DOCUMENT DESCRIPTION: NALYSIS 2.0 USER MANUAL

DWG #: A-820-J-530-4

REVISIONS

TABLE 1

Revision Number	Date Revised	Description of Revision	Revision By
1	03APR2019	Switched over from 820-0007-J-6 document which was for NAlysis 1.0. Add upgrade via YModem in Terminal application section; and WinGov section.	HKC
2	18JUL2019	Update WinGov section. Add System Requirements 1.1	HKC
3	5FEB2020	Update acronym list; add RDU LED indicator legend; add Export Data section for NCORDER; Inspect Data section has updated screenshots and instructions for fuel usage estimate; update Speed Indicator screenshots	HKC/LLH
4	30MAR2020	Updated new Stats tab interface, removed autobaud from section 3.0, Updated section 4.4 Setup Tab to support the newly designed GUI	BL
5	13JAN2021	Update Process(*bli) for info on .csv outputs, updates for mile post location being on plot control display, formatting updates NCorder Interface	JJ

Table of Contents

1.0 Nalysis Software

The Nalysis software allows communication via RS-232 serial link to the *NForce, NCorder, NLIMIT NCOMPASS, WinGov* and *TERMINAL* screen (Windows Hyper Terminal).

The *NFORCE, NCORDER and NLIMIT* Systems have an integrated recording function which is continually operating while the system is functional. These systems record information and store it in three types of logs: 1) Faults, 2) Diagnostic, & 3) Statistics). This information can be downloaded using the Nalysis software program. This system scans all inputs and outputs – digitals and analogs – 10 times each second, and updates each log as required.

The Nalysis software also has the interface function to each of the system including the Terminal Interface (similar to the Hyper Terminal screen).

1.1 System Requirements

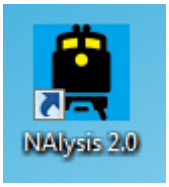
These are derived from Windows 7 requirements:

- Processor -1 gigahertz (GHz) or faster 32-bit (x86) or 64-bit (x64).
- RAM - 4 GB with at least 2 GB of available space.
- Disk - 16 GB available space (32-bit) or 20 GB (64-bit). NAlysis only takes up about 13 MB on the hard drive and will run on 32-bit or 64-bit systems.
- Graphics Card - DirectX 9 graphics device with WDDM 1.0 or higher driver.

2.0 Installing Nalysis

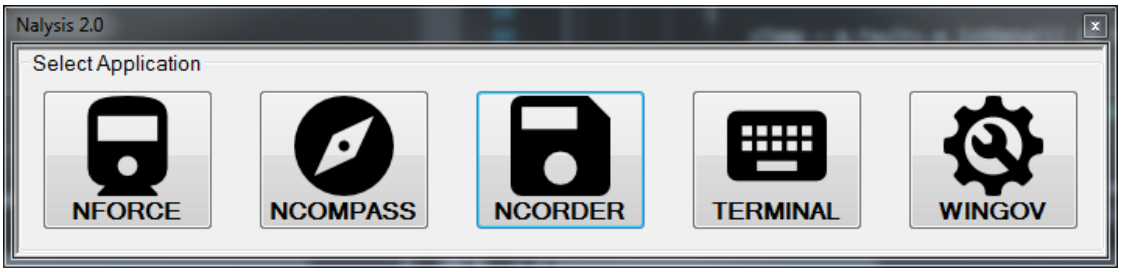
- If you install the Nalysis for the first time, download the software from the following link:

  https://nre-electronics.com/nredownloads.html

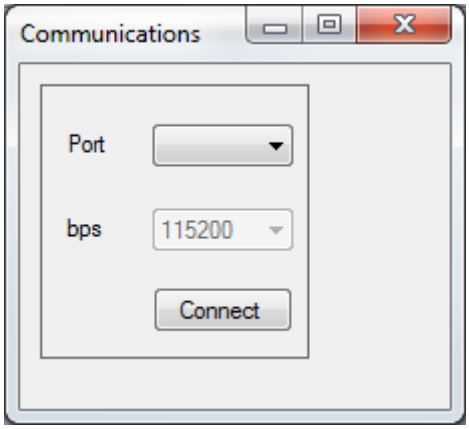
- From the web page, click on *Download NALYSIS Installation Zip File* or *Download NAlysis Installation Executable*
- If you downloaded the zip file, open the zip file, and double click on the Nalysis_Installer_xXX.exe that is in the zip file. You may get a security warning when you start the install. If you do, click on the Run button. Once the installer has started, follow the instructions.
- If you downloaded the executable, double-click on the file to install. You may get a security warning when you start the install. If you do, click on the Run button. Once the installer has started, follow the instructions.
- You should see a desktop icon after the installation completes.
- 

3.0 Nalysis Startup

- Open Nalysis from Laptop/Computer by clicking on the desktop icon and click on the required Application button to launch the specific Nalysis program.



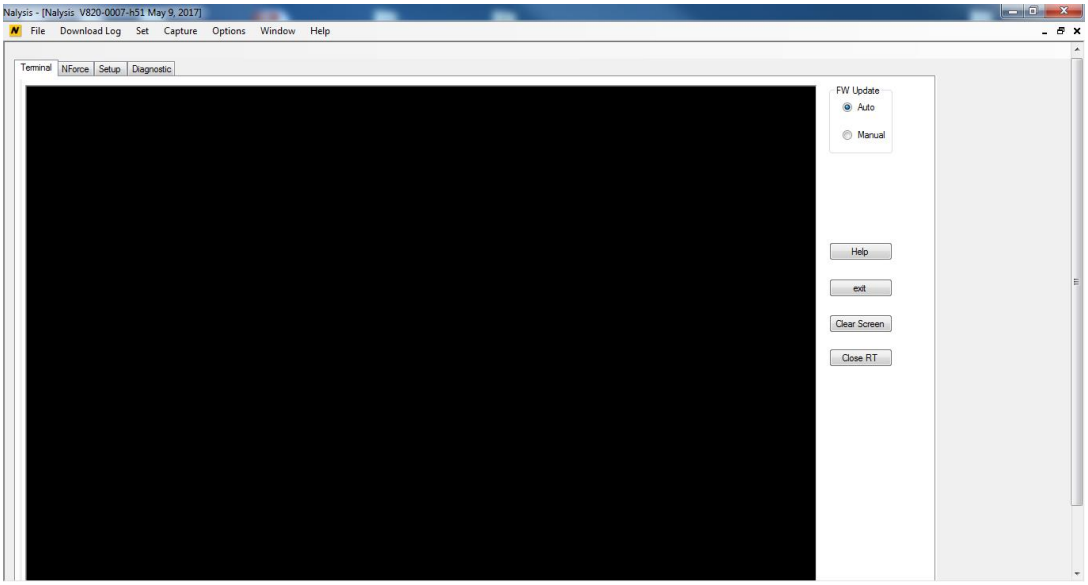
- Select the available Communication Port and click on Connect to establish communication between System and Nalysis



4.0 NFORCE Interface

Open NForce application by clicking on its button:

When selecting NFORCE, the user will first enter the Terminal tab of the NFORCE application.
Note: The following functionality is only available on NForce systems that have Nalysis communications Drivers.

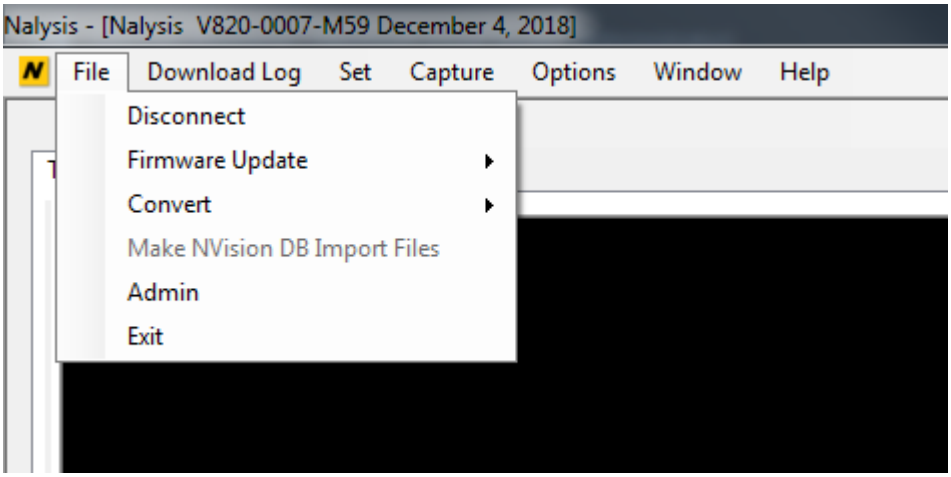


4.1 Menu

There are pull down Menu available for various functions in the NFORCE application.

4.1.1 File

The File pull down menu is available for the following functions:

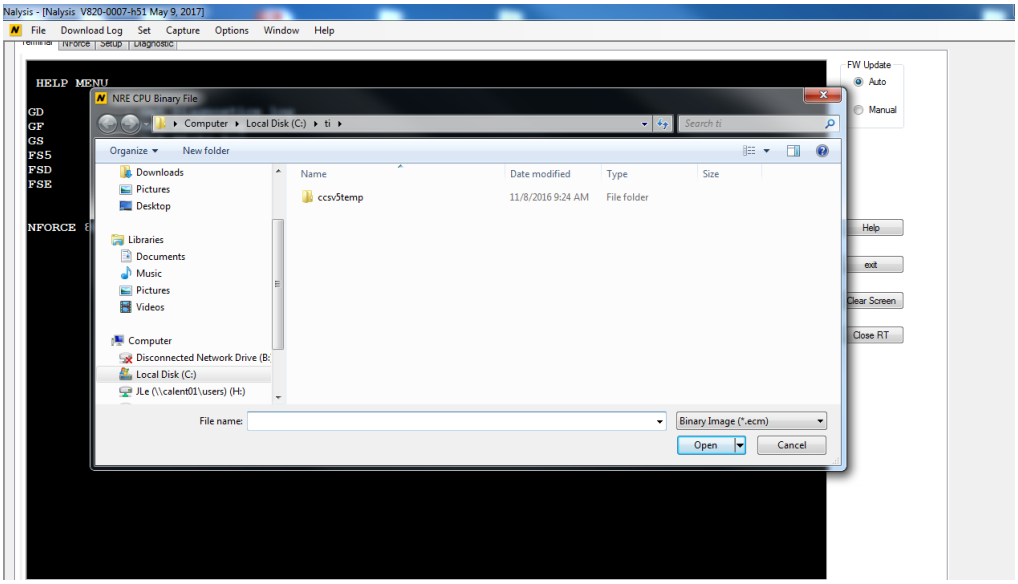


- **Connect/Disconnect**
  - Allow User to Connect or Disconnect communication between NFORCE system and Nalysis.

- **Firmware Update**
  - Allow User to update Firmware to the NFORCE system

  - To upgrade the *NFORCE* firmware, you must do the following:
    - Isolate the locomotive and shut down the engine(s).
    - Connect the communications cable to the front of the CPU board and your laptop.
    - Exit any real-time viewing screen in the Terminal or NFORCE tabs.

  - For automatic update, ensure the Auto radio button is selected (software default)
  - Select File->Firmware Update>CPU, an open file dialog similar to the one below will appear



- Browse to the location of the *NFORCE* firmware on your Laptop/Computer.
  i.e.
  The *NFORCE* firmware number = 820-0###-xXX.ecm (where ### = the NFORCE Firmware number, and xXX = Latest Revision)

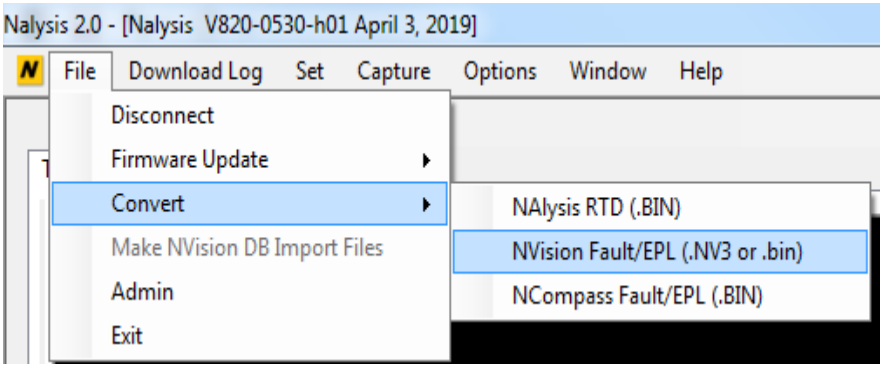
- Double click on the *.ecm file to upload the Firmware to the system

CAUTION: DO NOT INTERRUPT COMMUNICATIONS DURING THIS PROCESS; it could cause a fatal fault inside the NFORCE.

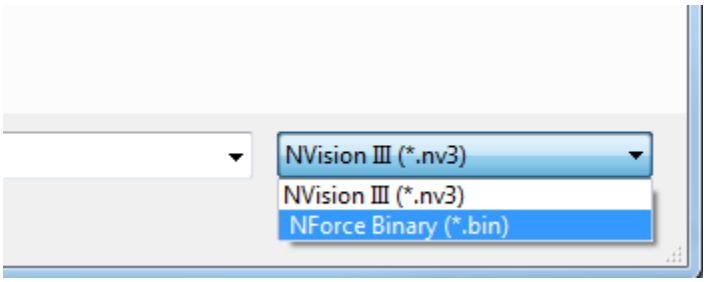
- **Convert**

  - To convert the RTD file with the ".bin" extension into a text file that is ready to analyze.

  - Convert an NVision 3 file to a CSV formatted file. The file was downloaded via the USB port on the NVision 3. This can also be used to convert a Fault or EPL ".bin" file that was downloaded from the NForce that has the binary download feature.



- Then select the file type in the Open File Dialog window.



- Convert a Fault or EPL file that was downloaded from the NRE website that was transmitted by NCompass.

- **Make NVision Import DB Files**
  - For Engineering use only. This will be greyed out for non-Admin users.

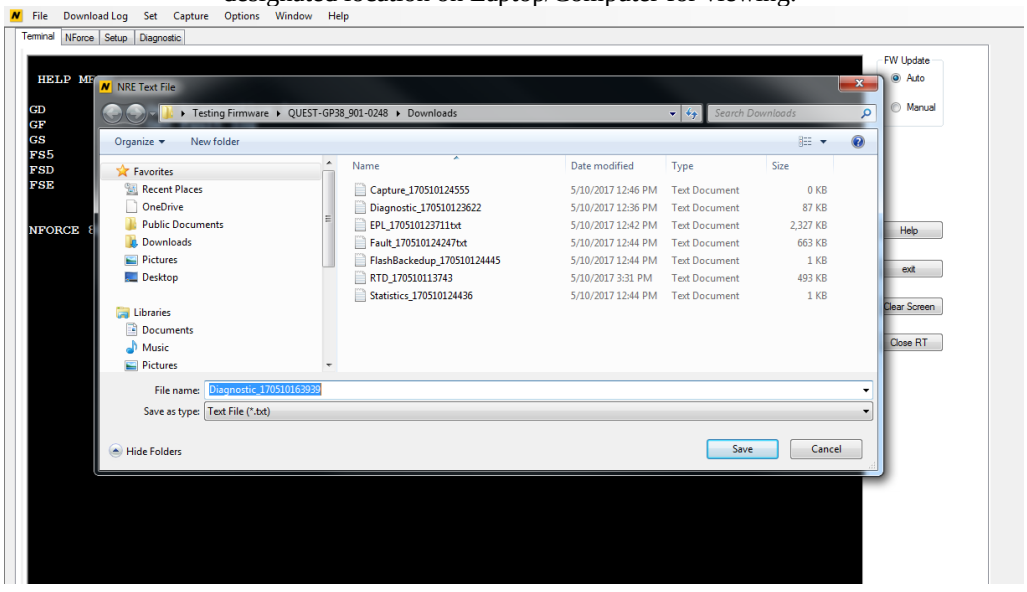
- **Admin**
  - Only available to the programmer.

- **Exit**
  - To exit NAlysis program.

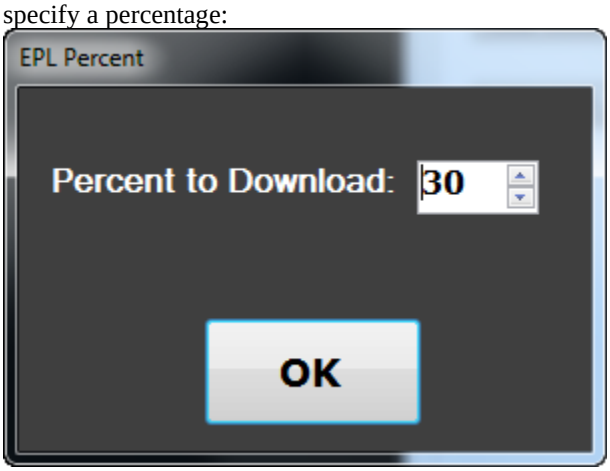
4.1.2 Download Log

This feature allows the User to perform the system log download from the pull down menu.

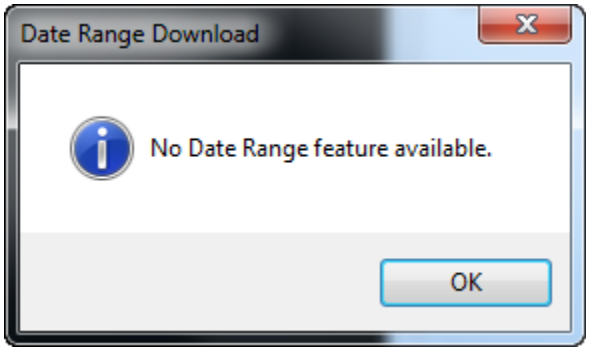
- **Diagnostic**
  - Diagnostic log download can be useful to observe the most recent performance of the locomotive. The log has all of the data download at 0.1 second intervals for around 1.5 to 2.0 minutes prior to taking the download.
  - Click on Diagnostic to download the Log to file. Save the file to a designated location on Laptop/Computer for viewing.



- **EPL**
  - The EPL stores long term locomotive data and can be used along with the Diagnostic and Fault downloads to provide a clear record of the operation and performance of the NFORCE system. When a fault is detected, the associated fault and data packets are recorded to both the fault record and the extended performance log. Certain events also cause data packets to be recorded to the EPL. A data packet is recorded to the EPL when the following events occur:
    - A monitored digital input signal changes state (turns ON or OFF)
    - A monitored analog signal changes by a pre-set threshold
    - A predefined number of minutes (typically 10 minutes to maximize recording memory) has passed since the last data packet was recorded
    - Downloads might only be performed if the locomotive is Isolated and is not Loading.
  - Click on EPL to download the Log to file. Save the file to a designated location on Laptop/Computer for viewing.
    - Download using Percentage. This option will prompt you for a percentage if you're using a system that uses ASCII. If your system utilizes binary downloads, this option will automatically download 100% of the EPL. If not, then you'll get a prompt to specify a percentage:



    - Download using Date Range. This is more efficient than the percentage download, if your system has binary downloads available. If your system does not binary downloads, this option will inform you that the feature is not available.



- **Fault**
  - The Fault log can be useful to identify problem with Feedback signals such as Contactor Fault or an open Solenoid.
  - Ensure that the locomotive is in Isolated and is not Loading. Initiate the file transfer by clicking on Fault to Download the Log file. Save the file to a designated location on Laptop/Computer for viewing.

- **Statistics**

  The Statistics Log records various information that relates to the locomotive and its operation. Most of this information is cumulative and is referred to as statistics; whereas some information defines the parameters of the locomotive and the *NFORCE* System. All Lifetime Statistics are also stored in an external, non-volatile memory device which remains on the locomotive at all times.
  Note: For an NFORCE system that has NAlysis communication capability, a Statistics Log can be downloaded and saved from the *Setup* Tab (see Section 4.4)

  The Statistics Report contains the following information:
  - **Date/Time** (settable parameter) is the time and date of the download computer when data was downloaded from the *NFORCE*.
  - **Firmware Version** indicates the version and revision of the *NFORCE* internal operating software.
  - **Loco ID** (settable parameter) is the ID number of the locomotive from which data was removed. The ID number is composed of 5 alpha-numeric characters. Acceptable characters include numbers 0-9, letters a-z and letters A-Z. Space is used for blanks in the event the ID number is less than 5 characters in length.
  - **Wheel Diameter** (settable parameter) is the diameter of the locomotive wheel in inches.
  - **Axle Gen PPR** (settable parameter) is the pulses per revolution (PPR) of the incoming speed signal from the installed speed pick-up equipment.
  - **Idle Parked** indicates the number of hours that the locomotive has spent with the engine at idle and the reverser in neutral.
  - **Idle Working** indicates the number of hours the locomotive has spent with the engine at idle and the reverser set in either forward or reverse.
  - **Idle Limit Shutdown** indicates the total hours the engine spent in *NFORCE* Shutdown mode.
  - **Isolated** indicates the total hours the locomotive spent with the isolate/run switch in the isolate position.
  - **Running** indicates the total engine run hours.

- **Shutdown** indicates the total engine shutdown hours (manual and automatic.)
- **Stop, Notch 1-8** displays the time in hours spent at various throttle positions.
- **Engine Run Times** displays hours and minutes spent at each RPM setting.
- **Distance** displays miles traveled in forward, reverse and neutral.
- **Energy** displays total energy consumed in kWh.
- ***RESTART COUNTS (ENGINE RESTART COUNTS)*** displays the *Reason* for each engine *NFORCE*, each recorded for the *Lifetime* of the *Trip*.
- ***SHUTDOWN TIMES (UNABLE TO SHUTDOWN TIMES)*** displays the *Reason* for each engine shutdown failure and the associated number of hours accumulated.

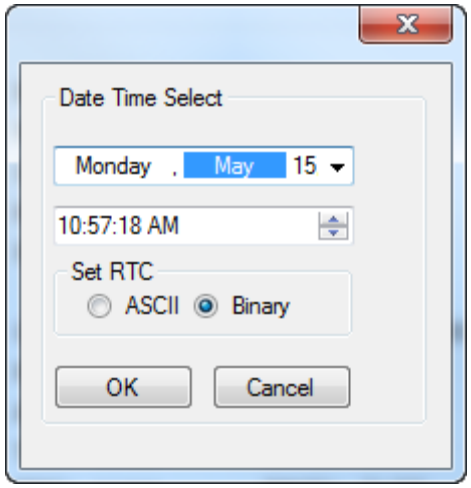
- **Report**
  - Currently not available.

- **Flash Backup**
  - This option downloads the statistics log from a backup memory location in the NForce. The data is the same as the Statistics log.

4.1.3 Set

This feature allows the User to set the System Real Time Clock, NForce Wheel Diameter, NForce Loco ID, NForce PPR, and Extended Performance Log. Download settings are available in the Set pull down menu.

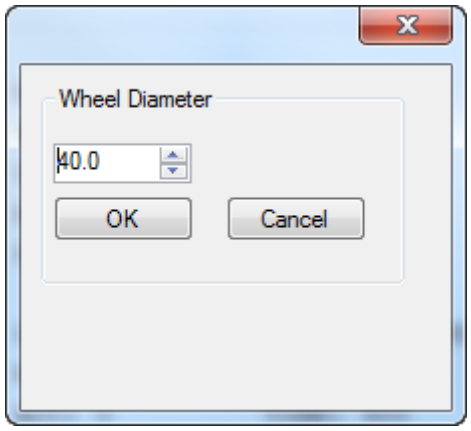
- **System Real Time Clock**
  - To set the Real-Time Clock, click on System Real Time Clock



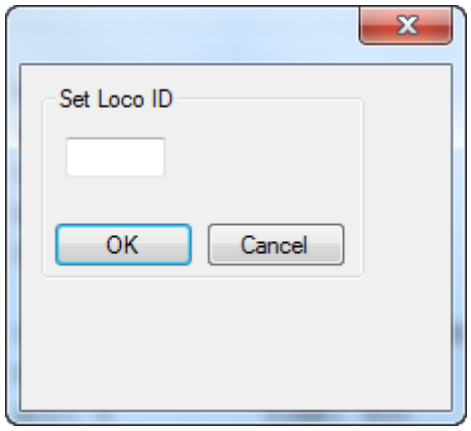
Note:

- For systems with the Nalysis communications driver, choose Binary then click OK to set the system time and date (i.e. NCorder, NForce, and NCOMPASS)
- For systems without the Nalysis communications driver, choose ASCII then click OK to set the system time and date (i.e. NForce, and NLIMIT with Hyper Terminal communications)

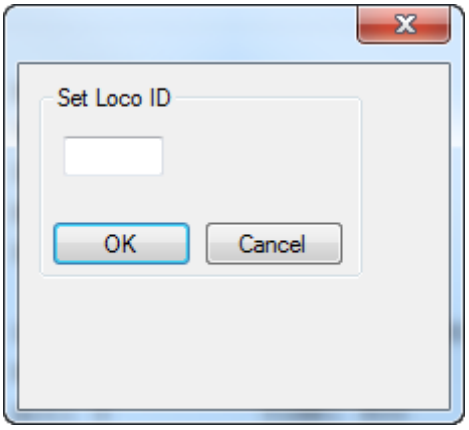
- **NForce Wheel Diameter**
  - To set Wheel Diameter, click on NForce Wheel Diameter



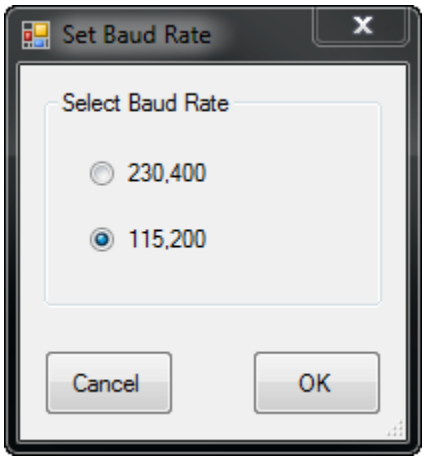
- **NForce Loco ID**
  - To set Loco ID, click on NForce Loco ID



- **NForce PPR**
  - To set PPR, click on set NForce PPR

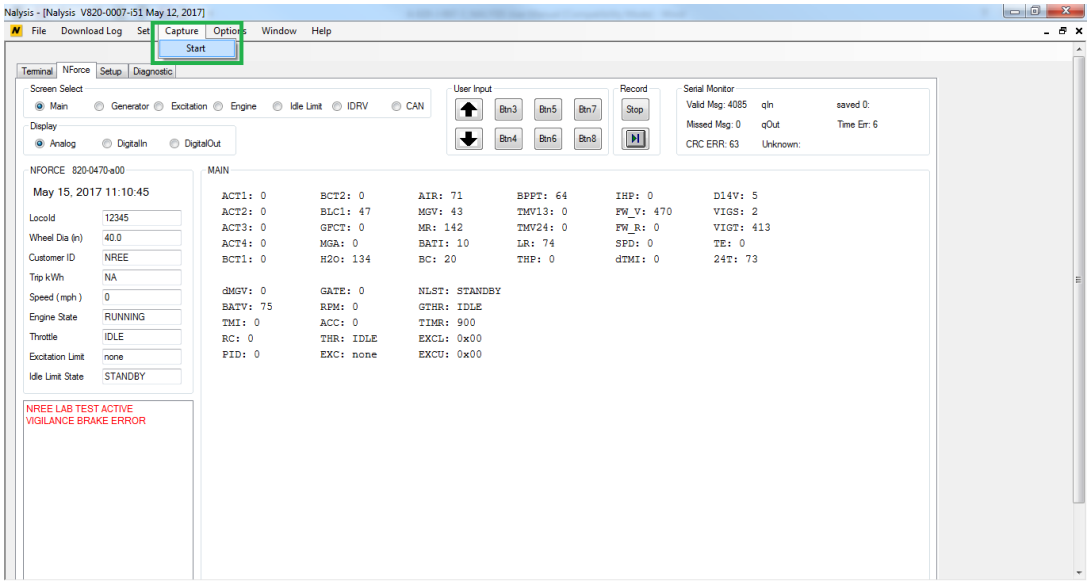


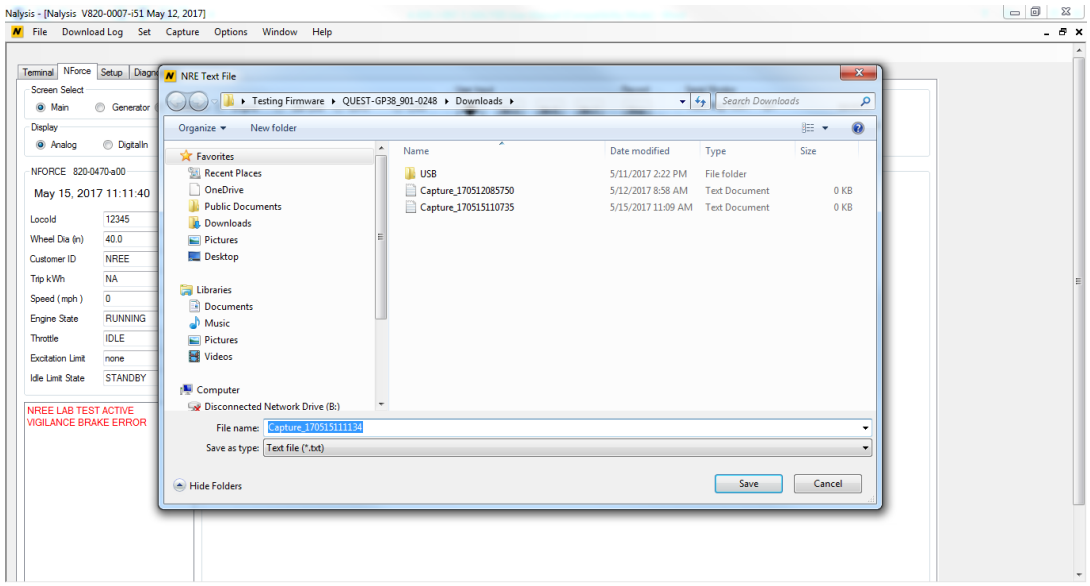
- **Baud Rate**
  - To change the communication speed with the NForce, RDU, or NCorder unit. (Note: This may not be available for your NForce system). If successful, the bottom left corner will show the changed baud rate. This setting is temporary, depending on whether a Fault, EPL, or NCorder download occurs which will reset the baud rate to 115,200 after completion.



4.1.4 Capture

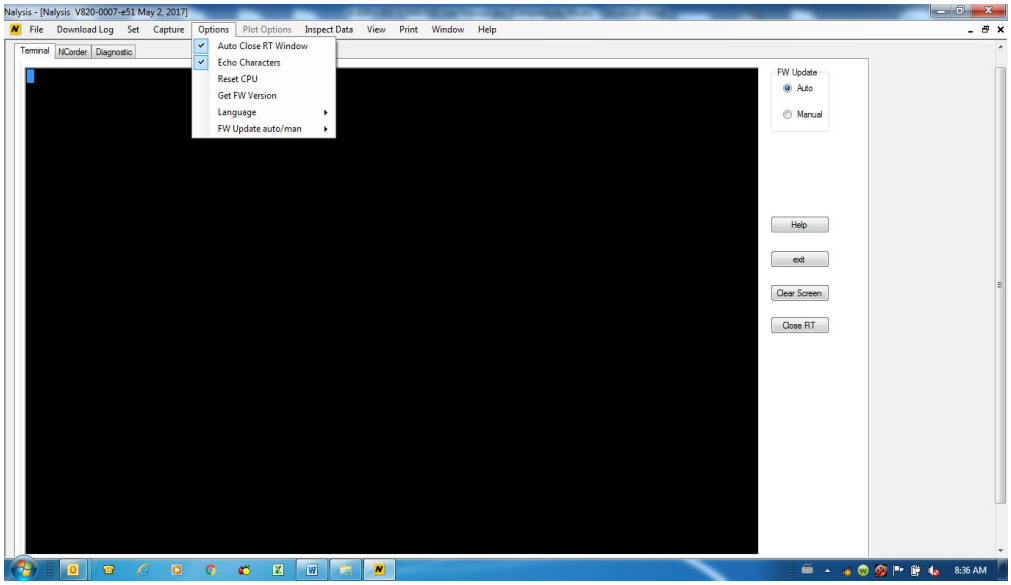
This feature will allow the User to capture the Real Time Updates of the NFORCE operation. Click on Capture and select Start to begin the process, select and save the file to the designated location then perform the operation that you need to capture. To stop the capture process, click on Capture pull down menu and select Stop.



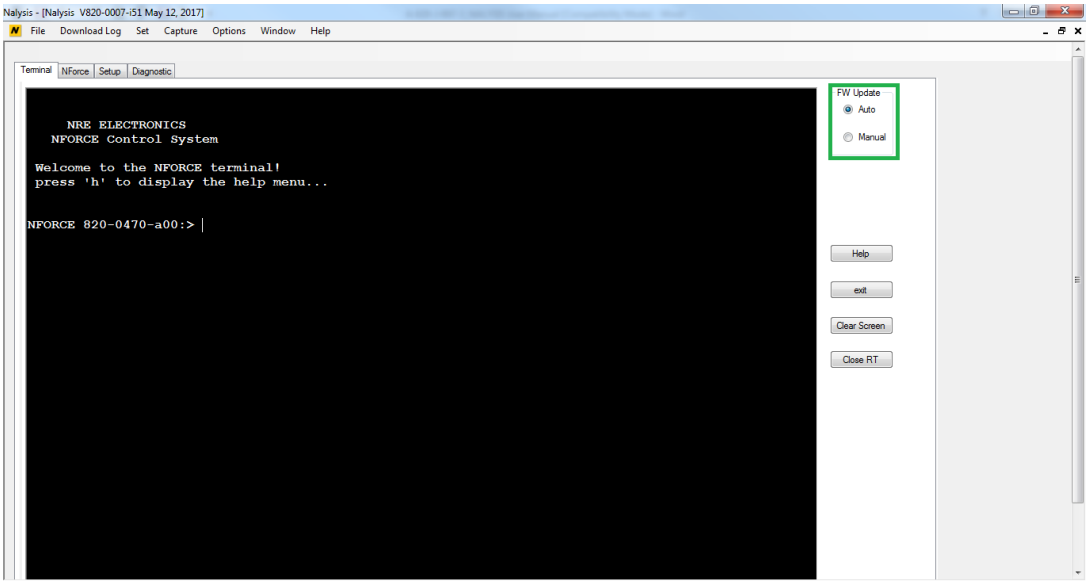


4.1.5 Options

- Click on the Options pull down menu and the following screen will appear:

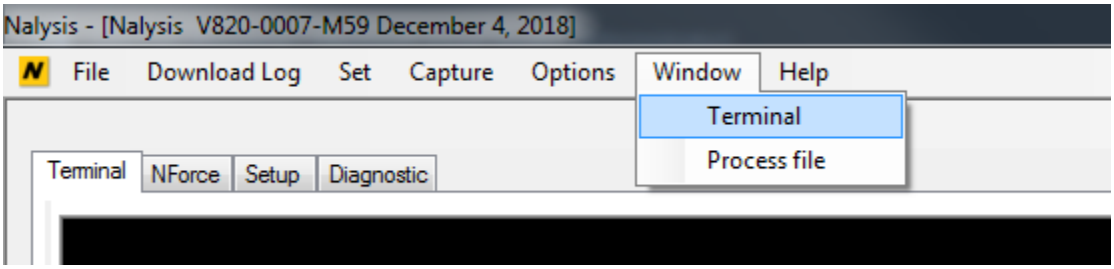


- If Auto Close RT Window is selected, real time screens will automatically close when exited, otherwise they remain open until the Close RT button is pressed.
- If Echo Characters is selected then key presses are echoed to the Terminal screen.
- Reset CPU will send the soft reset command to the NFORCE. If all reset conditions are met the NFORCE will reset without shutting down power.
- Get FW Version will retrieve the system's current firmware version (Nalysis communications driver required)
- Language allows the user to select display in English, Spanish or French. (Current set for English only)
- FW Update auto/man allows the user to select automatic or manual firmware update. This option functions the same as the FW Update radio buttons that appear on the top right of the Nalysis screen.

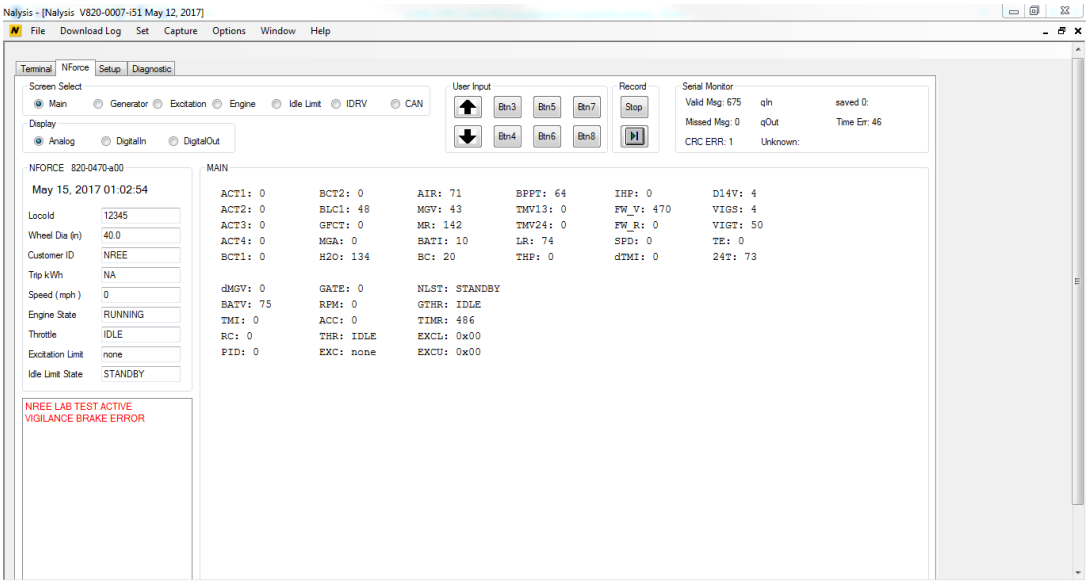


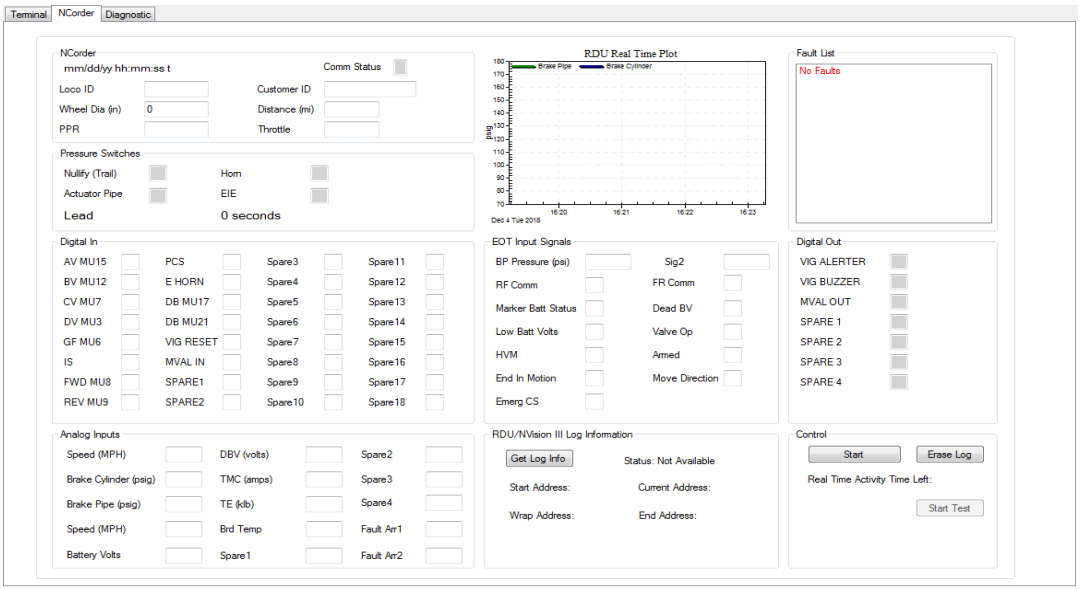
4.1.6 Window

- This feature allows you to select the screen options to either Terminal or Process file

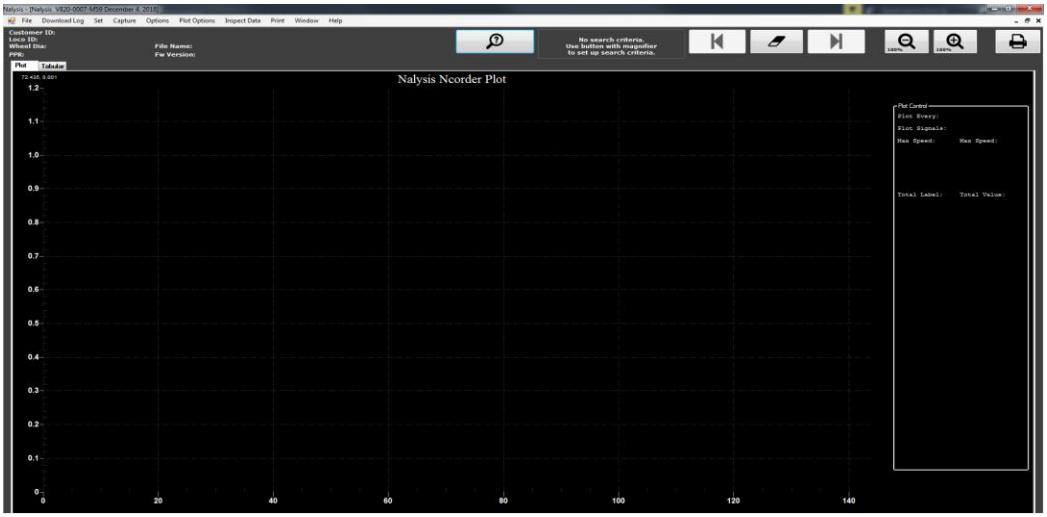


- When selecting Terminal from the Window pull down menu, the active screen will show the Terminal, NForce, Setup, or Diagnostic tabs if using NForce. If using the NCorder application, the Terminal option shows the





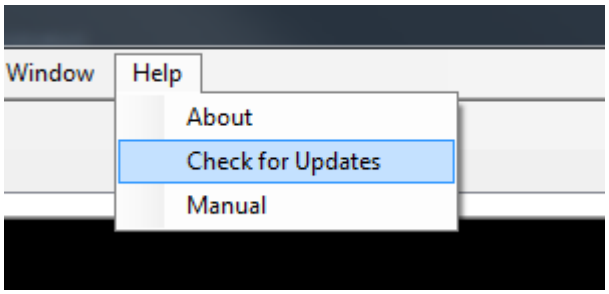
- When selecting Process file, the active screen will show the data screen that will allow user to either process the (*.bli) file or open the (*.pro) file from the File pull down menu for data viewing. See Processing Log File section for more details. (This feature is only applied to the NCorder application)



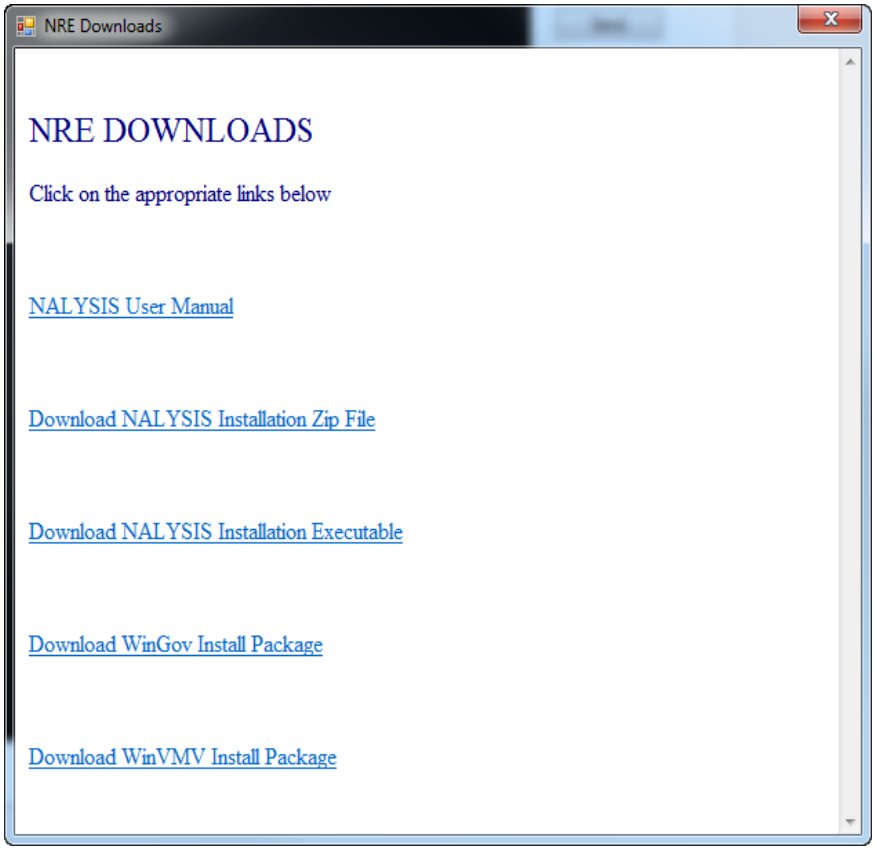
4.1.7 Help

Warning: Installing the latest NAlysis may not be compatible with your existing NForce, NCorder, or NCompass systems. Ensure that your systems are up-to-date before using the latest NAlysis by consulting release notes or FMI (field maintenance instruction) documents.

