during a download.

1. Confirm the correct SSS is being used for the ECM
2. Connect the SSS to the ECM
3. Connect power to the SSS via the included power adapter
4. Press the Key Switch until the Key On lamp is illuminated, about two seconds
5. Verify the Key On lamp stays illuminated for one second before proceeding. If not, refer to the troubleshooting section
6. Plug in the FLA to the 9-Pin Diagnostics Connector located on the SSS
7. Run a vehicle Scan
8. Download Supported Data (if available)
9. Enable RP1210 Mode (Optional depending on the ECM and user's procedure)
 - (a) Connect the USB Cable
 - (b) Run OEM Software
10. Verify the data collected via the FLA Preview
 - (a) If desired, repeat steps 3-6 until satisfied
 - (b) Skip to step 13 if there is a working Ethernet port where the bench download is occurring
11. Shutdown the FLA
12. Reach a location that has a working Ethernet port
13. Connect the FLA to the Internet
14. Upload the data from the field
15. View the full report on the FLA Portal

Part III

General Information

13

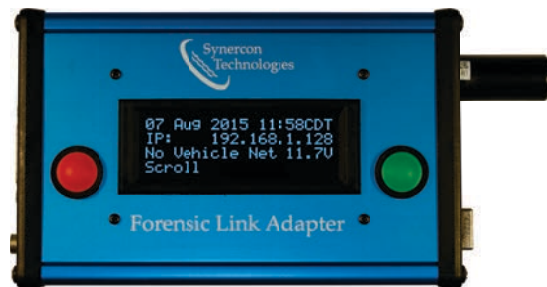
Troubleshooting

13.1 Vehicle Connection Problems

13.1.1 Do not get the Option to Scan Vehicle

Symptom:

The FLA Title Screen does not allow the user to scan the vehicle



Solution:

- Check that the key is in the ON position, with the engine not running.
- Check to see if the vehicle voltage is nominal, low voltage may prevent ECMs from responding.
- Check all cables for secure connections.

If the above list does not solve the issue, the communication wires from the ECM to the diagnostic port may be damaged. If this is the case, the ECM modules may have to be removed and the operator may have to perform a bench download on the unit. The recommended practice is to use a Synercon Smart Sensor Simulator with the truck ECMs in order to help preserve the data on the modules.

13.2 FLA Internet Problems

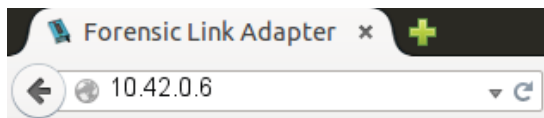
13.2.1 Cannot access the FLA Preview website

Symptom:

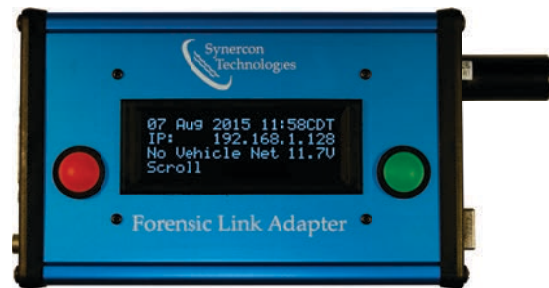
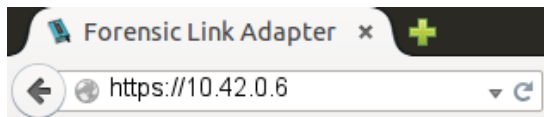
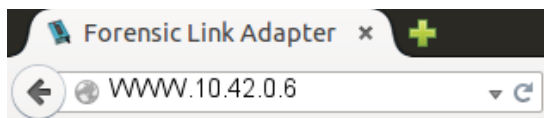
The operator is not able to access the FLA Preview website. Solution:

- navigate to the title screen and verify the FLA has an IP address. If the IP line reads 'cable unplugged', or 'finding IP address', see the FLA Does not have an IP Address section.
- If the FLA is not connected directly to a computer (i.e. the FLA is plugged into an Ethernet port in an office, or home) ensure the DHCP service is off. If the IP address of the FLA is 10.0.0.1, the DHCP service is likely on. For more information about the DHCP service, see section 3.3.7.
- Ensure the operator has typed in the IP address exactly as it appears on the FLA, do not add any extra characters, such as leading zeros before the numbers, or extra spaces.

