



SERVICE BULLETIN

ISSUE DATE:	8/14/2019
SERVICE BULLETIN SUBJECT:	E2 Ver 1 Software Verification and Update
VINs or MODELS AFFECTED:	Catalyst 40 E2 with Rooftop BTMS
COMPLETE BY:	Next Available Service Opportunity
SERVICE CAMPAIGN #:	SC-19-97

NOTICE! It is expected that this process may require up to 3 hours per bus. Please schedule appropriately to minimize vehicle downtime.

VEHICLE SOFTWARE VERIFICATION AND UPDATE

Description

The reason for this software update is to update various controllers. All the included Proterra Catalyst vehicles require a change to the software/configuration for the following items:

- Battery Pack Software
- Charge Controller
- ESM Software
- Powertrain Controller
- DWP/Dash Software
- Body Controller (ZR)
- Verify Only – Traction Motor Inverter Firmware Version

Summary of Software Changes

This update is to verify the latest software versions are installed for all controllers on the vehicle.

- Battery Pack Software
 - Improved recovery from INTCAN CAN Errors
 - Additional Range Modes to allow for higher resolution SOH updates
 - Balancing disabled during fast charge to prevent temperature de-rates to charging
 - HVIL improvements to prevent sudden loss of power when only one string is enabled
- Charge Controller
 - Improved high power charge handling
 - Broadcast of version numbers and EVSE parameters on CAN
- ESM Software
 - Improved SOC calculations and low voltage performance
- Powertrain Controller
 - Hill hold improvements
 - Updates to enable 315 tire installation
- DWP/Dash Software
 - Added icons
- Body Controller (ZR)
 - Added support for new dash content
 - Hill hold feature improvements
 - New feature when upgrading from pre-40.26:
 - Press-to-set hill hold activation and audible hill hold alert (if enabled)
 - Added features for Auxiliary heating (fuel fired heater) system
 - Support for cabin HVAC pre-conditioning (if supported by vehicle telemetry system)
 - Customer-requested updates
 - ADA chime to discrete output
 - Aux Heat disable while charging feature

Tools/Programs Required

Tools Required:

- Laptop Computer
- K-line USB Adapter (dash programming)
- USB to Serial Adapter (dash programming)
- Proterra OBD Breakout cable “Octopus”
- PCAN USB dongle
- Nexiq USB-Link or USB-Link 2

NOTE: IT IS NOT PERMITTED to use the Logena Service tool to perform the Body Controller software update: this tool has been obsoleted. This tool does not maintain configuration information and may result in unsafe/undesirable vehicle operation if used to flash body controller software.

Programs Required:

- BMS flashing utility (MonacoUDSClient)
- Proterra Diagnostic Tool
- CAVTAN Parameter Editor v3.03 (dash programming)

Software Files Required / Preparation

It is recommended that you copy the entire “service bulletin files” folder to your local machine in order to more effectively keep track of the software versions you are deploying:

<\\bus.local\files\Engineering\Service Bulletins\Service Bulletin Files for SB-19-97>

- *Body Controller Version 40.28:*
 - *044740.ZR32A_A*

- *Powertrain:*
 - *Main Version 2.4.1 : 042887.hex*
 - *SEPTA Version 2.5.1: 042886.hex*
 - *NYCT Version 2.6.1: 042885.hex*

- *CCS Charger Controller:*
 - *Dual Port*
 - *Part number 047977.zip*
 - *CC_2_0_4.srec*
 - *Single Port*
 - *Part Number 047978.zip*
 - *CC_2_1_4.srec*

- *ESM Controller Version 2.0.0:*
 - *Part Number 043836*
 - *ESM_Catalyst_2_0_0_release_04_11_2019.srec*

- *BMS (E2 Pack) Software:*
 - *Part Number 038975*
 - *0117340DE_MonacoBMS_Main.mbms*
 - *0117340AE_MonacoSC_Safety.mbms*

- *Dash Software - Version 6:*
 - *031728_rev6.zip*

Contents

Description	1
Summary of Software Changes	2
Tools/Programs Required	3
Software Files Required	4
Connect to the Vehicle to Start the Proterra Diagnostics Tool	6
Verify and Update the BMS (Battery Pack) Software	9
Verify Current Software Version	9
Update Using the Proterra Diagnostic Tool	10
Update Using MonacoUDS Client (Alternate Method)	13
Verify and Update ESM Controller Software Version:	20
Verify Current Software Version	20
Update Using the Proterra Diagnostic Tool	21
Update Using Microboot (alternate method)	23
Verify and Update Charge Controller Software Version	24
Verify Current Software Version	24
Update Using the Proterra Diagnostic tool	25
Update Using Microboot (alternate method)	27
Verify and Update Powertrain Software Version	28
Verify Current Software Version	28
Update Powertrain Software	29
Verify and Update Dash Software Version	31
Verify Current Software Version	31
Update Dash Software	32
Verify and Update Body Software Version	36
Verify Current Software Version	36
Update Body Controller Software	40
Store/Import Customer Configuration Dataset	44
Verification of Customer Configuration	46
Verify Traction Motor Software Version	47
Verify Current Software Version	47
Check List for Software Versions Deployed	48

Connect to the Vehicle to Start the Proterra Diagnostics Tool

This process will guide the user to connect to the vehicle with the Proterra Diagnostics Tool.

1. Turn **ON** the 12/24V rear Vehicle Master Disconnect located behind the vehicle curbside rear charge port access panel.
2. Turn **ON** the bus Master Run Switch at the Driver's Workplace and ensure the Dash screen is **ON** to display "KEY ON".
 - a. This places the vehicle into Key On / Low Voltage state for controller versions to be checked prior to software flash.
3. For Body Controller Programming:
 - a. Turn **OFF** the Master Run Switch at the Driver's Workplace and ensure the dash screen is **OFF**.
 - b. Turn **ON** the bus "programming switch" inside the **street side** wheel well box.
4. Using a T30 Torx screwdriver or appropriate tools, remove the two access covers:
 - a. Street side wheel well electronics cabinet (ECAB) panel for access to the OBDII Port.



- b. Rear deck access panel for OBDII Diagnostic port (NOTE: on E2-35 foot buses this is located behind the rear barn doors on the left hand side).

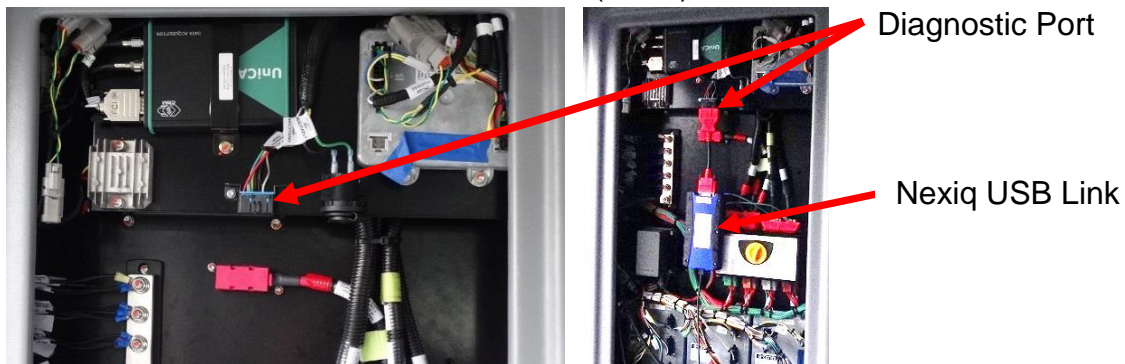


5. Power up (boot) the Proterra-supplied laptop containing the Proterra Diagnostic Tool.

6. Connect the Nexiq USB Link2 device to the laptop and to the appropriate OBDII Diagnostic Port.



7. For example, here is the Nexiq USB Link connected to the Diagnostic Port located on the street side wheel well electronics cabinet (eCab):