- This Help menu option contains information about NAlysis, Check for Software Updates, and Manual



- Ensure that you have a network connection to the Internet, then click on *Check for Updates*. The following window will appear. Click on *Download NAlysis Installation Zip File* or *Installation Executable* link and follow the directions to save the file.



If you downloaded the Zip file, double-click on the zip file to view the installer file inside. Double-click on the installation executable to install

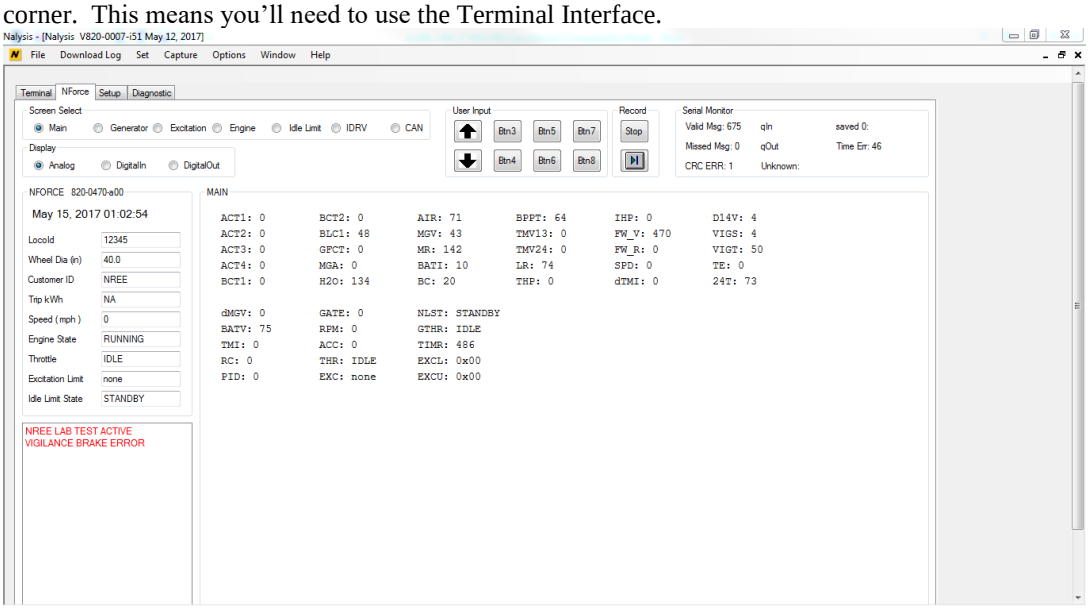
- To get the latest user manual, select the *Manual* option. You'll be greeted with the same options as the *Check For Updates option*. Click on the *NALYSIS User Manual* link to download.

4.2 Terminal Tab

This Terminal screen is similar to the Hyper Terminal screen. Type in "h" from the terminal prompt to view the list of Terminal Commands. This list of commands varies from one application to another as shown in Section 8.1 Terminal Tab.

4.3 NFORCE Tab

There is an NForce Tab available for systems that contain the Nalysis communications drivers. The following window will appear if you click on the NForce tab->Main->Analog. If the drivers are not available in the system, a "Disconnected" message will be displayed at the bottom right corner. This means you'll need to use the Terminal Interface.

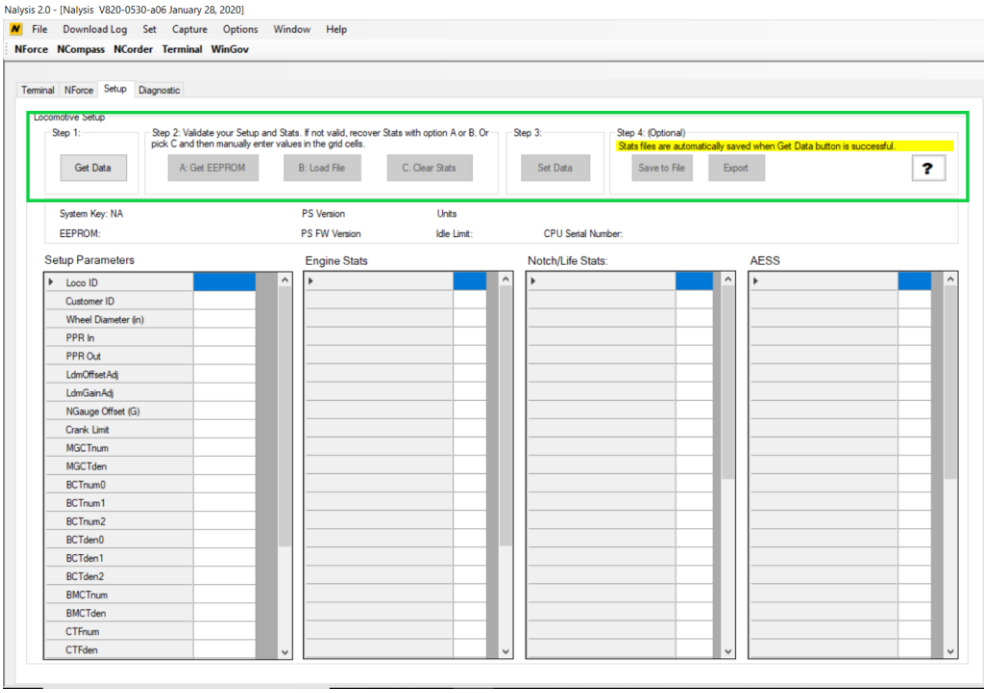


- This is a real-time screen of the NForce system that displays all of the Analogs reading and the active faults screen on the lower left (faults are displayed in Red).
- To go to the different screen, simply click on the radio button on the Screen Select or Display.

4.4 SETUP Tab

The Setup screen gives the User the ability to set and view the Parameters and accumulated Statistics saved in the NFORCE CPU, or in the EEPROM backup log. There are multiple options available from the Locomotive Setup box on the top of the Setup screen.

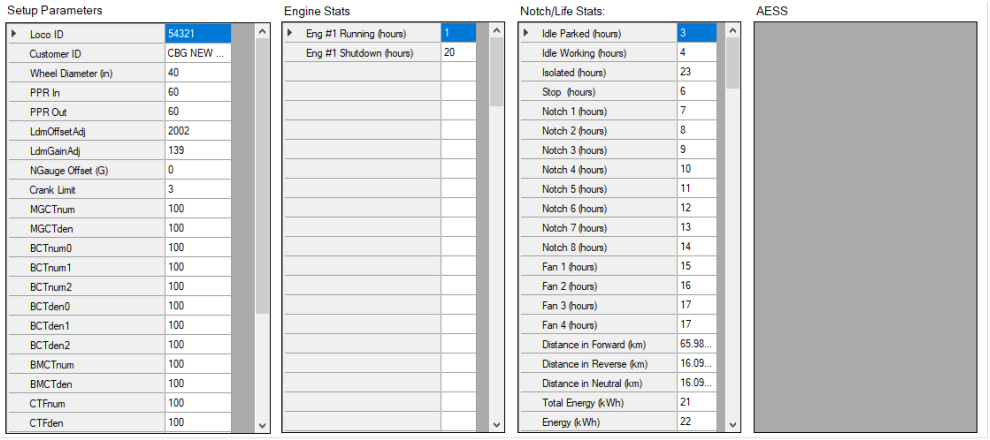
Note: This feature is only available on NFORCE systems that have the Flash updates capability.



4.4.1 Get Data

Click on the Get Data button from the Locomotive Setup box to view the current parameter settings and accumulated statistics saved in the NForce CPU Board.
The Parameters setting could also be verified and set manually from the Setup Parameters box on the left-hand side of the setup screen. If you want to change any of the parameters or statistics, double click on the field immediately to the right of the parameter or statistic. When you have selected the field, type backspace to delete the current setting, then enter the desired parameter or statistic value.

Note: Every time the Get Data button is clicked a copy of the current statistics and setup parameters are auto saved to: C:\NAlysisV2\StatsBackup\. The file name format is as follows Stats_CUSTOMERID_LOCOID_DATE_TIME.bin. The filename and auto save feature is indicated by the highlighted yellow line under Step 4.



4.4.2 Flash and EEPROM Log Status

Click on the Get Data button will update the current status of the CPU Flash and EEPROM logs. This data is located above the Setup Parameters column.

The top field shows the status of the system key:

i. System Key OK. This indicates the EEPROM and CPU logs are synchronized and working properly.

ii. System Key FAIL. This indicates that the system key in the CPU is different from EEPROM key stored. This can happen if one log becomes corrupt, the EEPROM fails or the CPU board is changed.

iii. EEPROM BUSY. This indicates the EEPROM is currently being read. Upon successful read the System Key status will be updated.

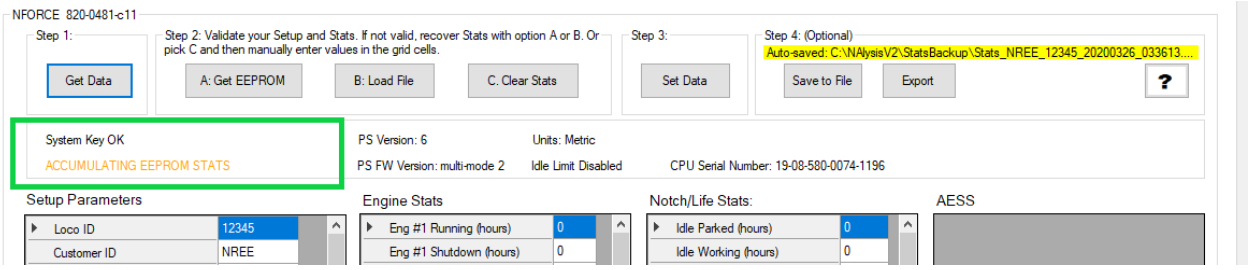
The bottom field shows the status of the EEPROM.

i. READING EEPROM DATA ATTEMPT #, where # is attempt 1, 2 or 3. This occurs when the NFORCE is first powered on. The EEPROM logs are being read and validated from the EEPROM.

ii. WRITING LOG1, READING LOG1, REPAIRING LOG1, WRITING LOG2, READING LOG2, REPAIRING LOG2. These indicate that data is currently being saved to the EEPROM logs and validated.

iii. ACCUMULATING EEPROM STATS. This indicates that the EEPROM log has finished its read/write cycle and is idle until the next update period.

<u>Note</u>: While the EEPROM is busy reading or writing, all buttons in Step 2, Step 3 and Step 4 (Optional) will be greyed out until the EEPROM has finished reading.

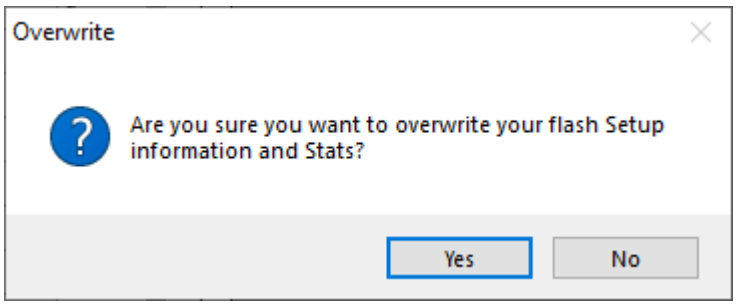


4.4.3 Get EEPROM

If the EEPROM status reads ACCUMULATING EEPROM STATS then the A: Get EEPROM button under the step 2 section will no longer be greyed out. Click this button to populate the Setup Parameter and Statistics tables with the values stored in the EEPROM log backup copy. The EEPROM log is a backup log and can be used to restore the statistics in the event of a CPU board failure or corruption.

4.4.4 Set Data

If the Setup Parameters and Statistics in the table are correct, Click on the Set Data button and click YES. This will save all Parameter settings and Statistics to the CPU Flash log and Backup EEPROM log.



Note: All of the up-to-date Statistics will be erased and replaced with the current values from the table. Proceed with precaution.

4.4.5 Clear Stats

4.4.5.1 From Setup Tab (If equipped with Flash statistics)

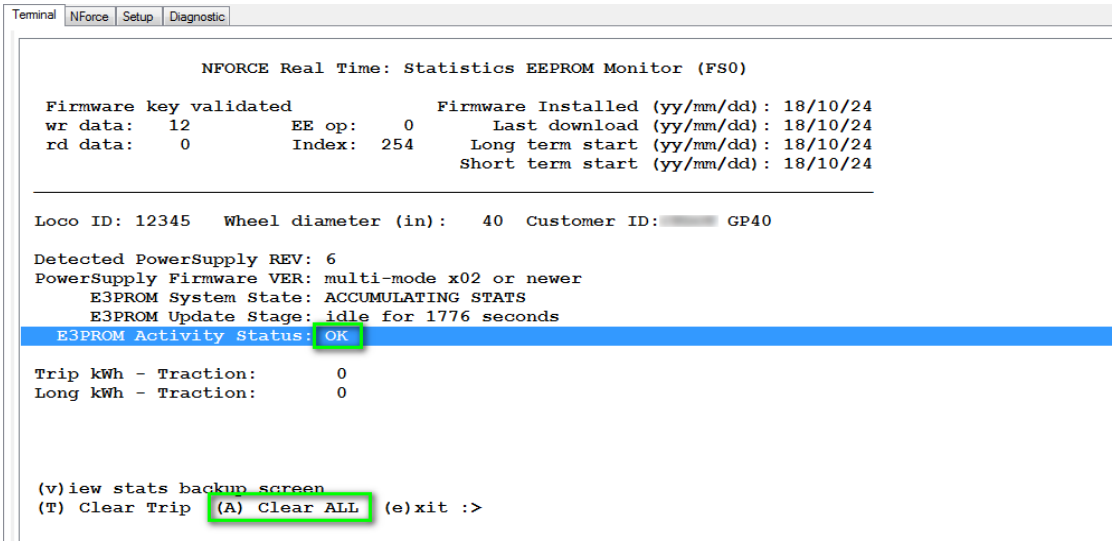
If you want to clear the statistics, click on the C: Clear Stats button. You will see all of the accumulated statistics values get set to zero. Then click on the Set Data button to save (see section 4.4.4).

Note: Proceed with caution! NRE recommends you perform a stats log download before proceeding with any stats clearing commands.

4.4.5.2 From Terminal (If not equipped with Flash statistics)

- **Clear Stats from Terminal Tab Interface**

1. Many NFORCE systems running Terminal Interface have the ability to clear the statistics log via the FS0 screen. Check that your NFORCE system has this capability by navigating to the Terminal tab and typing ‘FS0’ without the single quotes. This would take you to a screen that looks like this:

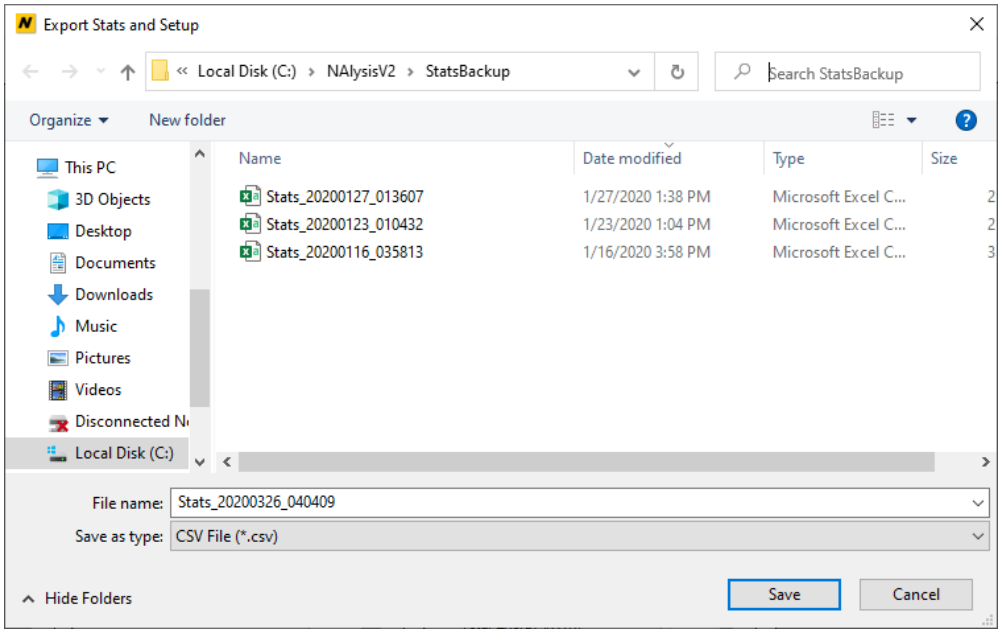


Make sure that you're able to see the E3PROM Activity Status is OK. If that's the case you'll also see the "(A) Clear ALL" option. Type 'A' (without the single quotes) to erase the stats.

2. The "Clear All" operation takes about 5 minutes as the NFORCE has to communicate to the power supply board and then onto the EEPROM that is in the harness. The FS0 screen provides feedback to the user that the interaction with the EEPROM is completed.
3. Once the stats are erased, the user will typically need to enter the following parameters again:
    a. Wheel diameter
    b. Locomotive ID number
    c. Load meter calibration (if equipped) via the IO test sequence

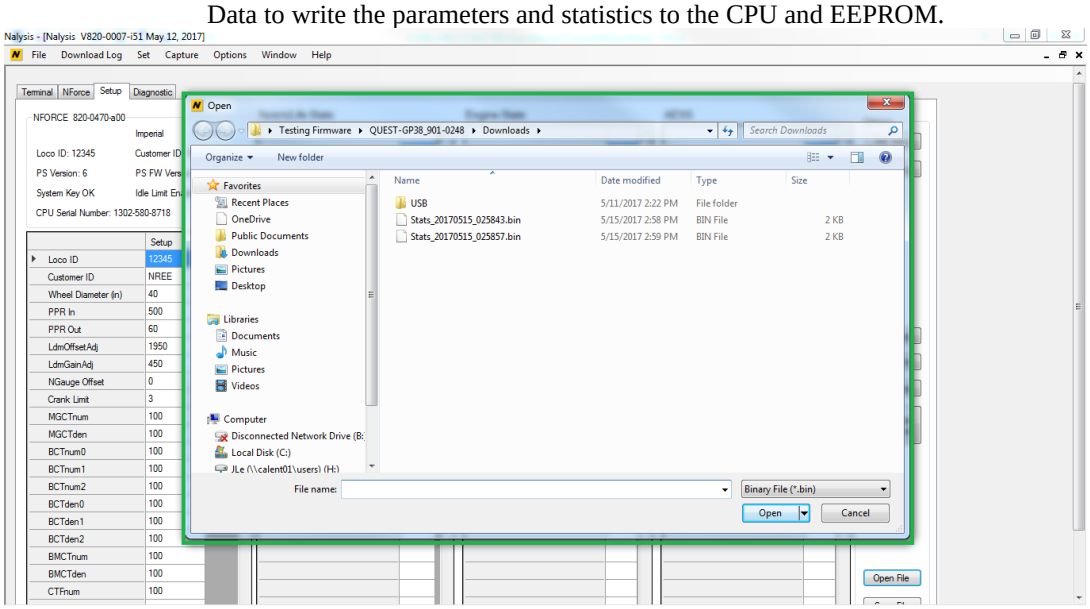
4.4.6 Export

This feature lets the User export Stats and Setup information to a .CSV file which can be saved for review or to be used again. Accept the default file or enter the new file name then save.



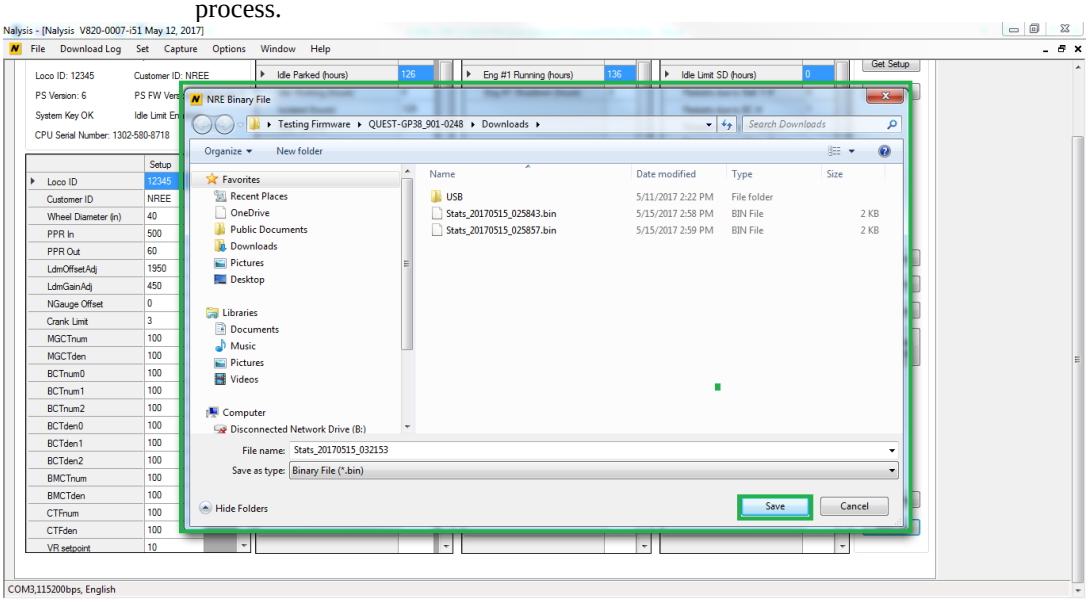
4.4.7 Load File

This feature allows a user to recover the statistics and setup configuration from a saved file. Select the "*.bin" file and click on Open to complete the process. Then click on Set Data to write the parameters and statistics to the CPU and EEPROM.



4.4.8 Save to File

This feature allows the user to save the current NFORCE Setup and Statistics file to Laptop/Computer for review or future use. Click on Save to File button and select the default or enter the new "*.bin" file name then click on the Save button to complete the process.

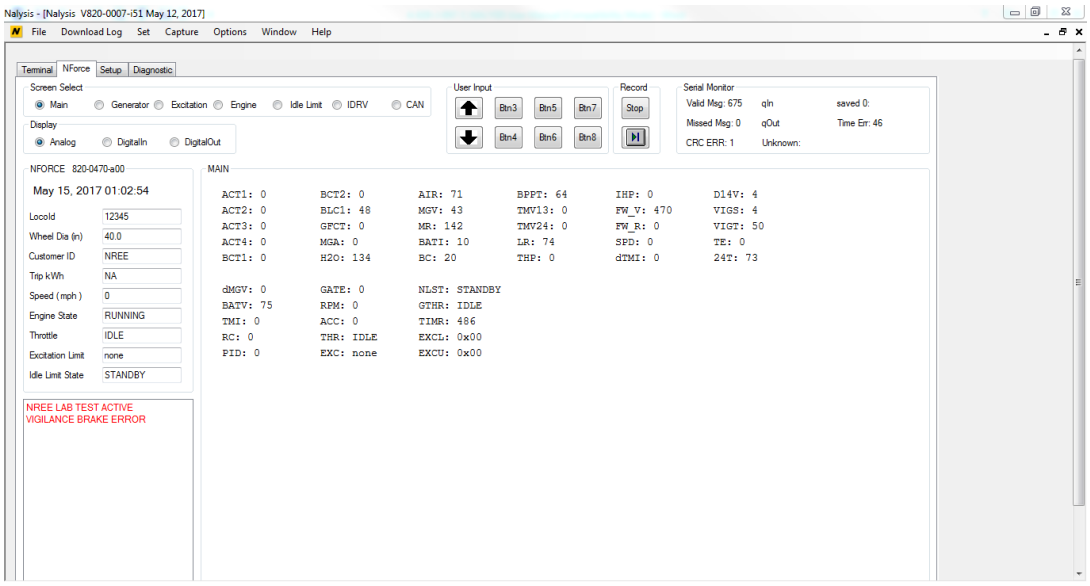


4.5 Diagnostic Tab

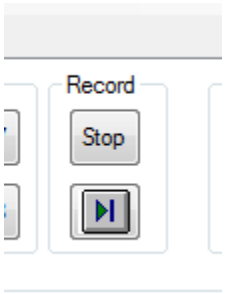
This Diagnostic screen is similar to the FS5's memory screen from Hyper Terminal. This screen contains features that can be used for analyzing or trouble shooting the memory tables. See Section 8.2 Diagnostic Tab for more details.

4.6 RTD (Real Time Diagnostic) Log

- RTD log download can be useful to observe the most recent performance of the locomotive. The log has all of the data download at 0.1 second intervals from the time that the download is started until the time that the download is stopped. This download can capture complete tests without the restrictions of the Diagnostic download.
- Click on the Nforce tab, then click on Main in the Screen Select section as shown below.

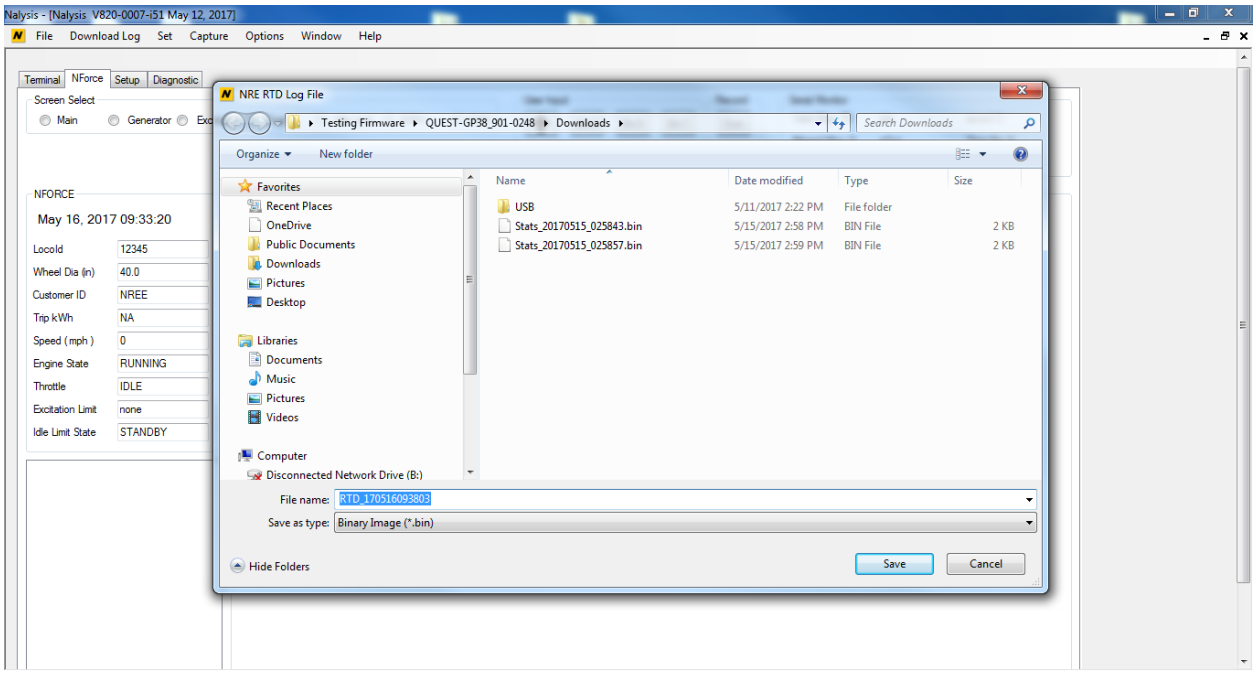


- Click on the Stop button under the Record section on the screen shown below (zoomed from above screen view)

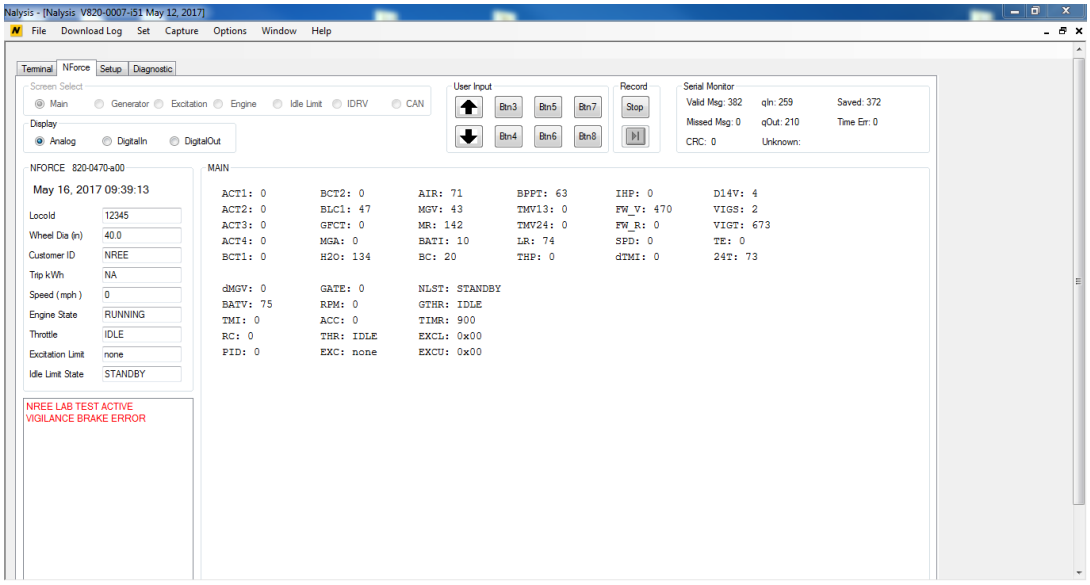


- Then click on the record button shown as the  in the zoomed in picture above.

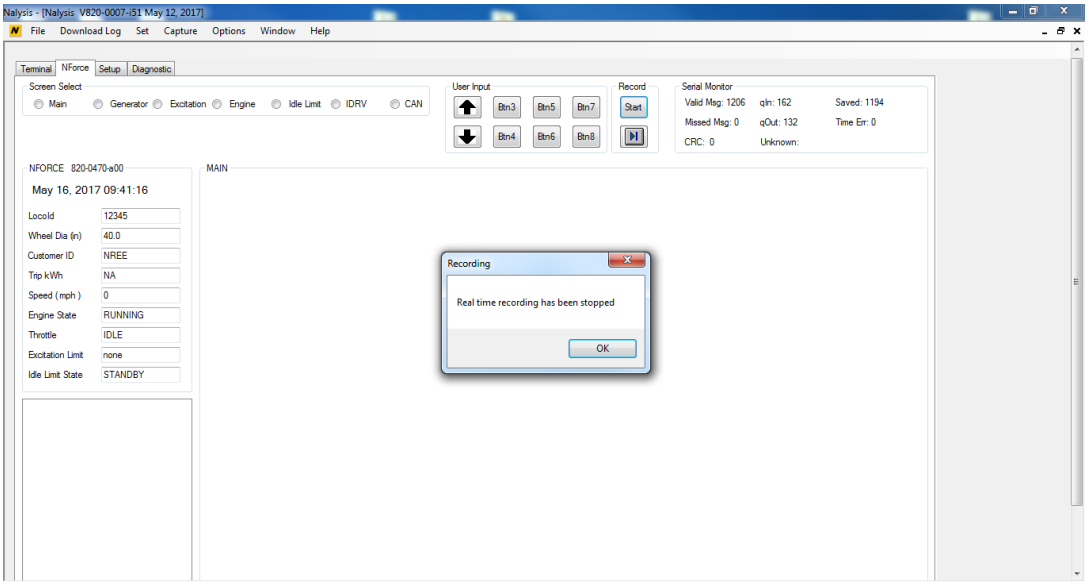
- The following screen will appear:



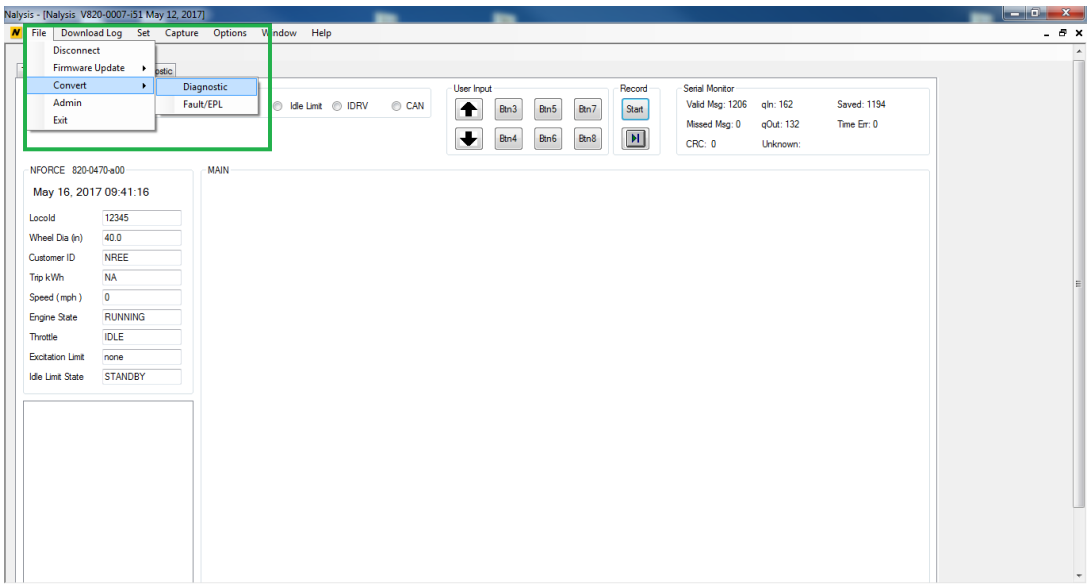
- A default file name is created (LogType_yyddmmhhmmss.bin, in this case it is RTD_150707122503.bin), which the user may change to any other name. Once the user is satisfied with the filename and directory, clicking save will start the log download.
- The screen will return to the main data screen, although you may notice that the updates and serial monitor numbers are updating more quickly.



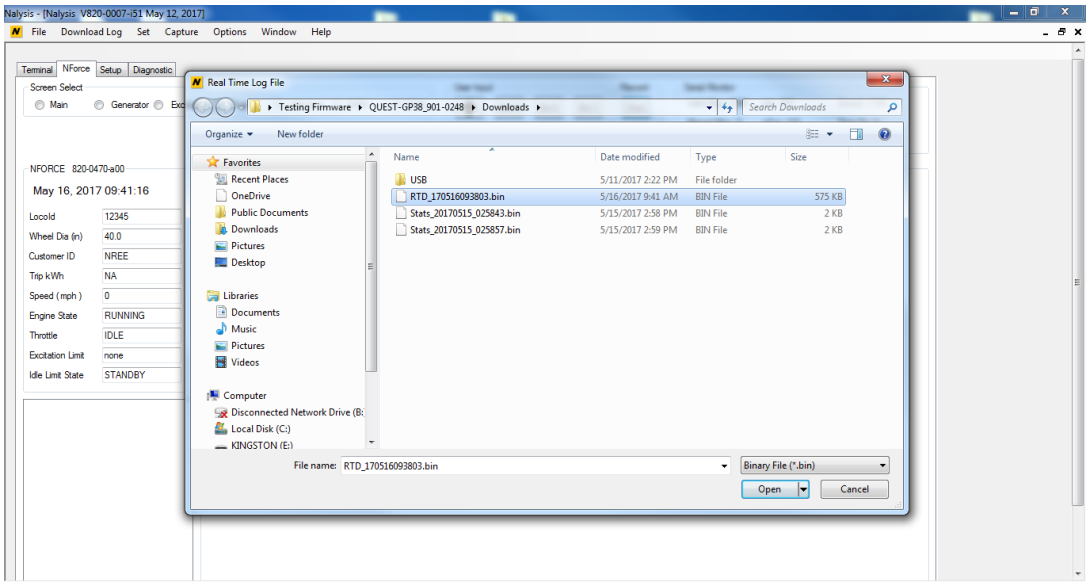
- Perform the locomotive testing that you want to capture. When you are finished with the testing, click on the Stop button under the record section to stop the download. The recording stopped message will be displayed as shown below.