Correct:



Incorrect:



- Ensure the FLA is on the same network as the computer used to access it. Depending on the configuration, if the computer is connected to a wireless network, try to plug into an Ethernet cable near the port the FLA is plugged into.

If the above steps do not resolve the problem, the operator may need to contact the department IT services. If they are not able to resolve the issue, please contact Synercon support.

13.2.2 FLA Does not Have an IP Address

IP says Ethernet Unplugged

Symptom:

The IP line of the FLA Title screen says Ethernet Unplugged



Solution:

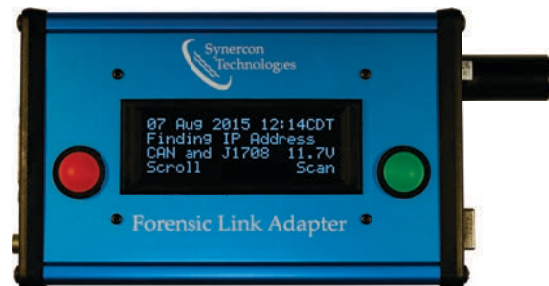
- Check cables are plugged in all the way.
- Reboot the FLA with the Ethernet cable plugged in.
- Verify the port is working with a computer.
- Contact your department IT services, and ensure the FLA is given the permissions to access the Internet. Often this is done by 'whitelisting a MAC address'. If the operator needs to provide the MAC of the FLA, this can be accessed via the configuration menu. For more information, see section 3.2.2.

If the above steps do not solve the issue, the operator may need to contact Synercon support.

IP says Finding IP Address

Symptom:

The IP line of the FLA Title screen says Ethernet Unplugged



Solution:

- If the FLA is being used in the field, and directly connected to a computer, enable the DHCP service. See section 3.3.7.
- Reboot the FLA with the Ethernet cable plugged in.
- Verify the port is working with a computer.
- Contact your department IT services, and ensure the FLA is given the permissions to access the Internet. Often this is done by 'whitelisting a MAC address'. If the operator needs to provide the MAC of the FLA, this can be accessed via the configuration menu. For more information, see section 3.2.2.

13.3 FLA Boot Problems

13.3.1 FLA Does not Boot When Plugged in

Symptom:

The FLA does nothing when plugged into a vehicle. Solution:

- The power wires to the diagnostic port may have been damaged, use the cigarette lighter adapter in the FLA case to provide power to the FLA. It is recommended to carry a portable battery for powering the FLA via battery for such situations.

If the FLA will not boot with either the cigarette lighter adapter plugged into a know charged battery, or the wall adapter, please contact Synercon support.

13.3.2 FLA Does not finish booting

Symptom:

The FLA reaches this screen, and does not proceed to the Title screen for more than 30 seconds.



Solution:

- Wait 30 seconds for the system to attempt to boot.
- If the system does not boot, remove power sources, wait 30 seconds and then plug the FLA in. Note this is not recommended as a standard method to shut the FLA down, only do this when you have exhausted all other methods to shut the system down safely.

If the device continues to fail to boot for more than 2 times, please contact Synercon support.

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Definitions

When dealing with heavy truck data, there are many acronyms, symbols and phrases that are used to describe the data. This chapter presents a list to help decipher some of the terms used for dealing with heavy vehicle event data recorders.

The Forensic Link Adapter (FLA) is a field rugged computer that is programmed to download data from heavy vehicles.

ECMs: Electronic Control Modules. These are the “computers” that run heavy vehicles, they can contain data useful when investigating a heavy vehicle.

OEM Original Engine Manufacturer.

The FLA the data extraction device device created by Synercon. This is the blue box that the operator uses to communicate with heavy vehicles.