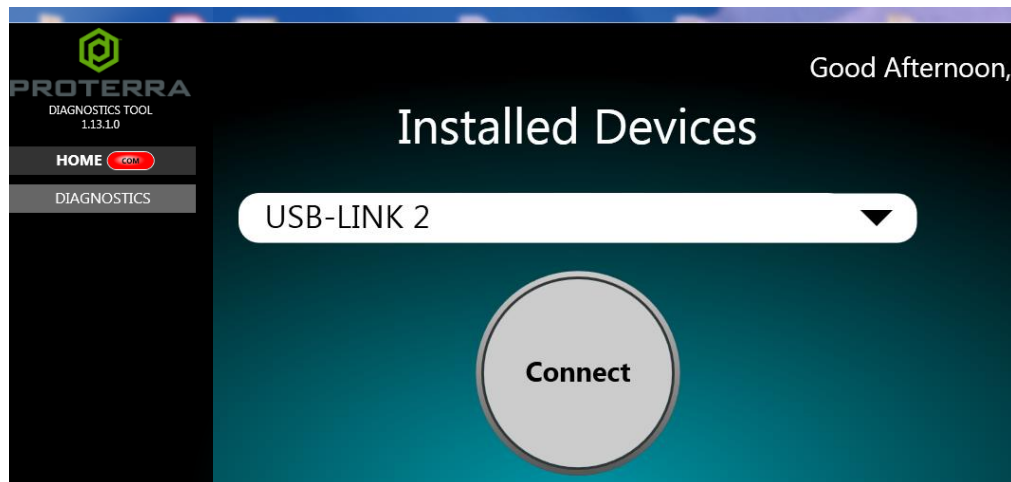


8. On the laptop, double-click on the Proterra Diagnostics Tool software icon to start the software.

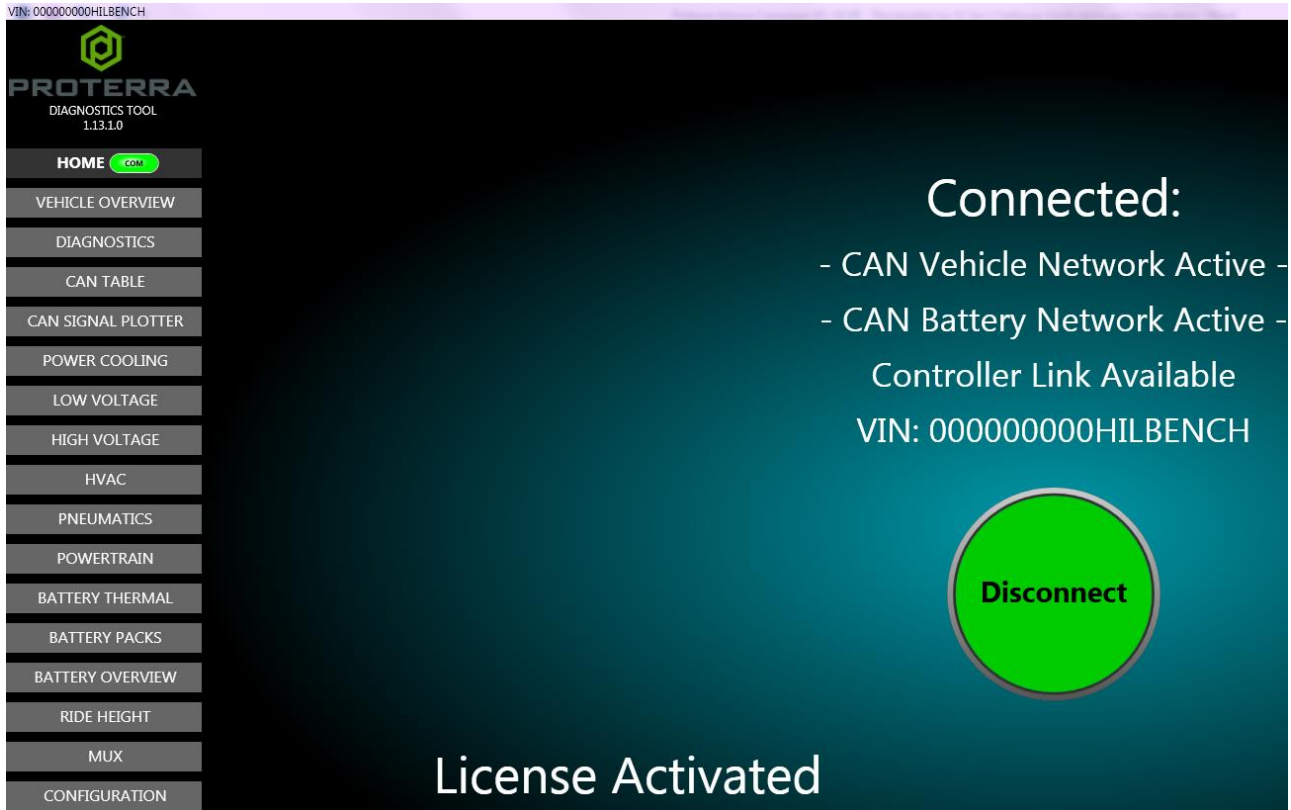


9. When the program opens, read and click OK for the prompt.

10. On the Home tab, select the appropriate device from the drop down and click "Connect".



11. Once the diagnostic tool has connected to the vehicle, you will have a VIN number and connection status displayed on the home screen, and tabs available to navigate.



Verify and Update the BMS (Battery Pack) Software

This procedure checks the Body Controller software version and maintains the body controller parameter configuration data across the flash download of new software.

Verify Current Software Version

1. With the Diagnostic tool connected to the vehicle at the front or rear deck OBDII Port, navigate to the “Battery Packs” Tab and view the Main and SC SW Versions.
 - a. If these do not read **117340A and 117340D**, as shown below, you must download battery pack firmware.
 - b. Be sure you check for each Pack using the drop down in the upper right corner.

Click Battery Packs Software Versions Pack Selection

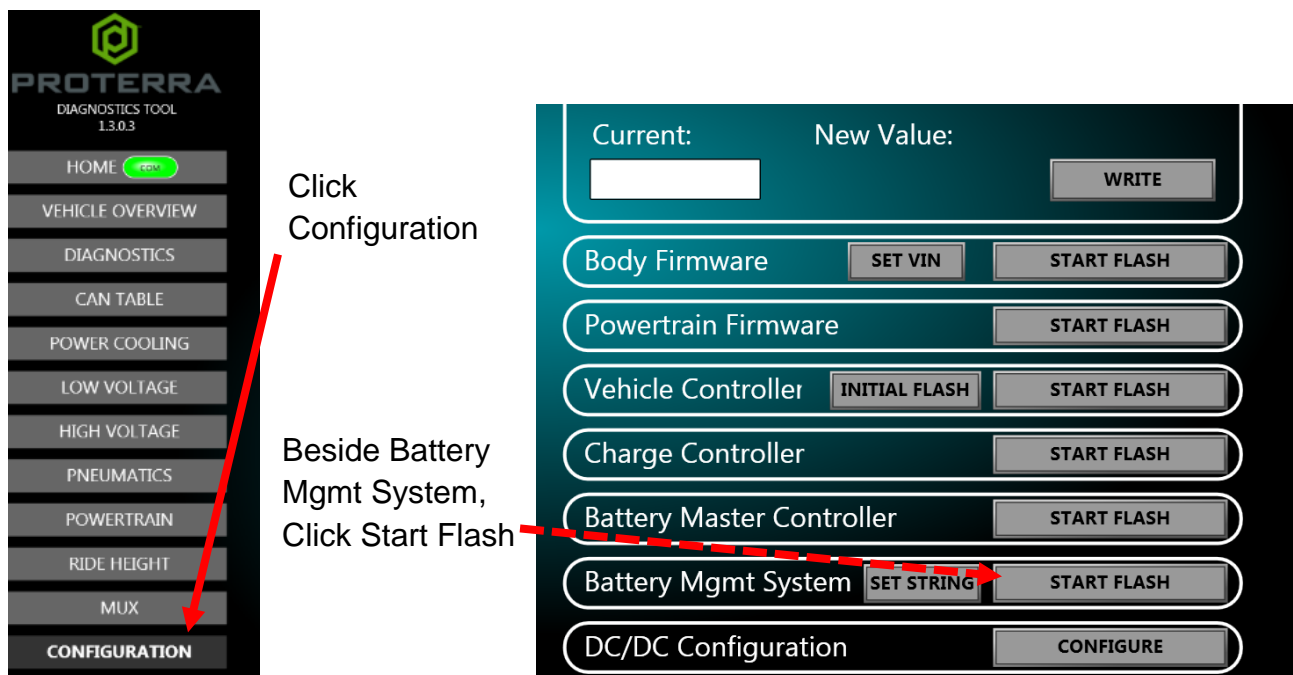
The screenshot shows the Proterra Diagnostics Tool interface. On the left is a navigation menu with 'BATTERY PACKS' selected. The main display area shows various vehicle parameters and a table of battery pack data. Red arrows point to the 'BATTERY PACKS' menu item, the 'SC SW Ver: 117340A' and 'Main SW Ver: 117340D' text, and the 'PACK 1' dropdown menu.

83°	83°	83°	83°	83°	83°	83°	83°	83°	83°	84°	83°	84°	84°	83°
3.815	3.818	3.817	3.815	3.816	3.817	3.815	3.814	3.815	3.817	3.815	3.815	3.817	3.815	3.815
3.816	3.818	3.817	3.815	3.816	3.818	3.815	3.815	3.814	3.818	3.815	3.815	3.817	3.817	3.816
3.815	3.817	3.817	3.815	3.816	3.817	3.815	3.815	3.814	3.817	3.815	3.815	3.816	3.816	3.816
3.816	3.815	3.816	3.815	3.815	3.815	3.815	3.815	3.816	3.815	3.815	3.816	3.815	3.814	3.817

- c. NOTE: This pack version will only refresh if you cycle power to the controller (by turning off the Master Disconnect at the rear of the Vehicle) and also disconnect/reconnect the Proterra Diagnostic tool.

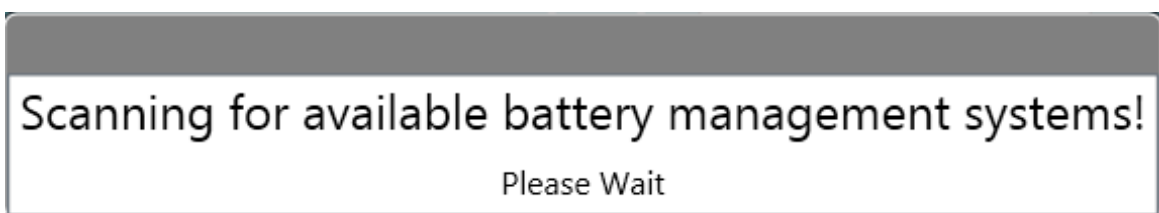
Update Using the Proterra Diagnostic Tool

1. Ensure the laptop battery is full or it is connected to AC power. The procedure can take up to ten minutes per pack to complete.
2. Ensure you have the latest software file **** .mbms** to a known location on the service technician's computer (Folder or Desktop).
IMPORTANT! NEVER access the software from the USB memory device, ALWAYS copy the software files to your computer hard drive and access the software from this location. Secure the bus with the Vehicle Master Disconnect in the rear ON.
3. Turn the dash Master Switch to ON. Do not press START. Use the hazard lights if necessary to maintain bus power.
4. With the Proterra diagnostic tool connected to either the front or rear diagnostic port (must have BCAN data available), navigate to the Configuration tab.