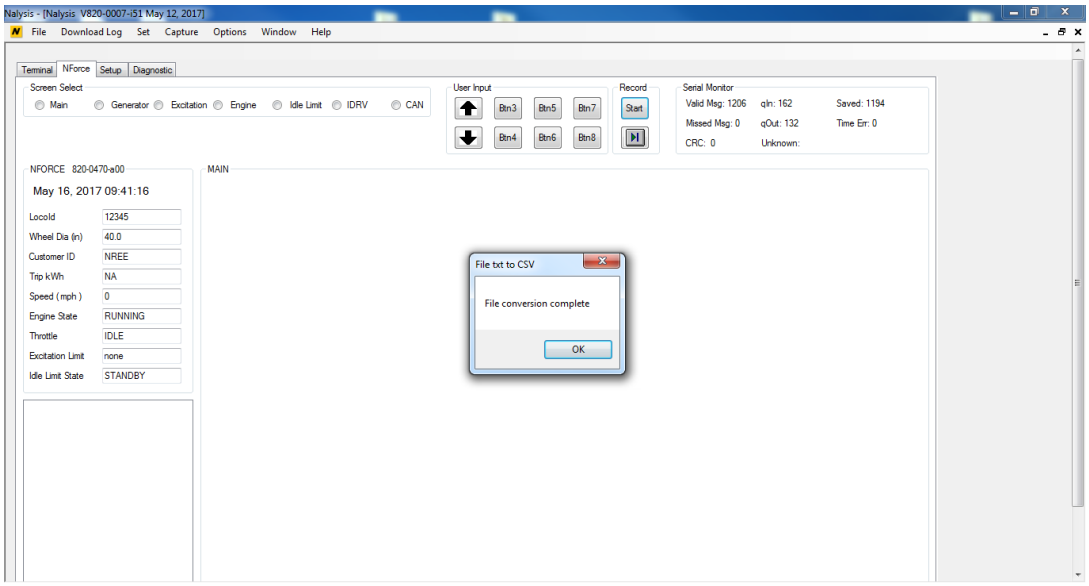
- The file will be saved as a .bin file instead of a .txt file. To convert the file to be imported into Excel, click on the File pull down menu and select Convert, and then select Diagnostic.



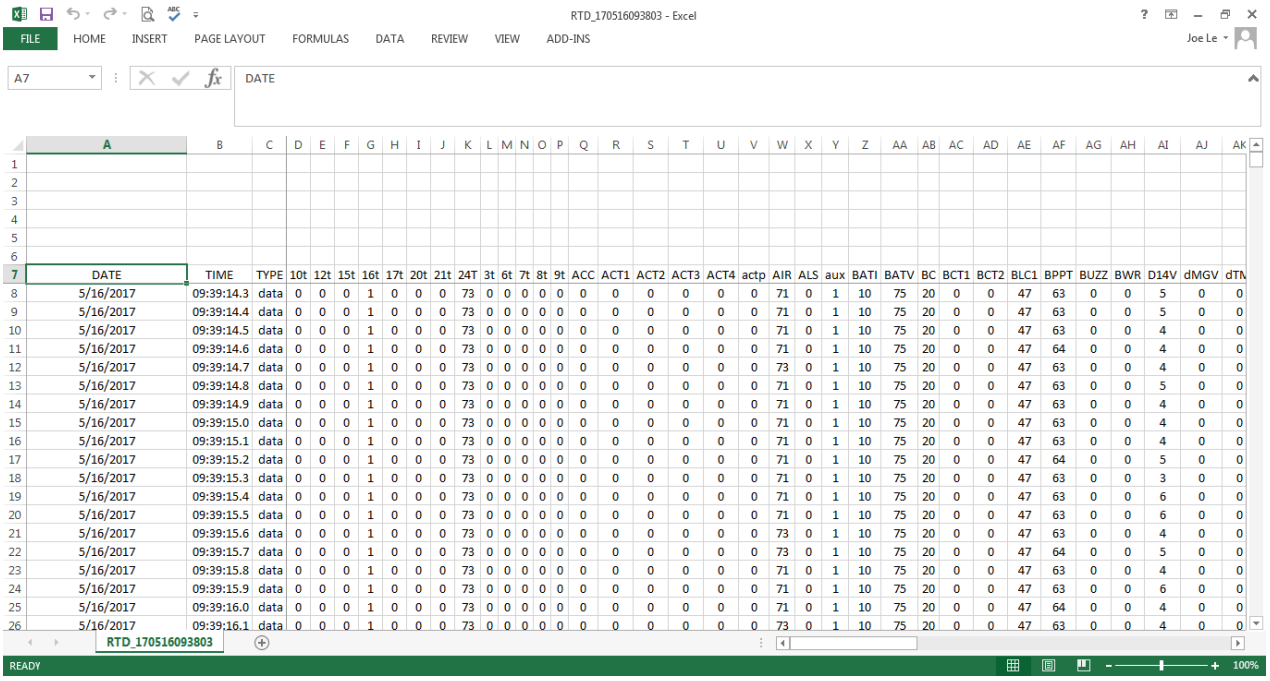
- Click on the RTD download file that was just saved, and click on Open.



- The following message will be displayed when the conversion is finished.



- To view the RTD's text file, open the RTD.txt file by using the Download Analyzer program (820-0442-x##.xls, where ## = latest revision). The example data file will be displayed like below.



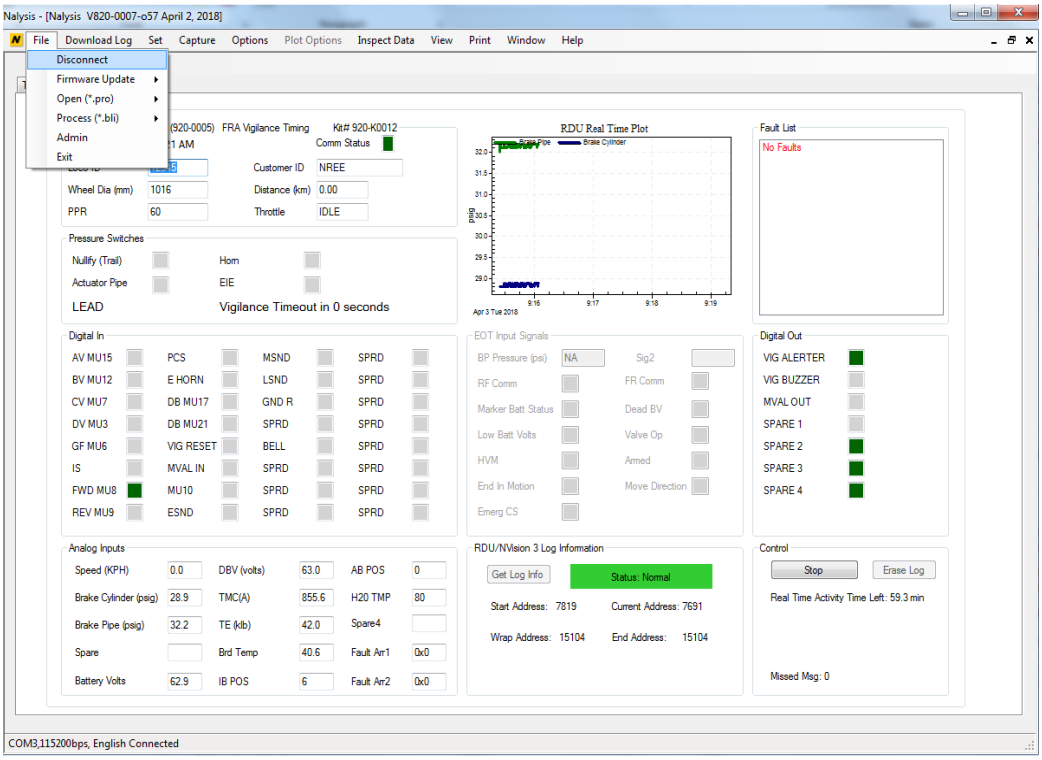
DATE	TIME	TYPE	10t	12t	15t	16t	17t	20t	21t	24T	3t	6t	7t	8t	9t	ACC	ACT1	ACT2	ACT3	ACT4	actp	AIR	ALS	aux	BATI	BATV	BC	BCT1	BCT2	BLC1	BPPT	BUZZ	BWR	D14V	dMGV	dTN
5/16/2017	09:39:14.3	data	0	0	0	1	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	71	0	1	10	75	20	0	0	47	63	0	0	5	0	0
5/16/2017	09:39:14.4	data	0	0	0	1	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	71	0	1	10	75	20	0	0	47	63	0	0	5	0	0
5/16/2017	09:39:14.5	data	0	0	0	1	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	71	0	1	10	75	20	0	0	47	63	0	0	4	0	0
5/16/2017	09:39:14.6	data	0	0	0	1	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	71	0	1	10	75	20	0	0	47	64	0	0	4	0	0
5/16/2017	09:39:14.7	data	0	0	0	1	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	73	0	1	10	75	20	0	0	47	63	0	0	4	0	0
5/16/2017	09:39:14.8	data	0	0	0	1	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	71	0	1	10	75	20	0	0	47	63	0	0	5	0	0
5/16/2017	09:39:14.9	data	0	0	0	1	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	71	0	1	10	75	20	0	0	47	63	0	0	4	0	0
5/16/2017	09:39:15.0	data	0	0	0	1	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	71	0	1	10	75	20	0	0	47	63	0	0	4	0	0
5/16/2017	09:39:15.1	data	0	0	0	1	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	71	0	1	10	75	20	0	0	47	63	0	0	4	0	0
5/16/2017	09:39:15.2	data	0	0	0	1	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	71	0	1	10	75	20	0	0	47	64	0	0	5	0	0
5/16/2017	09:39:15.3	data	0	0	0	1	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	71	0	1	10	75	20	0	0	47	63	0	0	3	0	0
5/16/2017	09:39:15.4	data	0	0	0	1	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	71	0	1	10	75	20	0	0	47	63	0	0	6	0	0
5/16/2017	09:39:15.5	data	0	0	0	1	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	71	0	1	10	75	20	0	0	47	63	0	0	6	0	0
5/16/2017	09:39:15.6	data	0	0	0	1	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	73	0	1	10	75	20	0	0	47	63	0	0	4	0	0
5/16/2017	09:39:15.7	data	0	0	0	1	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	73	0	1	10	75	20	0	0	47	64	0	0	5	0	0
5/16/2017	09:39:15.8	data	0	0	0	1	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	71	0	1	10	75	20	0	0	47	63	0	0	4	0	0
5/16/2017	09:39:15.9	data	0	0	0	1	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	71	0	1	10	75	20	0	0	47	63	0	0	6	0	0
5/16/2017	09:39:16.0	data	0	0	0	1	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	71	0	1	10	75	20	0	0	47	64	0	0	4	0	0
5/16/2017	09:39:16.1	data	0	0	0	1	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0	73	0	1	10	75	20	0	0	47	63	0	0	4	0	0

5.0 NCORDER Interface

Access the NCorder application using the application bar:

5.1 Menu

5.1.1 File

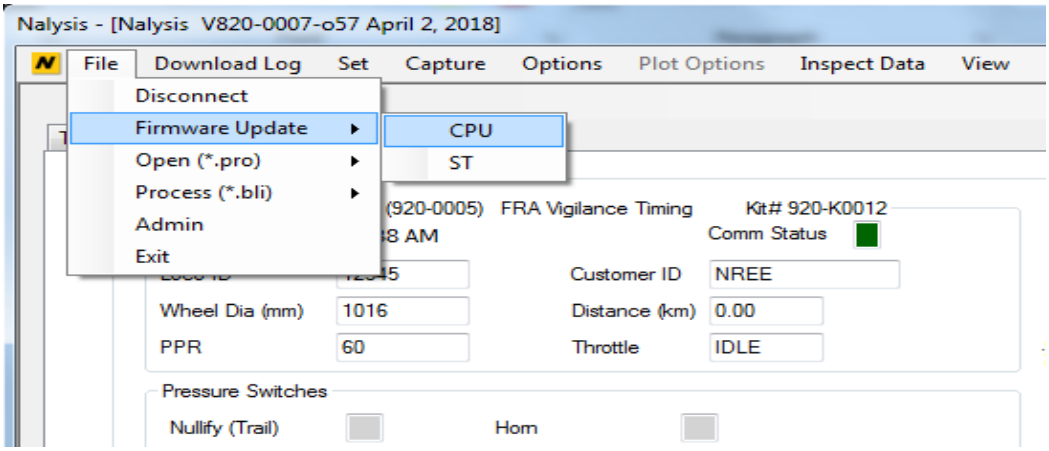


- **Connect/Disconnect**
  Allow User to Connect or Disconnect communication between NCorder system and Nalysis.

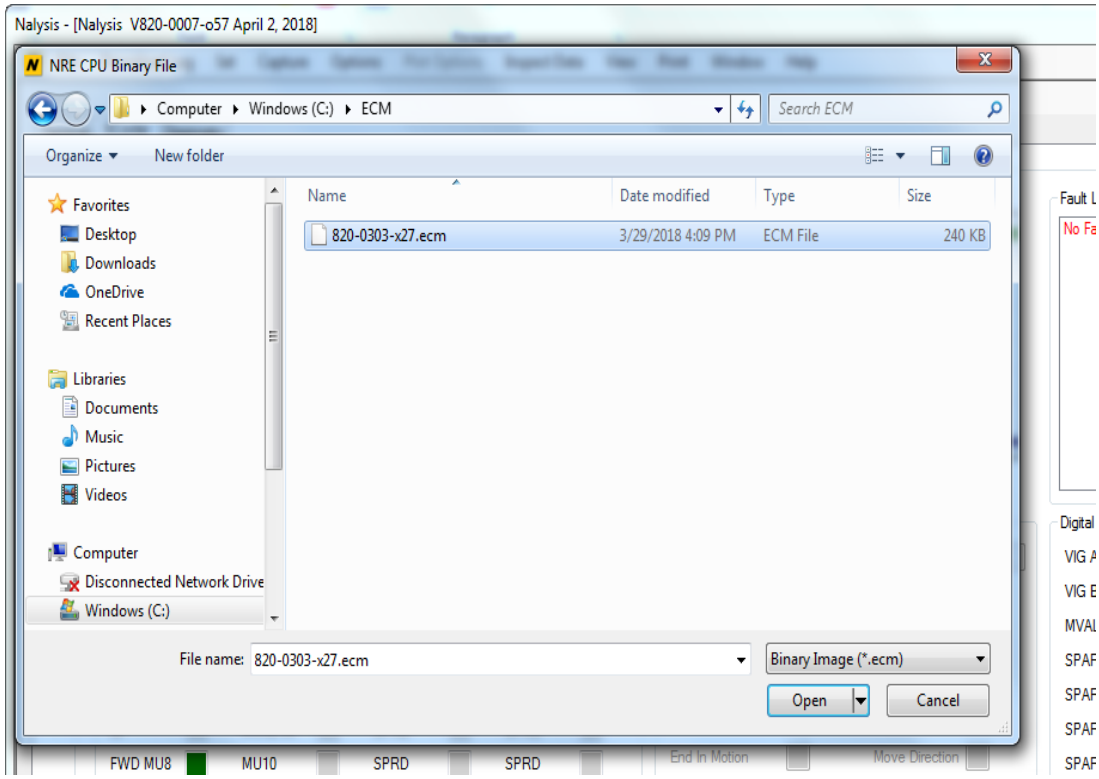
- **Firmware Update**

Steps to install an update revision of the event recorder's operating firmware:

1. Connect the Serial Communications Cable (NRE Part No. 058-0001-000) to the Serial port on the Laptop/Computer. Connect the other end to diagnostic port (Lemo connector) on the Remote Download Box (RDU).
2. Select File->Firmware Update->CPU.

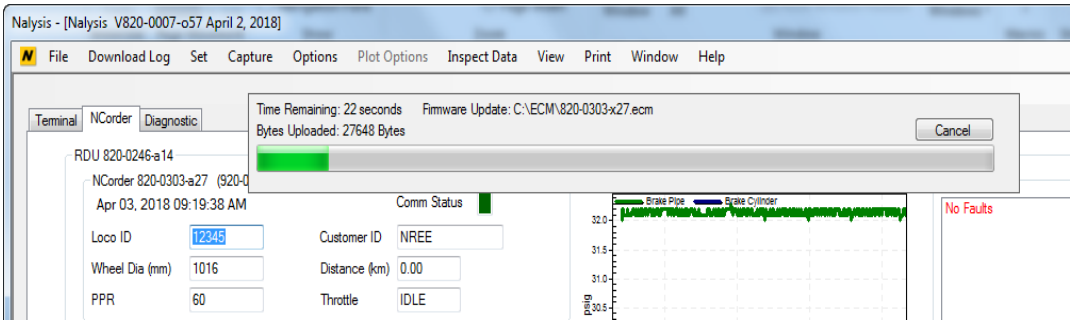


3. From the NRE CPU Binary File window box, locate the up-to-date file on the Laptop/Computer hard drive or network. Select the following file options:
   - NCorder model number 920-0001-000 use 820-0249-xXX.ecm, where XX = Latest Revision
   - NCorder model numbers 920-0005-000 and 920-0006-000 use 820-0303-xXX.ecm, where XX = Latest Revision



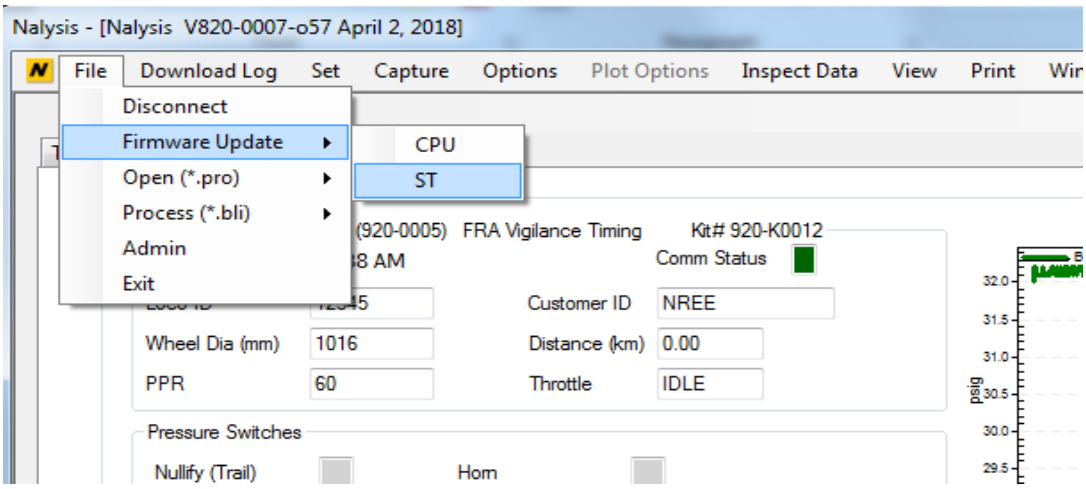
4. Click on Open. The progress status bar will show the uploading progress of the Firmware Update.

CAUTION: DO NOT INTERRUPT COMMUNICATIONS OR TURN OFF THE NCORDER OR RDU DURING THE UPDATE PROCESS; it could cause a fatal fault inside the event recorder.

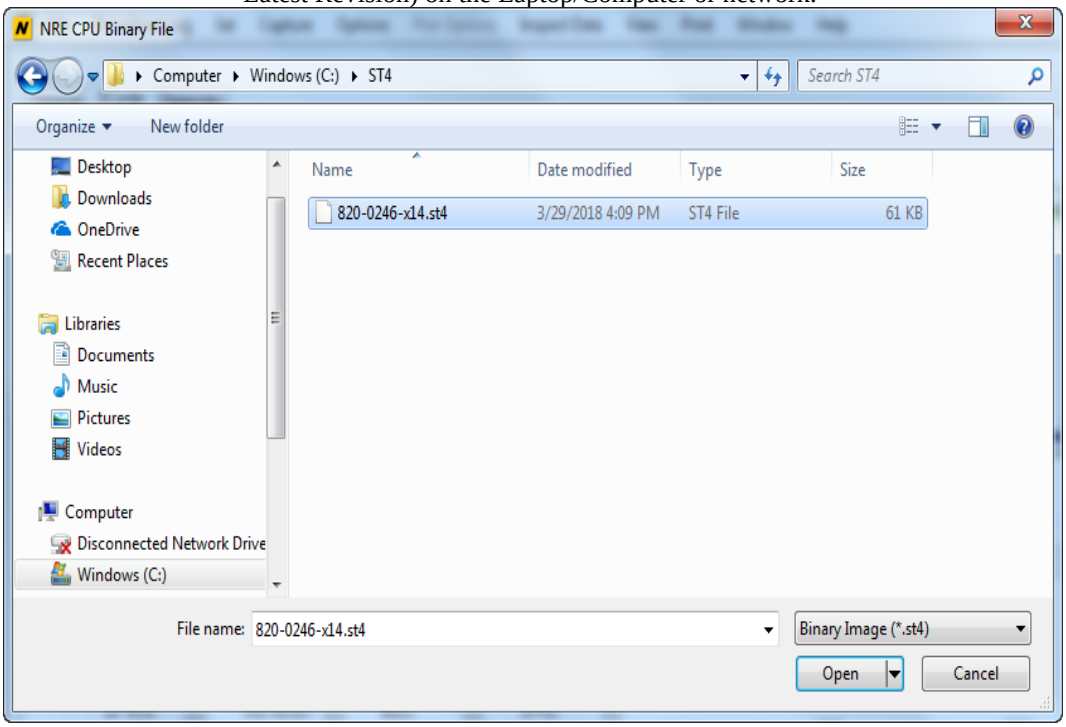


- **To install an update revision of the remote download units' (RDU) operating firmware:**

1. Connect the Serial Communications Cable (NRE Part No. 058-0001-000) to the proper serial port on the portable computer. Connect the other end to diagnostic port on the Remote Download Box.
2. Select File->Firmware Update->ST

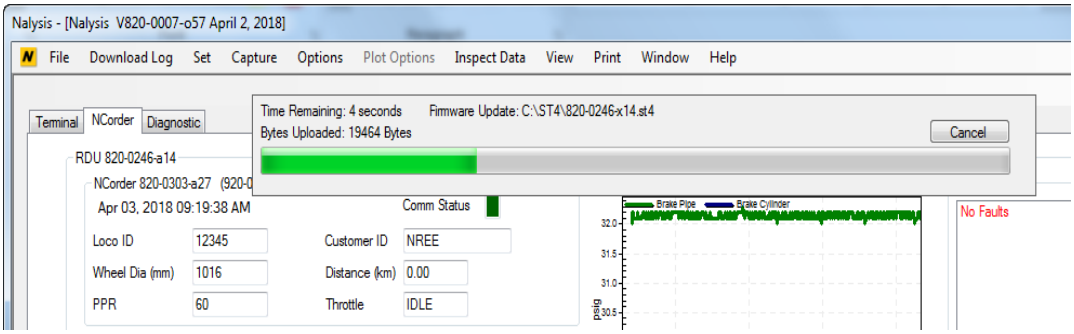


3. Locate the updated RDU Firmware file (820-0246-xXX.st4, where XX = Latest Revision) on the Laptop/Computer or network.

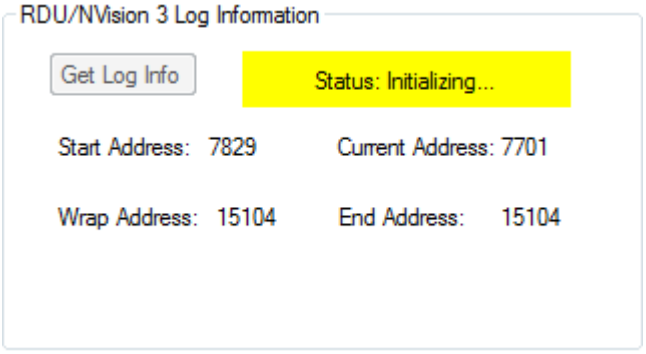


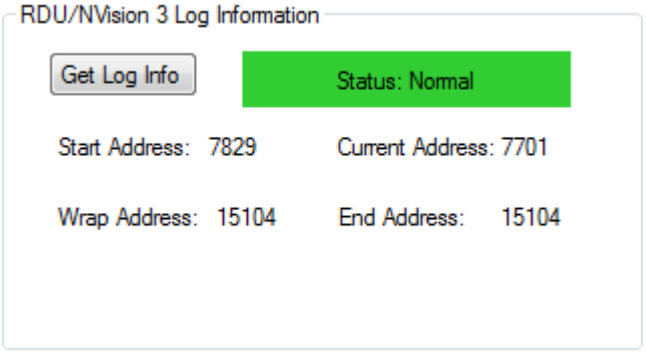
4. Select Open. The progress status of the file upload appears in the Uploading New Software dialog box.

CAUTION: DO NOT INTERRUPT COMMUNICATIONS DURING THIS PROCESS; it could cause a fatal fault inside the RDU.

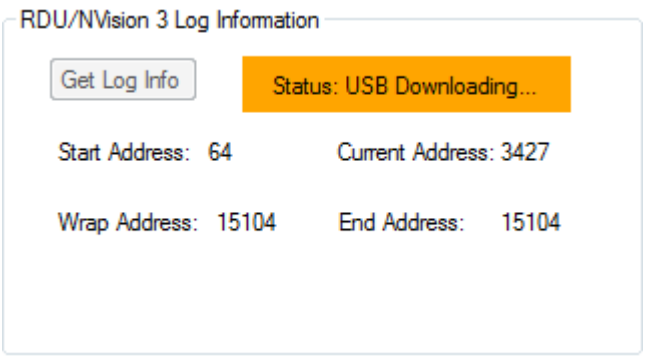


5. After the RDU is updated, its status will be “Initializing…” If this status does not change to “Normal” after 2 to 3 minutes, power cycle the NCorder and RDU. The status will be “Normal” if the RDU is functioning correctly.





6. If you are downloading the data with a USB thumb drive, this will be displayed:



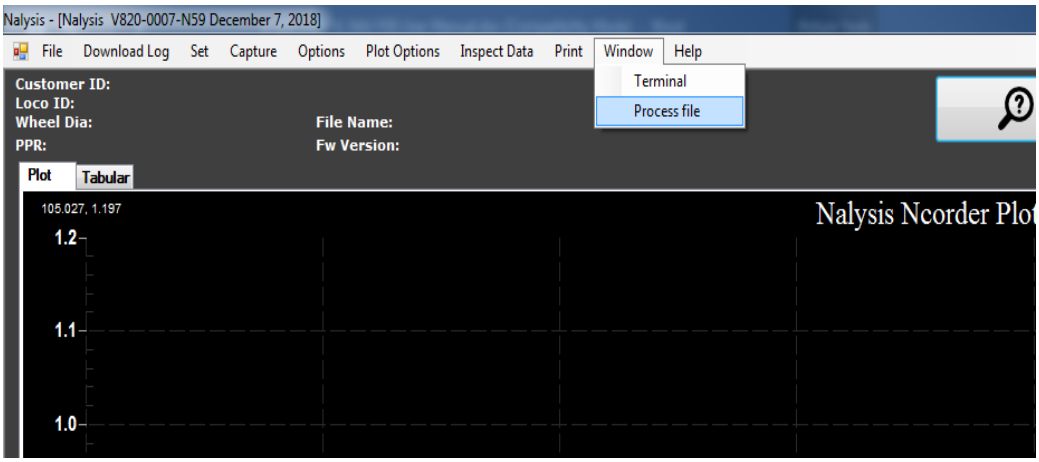
7. There are LEDs on the RDU (Remote Data Unit) indicate certain overlapping behaviors also:

Action	Indicator	Indicator Behavior		Indicator Color	
Data upload to USB	UPLOAD IN PROGRESS	Flashing Fast		Green	
Data upload to USB is done	UPLOAD Complete	Solid		Blue	
RDU getting data from NCORDER	UPLOAD IN PROGRESS	Flashes for each packet received from NCorder		Green	
Problem with Memory Stick	Combination of UPLOAD IN PROGRESS and UPLOAD COMPLETE	Flashing Fast	Flashing Fast	Green	Blue
Normal Operation	STATUS 1	Flashing once per second		Green	

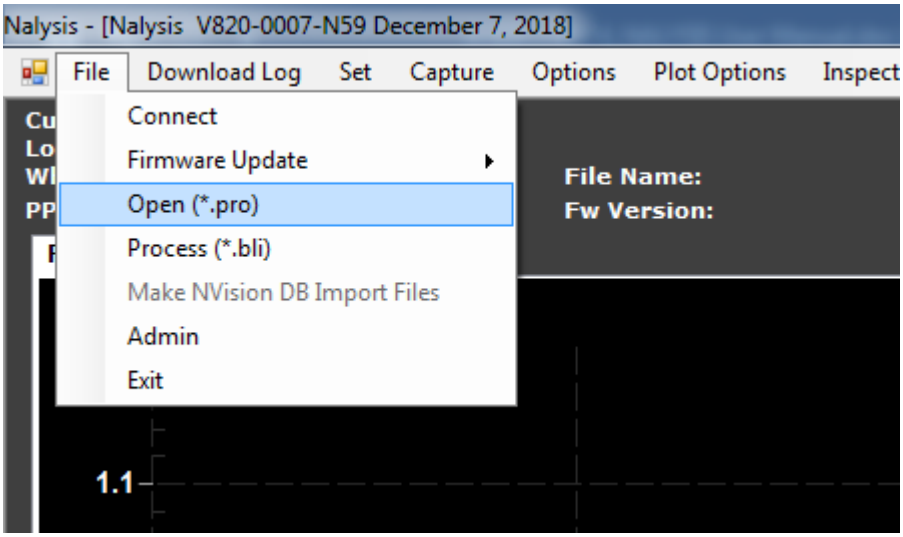
Fault Indicator	STATUS 2	Solid	Red
RDU Power Up; or Memory Stick is inserted on startup	STATUS 2	Flashing Fast	Red

- **Open (*.pro)**

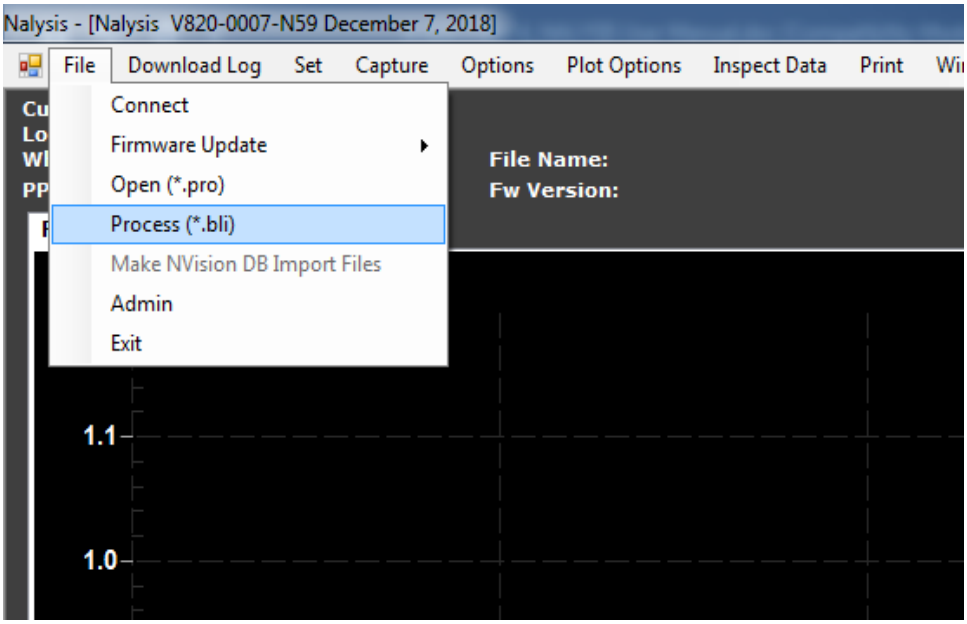
  - To open a *.pro file, make sure that you're in the Process File mode by going to the Window pull down menu and clicking on Process file. If you're already in the Process File mode, you'll see the Plot and Tabular tabs



  - Go to the File pull down menu and click on Open (*.pro) and select the file to be processed from the Log file window



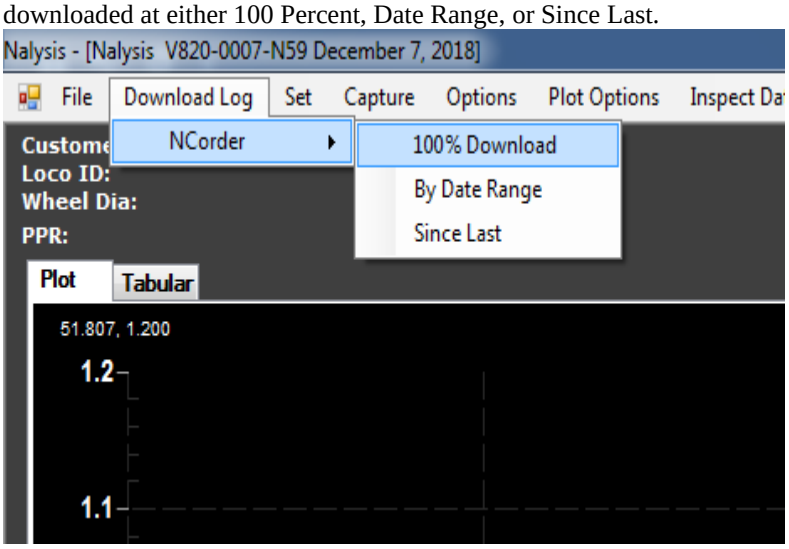
- **Process (*.bli)**
  - This feature allows the User to process the *.bli file from a previous download
  - Go to File pull down menu and click on Process (*.bli)>NCorder>##% and select the *.bli file to be processed from the Log file window



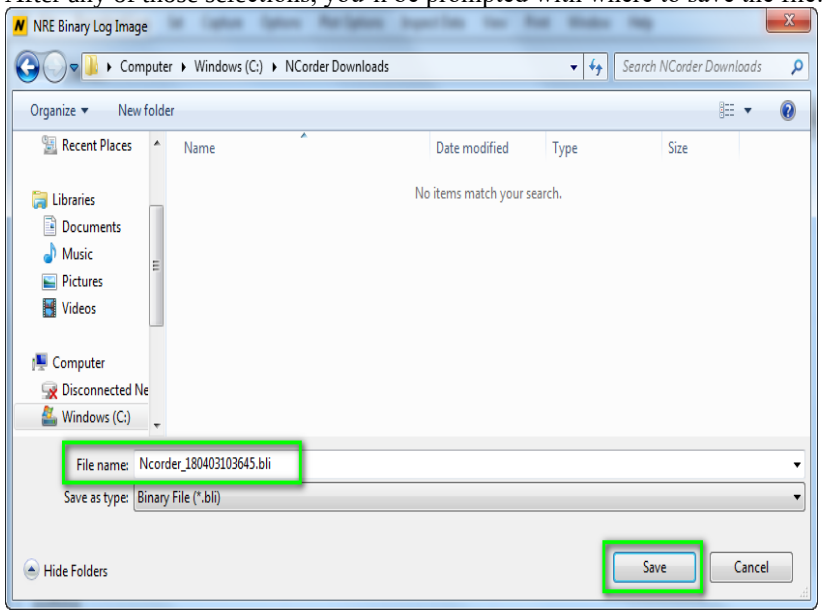
- **Admin**
  - Only available to the Programmer
- **Exit**
  - To Exit NAlysis

5.1.2 Download Log

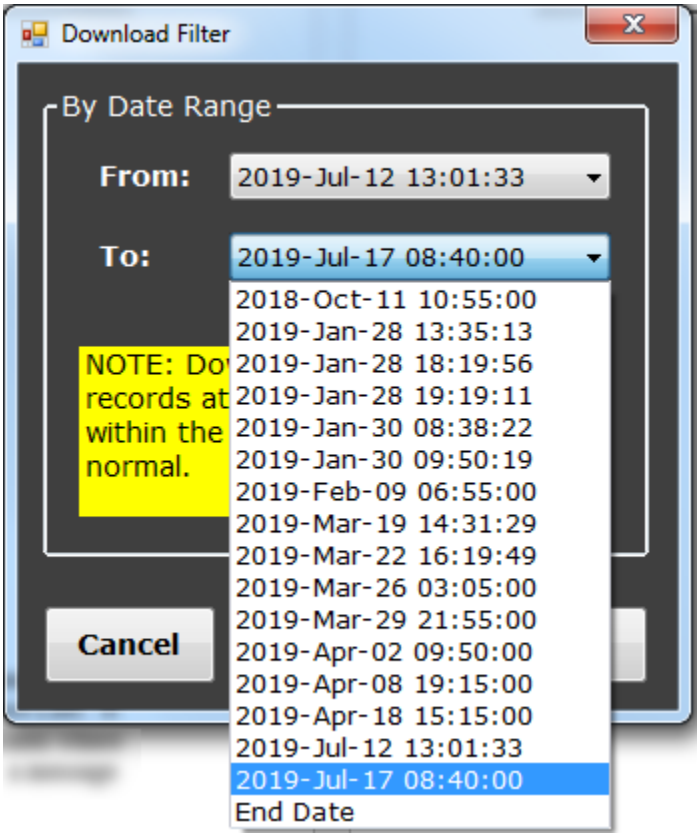
- There is a Download Log pull down menu available for downloading logs on the NCorder system. This will provide you with a way to view and diagnose problems that occur during its operation. The NCorder log can be downloaded at either 100 Percent, Date Range, or Since Last.



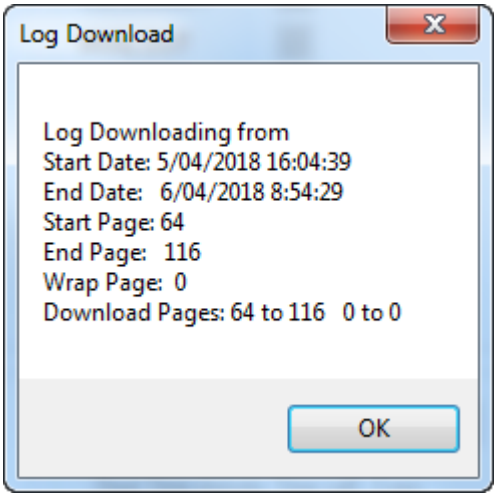
- After any of those selections, you'll be prompted with where to save the file:



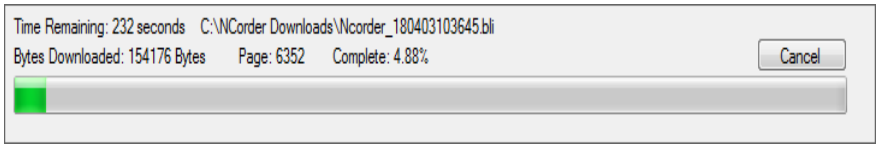
If you selected By Date Range, you'll be shown a list of possible dates. You cannot pick the same date for both the *From* and *To*; nor can you pick a *From* date that is later than the *To* date. The *End Date* option is so that you can get the most recent data. Note that the date-time options have a resolution showing to the hour. That could mean several minutes into the hour and not exactly on the hour as the display might suggest.



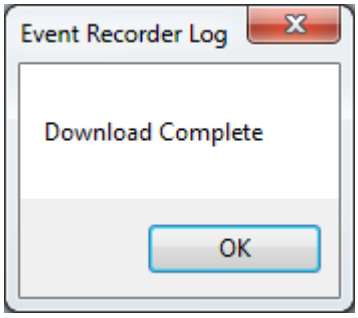
If you selected 100% Download or Since Last, the following summary window appears. Since Last uses the last 100% Download or Since Last. It does not reference Date Range downloads. In addition, in some cases where the NCorder log has recorded past the Since Last reference point, a message appears saying “No since last available”.



- The progress bar will show the status of the downloading process. You must be in Terminal mode to see the progress bar.

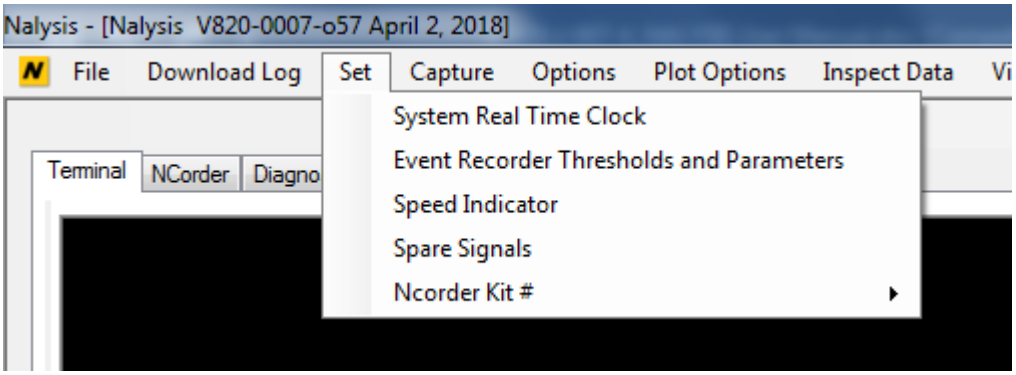


- Once the downloading is complete, the following pop-up window will be displayed. Click OK to complete.