The FLA Portal the website fla.synercontechologies.com . This is where operators can view full reports

The FLA Preview the local website hosted by the FLA. This allows operators to preview reports before they are uploaded to the FLA Portal.

Data Package all of the data extracted from a heavy vehicle, as well as metadata about the extracted data, such as GPS coordinates, and timestamps.

Preview Report a report that has not been processed by the FLA Portal, these reports only have standards-based data, and some of the non-standards-based data.

Full Report a report that is being viewed from the FLA Portal, these reports will have all of the data the FLA system is able to understand.

Standards-based-data Data that is defined by the SAE standards J1587 and J1939.

Non-Standards-based-data Data that is not defined by the SAE standards J1587 and J1939. i.e. Snapshot records for CAT ECMs. These data elements are determined by the OEM of the ECMs

NIST National Institute for Standards and Technology (<http://www.nist.gov/>)

RTC Real Time Clock

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Requirements

In order to take full advantage of the Synercon products, such as the FLA, FLA Preview, and FLA Portal, the user will need to have access to additional software and ports such as those outlined in the following sections.

15.1 Supported Web Browsers

In order for the FLA Preview and FLA Portal to work correctly, the user will need to meet the following browser requirements.

Internet Explorer at least version 10 (2012)

Firefox at least version 31 (2012)

Chrome at least version 31 (2013)

Safari at least version 7 (2013)

Opera at least version 29 (2015)

15.2 Drivers

In order to use the FLA in RP 1210 mode, the operator will need to install the drivers first. This will require administrative privileges. The drivers are provided with the FLA.

15.3 OEM Software

In order to extract data from ECMs that are not fully supported, the operator will need the relative OEM software to acquire non-standards-based data.

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Warnings

Synercon Technologies does not warranty any products against user caused problems. In order to prevent any damage to the FLA and data collected by the FLA, always follow these guidelines.

Only use the included wall adapter or cigarette adapter to power the FLA

When not using a vehicle to power the FLA, only power the device using the included power supplies. Never plug in a foreign adapter, especially if the voltage exceeds 12 volts.

Never plug the FLA into a diagnostic port that has a vehicle voltage above 26 volts

When plugging in the FLA to a vehicle, ensure the voltage of the diagnostic port does not exceed 26 volts. If in doubt, a multi-meter can be used to verify voltage

Do not remove power from the FLA without first shutting down

Unless specifically instructed to do so by a troubleshooting guide, avoid removing power to the FLA without first shutting down. Use the securing screws of the cables to secure all cables against accidental disconnection.

Do not expose the FLA to water

The FLA is NOT waterproof, even powered off. Avoid dropping the unit in puddles, or exposing the device to rainfall. Take care to ensure a dry environment is available before operating the FLA. If the unit is exposed to water, even when powered off, the water can damage the unit, and potentially any data stored on the unit. If exposed to water, immediately power the unit off and contact Synercon Support for instructions.

Do not expose to excess heat or cold

Do not expose the FLA to temperatures exceeding 50C (122F), or below 0C (-32F).

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Synercon Training

Synercon Technologies provides classes to train users in the proper use of Synercon Products in investigating vehicles. For more information about classes, please contact jeremy@synercontechologies.com.

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Contact Synercon Technologies

Sales

If you need to extend an extending an FLA subscription, or are interested in purchasing additional FLAs, or SSSs, please contact our sales department at [email{sales@synercontechologies.com}](mailto:sales@synercontechologies.com)

Support

While we strive to provide the highest quality products, if you have an issue with our products and need to contact us, please send an email to [\email{support@synercontechologies.com}](mailto:support@synercontechologies.com).

When requesting support, please include the following:

- 1) the product (i.e. FLA, or SSS)
- 2) the serial number (it is printed on the bottom of all Synercon Products)
- 3) A detailed explanation of the issue
- 4) Any steps you have already taken to solve the issue
- 5) [optional] any screen shots, or pictures if you believe they will help us understand the problem.

We will attempt to respond to you as quickly as possible.