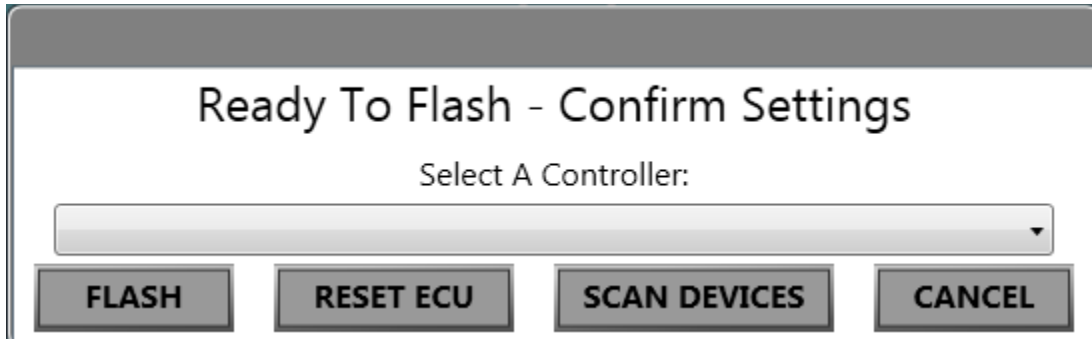


NOTE: If desired, you can now turn the Master Switch to “OFF”. The battery system remains active as long as the 12/24V switch is on. This may improve software download speed.

5. Select the option for Battery Management System “Start Flash”.
6. In the pop-up window, select one of the following software configurations to load the appropriate software into the two controllers for each pack:
 - a. Pack Safety Controller (SC): **117340A**.
 - b. Main Pack Controller: **117340D**.
7. A popup window will appear, “Scanning for available battery management systems”.



8. Once it is finished scanning, a window with a drop-down list box appears:



9. Select a controller from the drop down list:

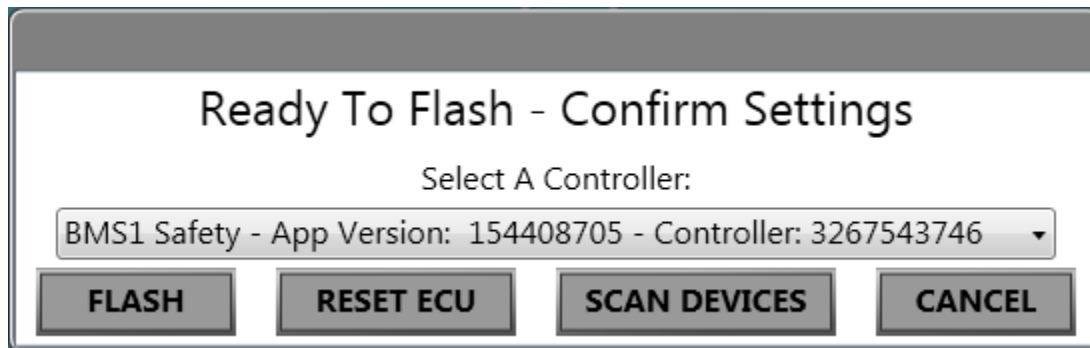
a. Safety Controller should display the following per pack, once properly updated:

BMS1 Safety - App Version: 171185921 - Controller: 3267543746

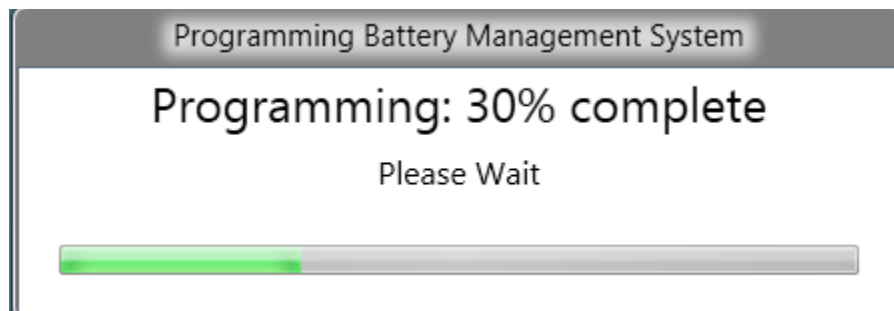
b. Main controller should display the following per pack, once properly updated:

BMS1 Main - App Version: 221517569 - Controller: 3250700737

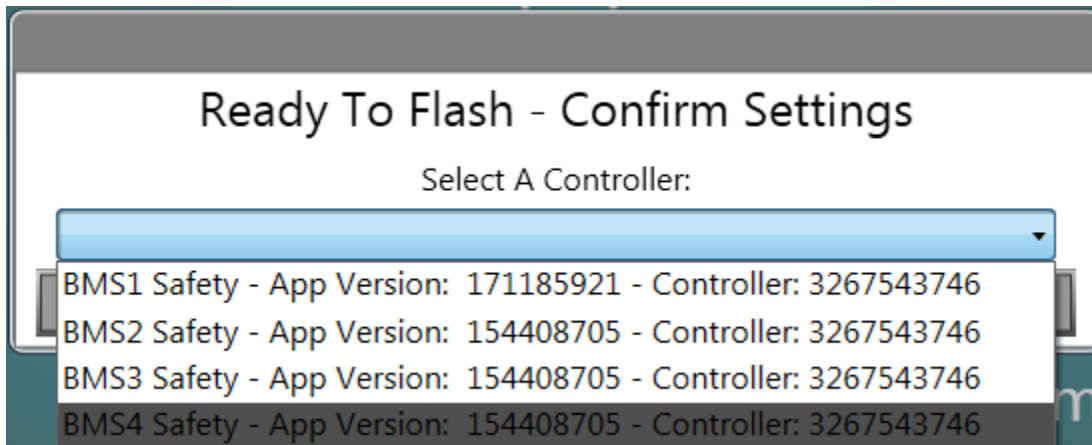
10. Select a pack controller and click the “Flash” button.



11. The Programming window will come up and may take a few minutes to complete.



12. When the Programming screen completes, the version numbers will update in the list to show you have completed that pack (BMS1 Safety has been updated below):



13. After all packs have been updated, cycle power to the bus.

14. Disconnect the diagnostic tool on the home tab and again click Connect.

- This will refresh the pack version information and allow you to verify all four packs are properly updated on the "Battery Pack" tab.

Click Battery Packs

Software Versions

Pack Selection

Isolation Internal: 36978 kΩ
 Isolation External: 2736 kΩ
 Pack Voltage: 343.82 V
 Pack Current: 0.00 A
 Coolant Supply Temp: -°F
 Coolant Return Temp: -°F

Temperature Display: °F °C
 SC SW Ver: 117340A
 Main SW Ver: 117340D

PACK 1

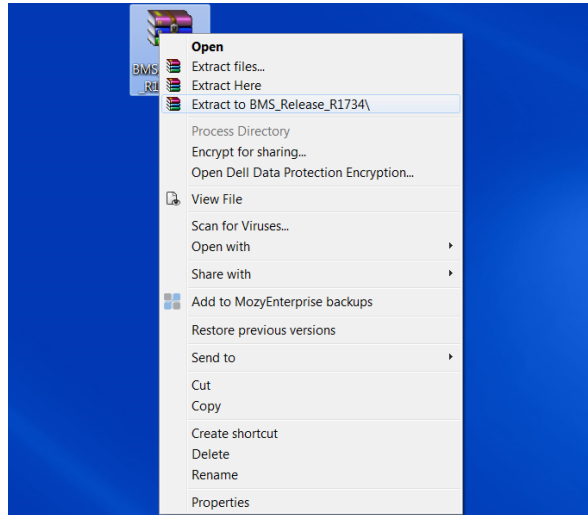
Contactor Moisture Detected

Reset Desiccant Alarm

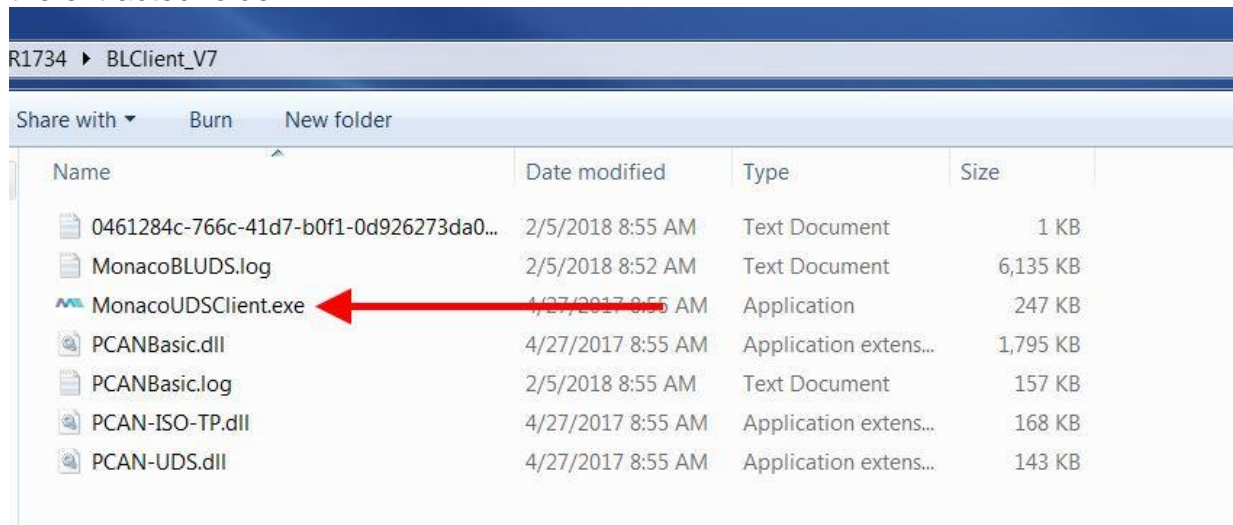
83°	83°	83°	83°	83°	83°	83°	83°	83°	83°	83°	84°	83°	84°	84°	83°
3.815	3.818	3.817	3.815	3.816	3.817	3.815	3.814	3.815	3.817	3.815	3.815	3.817	3.815	3.815	3.815
3.816	3.818	3.817	3.815	3.816	3.818	3.815	3.815	3.814	3.818	3.815	3.815	3.817	3.817	3.817	3.816
3.815	3.817	3.817	3.815	3.816	3.817	3.815	3.815	3.814	3.817	3.815	3.815	3.816	3.816	3.816	3.816
3.816	3.815	3.816	3.815	3.815	3.815	3.815	3.815	3.816	3.815	3.815	3.816	3.815	3.814	3.817	3.817