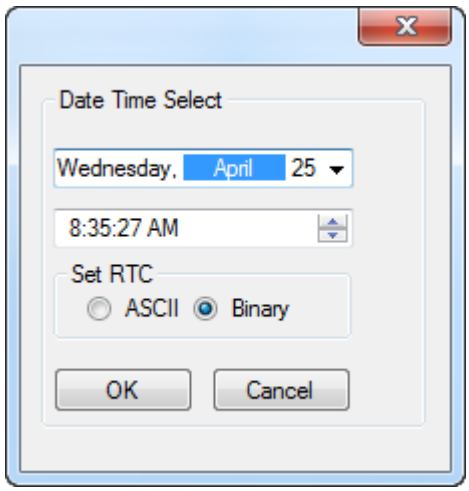
5.1.3 Set

- This feature allows the User to set the System Real Time Clock, Event Recorder Threshold and Parameters, Speed Indicator, Spare Signals, and NCorder Kit#. These settings are available in the Set pull down menu.

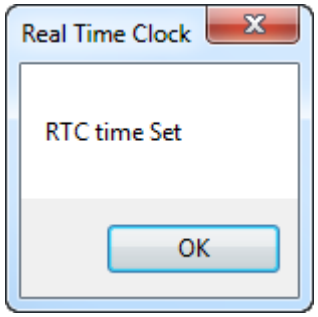


- **System Real Time Clock**

  To set the Real Time Clock, click on System Real Time Clock

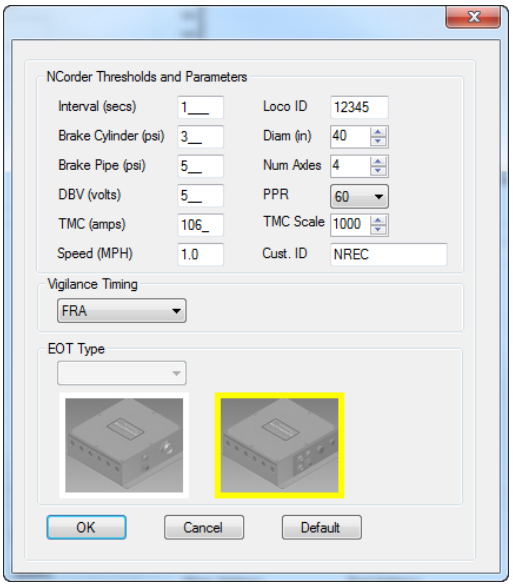


You should see a confirmation dialog with “RTC time set”. If not, then try again; and/or switch from Binary to ASCII before clicking OK.



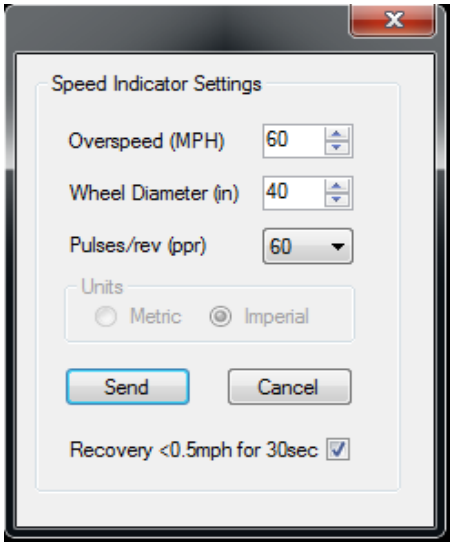
Note: For systems with the Nalysis communications driver Select Binary then click OK to set the system time and date (i.e. NCorder, NForce, and NCOMPASS)

- **Event Recorder Threshold and Parameters**
  - To set thresholds and parameters, click on the Set menu item, the submenu item - Event Recorder Thresholds and Parameter. Enter the required values and click on OK to accept the new settings. (see NCORDER manuals for more information for settings)



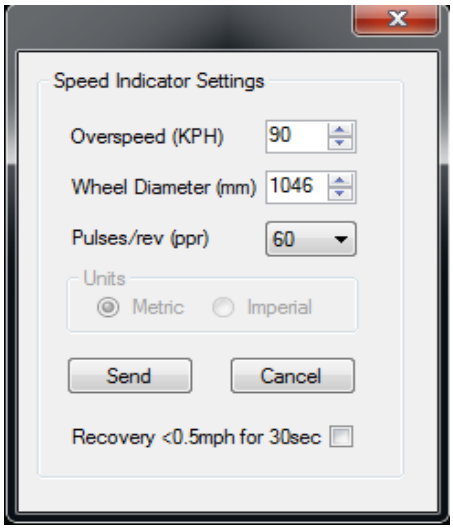
- **Speed Indicator**
  - Ensure the locomotive is stopped.
  - NALYSIS must establish communications with the Speed Indicator before any communication operation can be completed. This is done by connecting the communications (or download) cable (NRE P/N: 058-0001-000) from the Speed Indicator's communication port (Lemo connector on the back of the speed indicator) to a portable computer (or Laptop).
  - Launch NCORDER NALYSIS
  - Select Set->Speed Indicator

  For Imperial Units, the following panel will be displayed:



- Locomotive Overspeed can be set between 20 and 100 MPH (32-160 KPH)
- Wheel Diameter can be set between 32.0” and 47.0” (813 mm and 1192 mm)
- For the Recovery selection box:
    - Check box for MVOS braking control
    - Un-check box for excitation reduction control

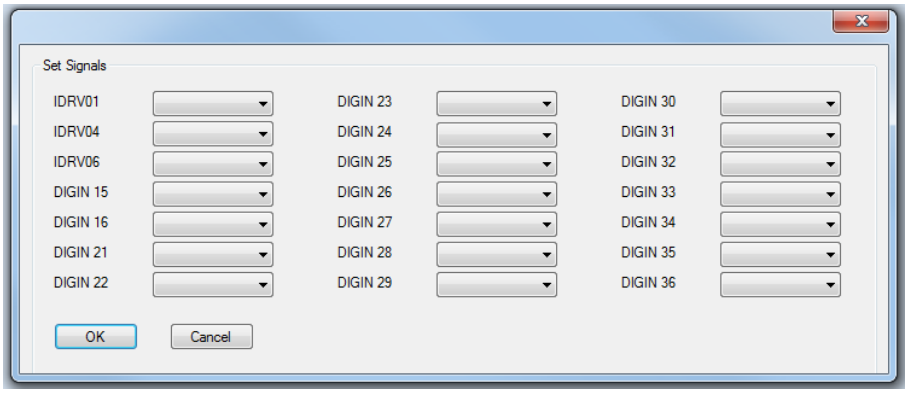
For Metric Units, the following panel will be displayed:



- Locomotive Overspeed can be set between 20 and 100 MPH (32-160 KPH)
- Wheel Diameter can be set between 32.0” and 47.0” (813 mm and 1192 mm)
- For the Recovery selection box:
    - Check box for MVOS braking control
    - Un-check box for excitation reduction control

- Once your parameters are set, click on Send

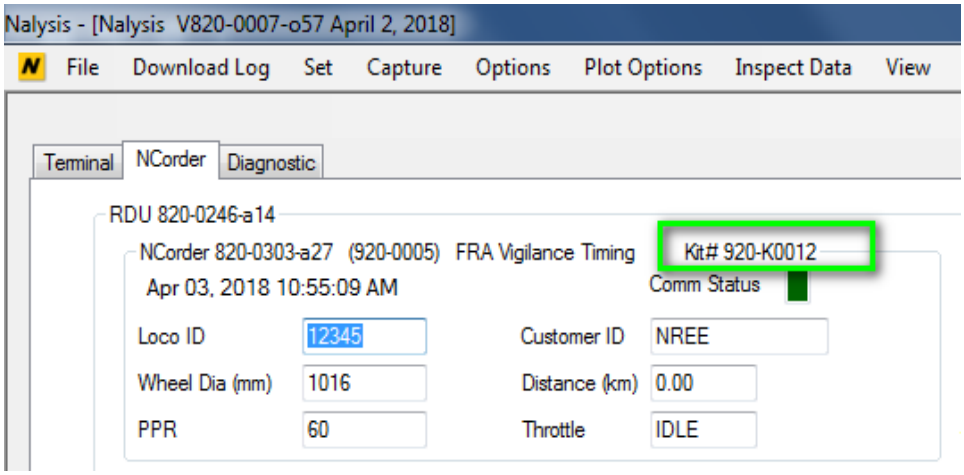
- **Spare Signals**
  - This feature allows the User to manually set up the Spare Signals layout for viewing of the Real-Time Signal Update screen



Note: This feature is only supported on the Stand-Alone Event Recorder

- **NCorder Kit#**

  - This feature allows the User to set the NCorder Kit number that is applied to the specific application. Once the NCorder Kit number is set, the Nalysis application will display their default setting for Real Time Update signals.



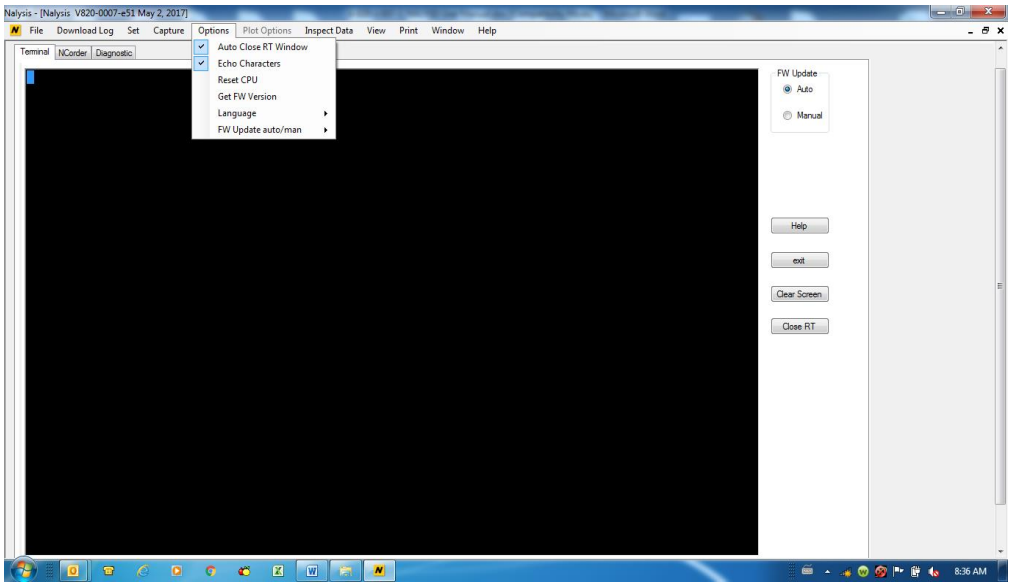
Note: This feature is only supported on the Stand-Alone Event Recorder

5.1.4 Capture

- This feature is not available on the NCorder application

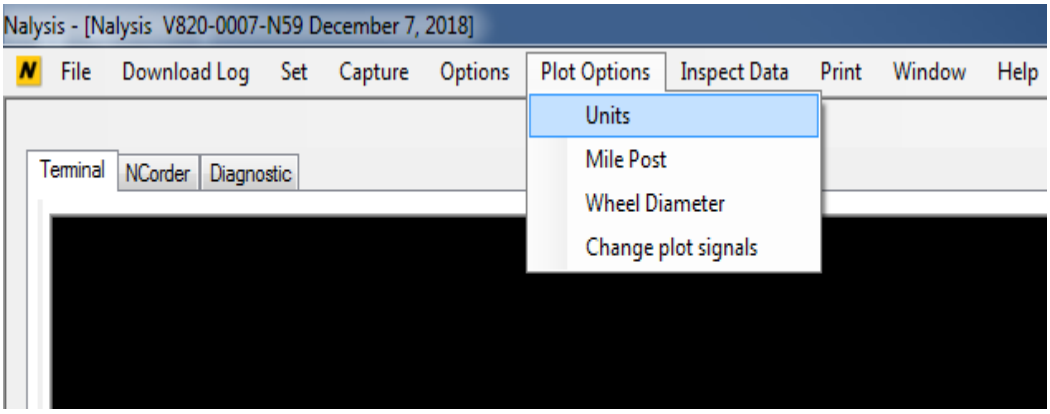
5.1.5 Options

- Click on the Options pull down menu and the following screen will appear:

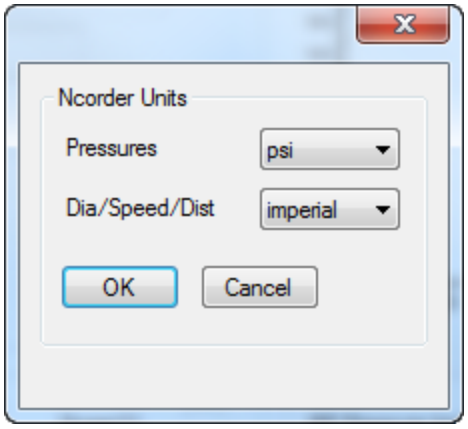


- If Auto Close RT Window is selected, real time screens will automatically close when exited, otherwise they remain open until the Close RT button is pressed. (This feature is not available on the NCorder application)
- If Echo Characters is selected then key presses are echoed to the Terminal screen. (This feature is not available on the NCorder application)
- Reset CPU will send the soft reset command to the NFORCE. If all reset conditions are met the NFORCE will reset without shutting down power. (This feature is not available on the NCorder application)
- Get FW Version will retrieve the system's current firmware version (Nalysis communications driver required)
- Language allows the user to select display in English, Spanish or French. (Current set for English only)
- FW Update auto/man allows the user to select automatic or manual firmware update. This option functions the same as the FW Update radio buttons that appear on the top right of the Nalysis screen.

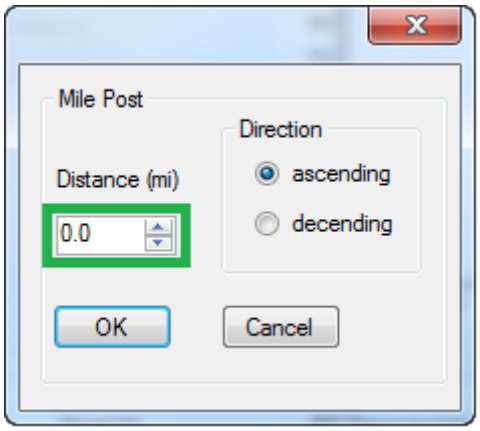
5.1.6 Plot Options



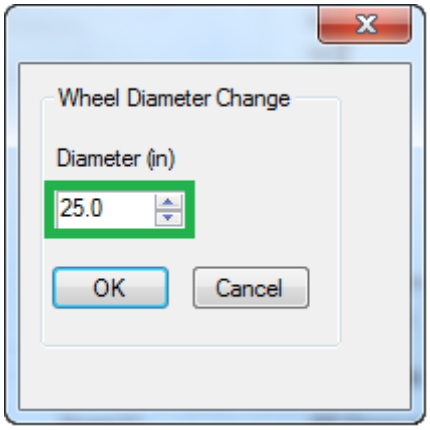
- The Plot Options allow User to set the following options for Plotting presentation:
  - Units
    - Allow User to change units to either Metric/Imperial



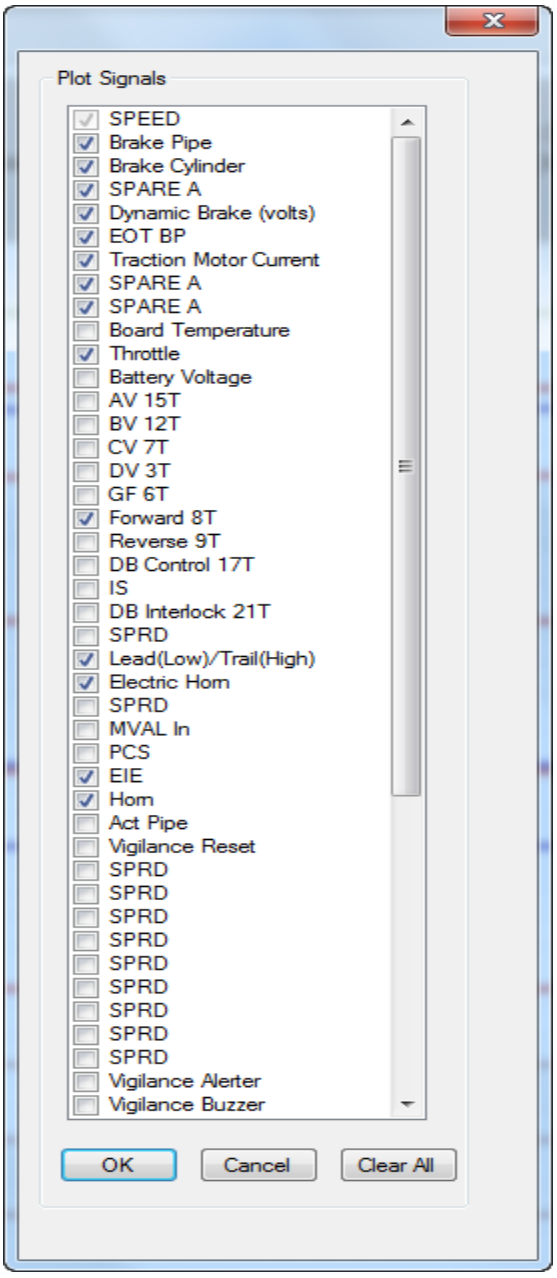
- Mile Post
  - Allow User to set Distance to plotting
  - The mile post is displayed in



- Wheel Diameter
  - Allow User to set the Wheel Diameter for plotting

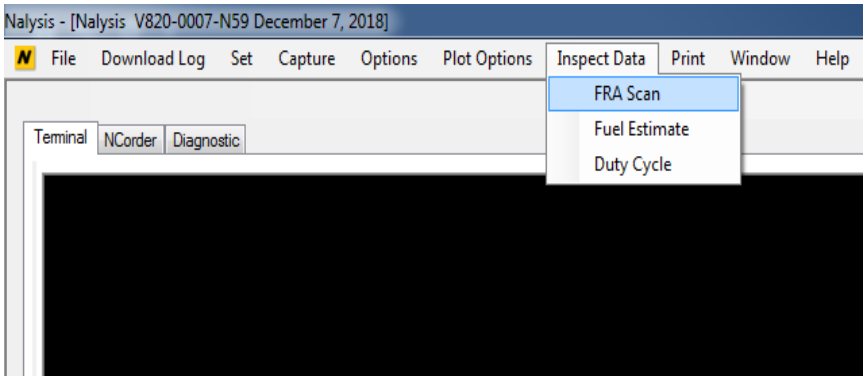


- Change plot signals
  - Allow User to select the required Signals for plotting. See Processing Log File section for more details.



5.1.7 Inspect Data

- Use this to perform an inspection on the downloaded log for further investigation, click on Inspect Data to navigate through the various options



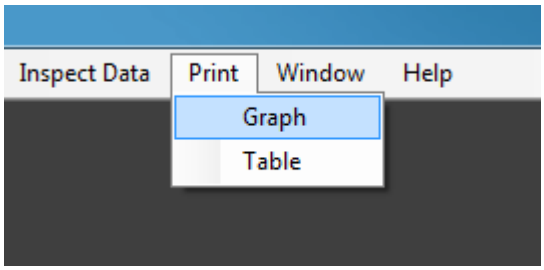
- See Processing Log File section for more details

5.1.8 View

- Feature to zoom in and out of the plotting data. See Processing Log File for more details.

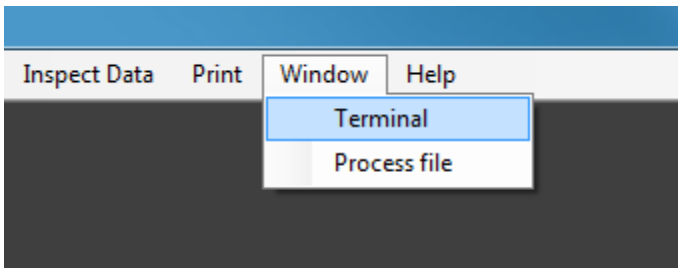
5.1.9 Print

- Print the data in either Graph or Table form. See Processing Log File section for more details. You can pick from the menu or the button located to the upper-right with the printer icon.
- Printing the graph uses a lighter background to reduce printer ink.

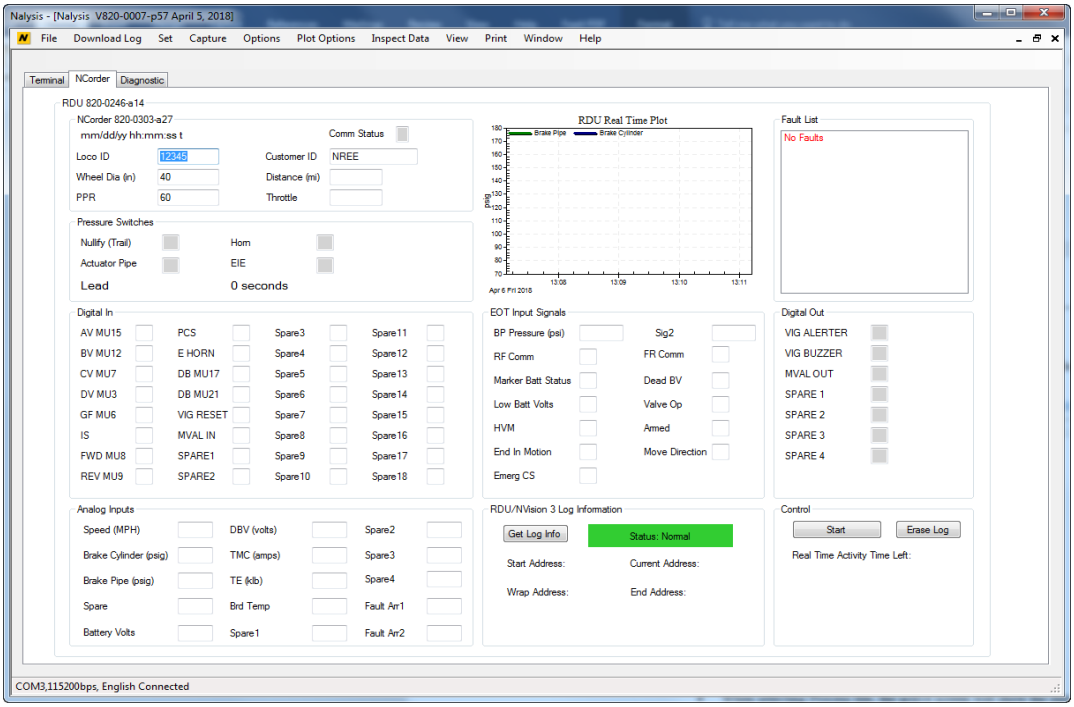


5.1.10 Window

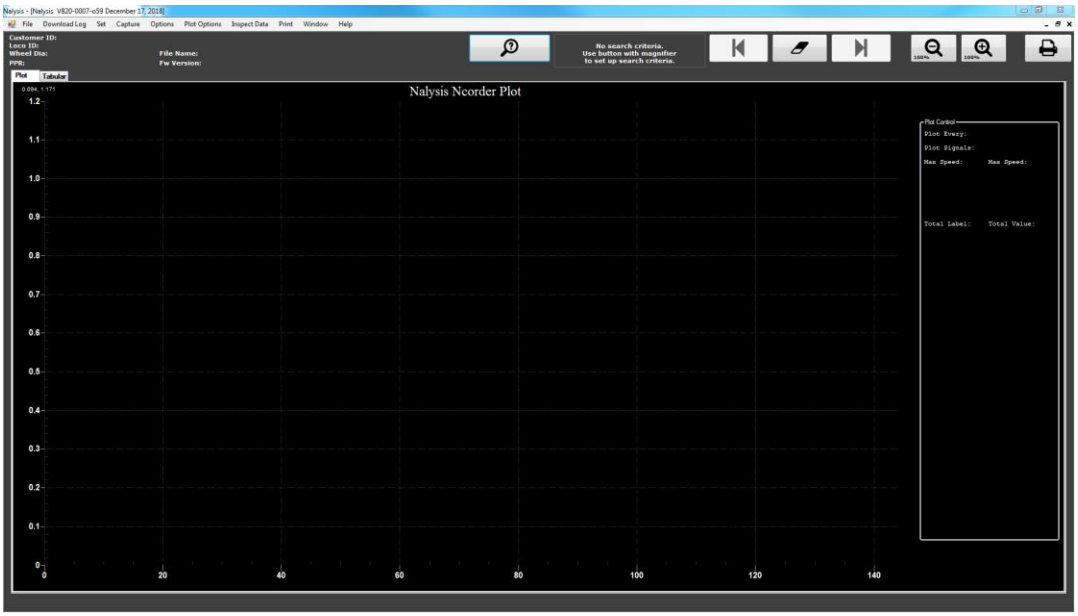
- This feature allows Users to select the screen options to switch to Terminal screen or the Process file screen



- When selecting Terminal from the Window pull down menu, the active screen will show the Real-Time Signals Update screen.



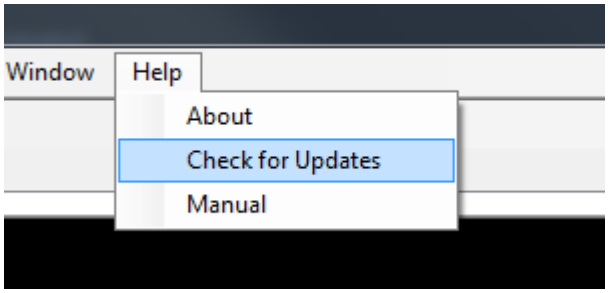
- When selecting Process file, the active screen will show the data screen that will allow User to either process the (*.bli) file or open the (*.pro) file from the File pull down menu for data viewing. See Processing Log File section for more details.



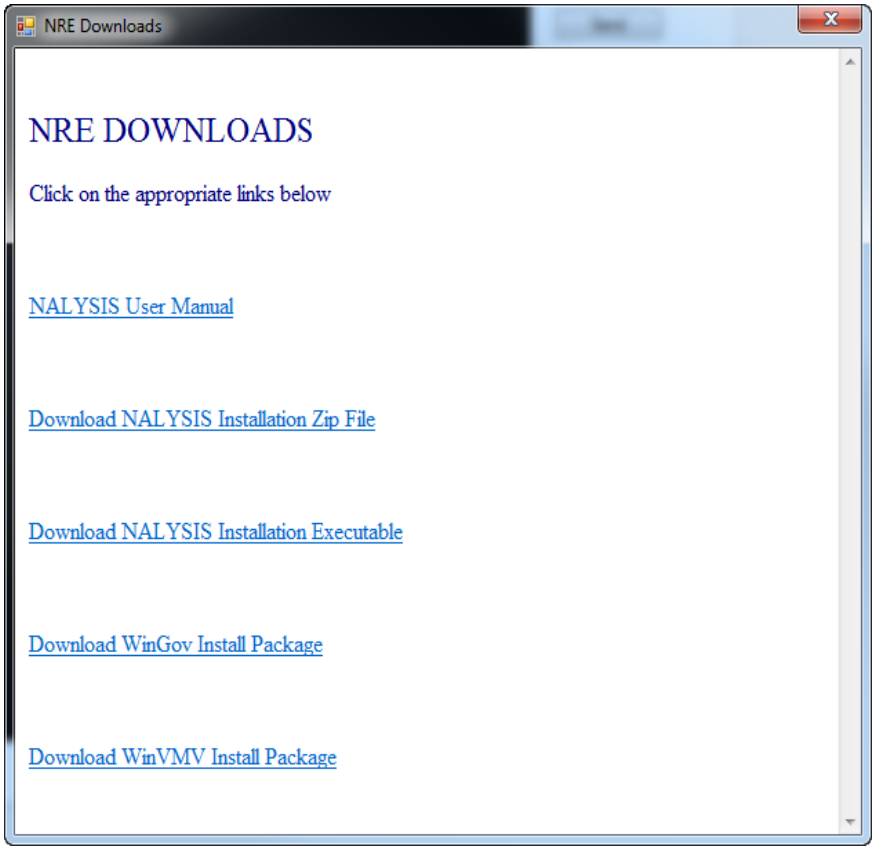
5.1.11 Help

Warning: Installing the latest NAlysis may not be compatible with your existing NForce, NCorder, or NCompass systems. Ensure that your systems are up-to-date before using the latest NAlysis by consulting release notes or FMI (field maintenance instruction) documents.

- This Help menu option contains information about NAlysis, Check for Software Updates, and Manual



- Ensure that you have a network connection to the Internet, then click on *Check for Updates*. The following window will appear. Click on *Download NAlysis Installation Zip File* or *Installation Executable* link and follow the directions to save the file.



If you downloaded the Zip file, double-click on the zip file to view the installer file inside. Double-click on the installation executable to install

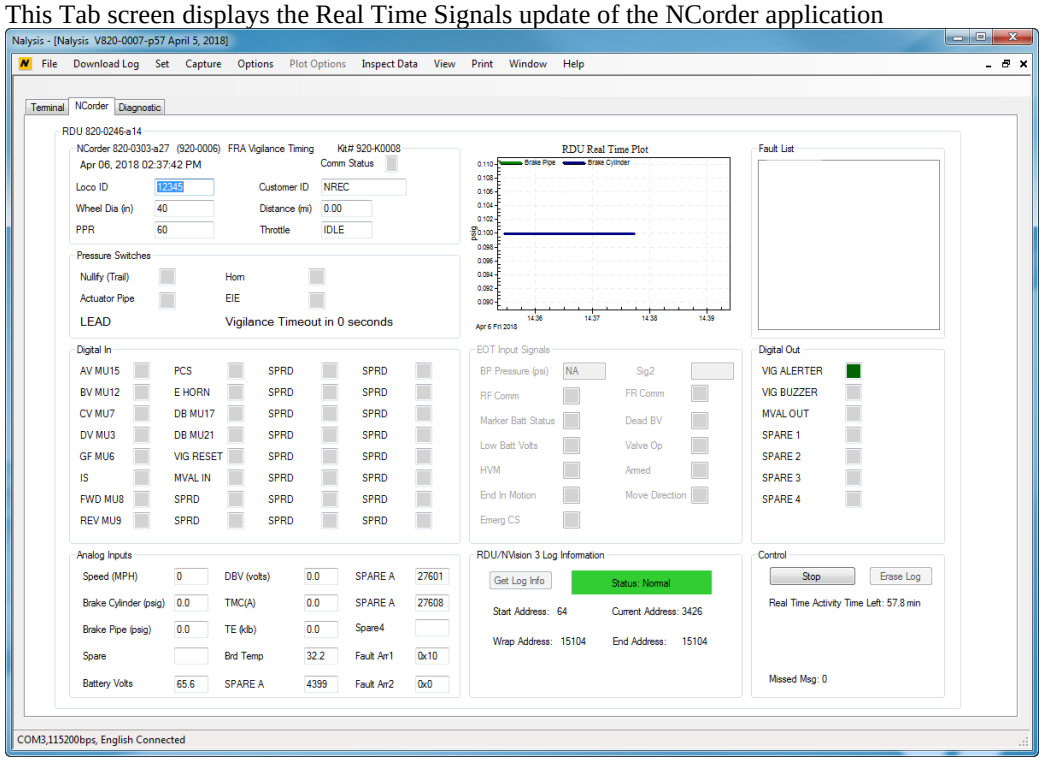
- To get the latest user manual, select the *Manual* option. You'll be greeted with the same options as the *Check For Updates option*. Click on the *NALYSIS User Manual* link to download.

5.2 Terminal Tab

This Tab screen is not supported on the NCorder Application.

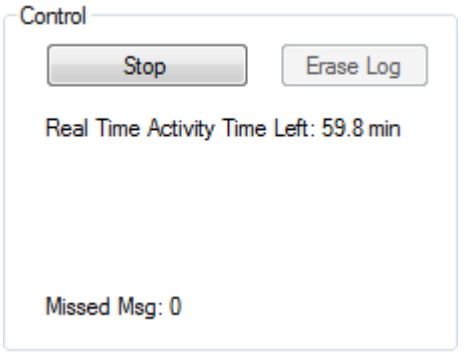
5.3 NCorder Tab

This Tab screen displays the Real Time Signals update of the NCorder application



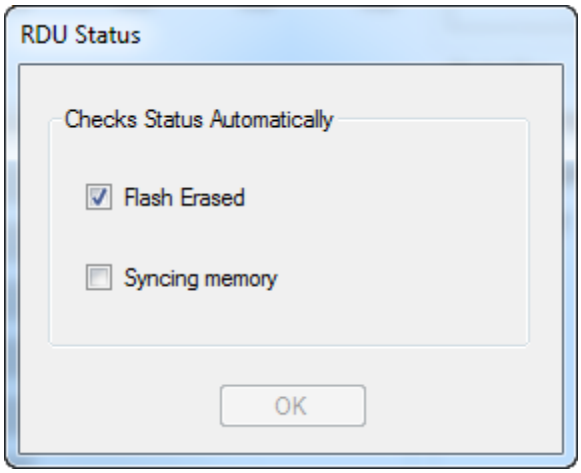
5.3.1 Start/Stop

In the bottom-right corner, The Start button when pressed toggles to Stop and vice versa. Use this to get real-time activity that can provide validation of the installation of your NCorder. Note that the real-time activity will automatically stop querying the NCorder after 60 minutes.

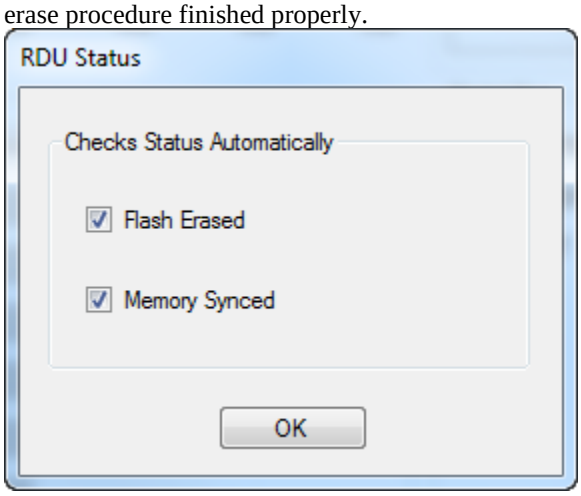


5.3.2 Erase Log

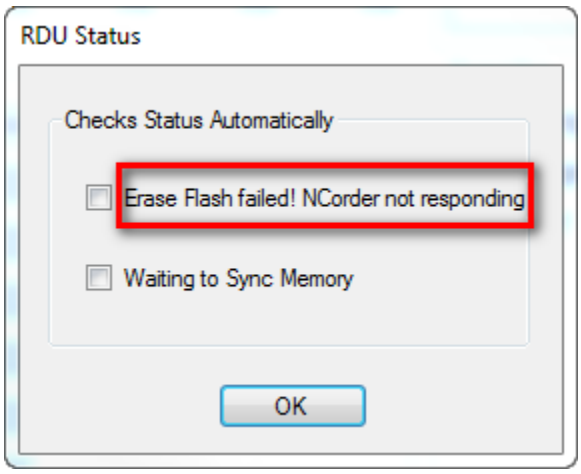
Use the erase log button to clear the RDU and NCorder logs. If you have an RDU connected, you'll see a dialog with two checkboxes. This is an automated process that will enable the OK button when it has completed.



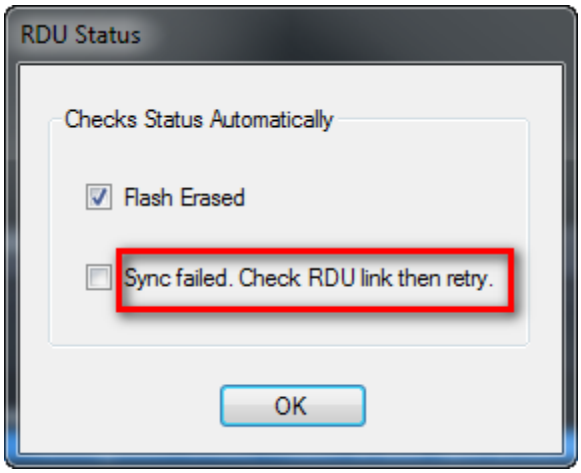
When both checkboxes are checked and the OK button is enabled, you'll know that the erase procedure finished properly.



If the dialog informs you of an error, make sure that your RDU and NCorder are connected and retry Erase Log. Three attempts are made to erase the Flash before failure.

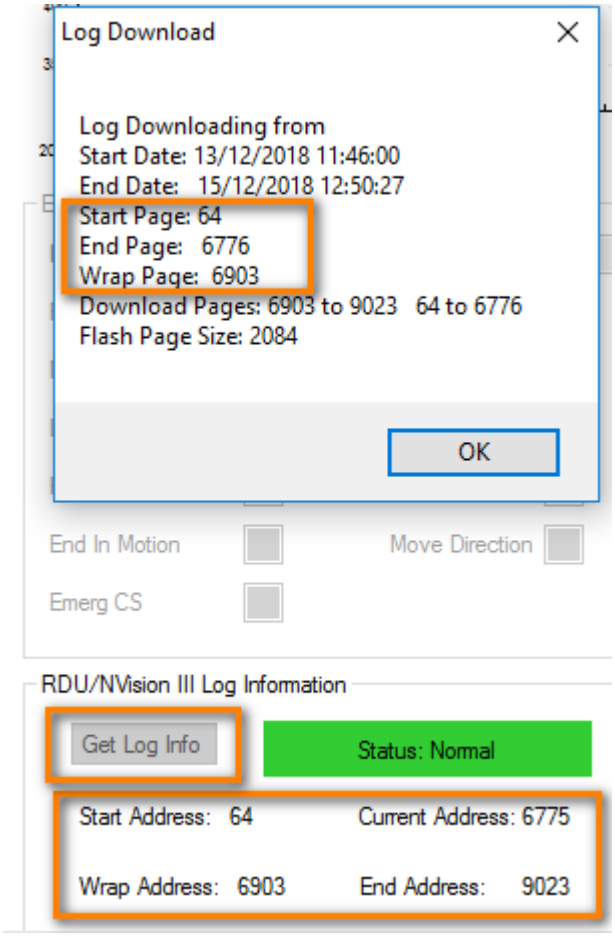


If the Syncing fails,



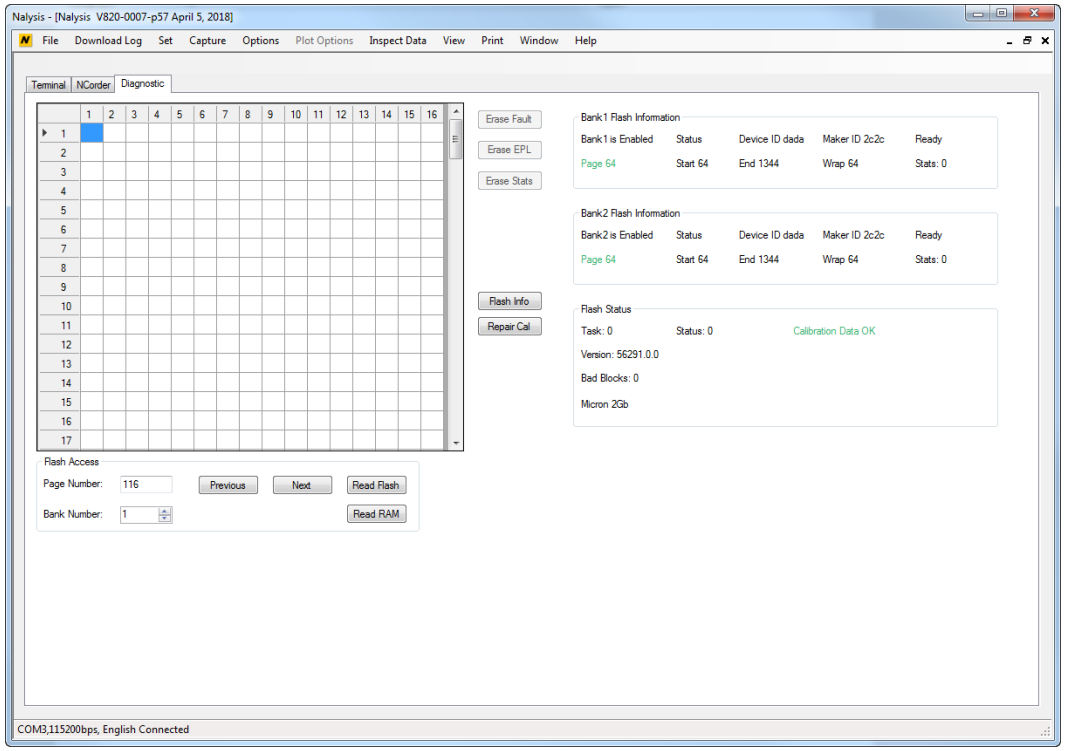
5.3.3 Get Log Info

The button Get Log Info will retrieve flash information from the RDU that is useful for Engineering. During a 100% download from the RDU, these addresses coincide with the Log Download pop-up window.



5.4 Diagnostic Tab

This Tab screen show the memory table and only use for troubleshooting purpose. The Erase Fault, Erase EPL, and Erase Stats buttons are do not apply to the NCorder and will be disabled when NCorder is selected as the application. See Section 8.2 Diagnostic Tab for more details.

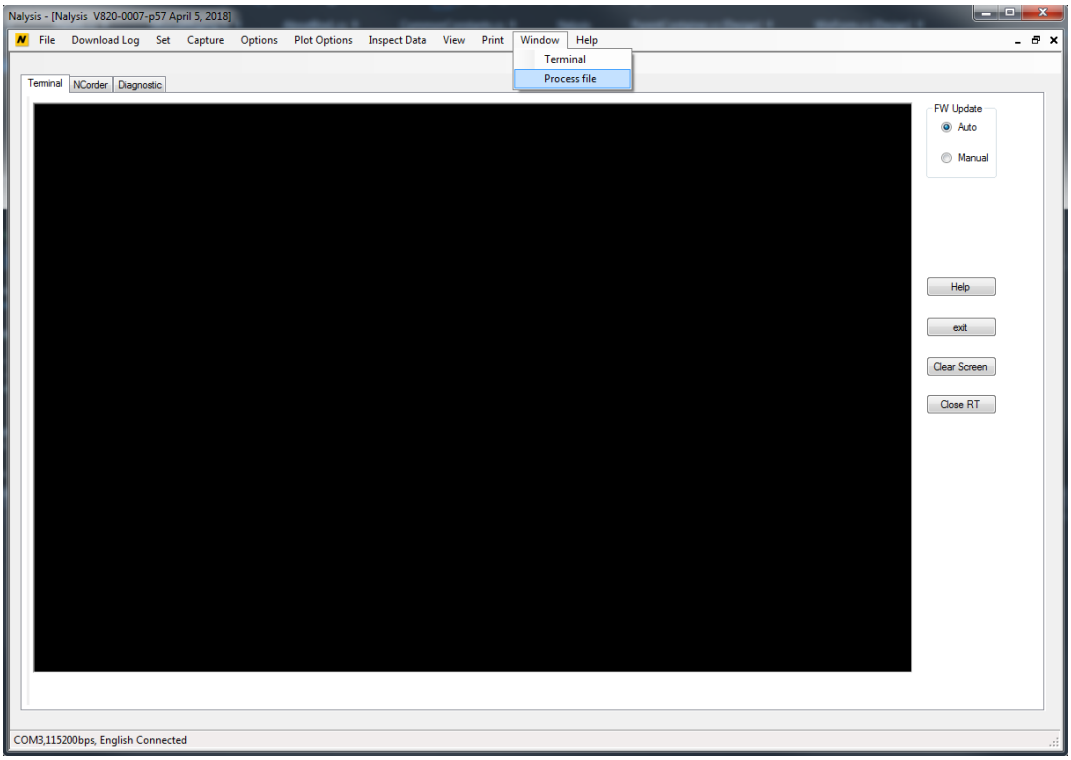


5.5 Processing Log File

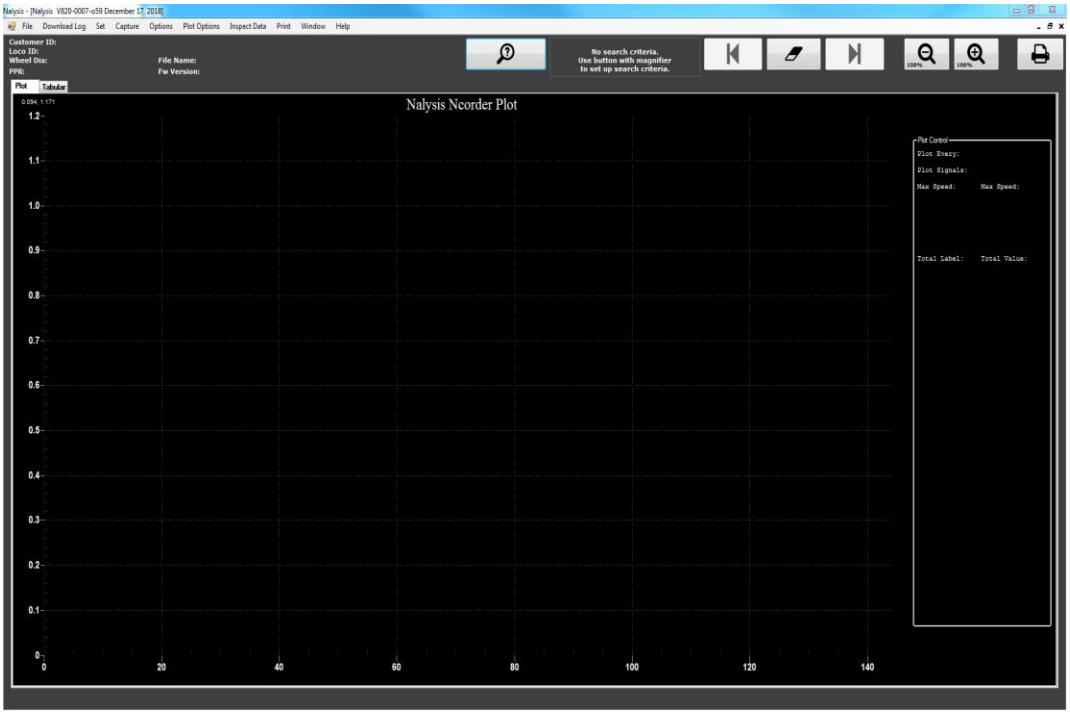
5.5.1 File Processing

This feature allows the .bli file from a previous download to be converted into 3 different outputs. The first output is a .pro output file that can be viewed using the NAlysis plot. Two types of .csv files will also be processed into the same directory allowing the user to view tabular data in excel. The files will have the same name as the .pro file, one of which with FRA appended to the name. The FRA output has the 0-distance point at the time of download and increasing as time moves towards the first data point. The non-FRA .csv file has the 0-distance point at the first data point and increases with time. If the download is large multiple excel files will be output so that the files are not too large for excel to properly open. These files are all one continues file, for example, the first data point of section2 file is the data point immediately following the last data point of the section1 file.

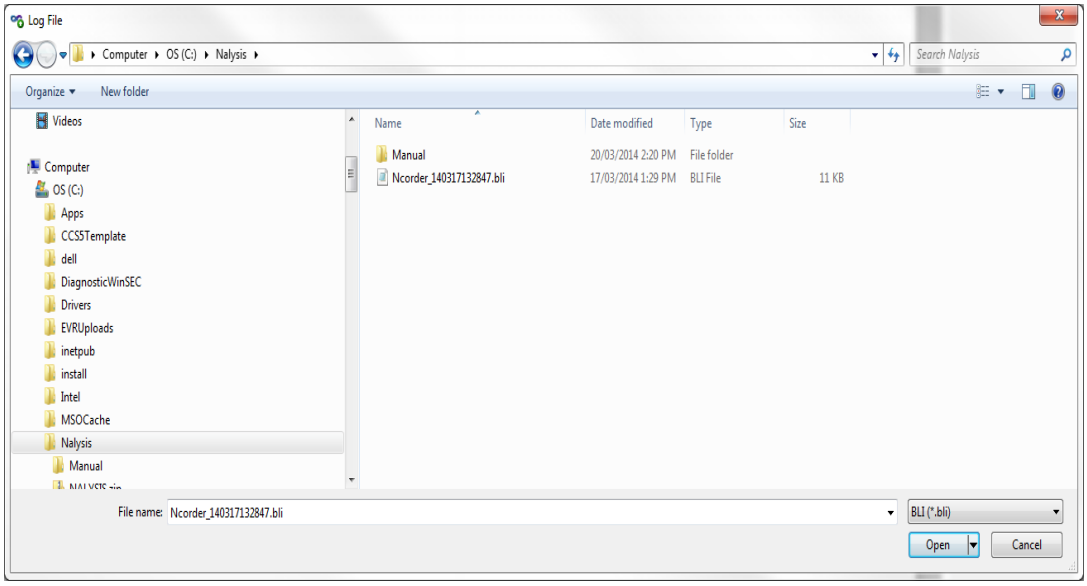
1. To process the downloaded bli file, click on Window->Process File



- The following screen will appear

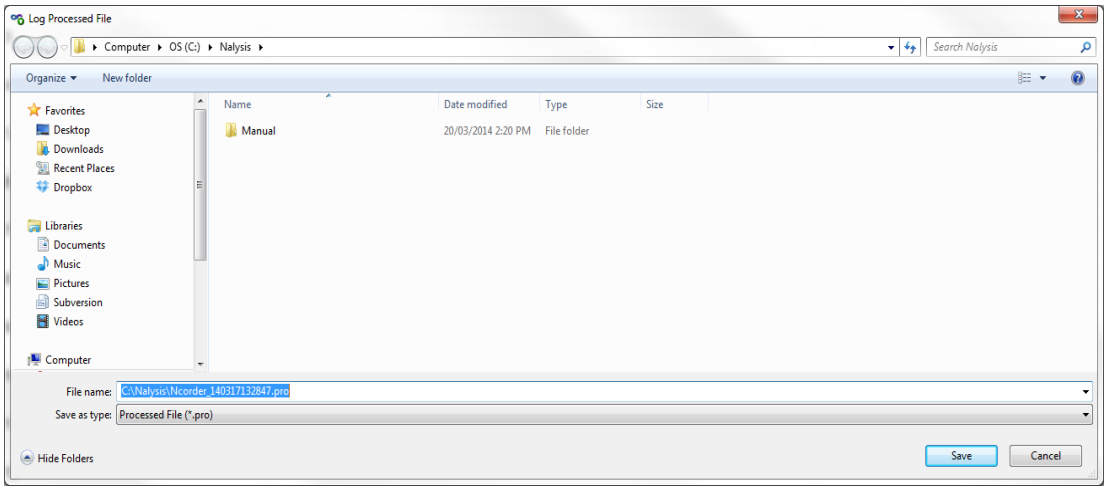


1. Select File->Process (*bli)
2. An open file dialog similar to the one below will appear



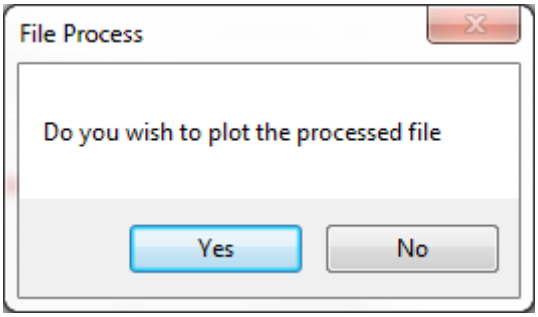
3. Locate the *.bli file that you want to process and click Open.

4. Now a save file dialog similar to the one below will appear with a new *.pro file name created.



The software needs to convert the binary file to a processed file for plotting.

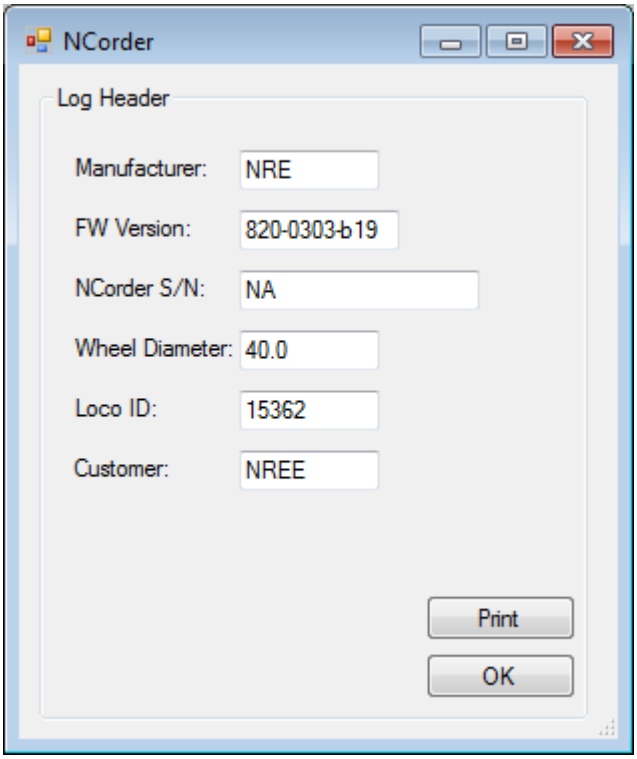
5. Click on Save will start the file conversion from *.bli to a *.pro file.
   - CSV files are also created in the same folder. The file with the FRA designation contains distance calculations for every record with the last record being the start, or zero distance, position.
   - The other CSV file uses distance calculations for legacy users.
6. Once completed, NAlysis will ask if you wish to plot the file at this time.



7. Click the Yes button to begin, if you choose No, you can always plot the file later by selecting File->Open->Event Recorder Log from the main menu

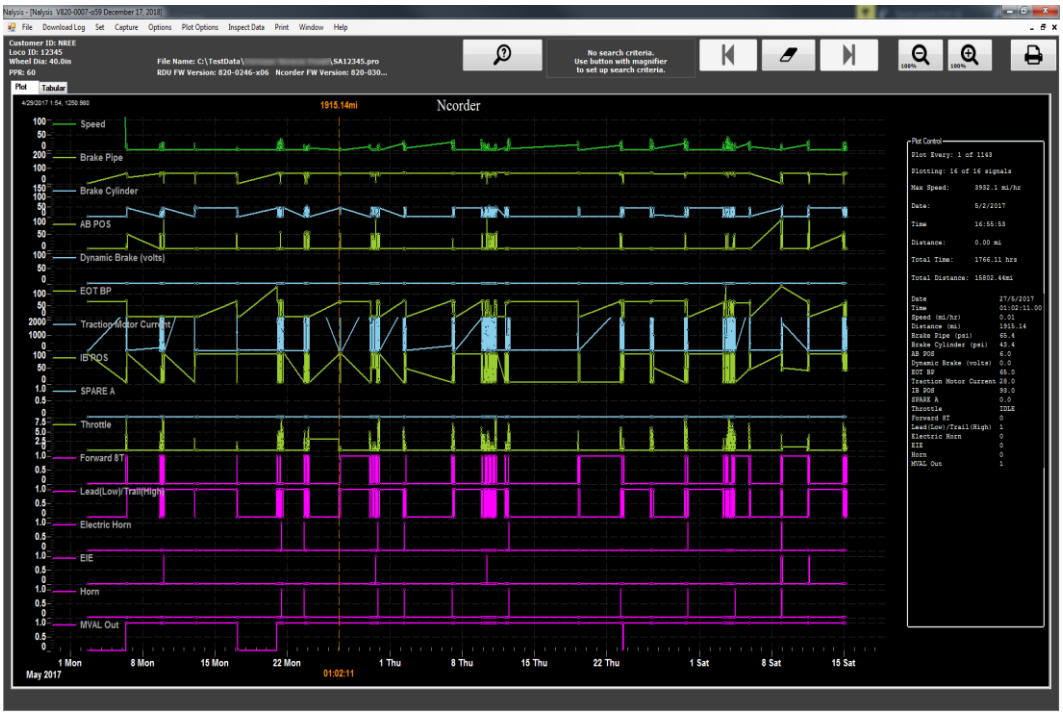
5.5.2 File Plotting

When plotting the file is selected, the following window appears. See Plot Options section for more information on plotting

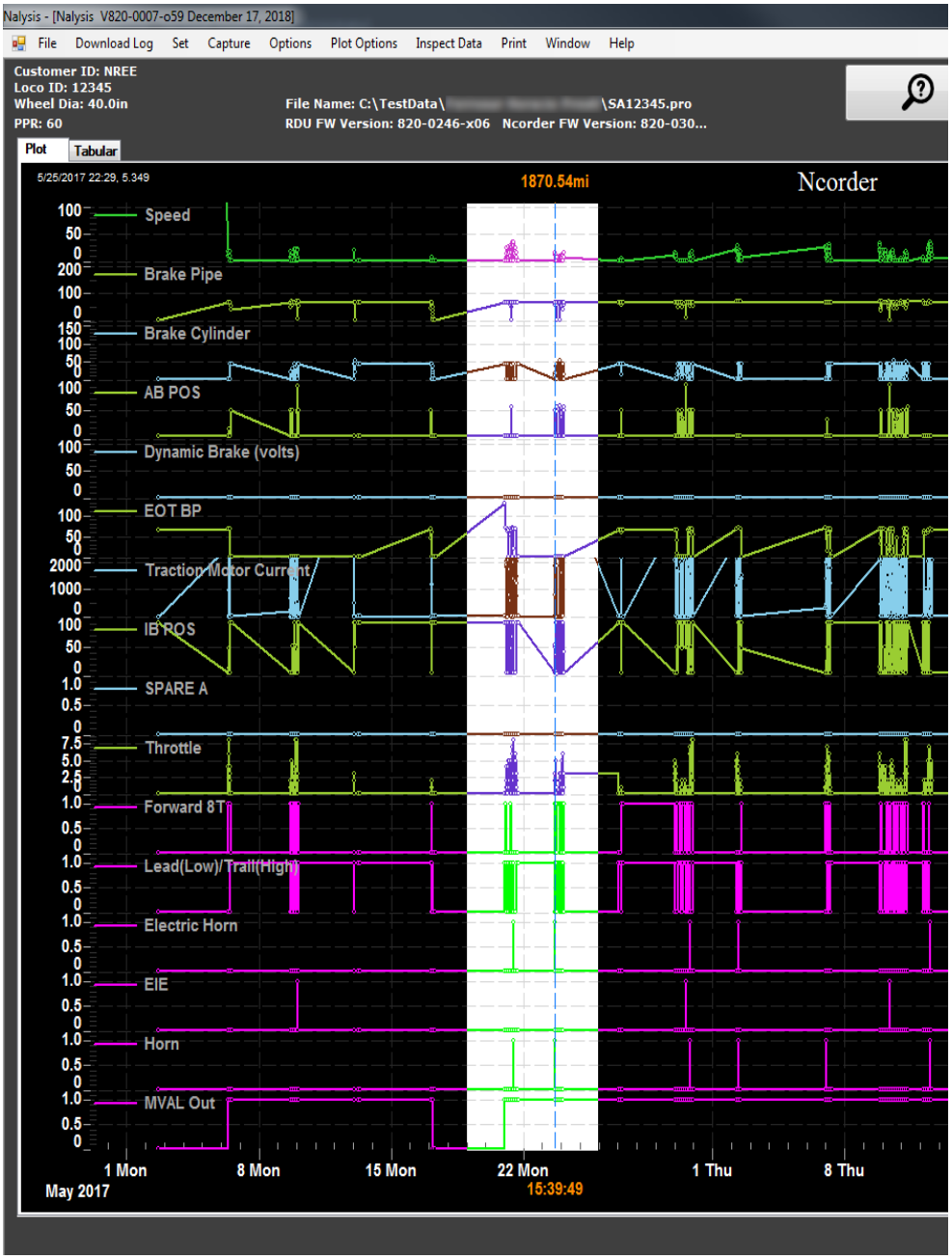


You can print this header for your records

Below is a sample plot:



To zoom in on an area, hold down on the left mouse button and drag the cursor over the area of interest (white area below) and release the mouse button. Alternatively, click on the area of interest until you see an orange vertical line appear which means you have clicked on a data point. Then use the button with the magnifying glass with the "+" to zoom in.



Here's the zoomed in white area:

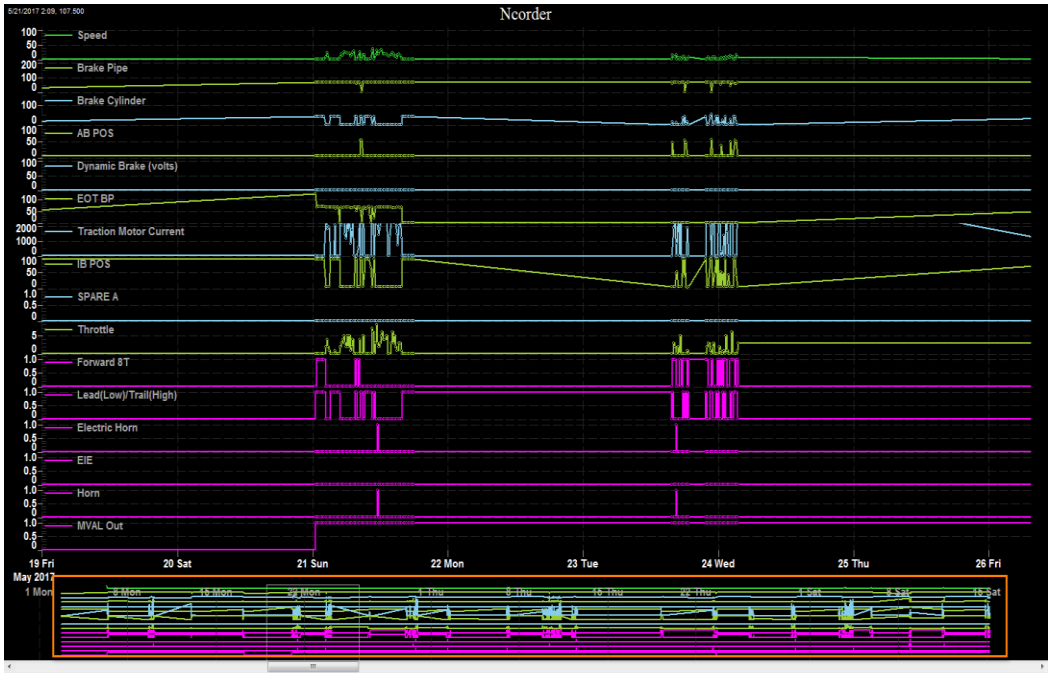
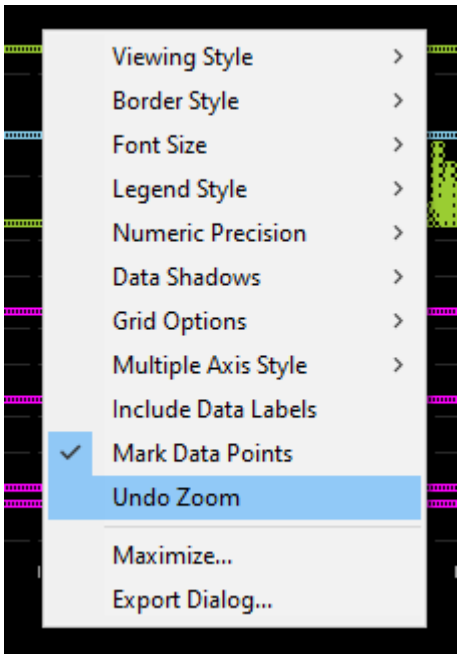
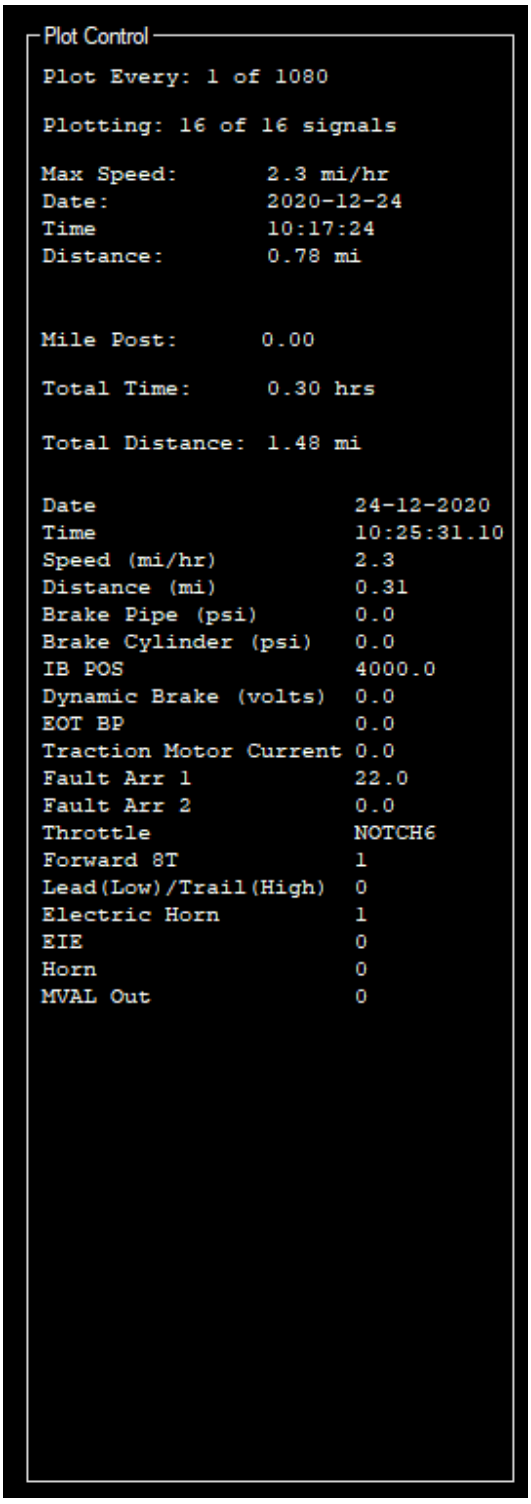


Figure 1. Note the mini graph at the bottom after zooming in and the scroll bar. This mini graph provides a reference point for the zoomed in area relative to the entire date range. With your mouse wheel, you can scroll forward or backwards through the time line.

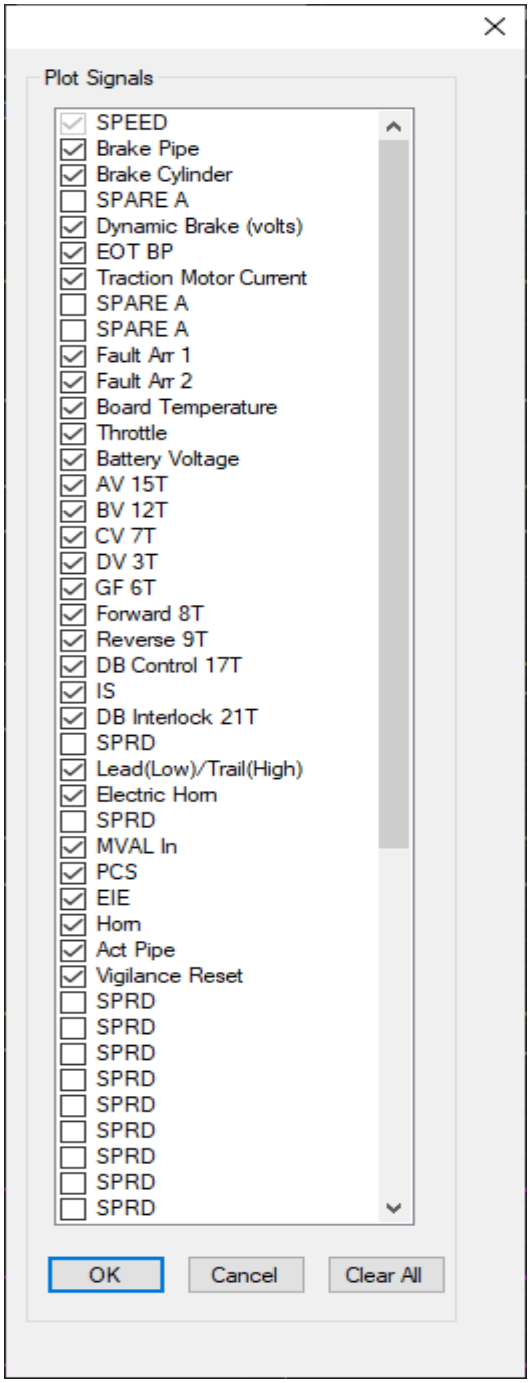
To zoom out, right-click on the plot area and select "Undo Zoom" from the context menu. Alternatively, use the button with magnifying glass with the "-".



To the right of the graph is a synopsis of the recorder's data

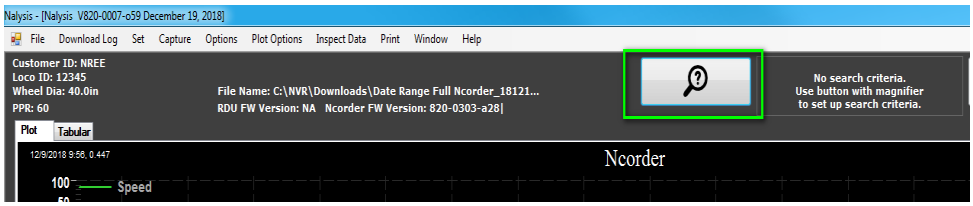


There is also the option to add or remove signals (Plot Signals). Select NCorder Set->Plot Signals the following window will appear. Choose up to 16 different signals. If you select more than 16, only the first 16 will be plotted. And Speed cannot be removed shown below with the checkbox greyed out.

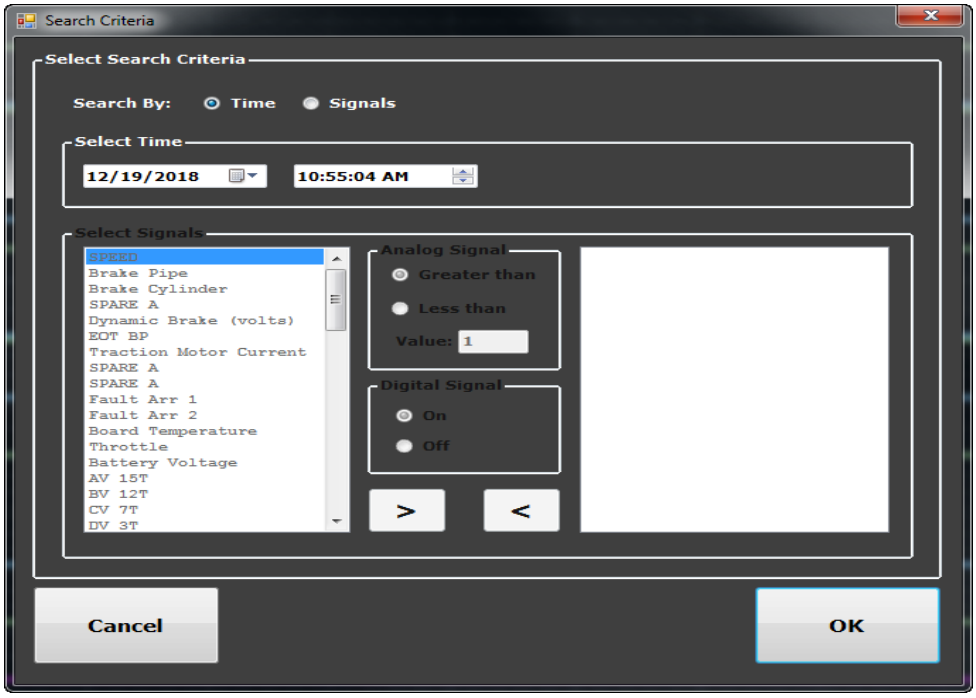


5.5.3 Searching

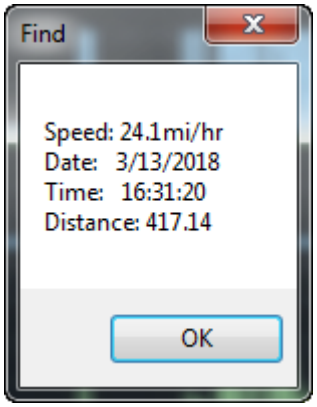
Options to find a specific signal(s) or time are available. Click the button showing the magnifying glass with the question mark.



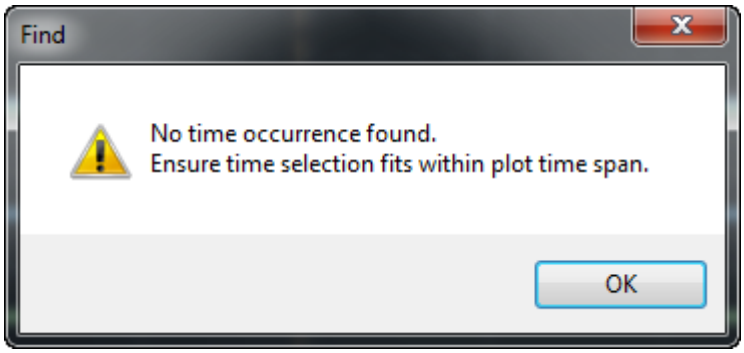
You will see a Search Criteria window that defaults to search by Time



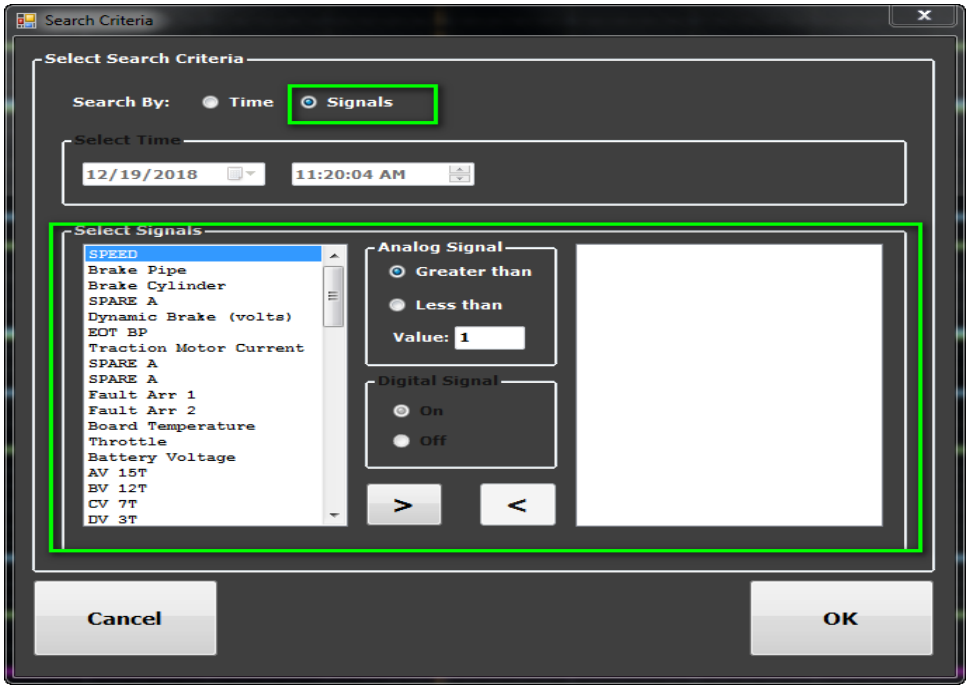
Search by Time allows you to specify to the second of the day. After specifying the time, click OK. If it exists, a pop-up appears confirming the Speed, Date, Time, and Distance; and the plot will automatically move to that date and time. Notice above that the widgets for the Select Signals option will be disabled when Search By Time is selected.



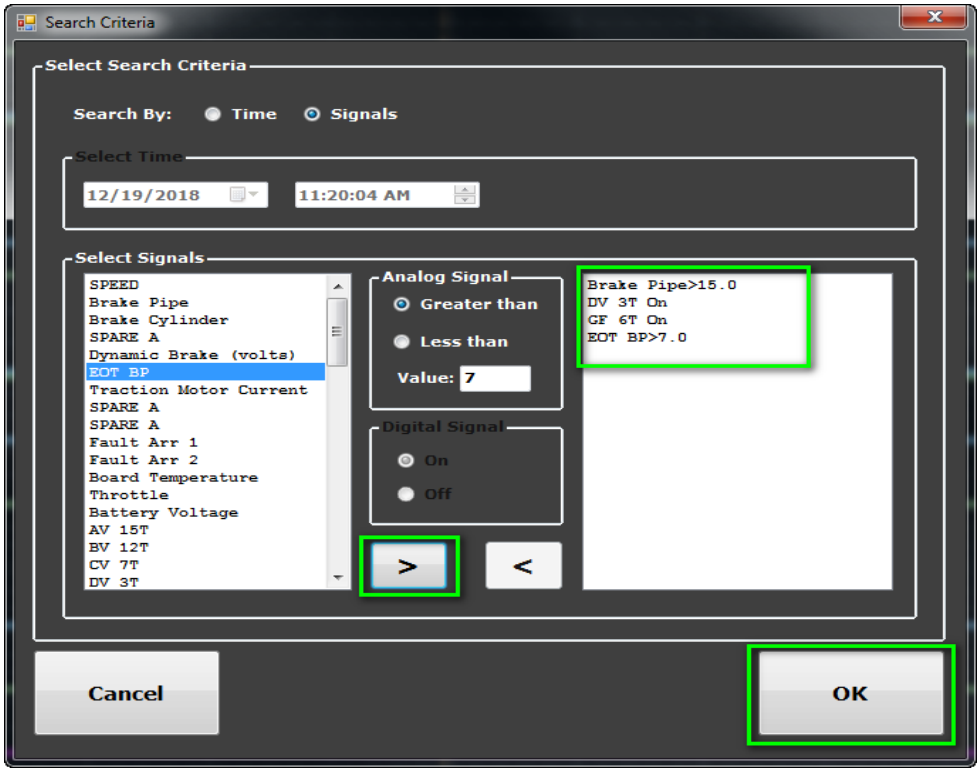
If the time doesn't find it, there will be a "No time occurrence found." message.



To search by Signals, select the Signals option that will enable the widgets in the Select Signals group.



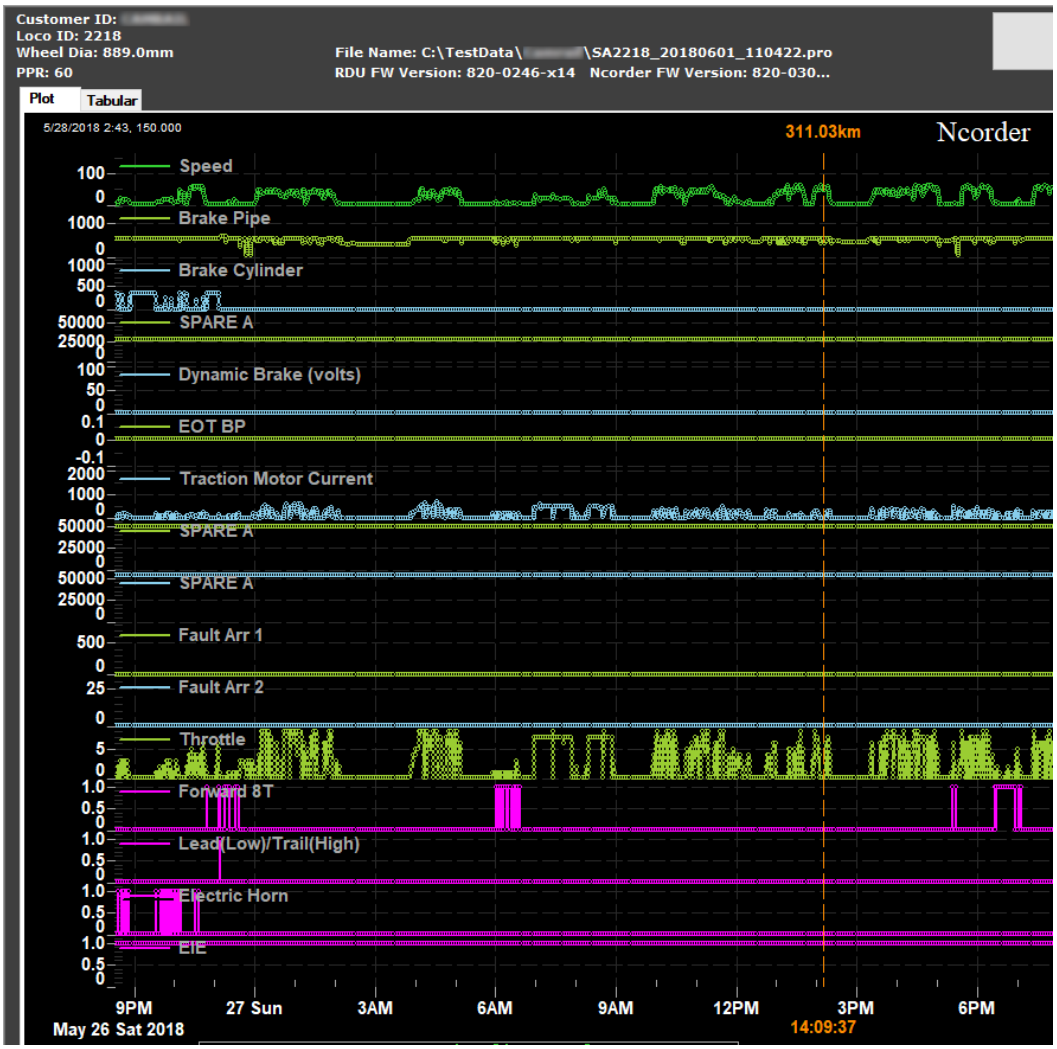
1. Select the Signal, specify greater than or less than, and click the “>” button.
2. Select multiple signals if desired



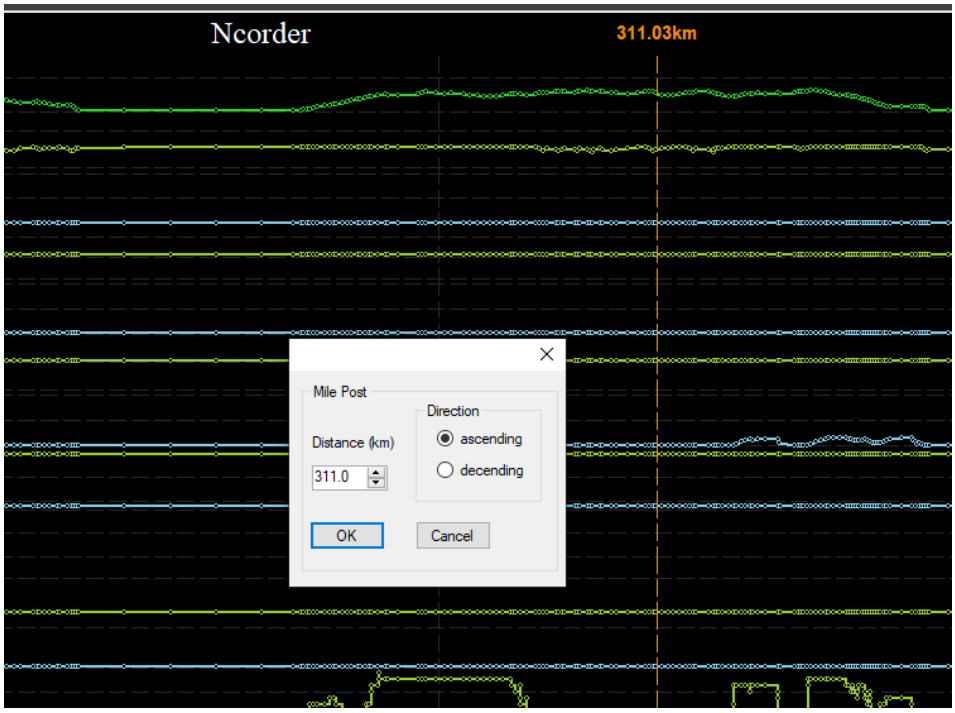
3. Then click OK. The plot will move to the first occurrence, if it finds the record that meets all the search criteria.