Update Using MonacoUDS Client (Alternate Method)

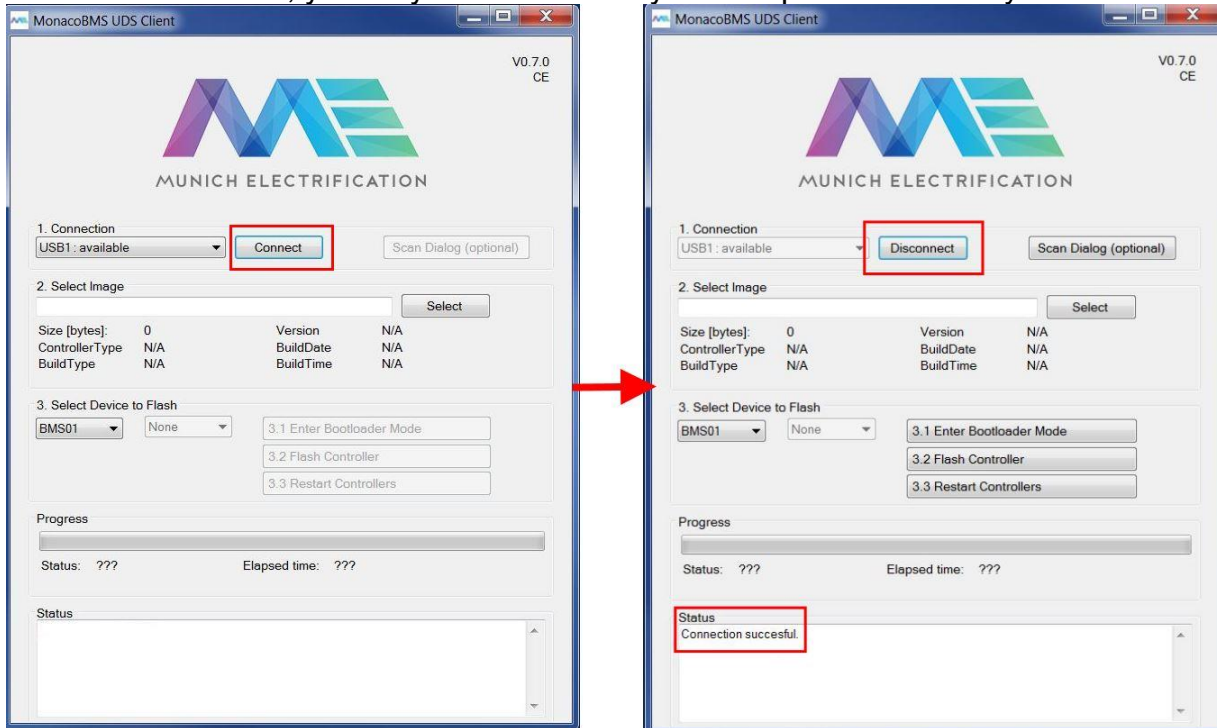
1. Ensure the laptop battery is full or it is connected to AC power. The procedure can take up to ten minutes per pack to complete.
2. Download the archive file (.zip or .rar) containing the flashing utility, BMS files, and instructions to your laptop hard drive.
3. Extract the archive file to a folder at a location of your choosing; remember this location for future steps.



4. Connect the PCAN dongle to the laptop.
5. Close all CAN utilities running on the laptop: PCAN Explorer, DST, CANalyzer, etc.
Note: These programs can interfere with the tool's ability to use the PCAN dongle and will prevent the tool from correctly flashing the BMS.
6. Launch the flashing tool: MonacoUDSClient.exe.
Note: Do not attempt to run the tool straight from the archive file; extract it first, then run it from the extracted folder.



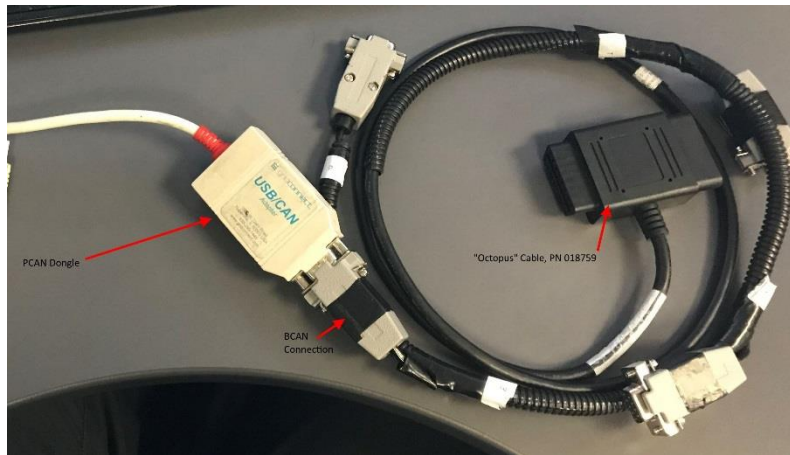
7. Click the “Connect” button beside the Connection drop-down menu. If this button is “grayed out” or not available, you may need to restart your computer to correctly connect to the dongle.



8. The button should change to “Disconnect” once proper communication is established.
NOTE: You will also get a “Connection Successful” message in the status window at the bottom.
9. Proceed to the next section: *Connecting to the bus.*

Connecting to the Bus

- Secure the bus with the Vehicle Master Disconnect in the rear **ON**.
- Turn the dash Master Switch to **ON**. **Do not press START**. Use the hazard lights if necessary to maintain bus power.
- Remove the rear deck access cover behind the back seats using a T30 Torx driver, or square key if the bus is so equipped.
- Connect the OBD to DB adapter cable to the rear diagnostic port, then connect the PCAN dongle to the BCAN port on the cable.



- Click on the “Scan Dialog” button, then “Start Scan” on the window that pops up.
Note: This will scan for all connected BMS units. On a 4 pack bus you should see 8 instances of “true” in the first column, as seen below.

Click “Start Scan”

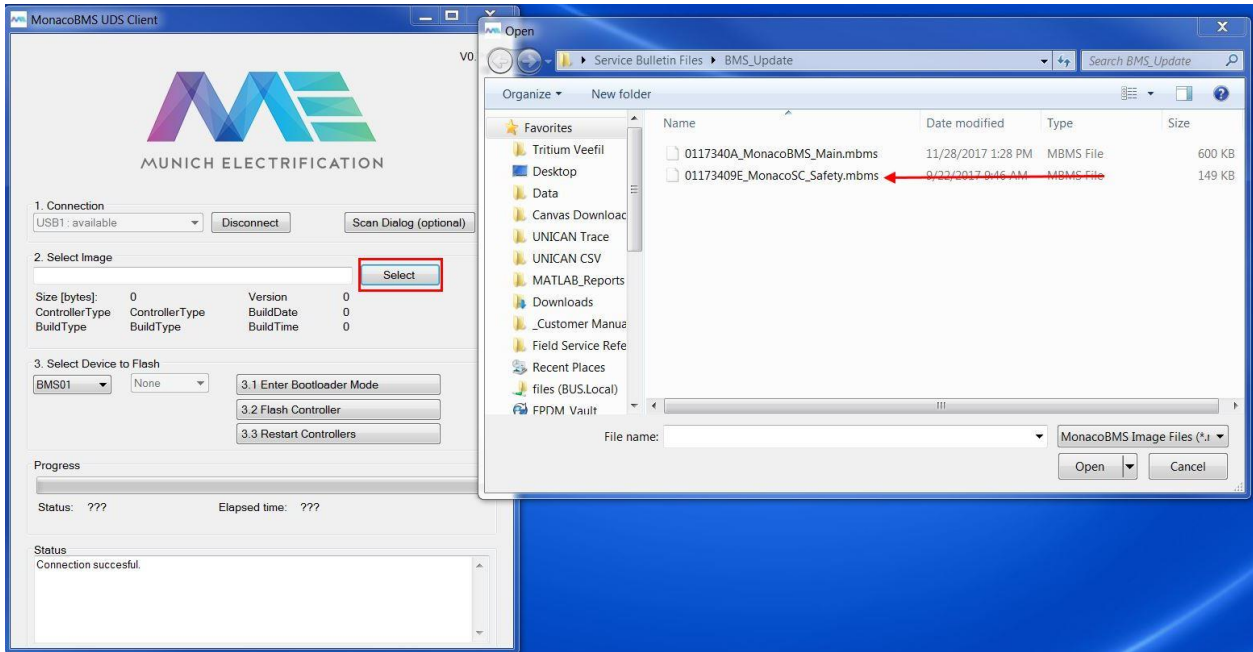
All Installed Packs “True”