5.5.4 Mile Post Menu Item

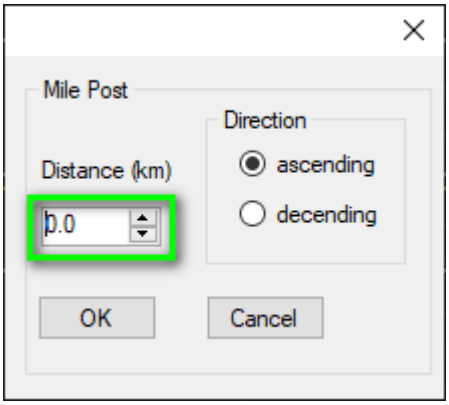
Select a point on the plot to create the mile post. An orange vertical line shows where the cursor is.



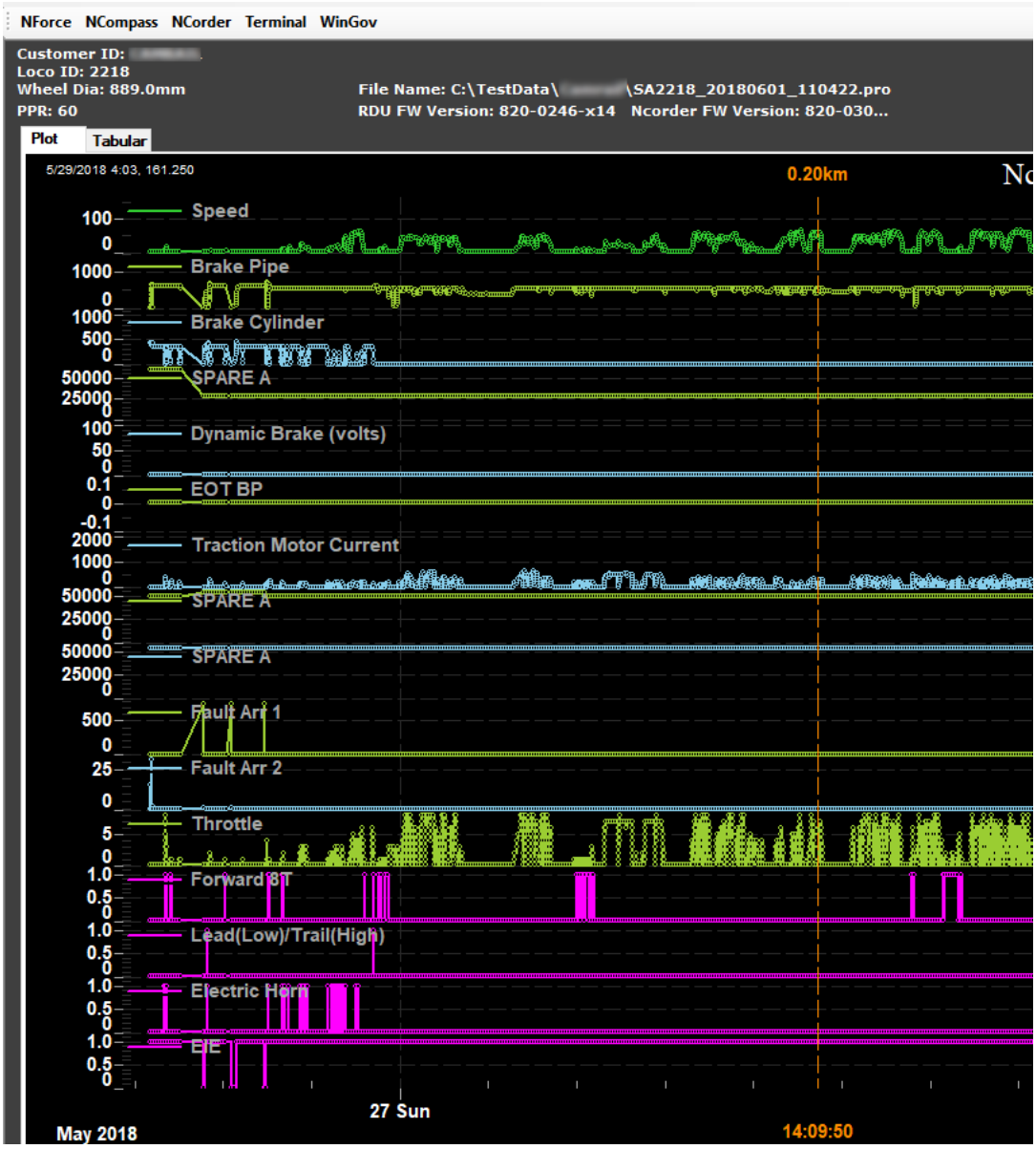
Now select Plot Options->Mile Post, the following will appear

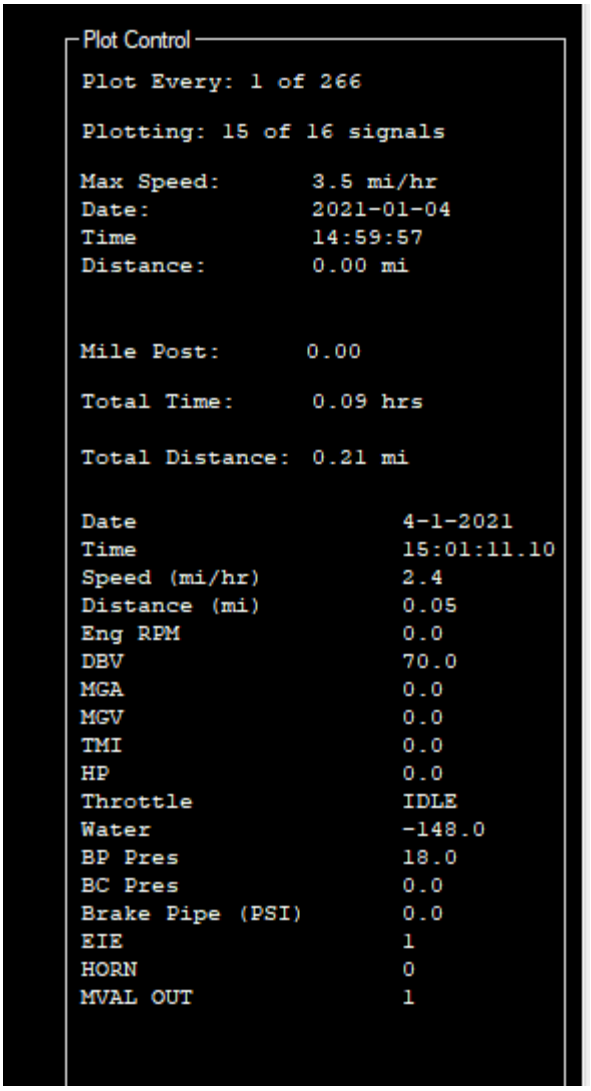


Select the new distance value and direction and click OK. For example, enter 0.0.



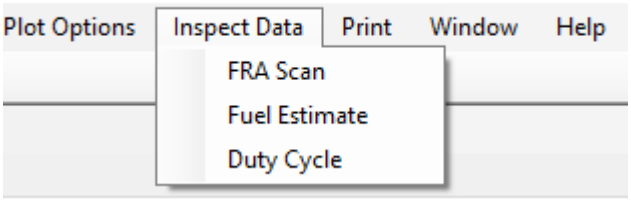
The distance readings will now be adjusted to the mile post selection, and the plot will be redrawn. Notice the distance is now 0.20 at our mile post selection. The Mile post postion will be displayed in the Plot control window to the right of the plot.



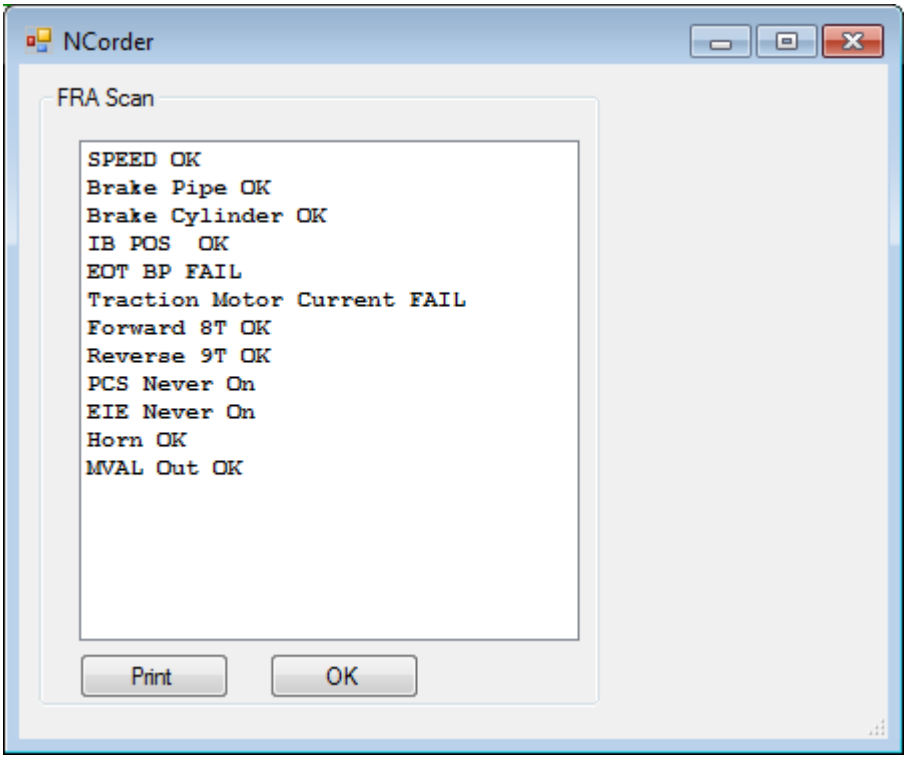


5.5.5 Inspect Data Menu Item

FRA Scan

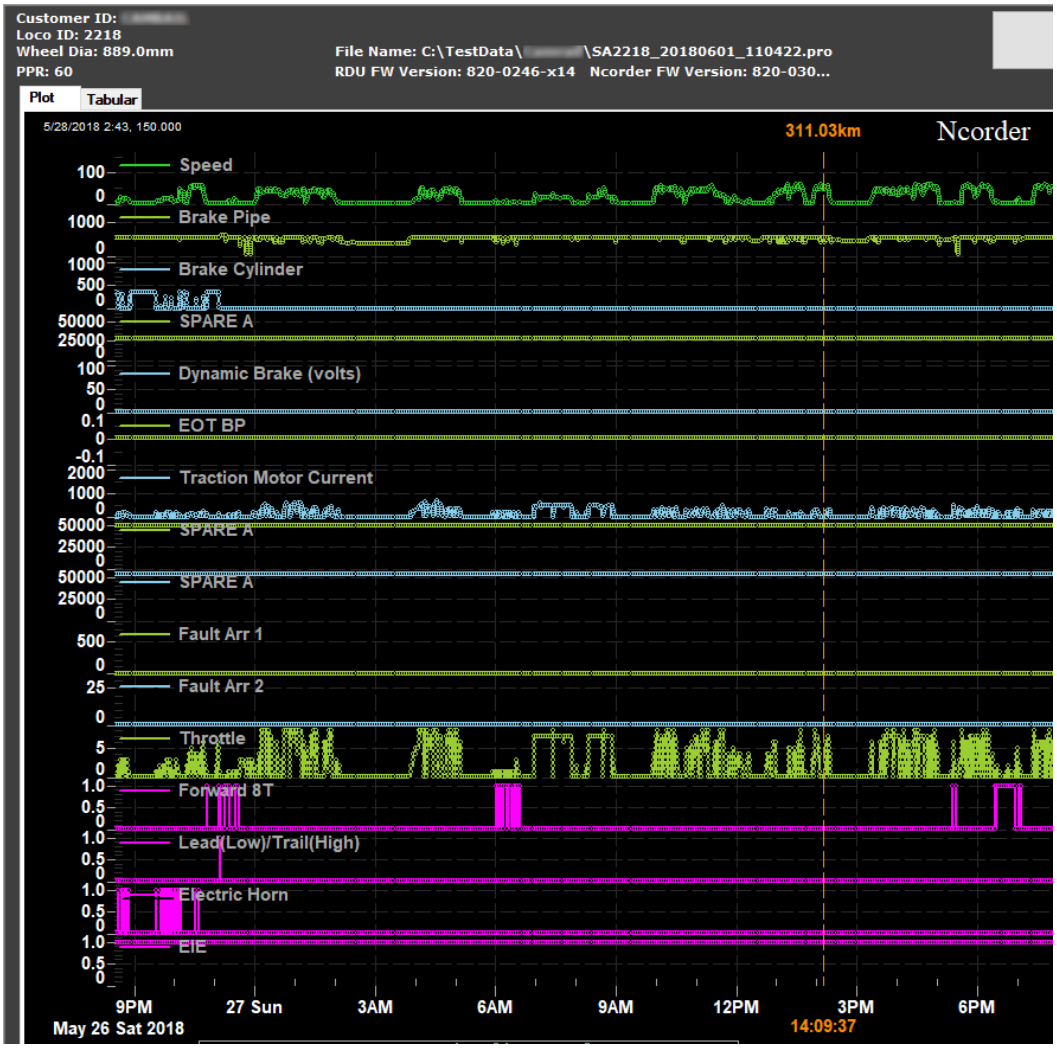


Select Inspect Data->FRA Scan and the following window will be shown. Results can be printed.

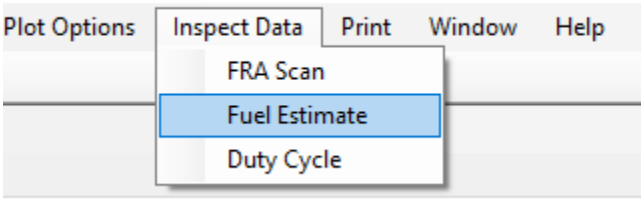


Fuel Estimate

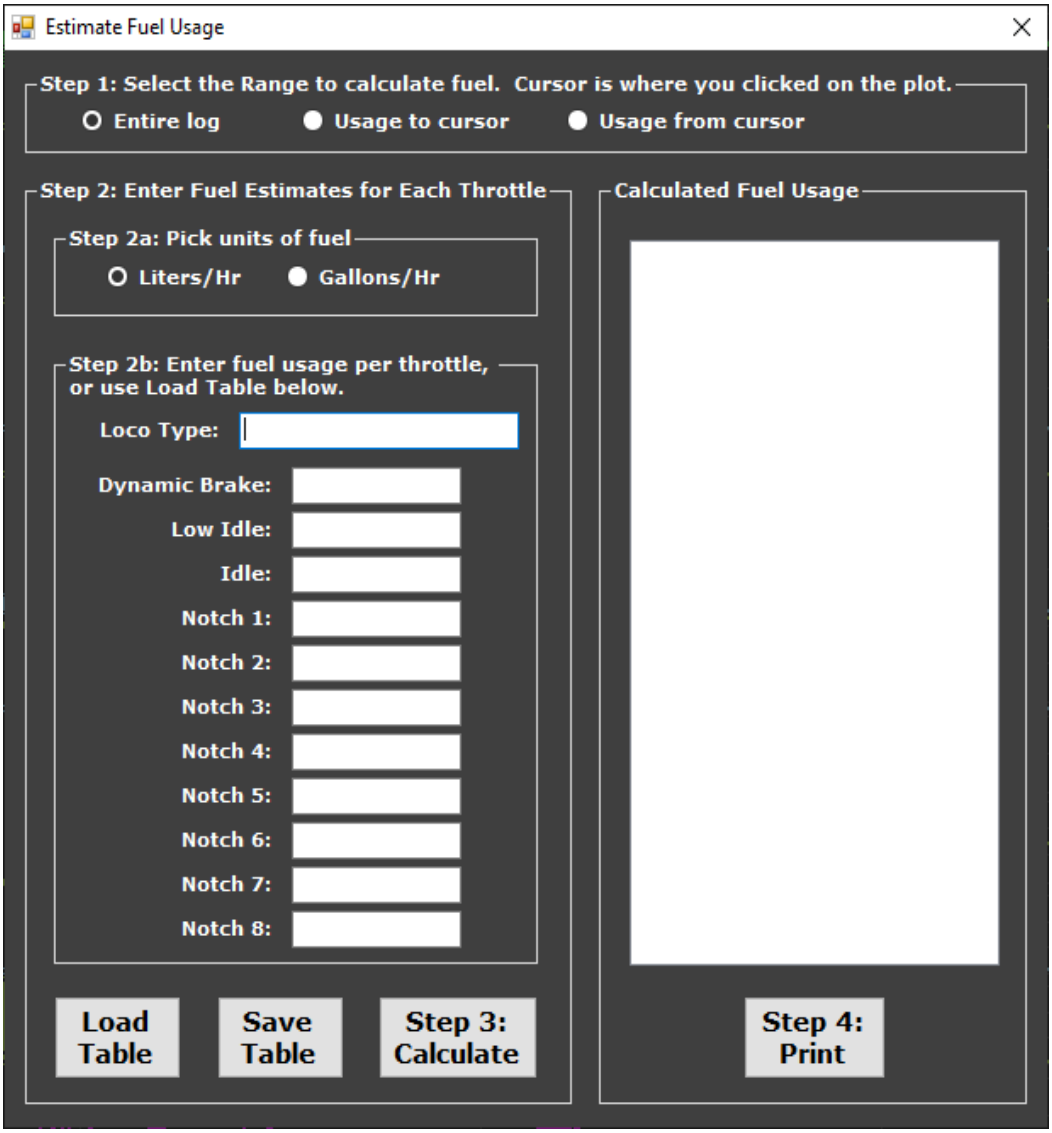
Select a point on the plot. An orange vertical line shows where the cursor is.



Select Inspect Data->Fuel Estimate.

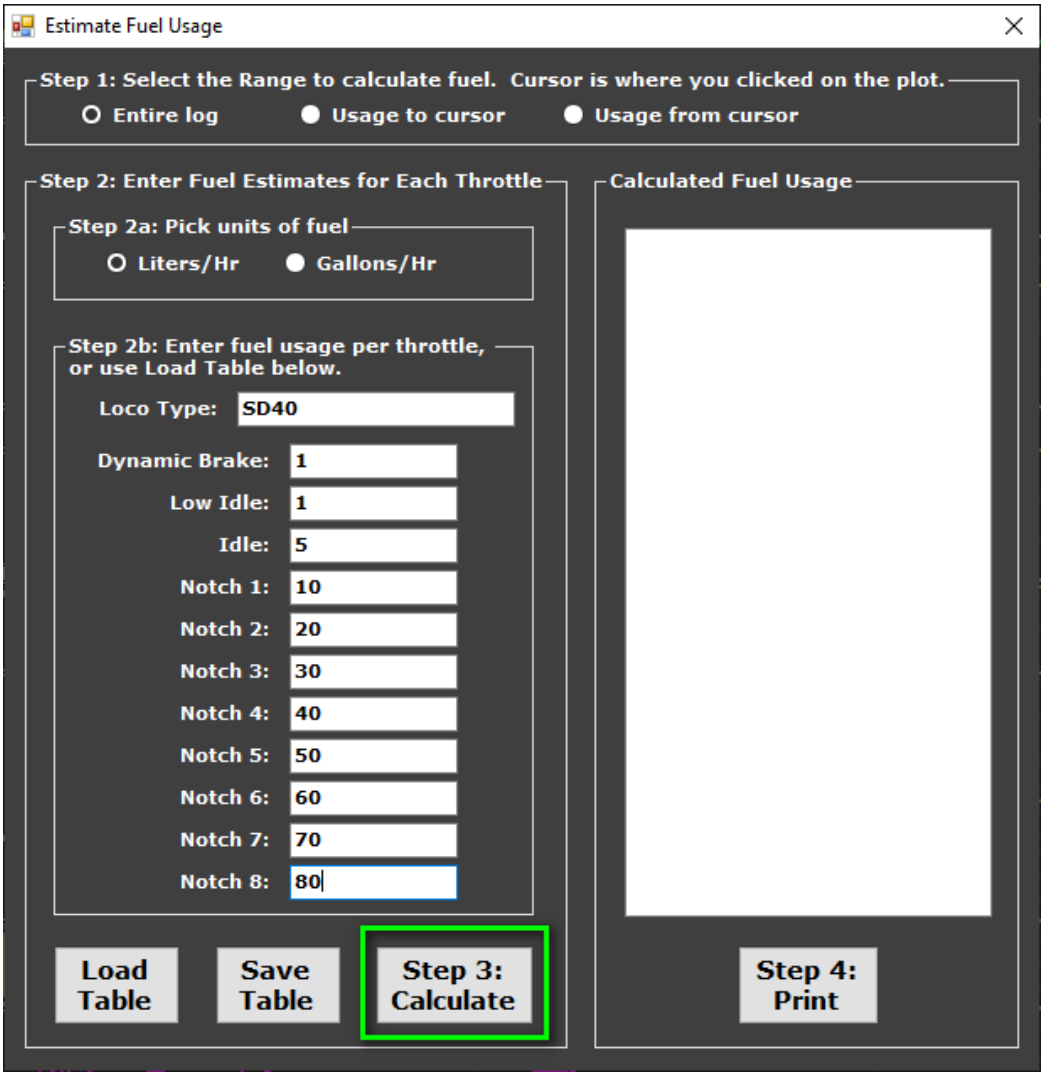


The following window appears:

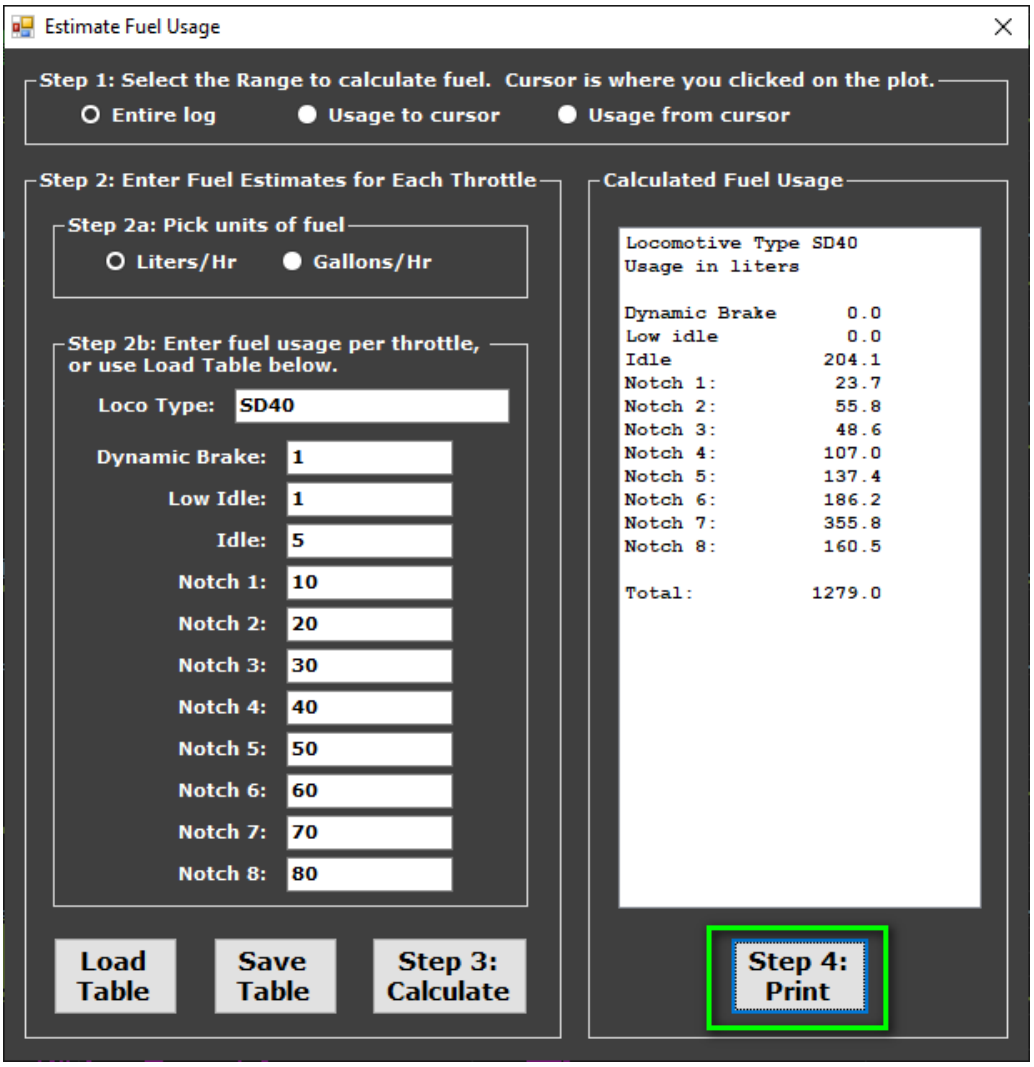


1. Select the range for the fuel calculation
    a. Entire log – the calculation uses the whole log and ignores any cursors.
    b. Usage to cursor – calculates up to where the orange vertical line occurs. If there is no cursor, no calculation occurs.
    c. Usage from cursor – starts calculation from where the orange vertical line occurs. If there is no cursor, the entire log is assumed.
2. Select the Units.
3. Enter the Loco Type along with numeric values for each of the throttle positions.

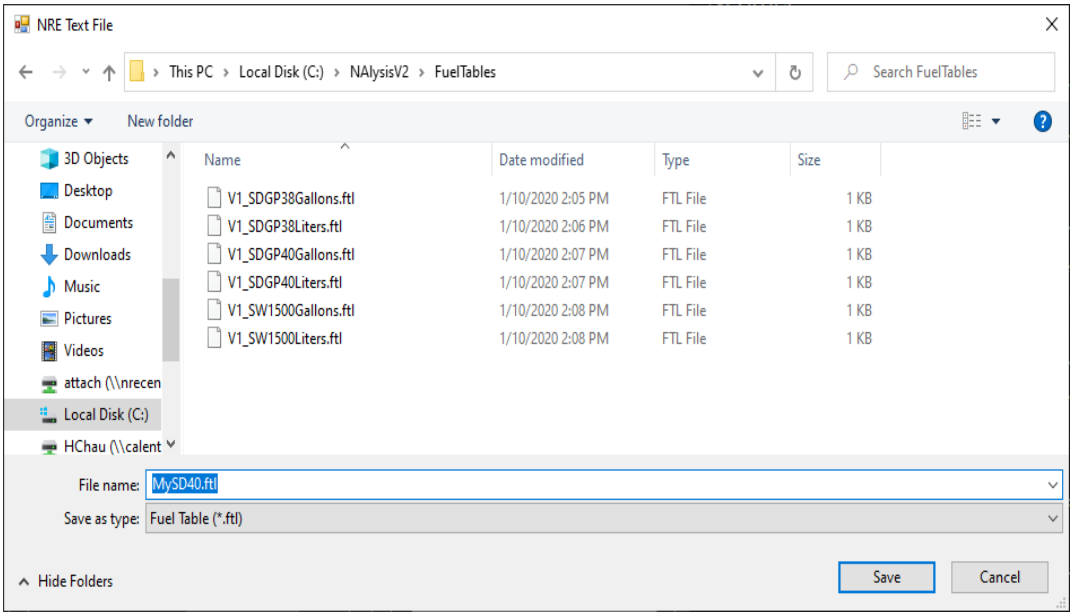
4. Click Calculate button.



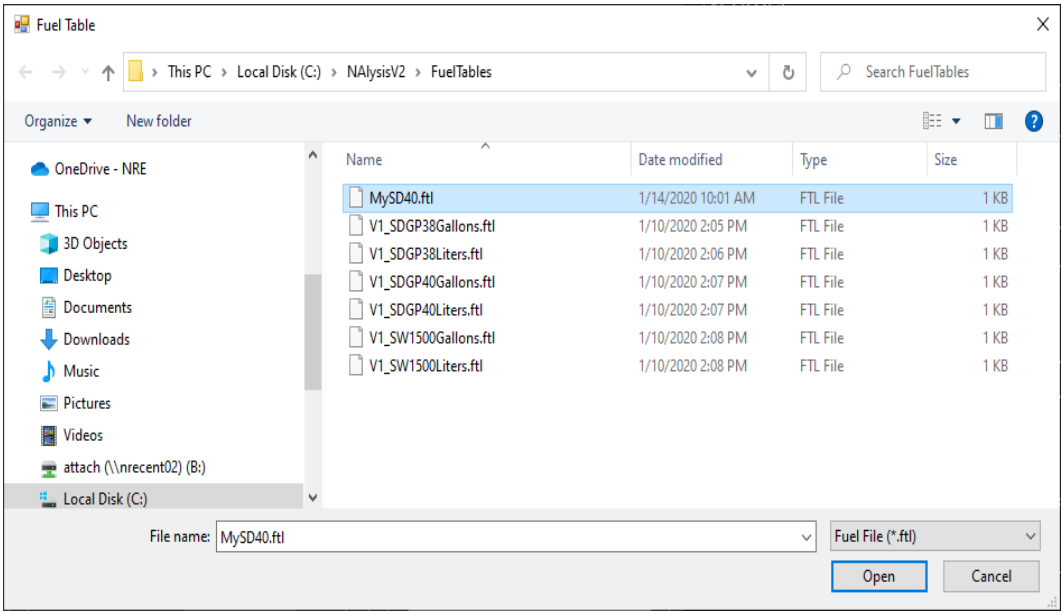
The estimated fuel usage for each throttle position will be displayed on the right. You can print the fuel estimate using the Print button.



If you wish to save the table for future calculations you can do this by clicking Save Table button.

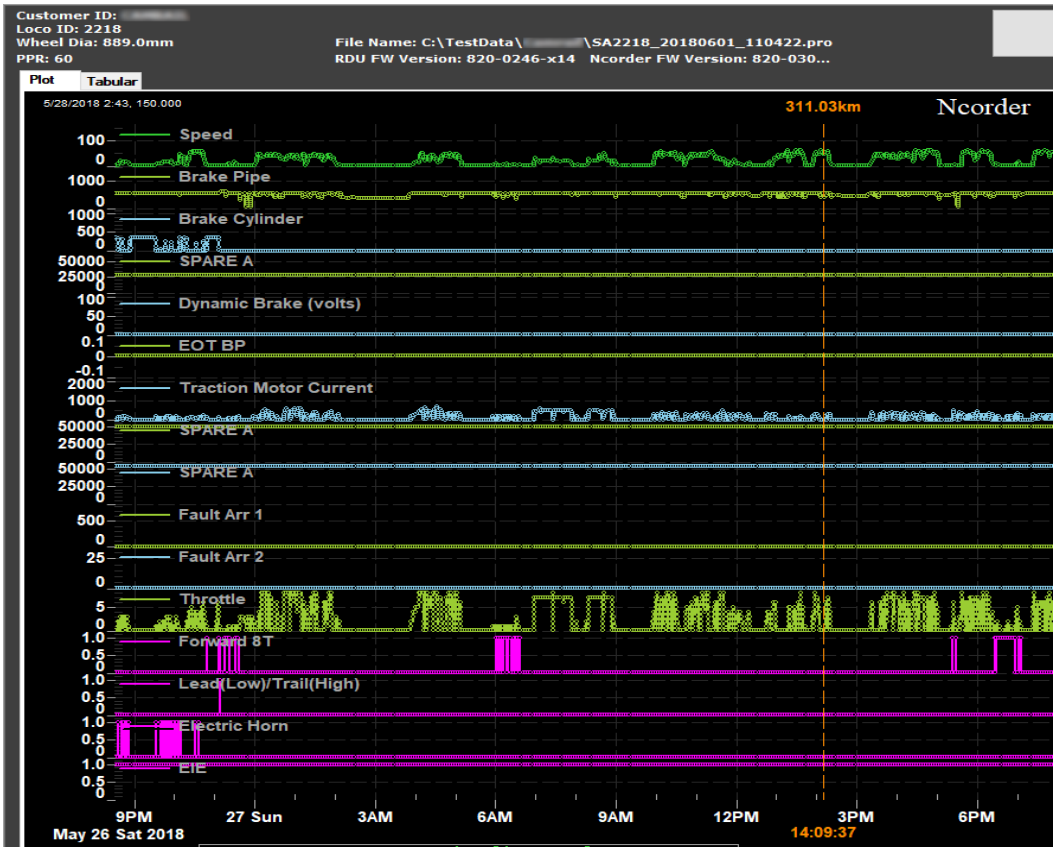


Click on Load Table to load a previously saved fuel table.

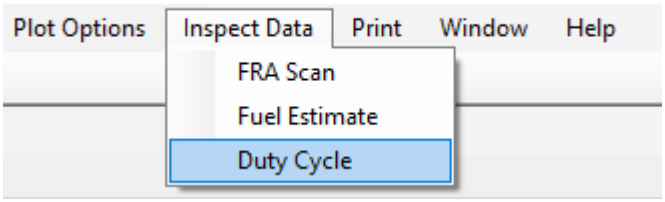


Duty Cycle

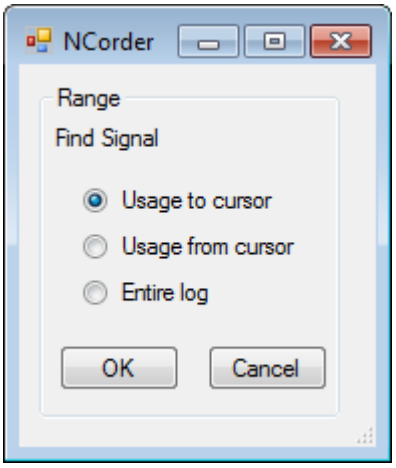
Select a point on the plot. An orange vertical line shows where the cursor is.



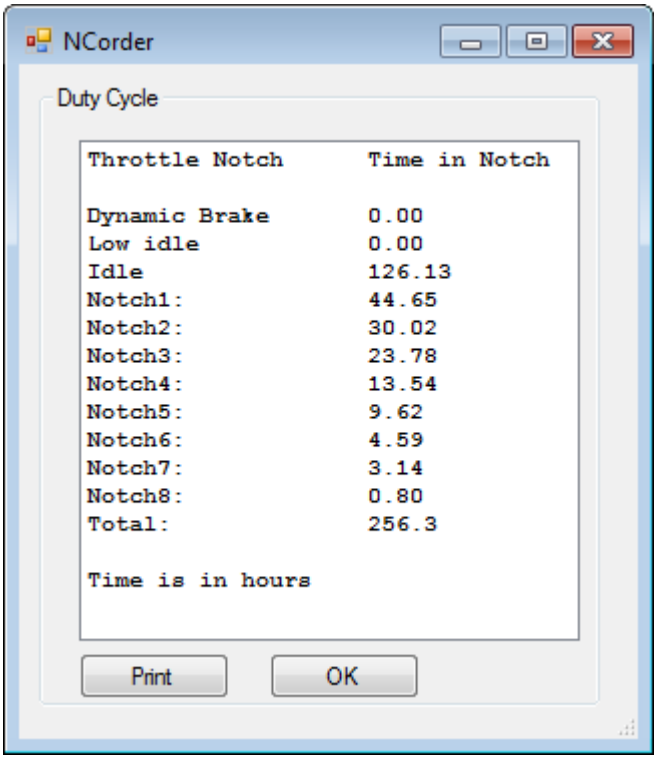
Select Inspect Data->Duty Cycle.



The following window will be displayed:

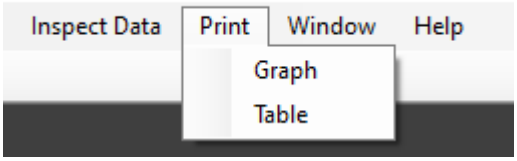


Select the range for the duty cycle calculation and click OK. The following should now appear



The results may be printed by selecting Print.

5.5.6 Print Options



Graph

a. When select the Graph print option, the Print out will show Plot form of data.

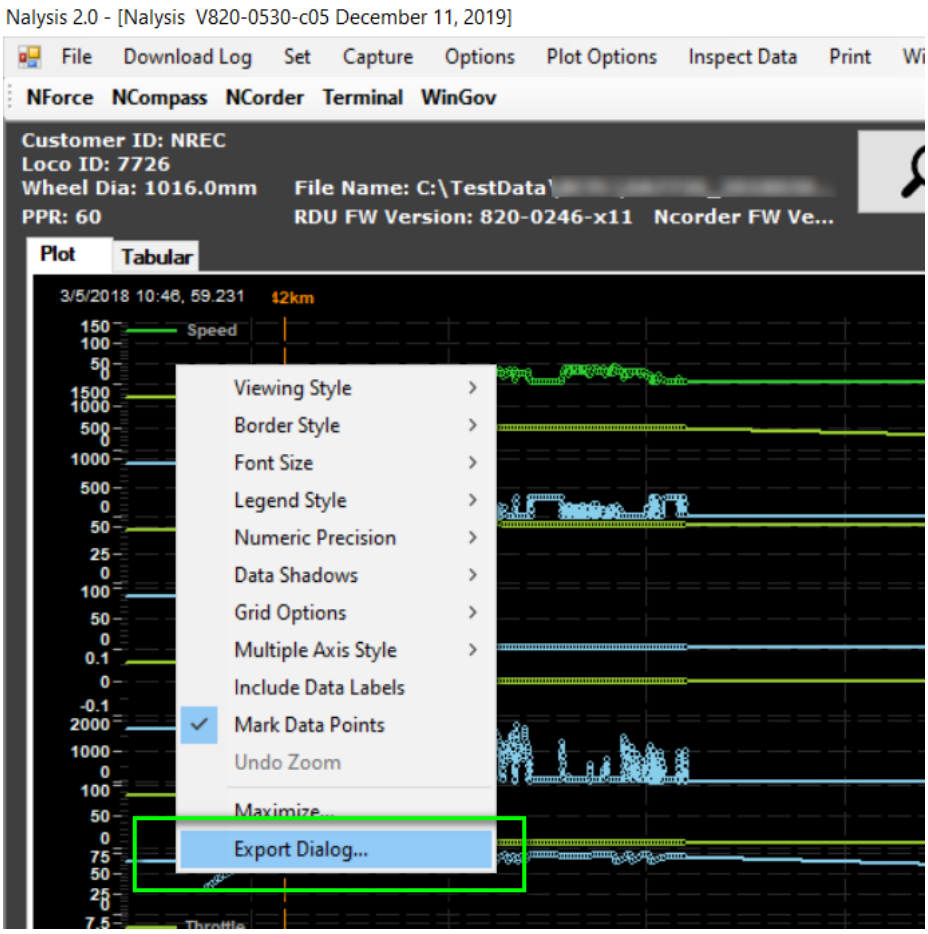
Table

b. When select the Table print option, the Print out will show the Tabular form of data.

5.5.7 Data Export

Data can be exported from the plot although we do not recommend it since the process may be slow and the data has already been nicely outputted as CSV files as part of the conversion of the BLI file. However, if you must:

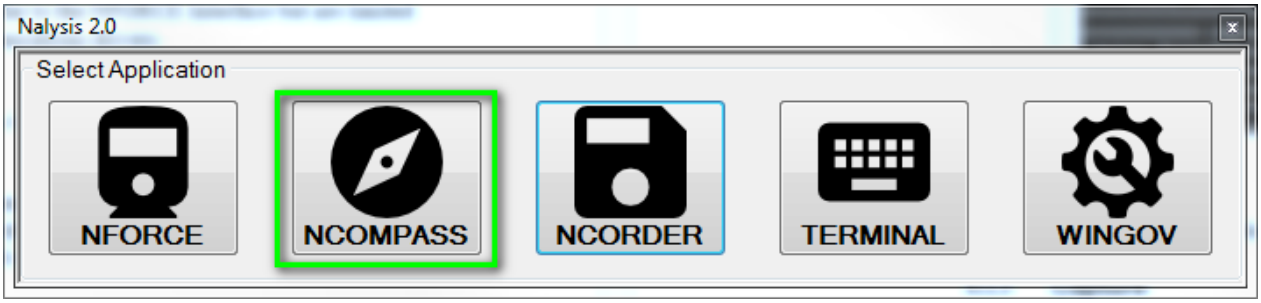
1. With your mouse, right-click on the plot to see the context menu appear



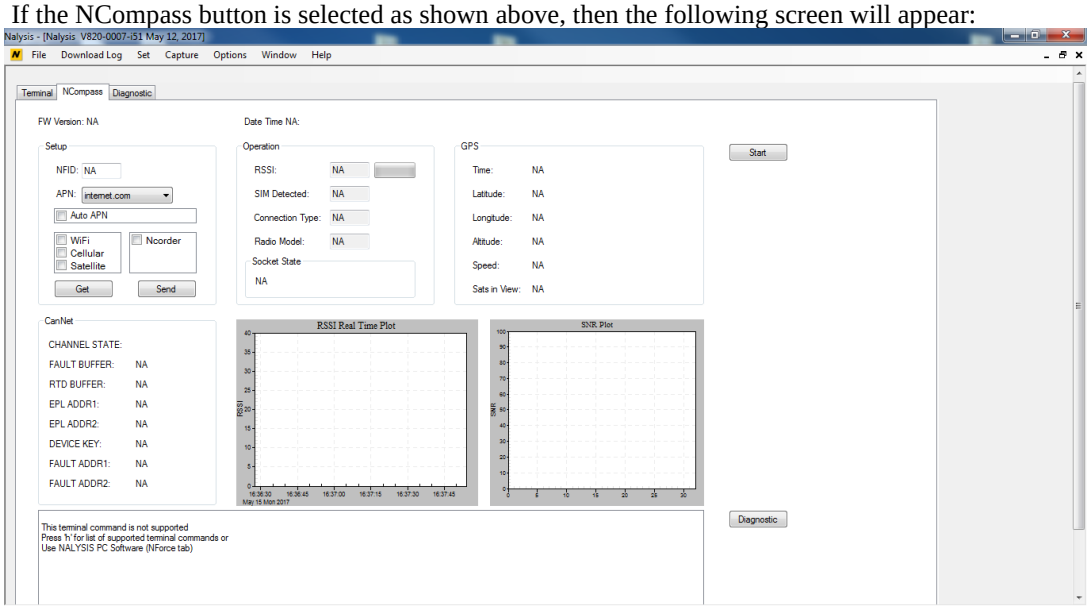
2. Select *Export Dialog…* And you'll see the following dialog. Select your options. ***Note: It is not recommended to use the Test/Data option as the data is already exported for you in the form of CSV files. See above reference to FRA output. Also, the features of this export dialog are from a third-party control and are not designed by NRE.***

6.0 NCOMPASS Interface

The Application Selection of the Nalysis software program contains the NCOMPASS application that will allow communications between the Laptop/Computer and the NCOMPASS system. To allow communications between the NCOMPASS and the portable computer, connect the Serial Communications Cable (NRE Part No. 058-0001-000) between the communications port of the NFORCE NCOMPASS board and the portable computer. Computers without serial ports will require a USB to serial adaptor (NRE Calgary part # 735-0046-000). The NFORCE cover needs to be removed to access the communications port on the faceplate of the NCOMPASS board. The Nalysis software must establish communications before any communications operations occur.



If the NCompass button is selected as shown above, then the following screen will appear:



6.1 Menu

These are the only menu options available in the NCOMPASS application.

6.1.1 File

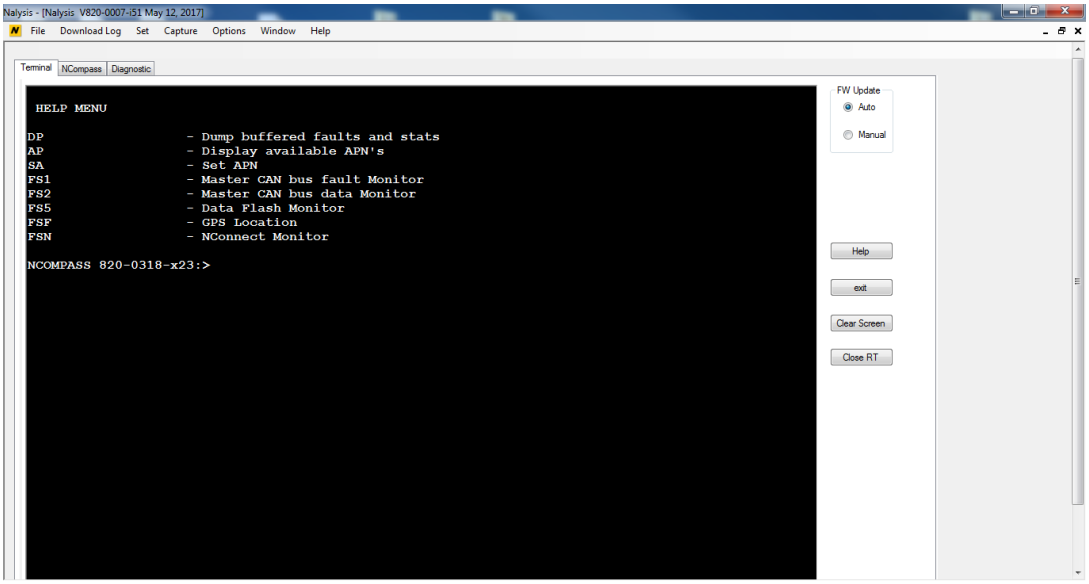
Only Disconnect, Firmware Updates, and Exit from the pulldown menu apply.

6.1.2 Help

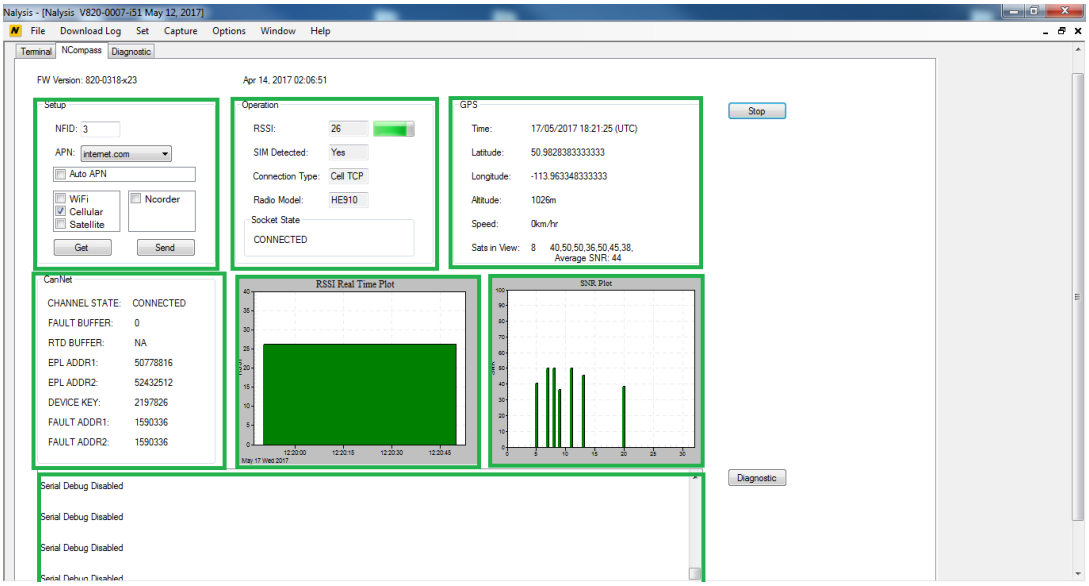
See section 4.1.7

6.2 Terminal Tab

This Terminal screen behaves similar to the Hyper Terminal screen that has all of the NCOMPASS Terminal Commands from the Help menu. Type in “h” from the terminal prompt to see the available commands from the system.

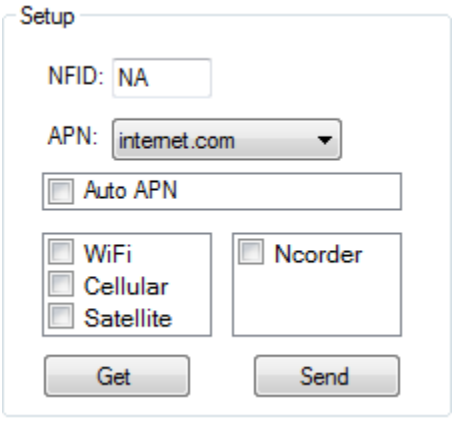


6.3 NCompass Tab



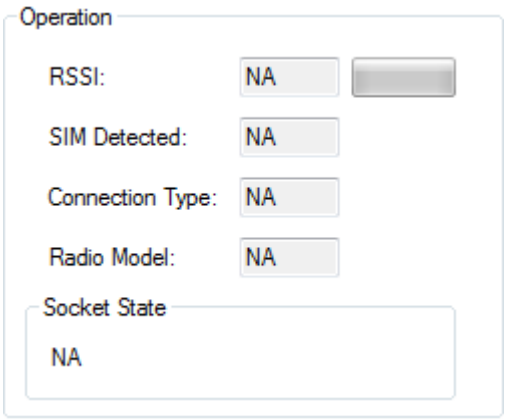
6.3.1 Setup

This is the initial communications setting from NCOMPASS to the Web Portal.



6.3.2 Operation

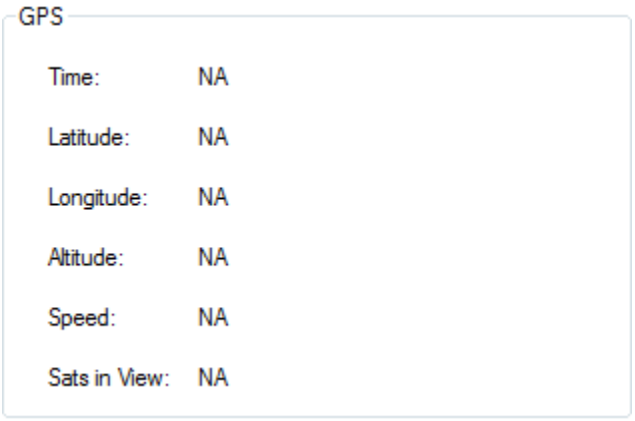
This is the Real Time communication statistics.



RSSI:	Signal strength of either the cellular, or satellite (depends on which is being used)
SIM Detected:	Yes or No, depends on whether a SIM card has been detected or not
Connection Type:	Type of medium being used for server communications (None, WiFi, Cellular, Satellite)
Socket State:	If the NCompass is trying to connect via the cellular module, the state of the socket will be shown, useful for debugging

6.3.3 GPS

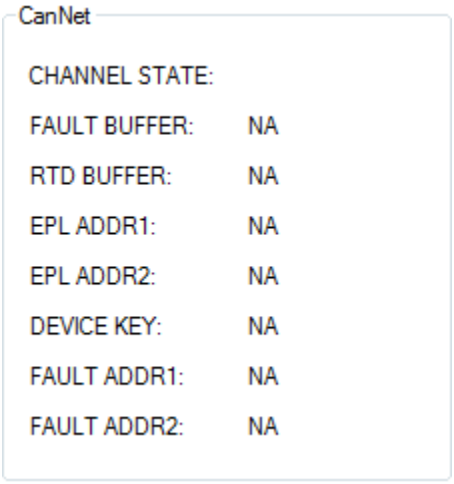
This shows the location of the Locomotive from the Global Position Satellite. Whe the Start button is clicked, it will update the fields seen below.



- All 1's indicates no GPS module present
- All 2's indicates GPS fix is poor

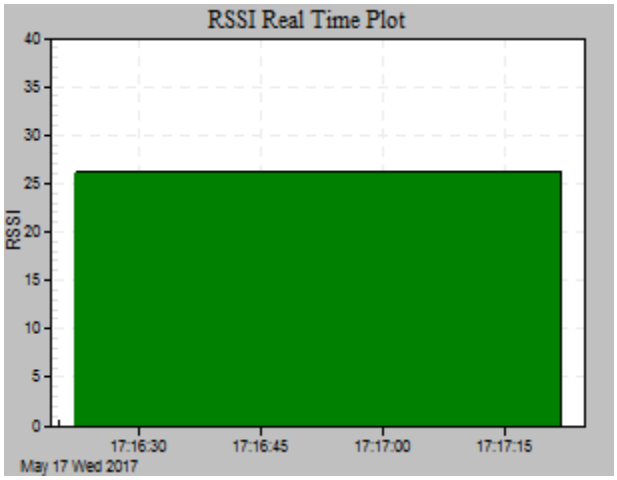
6.3.4 CanNet

This is the CANBUS status from NCOMPASS and NFORCE communications.



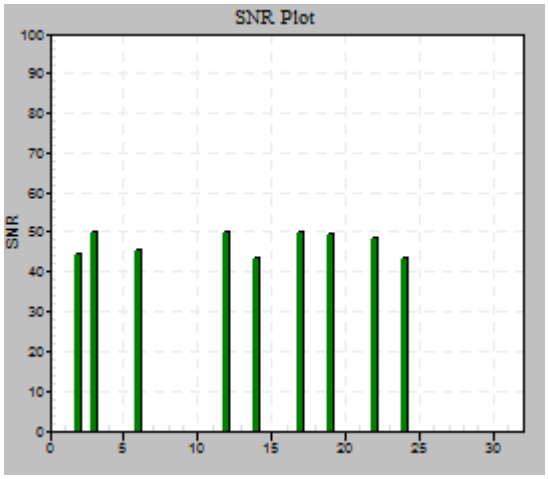
6.3.5 RSSI Real Time Plot

This is the Real Time Plot of the Received Signal Strength Indicator (RSSI). It is a measure of the power level that a RF client device is receiving from an access point.



6.3.6 SNR Plot

This is the Signal to Noise Ratio plot. It is defined as the ratio of signal power to the noise power, often expressed in decibels.

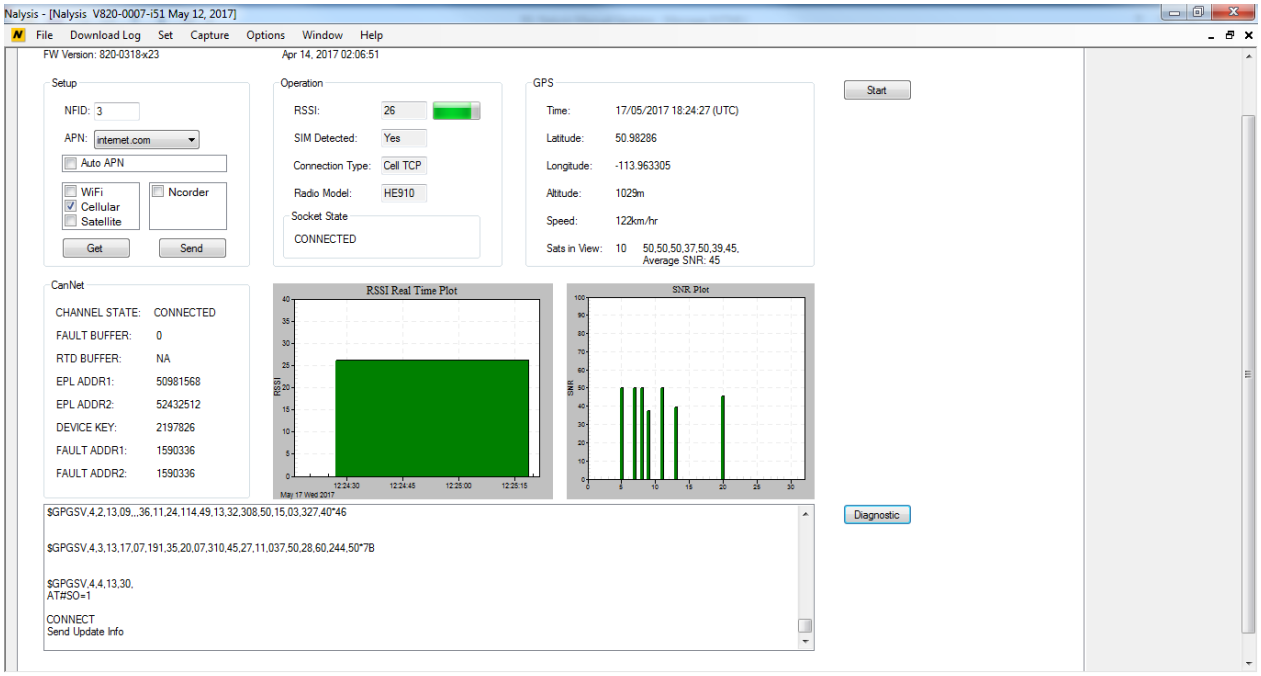


6.3.7 Terminal screen

This screen contain the same information as the Terminal Tab screen.

6.3.8 Start Button

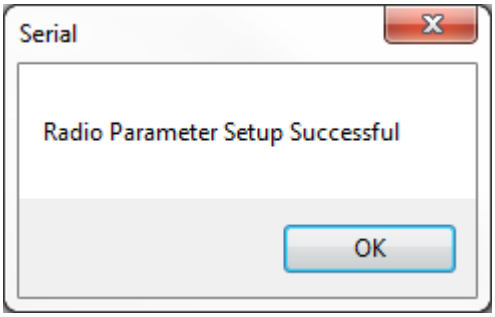
Click the start button that will start real time data acquisition with the NCompass. There are four group boxes which will be updated periodically



NFID: Current NCompass NFID (NFORCE ID) designation
APN: Current APN (Access Point Network) setting
Auto APN Select whether APN is tried automatically, or manually
Server communication medium to use, in this example Cellular only (indicated by check box)

The user can change the NFID (enter new number), select an APN from the drop-down list, then select auto or manual APN cycling, and add/remove server medium. Once new values are selected, click on Send.

If the NCompass accepts the new parameters, the following message will appear:



6.3.9 Diagnostic Button

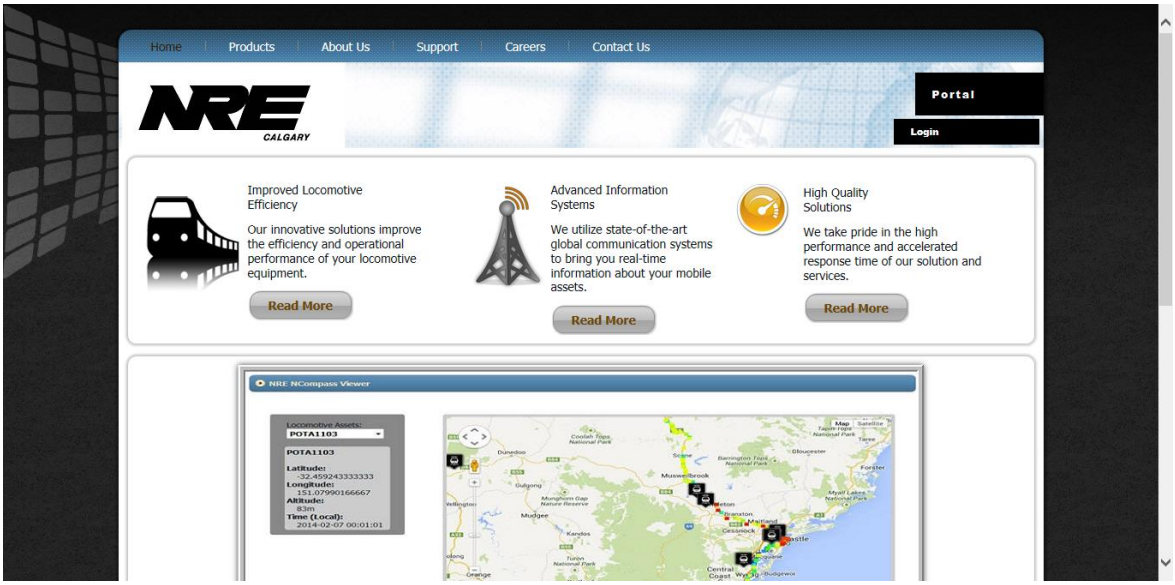
Clicking on Diagnostic button will output diagnostic messages to the Terminal screen and to the list box at the bottom of the NCompass tab. Messages relating to the connection can be helpful. Switching to the NCompass tab will automatically turn off the Diagnostics.

6.4 Diagnostic Tab

This Diagnostic screen is similar to the FS5 memory screen from Hyper Terminal. This screen holds features that can be used for analyzing or troubleshooting the memory tables. See section 8.2 for more details.

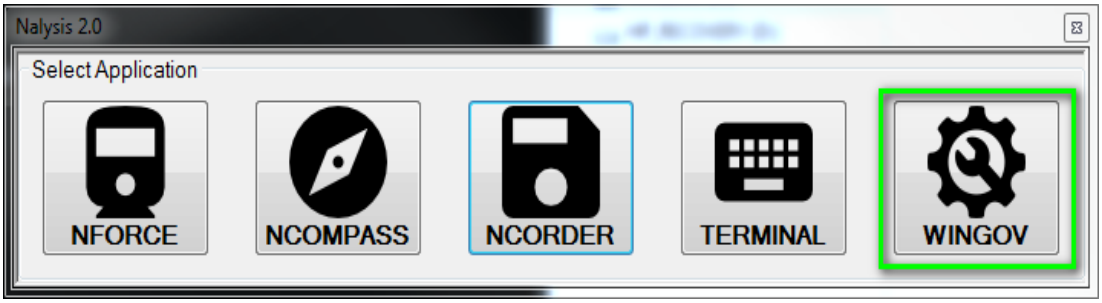
6.5 Web Portal

When NCompass is installed on your system, you can take advantage of the NRE's website portal for tracking your fleet. Through the portal, you can locate your assets, gauge their performance, and note how they are being used. See our Website for more general information: http://nre-electronics.com/index.php?option=com_content&view=category&layout=blog&id=44&Itemid=67 Information can also be found in the NCOMPASS System Installation Guide (A-580-J-0056-3.doc or PDF).

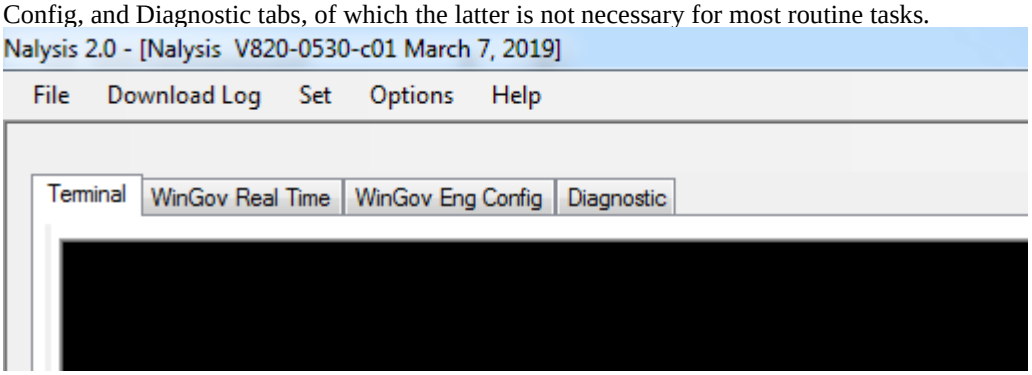


7.0 WinGov Interface

Access the WinGov application via the start bar.



You'll have access to four tabs when the application loads: Terminal, WinGov Real Time, WinGov Eng Config, and Diagnostic tabs, of which the latter is not necessary for most routine tasks.



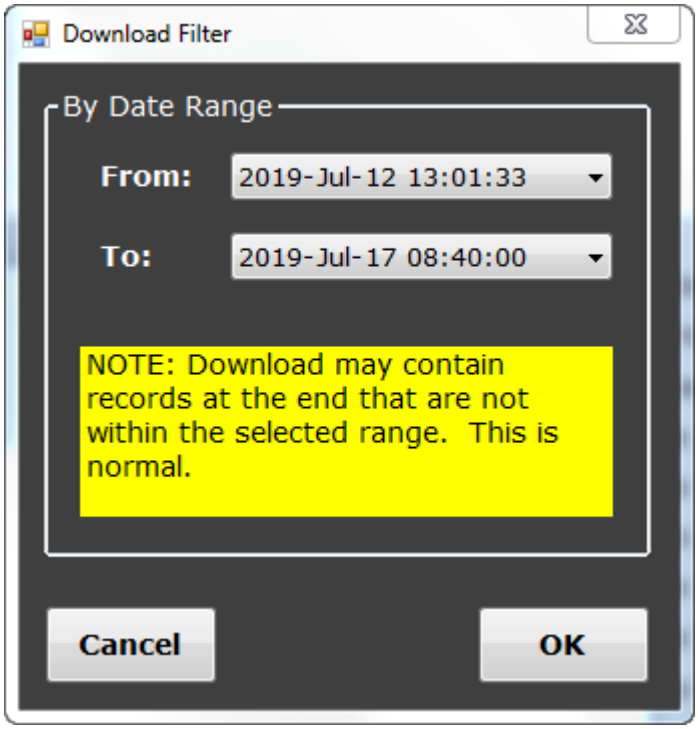
7.1 Menu

7.1.1 File

- Disconnect – closes communication port
- Firmware Update – allows selection of new ECM file to load and update
- Open – allows selection of recorded real-time data to be loaded. Make sure that you switch to the WinGov Real Time tab (see below) to view the recorded data.
- Process – changes a binary file (that was downloaded from the Governor) to be converted to a CSV (comma separated values) file
- Exit – close the application

7.1.2 Download Log

- All – downloads 100% of the Governor log
- Range – Prompts user for a date range that will be faster in most cases than a 100% download. If you want to get the last records recorded choose "End Date" from the "To" drop down.



7.1.3 Set

- Real time clock – set the date-time of the Governor's clock

7.1.4 Options

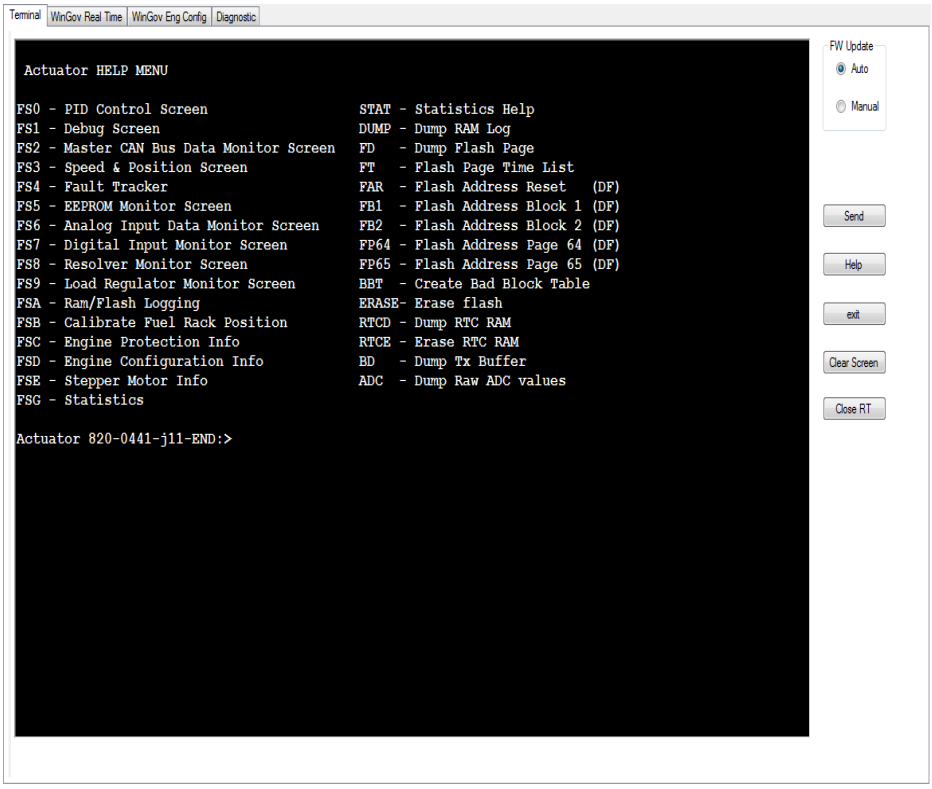
- Auto Close RT Window – enables the automatic closing of the RT screen
- FW Update Auto/Manual
  - Auto – automatic loading and updating of firmware after the file is selected
  - Manual – prompts user for directions.

7.1.5 Help

About – Version information about NAlysis
Check for Update – Takes user to NRE Calgary's website for latest NAlysis software
Manual – Takes user to NRE's Calgary website for latest NAlysis manual

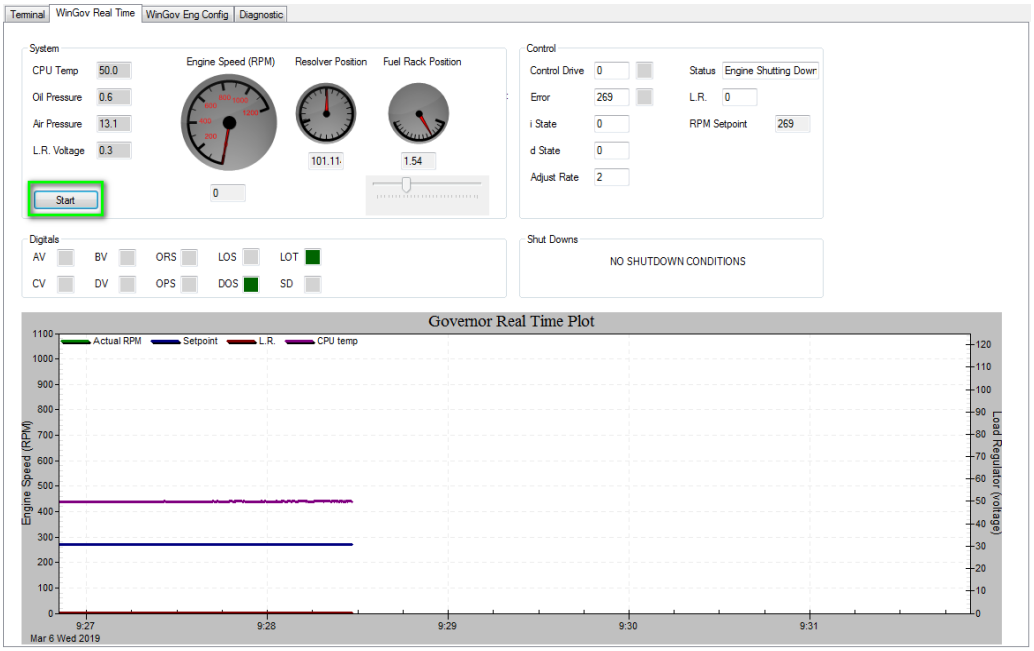
7.2 Terminal Tab

Type 'H' into the black area of the screen to get further available options



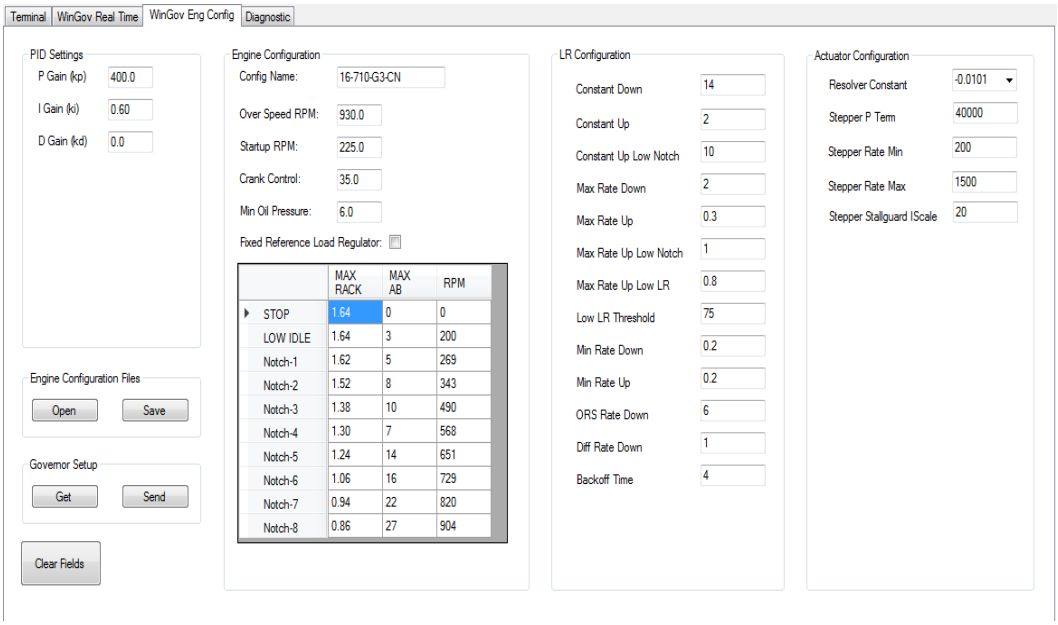
7.3 WinGov Real Time Tab

Monitor real-time data by clicking the “Start” button which will toggle the text to “Stop”. Press “Stop” to end real-time queries to the Governor. Note that exiting this tab to enter the Terminal tab will automatically stop the real-time queries.



7.4 WinGov Eng Config Tab

Load, edit, save, and set the Governor's configuration.

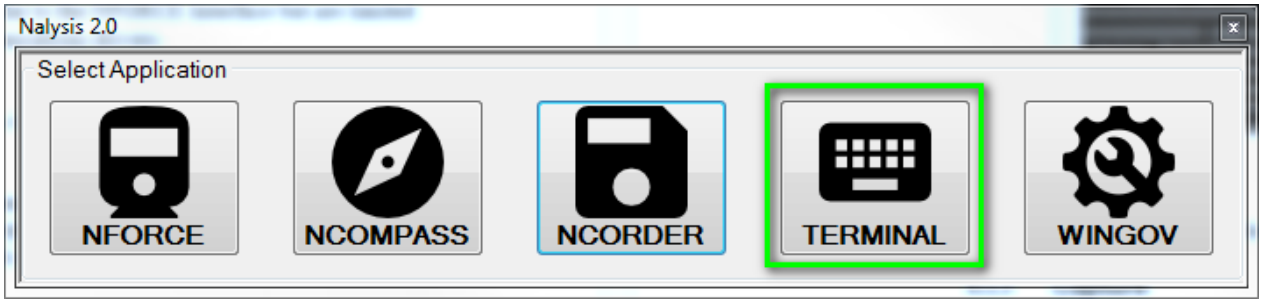


7.5 Diagnostic Tab

Does not apply to Governor.

8.0 Terminal Interface

The Terminal Interface is available for NFORCE/NLIMIT systems. These are systems that do not contain the NAlysis communications drivers. The NAlysis software program only contains the program selections that allow communications between the Laptop/Computer and the NFORCE/NLIMIT system through Hyper Terminal.



8.1 Menu

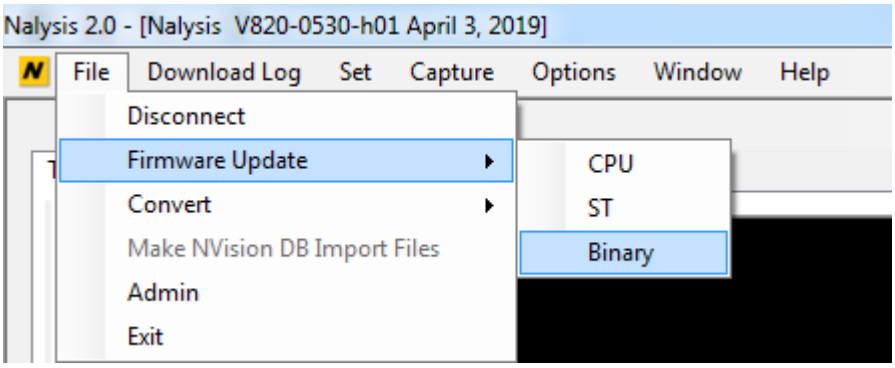
The Menu options in this Terminal Interface are similar to the NFORCE Interface but are limited to some setting due to the absence of Nalysis communications drivers.

8.1.1 File

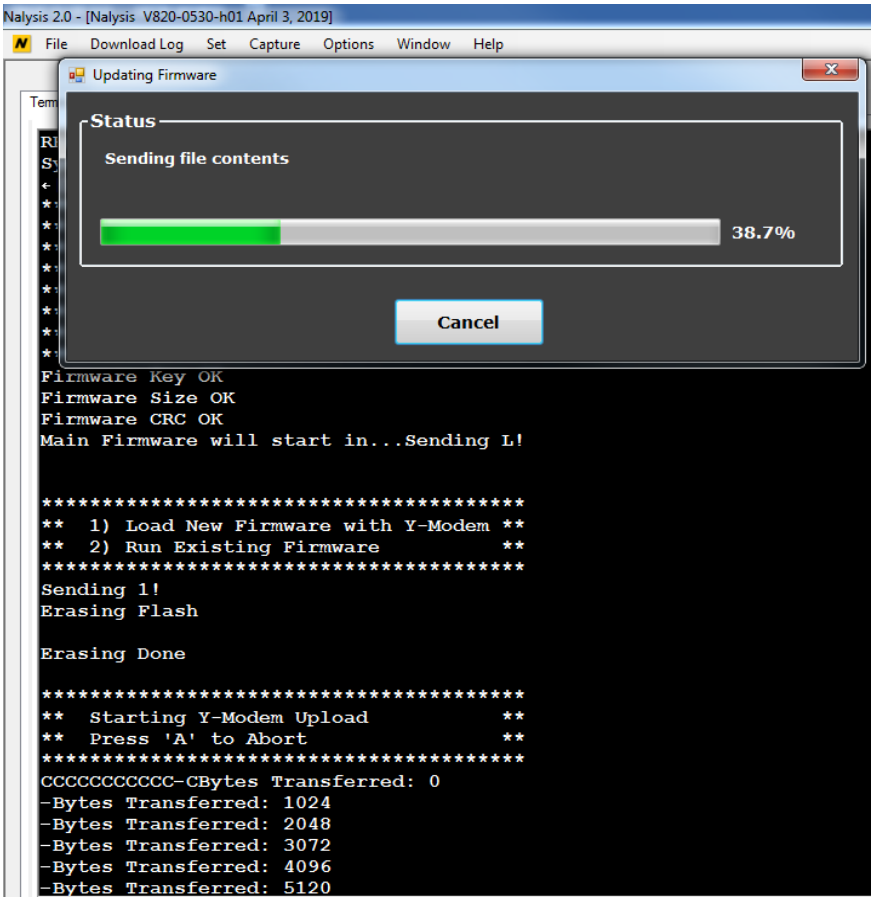
This menu is available to User. See Section 4.1.1 for details.

8. YModem

For some embedded applications like Equipment Blower Panel (EBP) and Rad Fan Panel (RFP), the Firmware Update uses a Binary option instead of the CPU (.ecm) or ST (*.st4). In this situation, use the Binary option which uses the YModem protocol.



When you have selected the file, the download will begin and will appear similar to this screenshot.



8.1.2 Download Log

This menu is available to User. See Section 4.1.2 for details.

8.1.3 Capture

This menu is available to User. See Section 4.1.4 for details.

8.1.4 Set

This menu is available to User. See Section 4.1.3 for details.

8.1.5 Options

This menu is available to User. See Section 4.1.5 for details.

8.1.6 Window

This menu is available to User. See Section 4.1.6 for details.

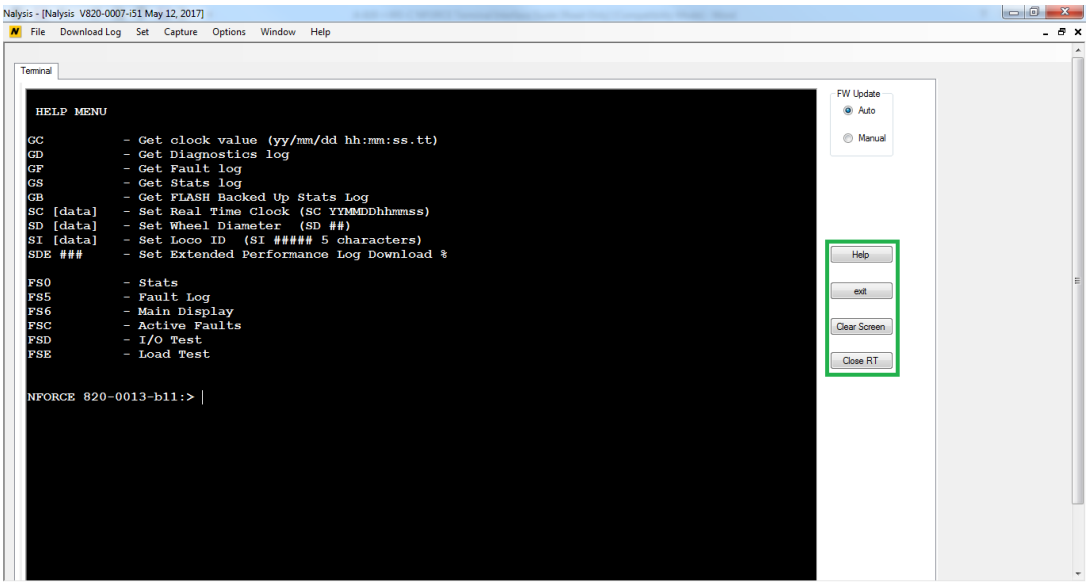
8.1.7 Help

This menu is available to User. See Section 4.1.7 for details.