Present	ID	Type	BLVer...	APPVer...	Controller
True	BMS01	MAIN	00000...	00000000	00000000
True	BMS01	SAFETY	00000...	00000000	00000000
True	BMS02	MAIN	00000...	00000000	00000000
True	BMS02	SAFETY	00000...	00000000	00000000
True	BMS03	MAIN	00000...	00000000	00000000
True	BMS03	SAFETY	00000...	00000000	00000000
True	BMS04	MAIN	00000...	00000000	00000000
True	BMS04	SAFETY	00000...	00000000	00000000
False	BMS05	MAIN	00000...	00000000	00000000
False	BMS05	SAFETY	00000...	00000000	00000000
False	BMS06	MAIN	00000...	00000000	00000000
False	BMS06	SAFETY	00000...	00000000	00000000
False	BMS07	MAIN	00000...	00000000	00000000
False	BMS07	SAFETY	00000...	00000000	00000000
False	BMS08	MAIN	00000...	00000000	00000000
False	BMS08	SAFETY	00000...	00000000	00000000
False	BMS09	MAIN	00000...	00000000	00000000

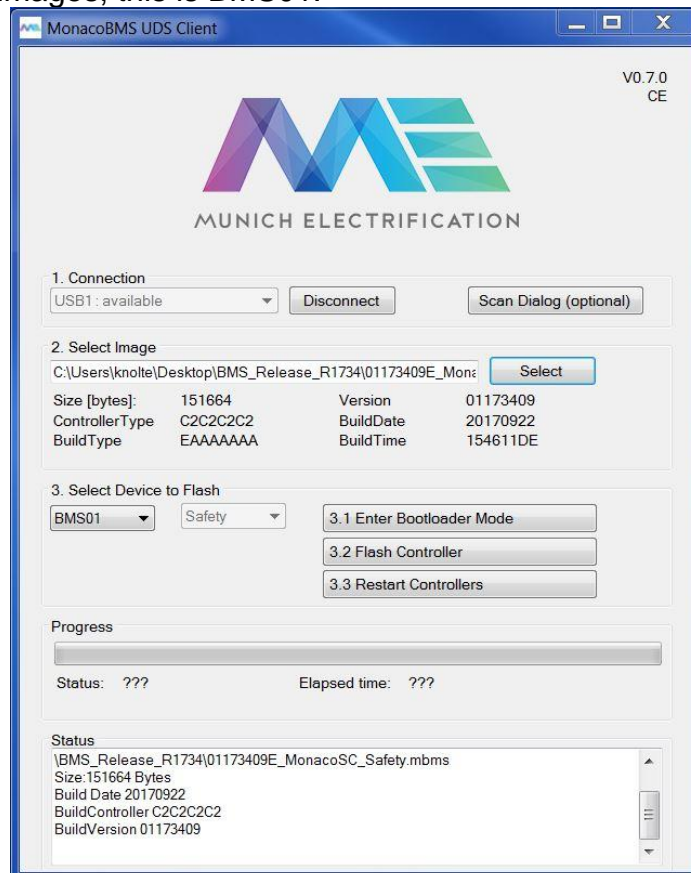
- Once all four packs’ Safety and Main controllers are verified as online, you may proceed with the flashing procedure.

Flashing the BMS

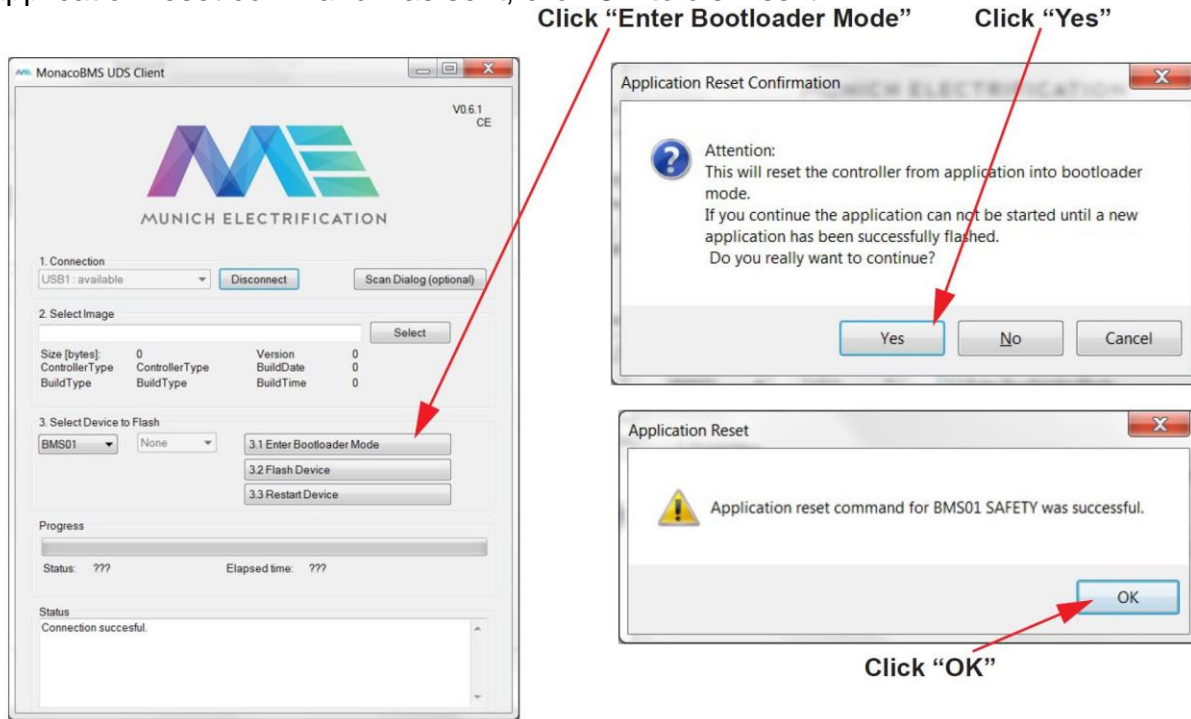
16. Select the file to flash, under “Select Image.” Click on “Select,” then navigate to the files you extracted in Step 2 of setup. Select the file labeled “0117340AE_MonacoSC_Safety.mbms”
Note: Each pack will need to be flashed twice, once for the MAIN and once for the SAFETY controller. The order in which these are done does not matter.



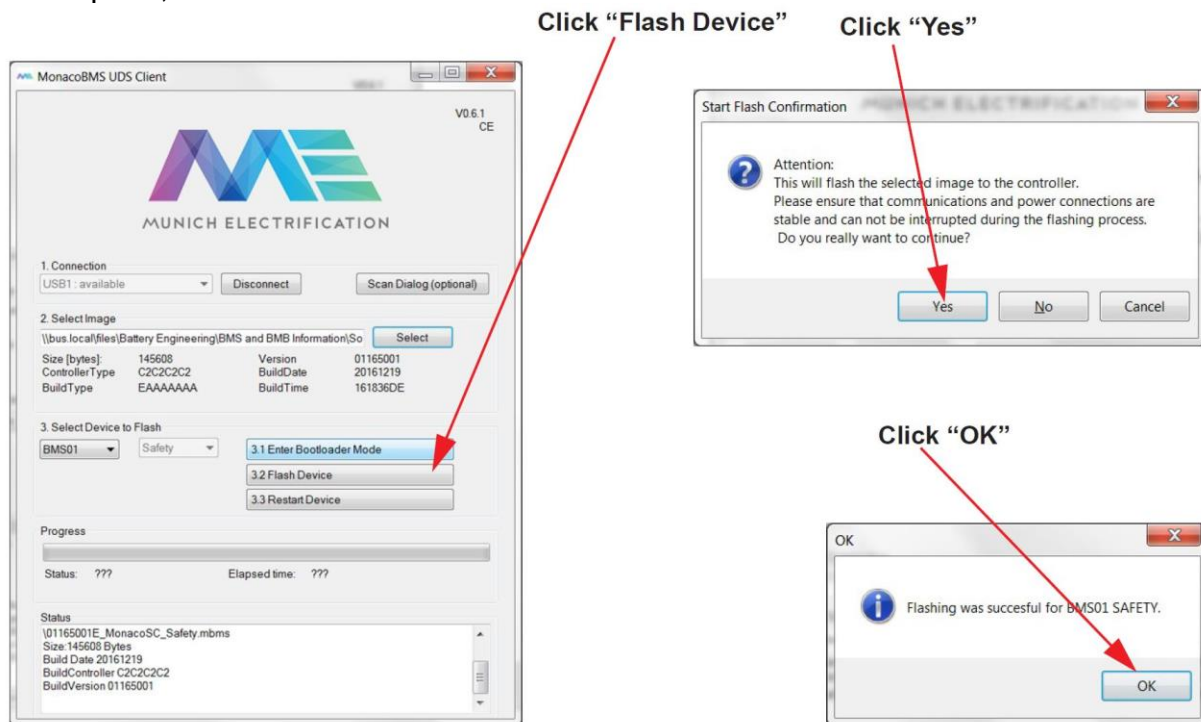
17. Under “Select Device to Flash” use the drop-down menu to select the BMS you are working on; in the example images, this is BMS01.