8.2 Terminal Tab

This Terminal screen behaves similar to the Hyper Terminal screen that has all of the NForce Terminal Commands from the Help menu. Type in “h” from the terminal prompt to see the

available commands from the system. See Terminal Interface Guide A-820-J-001-X (X = latest revision) for more details on Hyper Terminal communications.



In addition, there are optional radio buttons on the right-hand side of the Terminal screen that can be used as follows:

8.2.1 Help Button

- Click on the Help button will bring up the Help menu from the Terminal prompt screen.

8.2.2 Exit

- Click on the Exit button will exit any active screen and return to the terminal prompt screen.

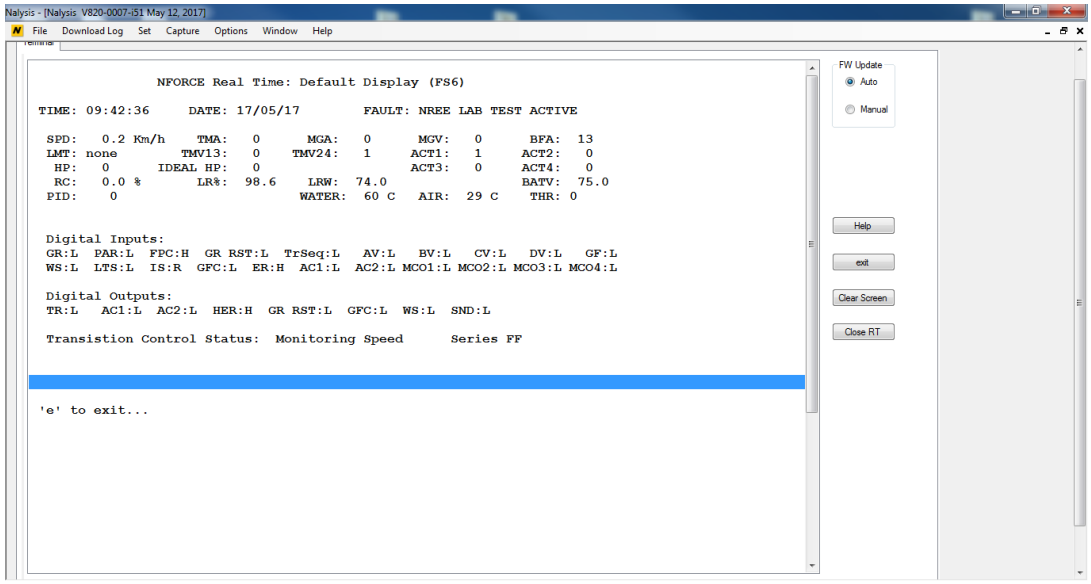
8.2.3 Clear Screen

- Click on Clear Screen will clear all the messages from the Terminal prompt screen.

8.2.4 Close RT

- Click on Close RT will close the Real-Time updates from system and return to the Terminal prompt screen.

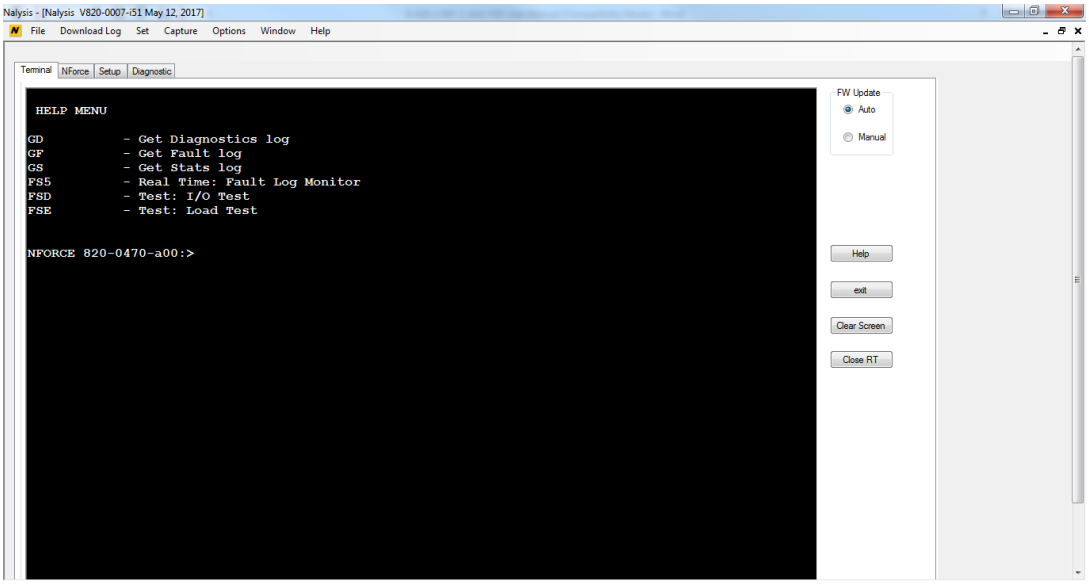
Note: The Terminal prompt screen always has a BLACK background. Any other screen will have a WHITE background (Active screen).



9.0 Generic Screen Tabs

9.1 Terminal Tab

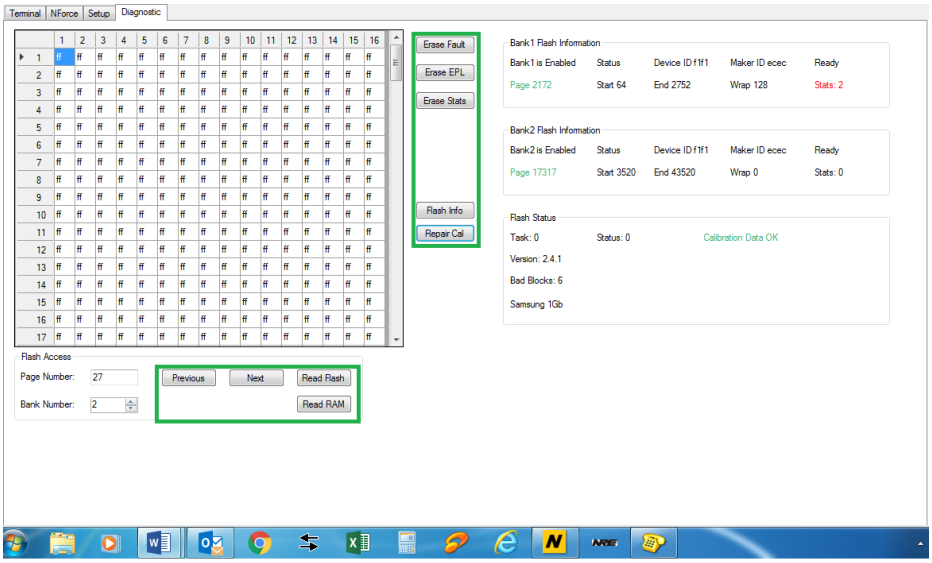
This Terminal screen is similar to the Hyper Terminal screen. Type in "H" from the terminal prompt to view the list of Terminal Commands. This list of commands varies from one application to another as shown in the following example.



Note: This Tab screen only available for the NFORCE/NLIMIT applications that is supported by Hyper Terminal.

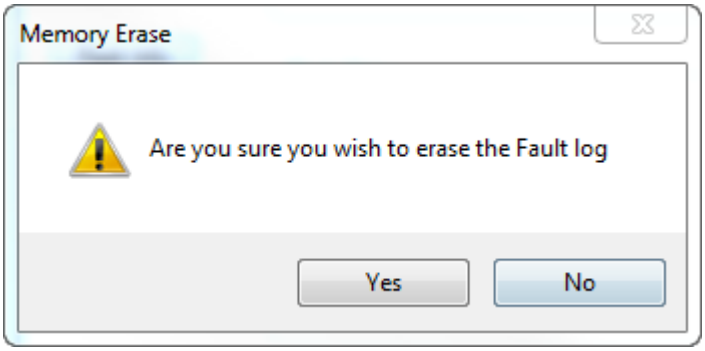
9.2 Diagnostic Tab

This Diagnostic screen is similar to the FS5 memory screen from Hyper Terminal. This screen has the following features that can be used for analyzing or troubleshooting the memory tables.



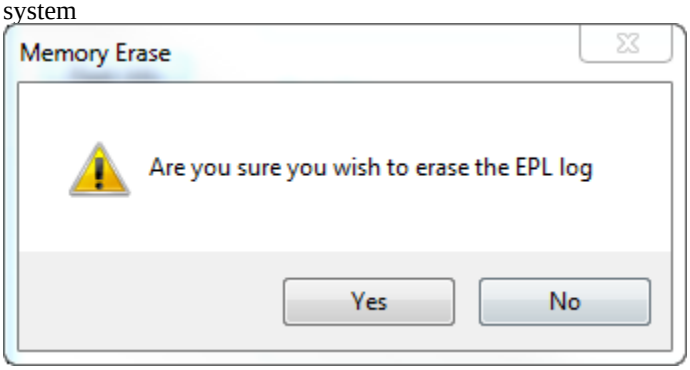
9.2.1 Erase Fault

Click on the Erase Fault button and select “Yes” will erase the Fault Log from the system



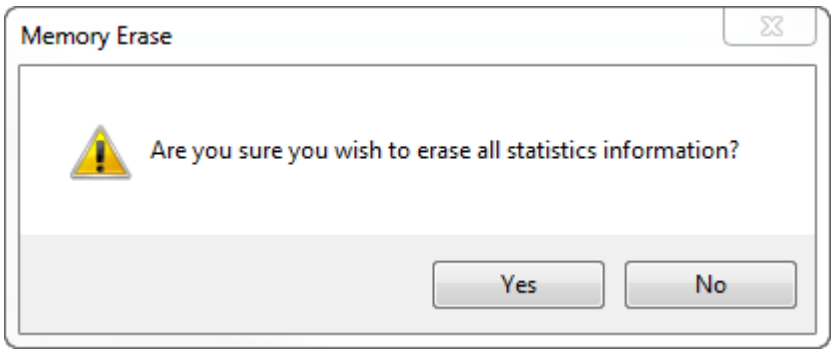
9.2.2 Erase EPL

Click on the Erase EPL button and select “Yes” will erase the Extended Log from the system



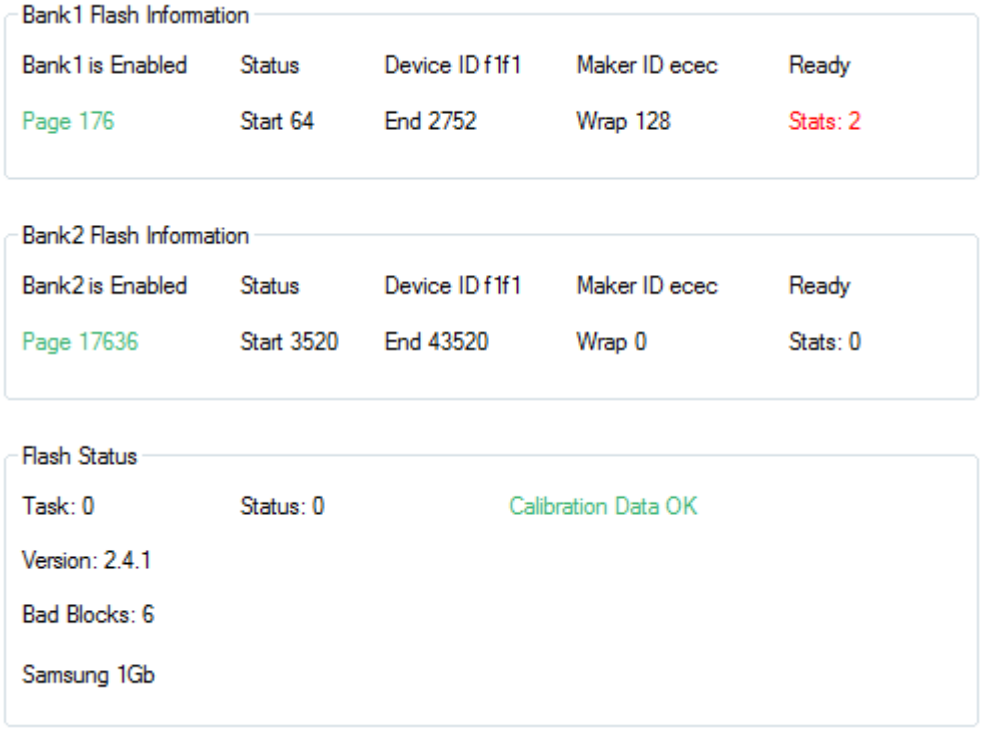
9.2.3 Erase Stats

Click on the Erase Stats button and select “Yes” will erase the Statistics Log from the system



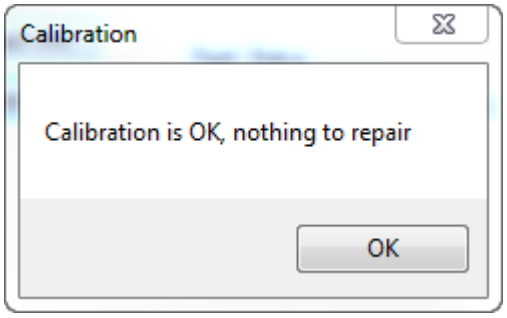
9.2.4 Flash Info

Click on the Flash Info button will display the Flash information of the system



9.2.5 Repair Cal

Click on the Repair Cal button will repair the calibration table if necessary. Otherwise the following pop up window will show



9.2.6 Previous

This selection is used for trouble shooting purpose only.

9.2.7 Next

This selection is used for trouble shooting purpose only.

9.2.8 Read Flash

This selection is used for trouble shooting purpose only.

9.2.9 Read RAM

This selection is used for trouble shooting purpose only.

10.0 Abbreviations used in NFORCE Download Files

TIME	Time in hours, minutes, seconds and 1/10th seconds for each record.
DATE	Date in day/month/year (fault and extended logs)
2t	Alarm trainline input (attendant call.)
3t	DV throttle trainline input.
5t	Emergency Sand trainline input.
6t	Generator field trainline input.
7t	CV throttle trainline input.
8t	Forward direction trainline input.
9t	Reverser direction trainline input.
10t	Wheel slip trainline input.
10msT	gate pulse off for WS TMI 6 or WS ATMV6
12t	BV throttle trainline input.
13t	Control and fuel pump trainline input.
15t	AV throttle trainline input.
16t	Engine run trainline input.
17t	Dynamic Brake setup trainline input.
20t	Dynamic Brake warning trainline input.
21t	Dynamic Brake excite trainline input.
22t	Air Compressor Control trainline input.
23t	Manual Sand trainline input.
24t	Dynamic Brake reference voltage trainline input.
24vcb	24V control circuit breaker digital input.
26t	Ground Relay Reset trainline input.
AATS or AIR	Ambient Air temperature sensor (°C).
ABDR	Compressor 2 Air Dryer Magnet Valve digital output.
ABR	Alarm Bell coil drive digital output.
AC1P	Auxiliary Power GS1 relay digital output.
AC2P	Auxiliary Power GS2 relay digital output.
AC3P	Auxiliary Power GS3 relay digital output.
ACC	speed acceleration
acc1	Auxiliary Power GS1 contactor feedback digital input.

acc2	Auxiliary Power GS2 contactor feedback digital input.
acc3	Auxiliary Power GS3 contactor feedback digital input.
ACCEL	speed acceleration multiplied by 161 then divided by 10000. Conversion to KPH acceleration.
ACCEL or ACC	Wheel acceleration (mph/s x 10).
ACINV	A/C Inverter enable digital output.
acmp1	Air Compressor 1 Over Temperature digital input.
acmp2	Air Compressor 2 Over Temperature digital input.
acomp	Air Compressor Over Temperature digital input.
acrst	A/C Reset Switch digital input.
ACT1, ACT2, ACT3, ACT4, ACT5, ACT6	Traction motor armature currents (Adc), 0 - 2000 A.
ACV	Auxiliary AC Bus voltage (Vac).
AHP	Auxiliary Power (hp).
aux	Auxiliary generator digital input.
AUXFL	Auxiliary Power Fault digital output.
AV, BV, CV, DV	Governor valve solenoid digital outputs.
b	B contactor feedback digital input.
B	B contactor coil digital output.
BATCT	64V battery charging current sensor, 0-200A
BC	Brake cylinder pressure sensor (PSI), 0 - 200 PSI.
BCT1, BCT2, BCT3	Grid resistor current sensors (Adc), 0 – 1000 A.
BDR	Compressor 1 Air Dryer Magnet Valve digital output.
Bf(a)	Battery field contactor feedback digital input.
BF(A)	Battery field contactor coil digital output.
BFCT	Battery field current sensor, 0-100A
BMT, BMT1, BMT2	Dynamic brake grid blower current sensor (Adc), 0 - 200 A.
br	Braking relay feedback digital input.
BR	Braking relay coil digital output.
BUZZ	NLIMIT warning buzzer digital output.
BWR	Brake warning relay digital output.
bwr	Brake warning relay feedback digital input.
c1flt	Chopper 1 Fault digital input.
C1JT	Chopper 1 Junction model temperature (°C).
c2flt	Chopper 2 Fault digital input.
C2JT	Chopper 2 Junction model temperature (°C).

c3flt	Chopper 3 Fault digital input.
C3JT	Chopper 3 Junction model temperature (°C).
c4flt	Chopper 4 Fault digital input.
C4JT	Chopper 4 Junction model temperature (°C).
c5flt	Chopper 5 Fault digital input.
C5JT	Chopper 5 Junction model temperature (°C).
c6flt	Chopper 6 Fault digital input.
C6JT	Chopper 6 Junction model temperature (°C).
CABHT	Cabin Heater currents (Adc), 0 - 66A.
cc1	CC1 contactor feedback digital input.
CC1	CC1 contactor coil digital output.
cc2	CC2 contactor feedback digital input.
CC2	CC2 contactor coil digital output.
cc3	CC3 contactor feedback digital input.
CC3	CC3 contactor coil digital output.
cer	Chopper enable relay digital input.
chcb	Chopper circuit breaker digital input.
CHT1	Chopper 1 base plate temperature (°C).
CHT2	Chopper 2 base plate temperature (°C).
CHT3	Chopper 3 base plate temperature (°C).
CHT4	Chopper 4 base plate temperature (°C).
CHT5	Chopper 5 base plate temperature (°C).
CHT6	Chopper 6 base plate temperature (°C).
crl	Compressor relay feedback digital input.
CRL	Compressor relay coil digital output.
CTA	Air compressor current (Aac), 0 - 200 A.
CTB	Equipment blower current (Aac), 0 - 200 A .
CTC	LVPS current (Aac), 0 - 200A
CTD	72 V battery charging current (Adc), 0 - 200 A.
CTE	24 V battery charging current (Adc), 0 - 200 A.
CTF	DC bus current (Adc), 0 - 2000 A.
CTG	Fireman’s Heater current (Adc), 0 - 66A.
CTH	Cabin heater currents (Adc), 0 - 66A.
D14V	D14 companion alternator voltage (Vac).
dACT	delta all traction motor currents

dact1-6	delta ACT currents
dadt	Wheel acceleration rate of change control signal.
DB%	Dynamic brake handle percentage control signal.
DBBL	Dynamic brake grid blower current (Adc), 0 - 200 A.
dbco	Dynamic brake cutout digital input.
DBTMV12	Traction motor 1&2 differential voltage in DB (Vdc), 0 - 1739 V.
DBTMV14	Traction motor 1&4 differential voltage in DB (Vdc), 0 - 1739 V.
DBTMV25	Traction motor 2&5 differential voltage in DB (Vdc), 0 - 1739 V.
DBTMV34	Traction motor 3&4 differential voltage in DB (Vdc), 0 - 1739 V.
DBTMV36	Traction motor 3&6 differential voltage in DB (Vdc), 0 - 1739 V.
dc1, dc2, dc3, dc4	Grid shorting contactor feedback digital input.
DC1, DC2, DC3, DC4	Grid shorting contactor coil digital output.
DCI	DC bus current (Adc), 0 - 2000 A.
DCV	DC bus voltage (Vdc), 0 - 1739 V.
dD14V	Companion alternator output voltage rate of change, volts AC / s.
dMGV	Change (delta) in generator voltage.
dTMI	Change (delta) in average traction motor current.
dtmi1-6	filtering of ACT input signals
dtmv1	Change (delta) TMV input
DUTY1	DC chopper 1 duty cycle output (% x 100).
DUTY2	DC chopper 2 duty cycle output (% x 100).
DUTY3	DC chopper 3 duty cycle output (% x 100).
DUTY4	DC chopper 4 duty cycle output (% x 100).
DUTY5	DC chopper 5 duty cycle output (% x 100).
DUTY6	DC chopper 6 duty cycle output (% x 100).
ebc	Equipment blower contactor feedback digital input.
EBC	Equipment blower contactor coil digital output.
ECMP	Engine computer main power relay digital output.
efcut	effective cut (RC cut)
efs	Engine filter switch digital input.
EOPT	Engine Oil Pressure Transducer (psi), 0 – 200 psi.
EOTS	Engine Oil Temperature Sensor (°C).
EPDO	Engine Protection Defeat digital output.
EXC LMT	Excitation limit message. This field is loaded by any control module that is limiting or reducing rate charging for a specific reason. Please see the operating manual for a complete list of possible excitation

	reduction messages possible.
EXCL, EXCU and EXC3 (or EXC1-16, EXC17-32 or EXC33-48)	excitation limit message can only display most recent message, although more than one can be active at a time. We can decode these hex numbers to analyze for multiple active limits
fbmcb	Filter blower circuit breaker digital input.
fc1, fc2, fc3	Fan contactor feedback digital input.
FC1, FC2, FC3	Fan contactor coil driver digital output.
fcfa	Equipment blower high speed FCFA contactor feedback digital input.
fcfb	Equipment blower high speed FCFB contactor feedback digital input.
FCFR	Equipment blower high speed contactor coils digital output.
fcs	Equipment blower low speed contactor feedback digital input.
FCSR	Equipment blower low speed contactor coil digital output.
FLT1-5	Active faults, used to see when faults are set. You will see full messages for these in the fault and EPL logs.
fpc	Fuel pump control digital input.
fpcr	Fuel pump control relay digital input.
Fs, fs1a, fs1b, fs2a, fs2b	Field shunt contactor feedback digital input.
FS, FS1A, FS1B, FS2A, FS2B	Field shunt contactor coil digital output.
FTRt	forward transition recovery time
FTSF	forward sand magvalve control
FUEL	NGAUGE Fuel Level.
fvs	Filter Vacuum Switch digital input.
FW_R	firmware revision number
FW_V	firmware version number
FWVER	Firmware version installed at that instance of the record
g1brk	GS1 main circuit breaker digital input.
G1EE	GS1 engine enable digital output.
g1fan	GS1 fan control relay digital input.
g1fcb	GS1 filter fan breaker digital input.
G1FLT	GS1 fault digital output.
G1H20	GS1 water temperature (°F)
g1oil	GS1 oil level digital input.
g1ots	GS1 rectifier over temperature digital input.
G1P1I	GS1 phase 1 current (Aac), 0 - 2000 A.
G1P3I	GS1 phase 1 current (Aac), 0 - 2000 A.
G1PSI	GS1 oil pressure (PSI).

G1RPM	GS1 rpm.
G1SRV	GS1 service engine digital output.
G1STA	GS1 engine start digital output.
G1VRO	GS1 voltage regulator on digital output.
g2brk	GS2 main circuit breaker digital input.
G2EE	GS2 engine enable digital output.
g2fan	GS2 fan control relay digital input.
g2fcb	GS2 filter fan breaker digital input.
G2FLT	GS2 fault digital output.
G2H20	GS2 water temperature (°F)
g2oil	GS2 oil level digital input.
g2ots	GS2 rectifier over temperature digital input.
G2P1I	GS2 phase 1 current (Aac), 0 - 2000 A.
G2P3I	GS2 phase 1 current (Aac), 0 - 2000 A.
G2PSI	GS2 oil pressure (PSI).
G2RPM	GS2 rpm.
G2SRV	GS2 service engine digital output.
G2STA	GS2 engine start digital output.
G2VRO	GS2 voltage regulator on digital output.
g3brk	GS3 main circuit breaker digital input.
G3EE	GS3 engine enable digital output.
g3fan	GS3 fan control relay digital input.
g3fcb	GS3 filter fan breaker digital input.
G3FLT	GS3 fault digital output.
G3H20	GS3 water temperature (°F)
g3oil	GS3 oil level digital input.
g3ots	GS3 rectifier over temperature digital input.
G3P1I	GS3 phase 1 current (Aac), 0 - 2000 A.
G3P3I	GS3 phase 1 current (Aac), 0 - 2000 A.
G3PSI	GS3 oil pressure (PSI).
G3RPM	GS3 rpm.
G3SRV	GS3 service engine digital output.
G3STA	GS3 engine start digital output.
G3VRO	GS3 voltage regulator on digital output.
GATE	SCR Gate fire analog output, (0 - 4095).

gfa	Generator field contactor feedback digital input.
GFA	Generator field contactor coil digital output.
gfc	Generator field contactor feedback digital input.
GFC	Generator field contactor coil digital output.
GFCT	Generator field current sensor (Adc), 0 - 200A.
gfd	Generator field decay contactor feedback digital input.
GFD	Generator field decay contactor coil digital output.
gr	Ground relay digital input.
GRCNT	Ground relay events count while motoring.
grco	Ground relay cutout switch digital input.
GRID1, GRID2, GRID3	Grid 1 current sensor (Adc), 0 - 1000 A.
GRN	NLIMIT Green indicator led digital output.
grrst	Ground relay reset switch digital input.
GRRST	Automatic ground relay reset coil digital output.
grrst	ground relay reset switch
GVSR	Governor Servo relay coil digital output.
hbap	Hand brake applied digital input.
hbrl	Hand brake released digital input.
hdrst	Headlight reset switch digital input.
her	Hot Engine relay feedback digital input.
HER	Hot Engine relay coil digital output.
hlrst	headlight reset switch
HOLD 1 and 2	hold gate
HPLAT	traction power prior to gate hold
IDEAL	Ideal brake power (hp).
Idiff	differential between minimum and maximum ACT readings
Idle limit	state of idle limit control, standby, restart, pre S/D, shutdown, disabled
iout1	4-20mA control output, may be used to drive NFIELD BFD
ips	Independent pressure switch digital input.
is	Isolation switch status digital input.
J ACT	J1939 engine communication activity.
J OK	J1939 engine communication OK.
ldsnd or ldsd	Lead truck sand switch digital input.
los	Governor low oil switch digital input

LR	Engine load regulator % of maximum field, 0-100%.
LRW	Engine load regulator wiper voltage (Vdc), 0-80 V.
lsc	Load shed contactor coil digital output.
LSC	Load shed contactor feedback digital input.
lssw	Yard mode selector switch digital input.
lt1, lt2, ltt1, ltt2	Load test transfer contactor feedback digital input.
LTR	Load test transfer pilot relay coil digital output.
ltsw or lttsw	Load Test selector switch digital input.
LTT1, LTT2	Load test transfer contactor coil digital output.
lvflt	LVPS fault digital input.
LVPS	LVPS power (hp).
m1	M1 contactor feedback digital input.
M1	M1 contactor coil digital output.
m2, m3, m4, m5, m6	M contactor feedback digital inputs.
maxD and MaxD1	Maximum differential traction motor current in WS recovery
mb-b	Braking position switchgear feedback digital input.
mb-m	Motoring position switchgear feedback digital input.
mco1, … , mco6	Traction motor cutout solenoid feedback digital inputs.
MCO1, …, MCO6	Traction motor cutout solenoid drive digital outputs.
mco16, mco25, mco34,	Traction motor cutout solenoid feedback digital inputs.
mco43, mco52, mco61	Traction motor cutout solenoid feedback digital inputs.
MCOR	Traction motor cutout relay coil digital output.
mcos1, …, mcos6	Traction motor cutout request switch digital inputs.
mcosw	Motor cutout switch
mcs16, mcs25, mcs34	Traction motor cutout switch digital inputs.
MFR	Motor fail relay coil digital output.
MGA	Main generator output current (Adc), 0 – 4800 A.
MGCT	Main generator output current sensor (Adc), 0 – 2000 A.
MGV	Main generator output voltage (Vdc), 0 – 1250 V.
minD, minD1	Minimum differential traction motor current in WS recovery, D1 is at 10ms
mmd1-6	Minimum/maximum differential traction motor current
MR	Main air reservoir pressure (PSI), 0 - 200 PSI.
MR2PT	Secondary air reservoir pressure (psi), 0 – 200 psi.
MRPT	Main air reservoir pressure (psi), 0 - 200 psi.

msand	Manual sand trainline digital input.
mtr	Motor relay feedback digital input.
MTR	Motor relay coil digital output.
MTRA	Motor 1-3 relay coil digital output.
MV1SF	Forward truck lead axle sanding magnet valve digital output.
MV1SR	Forward truck rear axle sanding magnet valve digital output.
MV2SF	Rear truck lead axle sanding magnet valve digital output.
MV2SR	Rear truck leading axle sanding magnet valve digital output.
MVBD	Compressor blow down magnet valve drive digital output.
MVCC	Compressor control magnet valve drive digital output.
MVFC	Fan clutch magnet valve drive digital output.
MVSH	Fan shutter magnet valve drive digital output.
NHC	Heater contactor drive digital output.
nsr	No speed relay feedback digital input.
NSR	No speed relay coil digital output.
ovrd	Idle limit override switch
p1, …, p6	P contactor feedback digital inputs.
P1, …, P6	P contactor coil digital outputs.
p12, p25, p34	P contactor feedback digital inputs.
P25, P34	P contactor coil digital outputs.
pa	Local control breaker digital input.
Parallel	P contactor feedback digital input.
pcr	Pneumatic control relay digital input.
pcs	Pneumatic control switch digital input.
PID	Excitation magnitude of change control signal.
plst2	pulse gate off timer
PRIME or PMR	Engine Prime drive digital output.
prog	Chopper programming digital input.
rate	Loading rate at instance of record (% x 10).
RC	Rate Control excitation control signal, 0-100%.
rcl	Remote system active digital input.
RED	NLIMIT Red indicator led digital output.
RPM	Engine rpm.
RTSR	Reverse sand magvalve control
run	Isolation switch status digital input.

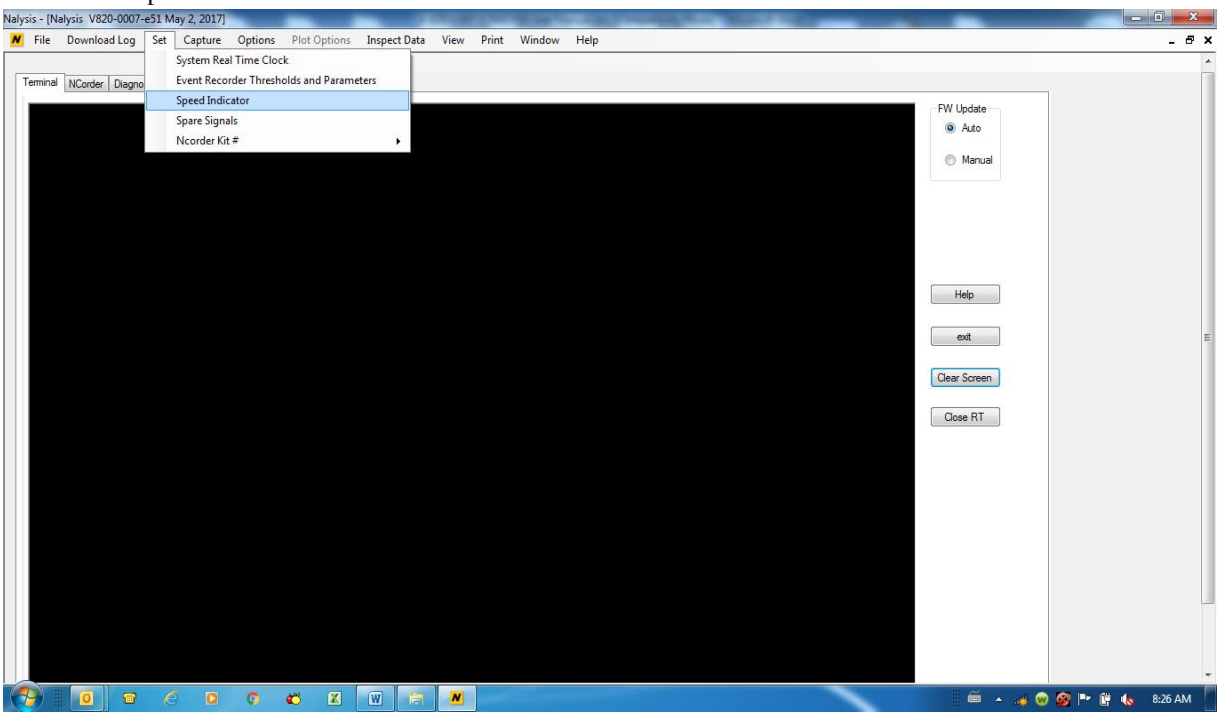
rv1, … , rv6	Forward reverser contactor feedback digital inputs.
rvf	Reverser pilot relay feedback digital input.
RVF	Reverser pilot relay coil digital output.
rv-f	Forward reverser switchgear interlock digital inputs.
rvf16, rvf25, rvf34	Forward position reverser switchgear interlock digital inputs.
rvr	Reverser pilot relay feedback digital input.
RVR	Reverser pilot relay coil digital output.
rv-r	Reverse reverser switchgear interlock digital input.
rvr43, rvr52, rvr61	Reverse position reverser switchgear interlock digital inputs
s13,s14,s16,s24,s25,s34,s36	Series-parallel contactor feedback digital input.
S13,S14,S16,S24,S25,S34,S36	Series-parallel contactor drive digital output.
SAND	Sanding relay digital output.
sb	Series bridge contactor feedback digital input.
SB	Series bridge contactor drive digital output.
sdovr	Shutdown override switch digital input.
sf	Generator shunt field contactor feedback digital input.
SF	Generator shunt field contactor coil digital output.
shpc	Shore power contactor digital input.
shpr	Shore power pilot relay digital input.
SLOWR	Code to show reason NFORCE is applying a slow control rate (PID to 100)
spc	Spotter contactor feedback digital input.
spot	Spotter switch digital input.
SPR	Spotter contactor coil digital output.
sprD, sprD1	Maximum differential TMI minus minimum differential TMI (spread differential), and spread differential at 10 ms
SPx10	Locomotive ground speed as detected by the axle generator (mph x 10).
SSR	Slow Speed relay coil digital output.
START	Engine start digital output.
start	Engine start switch digital input.
STOPC	Code to show reason NFORCE is applying stop charge (PID to zero)
TCO 1	Truck 1 cutout indicator light digital output.
TCO 2	Truck 2 cutout indicator light digital output.
THOLD	Gate hold due to TMV slip correction

THP	Traction power (hp).
THROTTLE	Control stand throttle position.
tlpr	Turbo lube pump relay digital input
TLPR	Turbo lube pump relay drive digital output
TMI	Average traction motor armature current
TMI1, …, TMI6	Traction motor armature currents (Adc), 0 - 2000 A.
tmigp	Gate pulse timer for WS TMI 1-4
TMT1, …, TMT6	Traction motor modeled temperatures (°C).
TMV1	Traction motor 1 voltage (Vdc), 0 - 1739 V.
TMV1, …, TMV6	Traction motor voltages (Vdc), 0 - 1739 V.
TMV12	Traction motor 1&2 differential voltage (Vdc), 0 - 1739 V.
TMV14	Traction motor 1&4 differential voltage (Vdc), 0 - 1739 V.
TMV2	Traction motor 2 voltage (Vdc), 0 - 1739 V.
TMV25	Traction motor 2&5 differential voltage (Vdc), 0 - 1739 V.
TMV34	Traction motor 3&4 differential voltage (Vdc), 0 - 1739 V.
TMV36	Traction motor 3&6 differential voltage (Vdc), 0 - 1739 V.
TMVAV	Average traction motor armature voltage (Vdc), 0 - 1739 V.
TR	Transition relay coil digital output.
trks1	Truck 1 cutout request switch digital inputs.
trks2	Truck 2 cutout request switch digital inputs.
VRC	Voltage regulator change relay coil digital output.
WATER	Engine radiator coolant temperature (°F).
WLR	Wheel slip light relay coil digital output.
YEL	NLIMIT Yellow indicator led digital output.

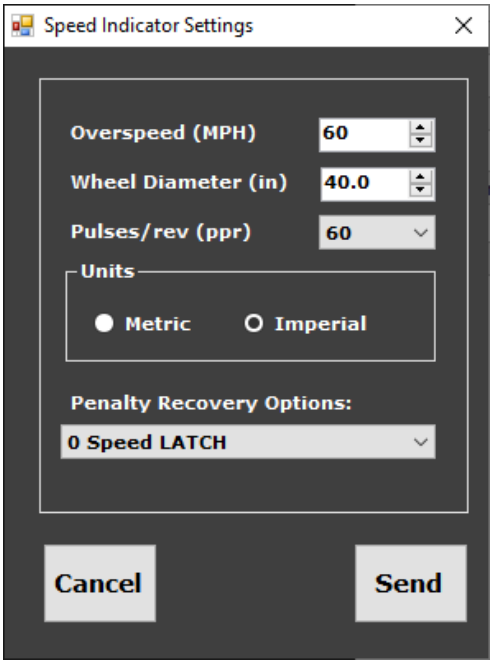
11.0 Speed Indicator Setting:

- Ensure the locomotive is stopped.
- NALYSIS must establish communications with the Speed Indicator before any communication operation can be completed. This is done by connecting the communications (or download) cable (NRE P/N: 058-0001-000) from the Speed Indicator's communication port (Lemo connector on the back of the speed indicator) to a portable computer (or Laptop).
- Launch NCORDER NALYSIS and select "Speed Indicator" from the Set pulldown menu.

Select Set->Speed Indicator

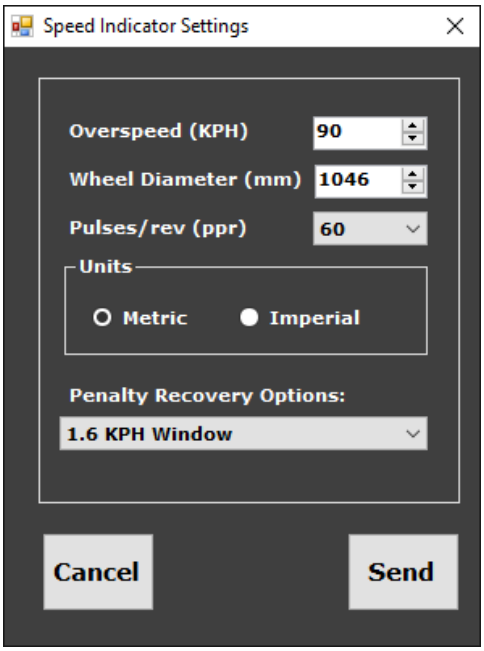


For Imperial Units, the following panel will be displayed



- Locomotive Overspeed can be set between 20 and 100 MPH (32-160 KPH)
- Wheel Diameter can be set between 32.0” and 47.0” (813 mm and 1192 mm)

For Metric Units, the following panel will be displayed



- Locomotive Overspeed can be set between 20 and 100 MPH (32-160 KPH)

- Wheel Diameter can be set between 32.0” and 47.0” (813 mm and 1192 mm)

12.0 Customer Support

For general questions regarding the Analysis/Download Software program, contact NRE Calgary technical support personnel.

Before contacting NRE Calgary with questions about this product or any of its ancillary equipment, carefully review the contents of this guide. If you are unable to find an explanation for problems with your equipment, gather the following information prior to contacting NRE Calgary:

- The *System* Type (NFORCE, NCORDER, NCOMPASS, WinGov, or NLIMIT) and Part Number that is experiencing problems
- The version number of the *System* Internal Operating Firmware
- The serial number of the *System*
- The type of locomotive with the installed *System*
- The version number of the Nalysis software program
- The type of Laptop/Computer being used
- A detailed description of the problem(s)

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