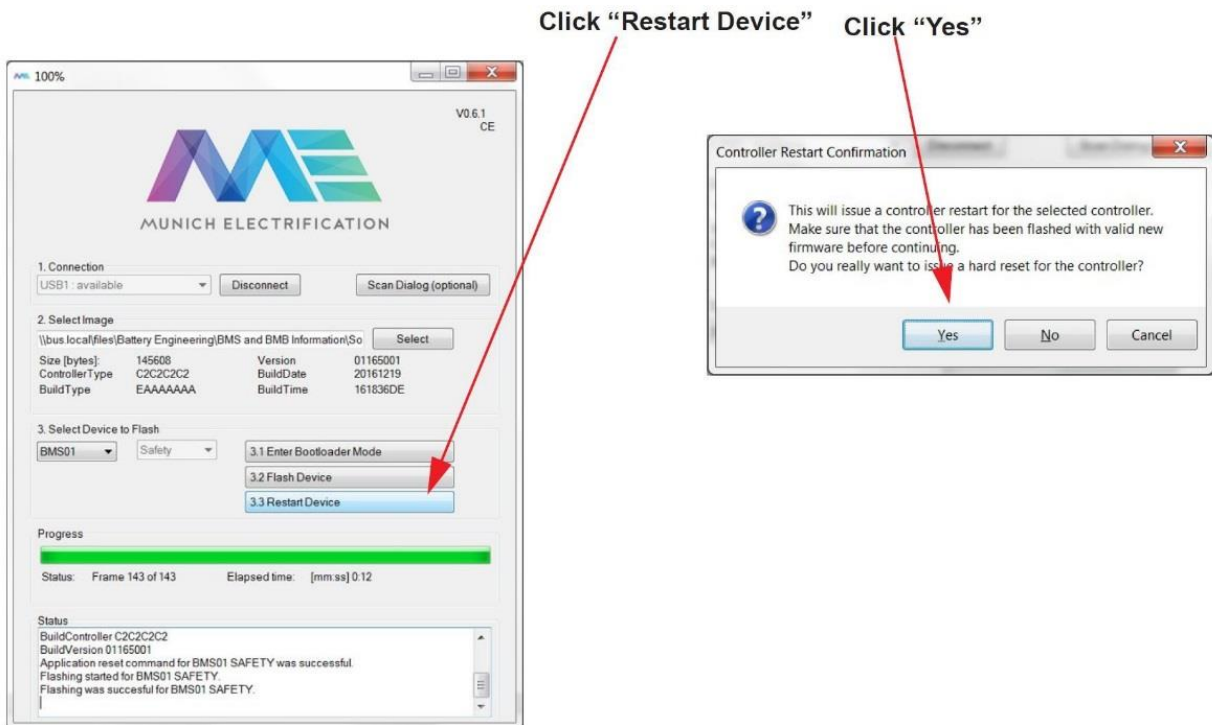
18. Click on the “Enter Bootloader Mode” button. A dialog box will appear to ask for confirmation. Select “Yes” to confirm and proceed. A second dialog box will appear to notify you the application reset command was sent, click OK to dismiss it.



19. Click “Flash Device” to load new software into the BMS. A dialog box will appear to ask for confirmation to proceed, select “Yes” to continue. Another dialog box will appear when flashing is complete, click OK to continue.



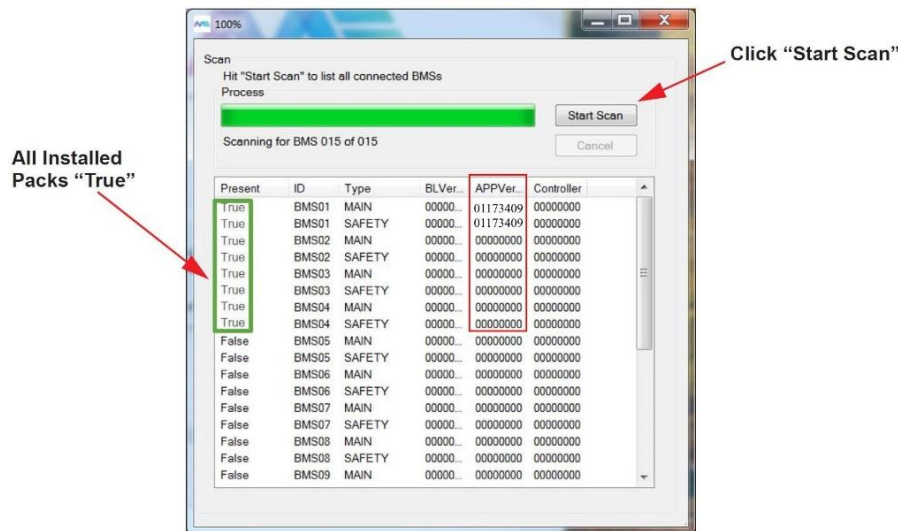
20. Click “Restart Device” to send a reset command to the BMS. A confirmation box will appear, click “Yes” to confirm the command.
Note: You will NOT receive a notification box after this, but the Status window will indicate the restart commands were sent.



21. Repeat step 1-5, this time selecting the file labeled “0117340DE_MonacoBMS_Main.mbms” as the image to be loaded.

22. Verify the new software load by using the “Scan Dialog” option on the client main screen. You should see new App Version numbers for the BMS you just flashed, matching the 7-digit number from the file names selected.

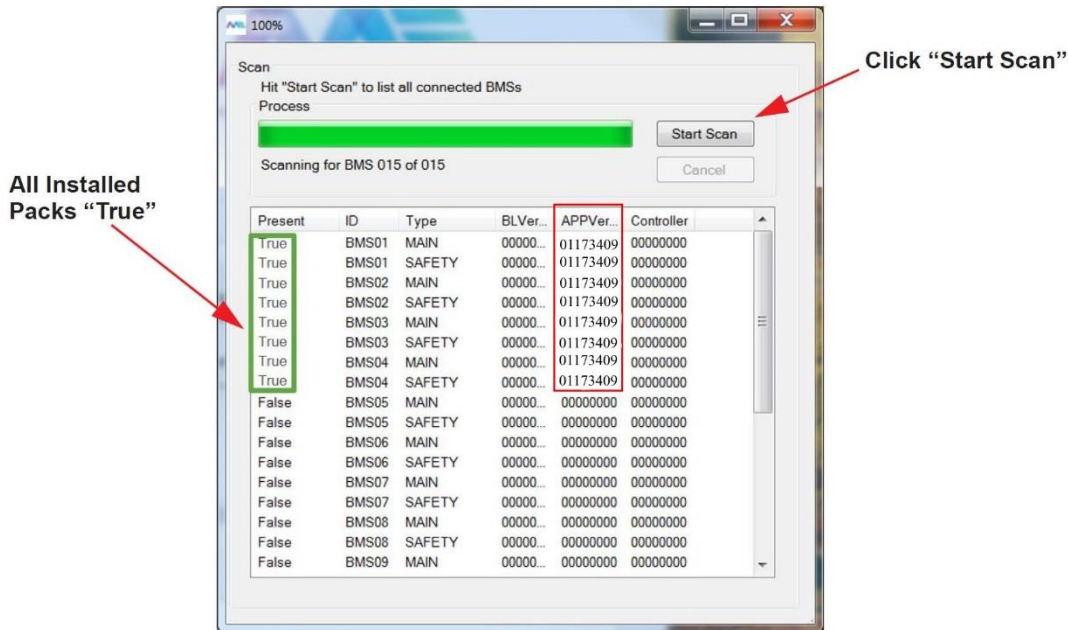
Note: If you do not see these new version numbers, or a pack does not show as present, you will need to run the flashing procedure again and verify that the controllers reset.



23. Repeat steps 1-6 for the other packs on the bus to update the BMS boards.

Verification and Close-out

24. Run the Scan Dialog once the all the packs have been updated and verify that all packs installed are Present and the version numbers for all Safety Controllers are the same and version numbers for all Main Controllers are the same.



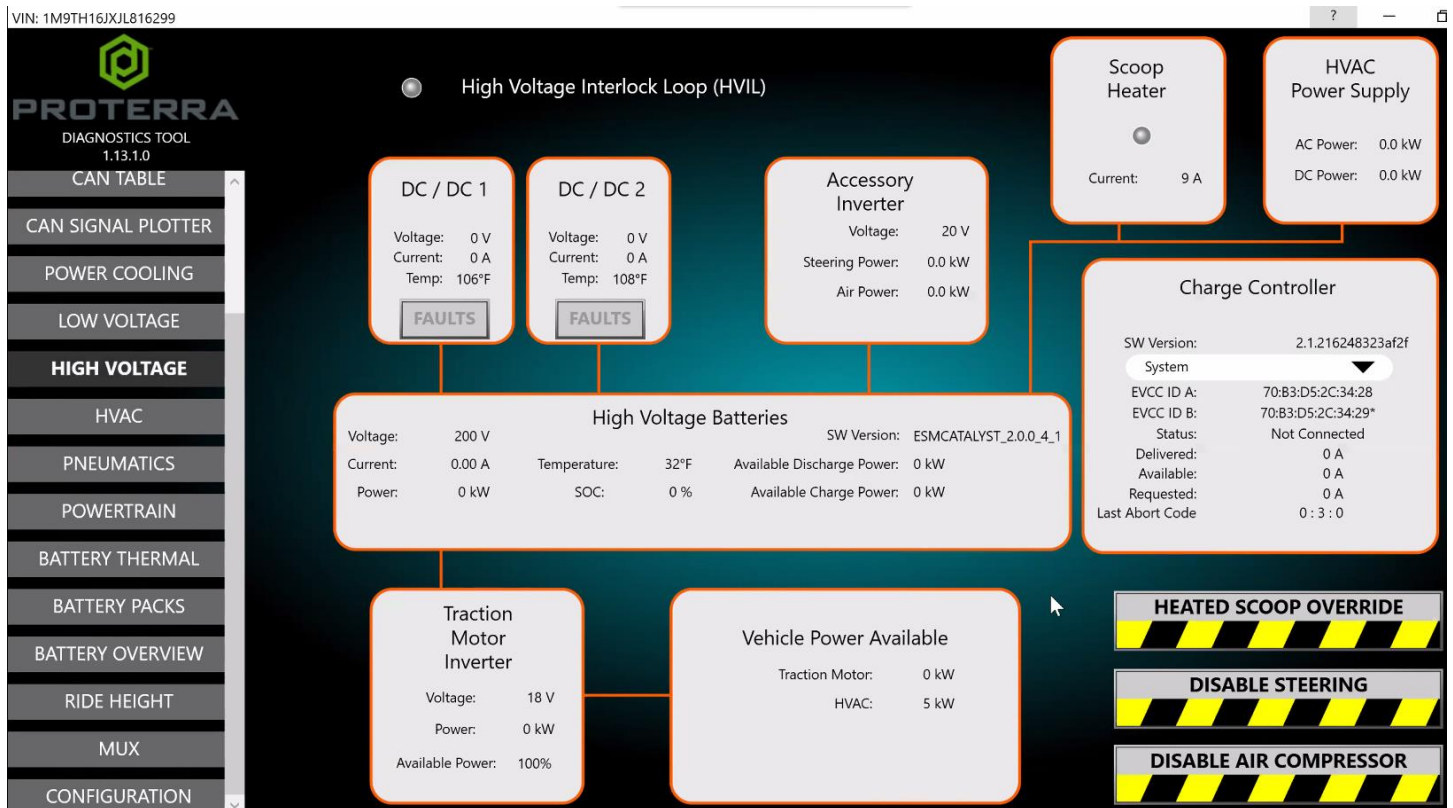
25. Close out of the MonacoBMS client, then disconnect the PCAN dongle and adapter cable.
26. Turn the bus Dash Master Switch to OFF, then the Vehicle Master Disconnect to OFF.
Note: Wait 30 seconds.
27. Turn the Vehicle Master Disconnect switch back to ON.
28. Turn the Dash Master Switch ON, then press START.
29. Verify no battery faults are present when the bus reaches RUNNING status.

Verify and Update ESM Controller Software Version:

This procedure checks the ESM Controller software version and upgrades as necessary.

Verify Current Software Version

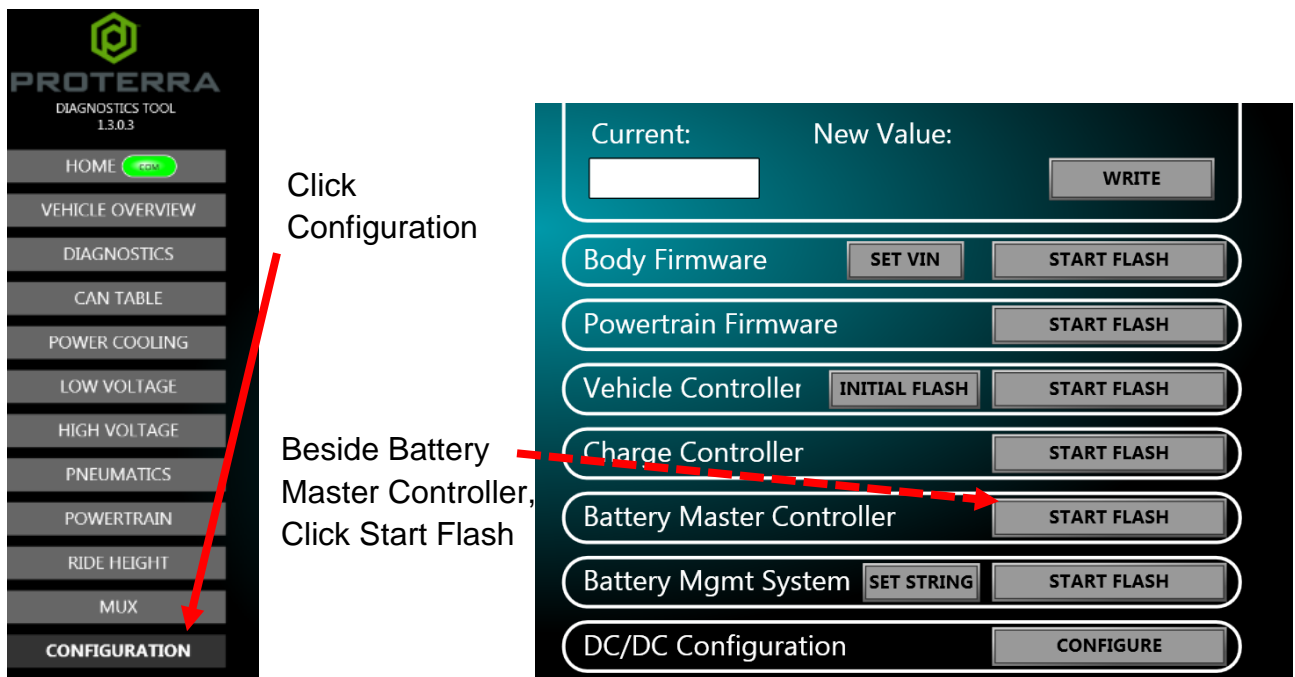
1. Connect Proterra Diagnostics tool to either front or rear OBDII connector.
2. Navigate to High Voltage Tab.
3. Verify the High Voltage Batteries Controller Software version is “ESMCATALYST_2.0.0”:



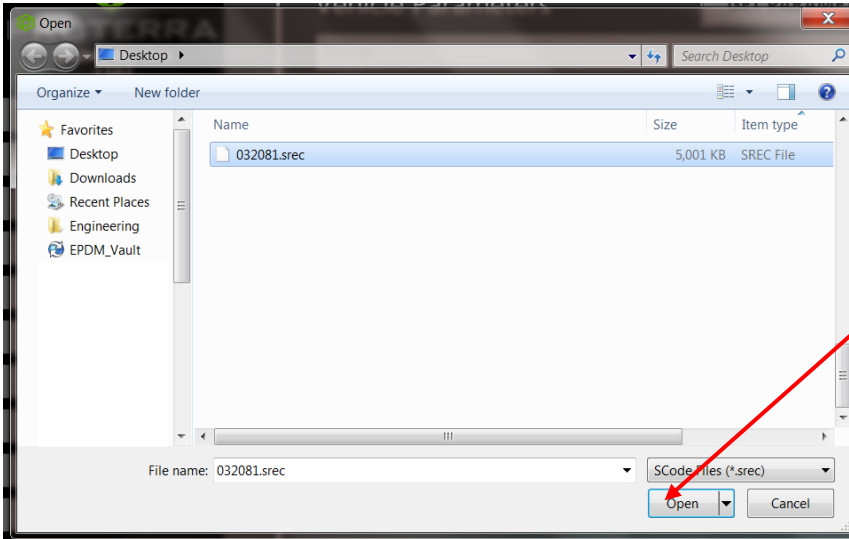
4. In this screenshot, the ESM controller software version (middle of the screen) is 2.0.0.
5. If the version is not 2.0.0, proceed to the next section to update the controller software.

Update Using the Proterra Diagnostic Tool

6. Ensure you have the latest software file **ESM_**.srec** to a known location on the service technician's computer (Folder or Desktop).
IMPORTANT! NEVER access the software from the USB memory device, ALWAYS copy the software files to your computer hard drive and access the software from this location.
7. Turn **ON** the 12/24V rear Master Disconnect located behind the vehicle curbside rear upper access panel.
8. Turn **OFF** the bus High-Voltage Master Switch at the Driver's Workplace and ensure the Dash screen is **OFF**.
9. Once connected to the vehicle with the Proterra Diagnostics tool, Click on the "Configuration Button" to open the Configuration screen and then click the Battery Master Controller "Start Flash" Button.



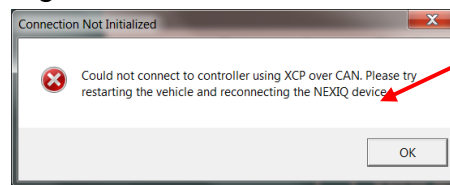
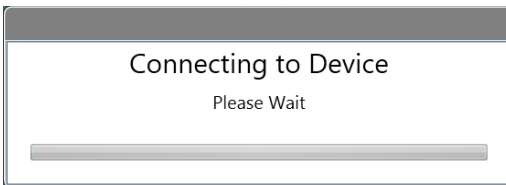
10. The following screen will be displayed. Navigate to the location where you stored the configuration file earlier. Select the file and click “Open” to load the file.



Select the file and Click Open

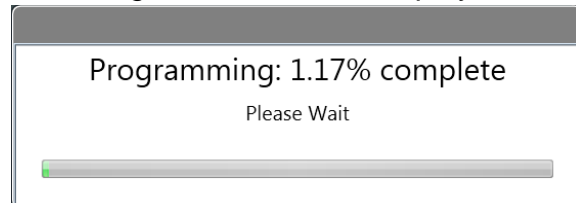
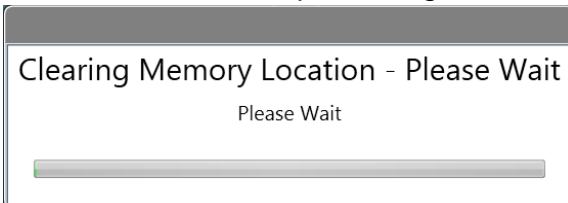
11. The Proterra Diagnostic Tool will attempt to connect to the device.

NOTE: You may receive an error on the first attempt. If so, retry by clicking the Battery Master Controller “Start Flash” button again.

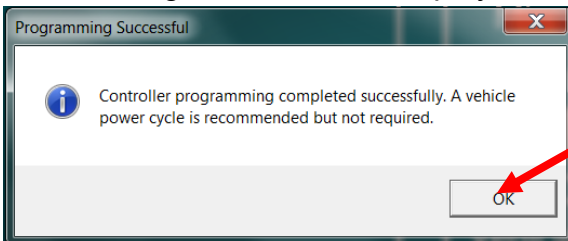


Error message on failed first attempt

12. When the software update begins, and the following screens will be displayed.



13. The software update may take several minutes to complete. When the update is complete the following screen will be displayed. Click the “OK” button to complete the update process.



Click OK

14. The software update is now complete.

15. Reset the bus and proceed.

Update Using Microboot (alternate method)

The purpose of this procedure is to update the ESM Controller software version.

1. Ensure you have the latest program and software file **ESM_**.srec** to a known location on the service technician's computer (Folder or Desktop).
IMPORTANT! NEVER access the software from the USB memory device, ALWAYS copy the software files to your computer hard drive and access the software from this location.
2. Turn **ON** the 12/24V rear Master Disconnect located behind the vehicle curbside rear upper access panel.
3. Turn **OFF** the bus High-Voltage Master Switch at the Driver's Workplace and ensure the Dash screen is **OFF**.
4. Power up (boot) the Proterra-supplied laptop containing the MicroBoot executable file.
5. Connect the octopus cable to the OBD port located in the Rear Deck of the bus.
6. Connect the PCAN dongle to the PCAN connection on the octopus cable.
7. Verify no other CAN utilities are running on the laptop; close PCAN Explorer, Proterra Diagnostic Tool, etc.
8. Connect PCAN dongle to the USB port on the laptop.
9. Launch MicroBoot on the laptop.
10. Use the "Browse" button to navigate to and select the SREC file to be loaded.
 - a. The software will load automatically from this point.
11. The software update may take several minutes to complete. When the update is complete the following screen will be displayed. Click the "OK" button to complete the update process.
12. The ESM Controller software update is now complete.

Verify and Update Charge Controller Software Version

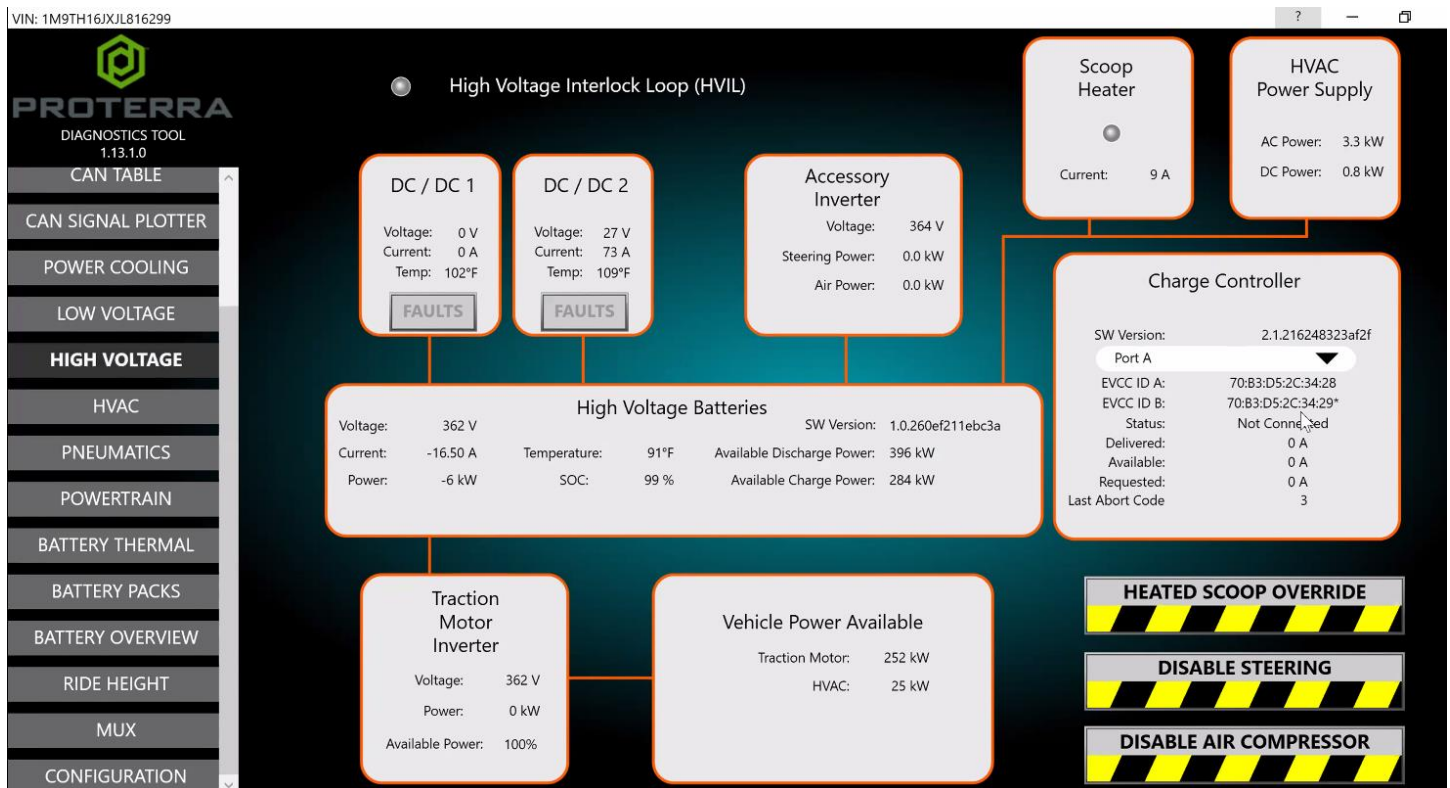
This procedure checks the Charge Controller software version and upgrades as necessary.

Verify Current Software Version

Note: Single Charge Port or Dual Port bus will have different software. The middle integer in the software version delineates which is which.

- If single port, your bus should have version (2.1.4).
- If dual port, your bus should have version (2.0.4).

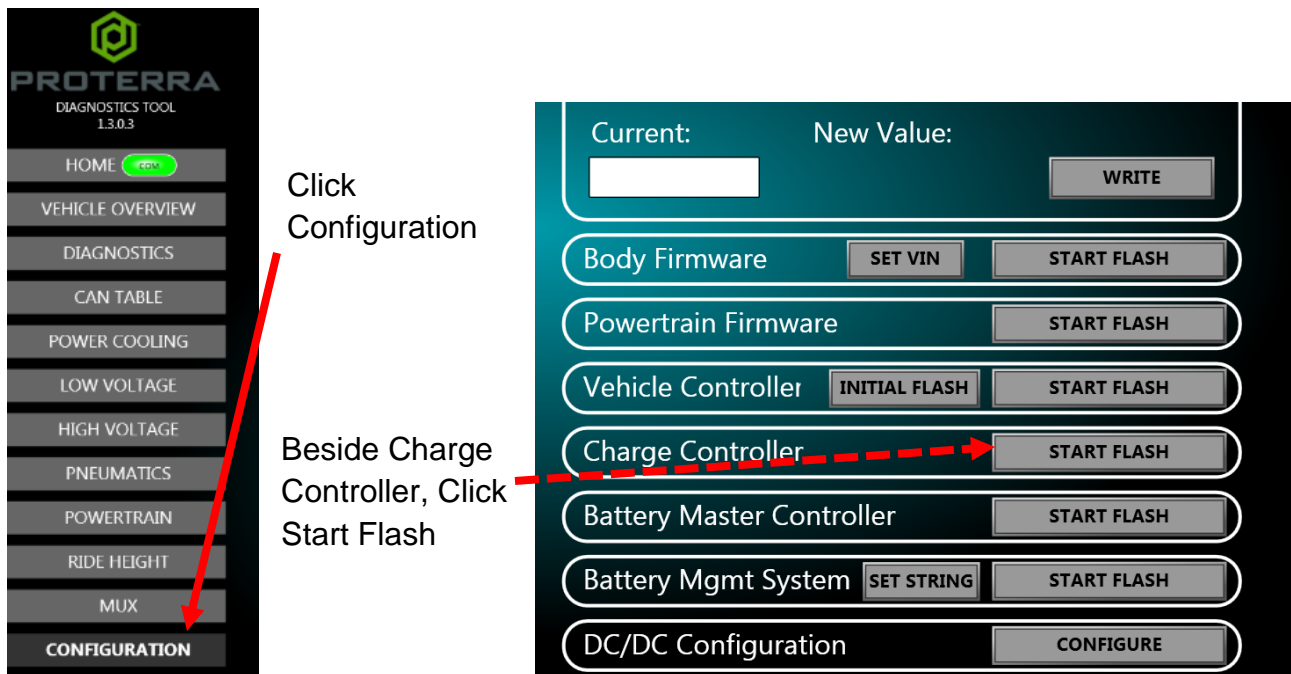
1. Connect Proterra Diagnostics tool to either front or rear OBDII connector.
2. Navigate to High Voltage Tab.
3. Verify the Charge Controller Software version is **2.0.4** or **2.1.4**.



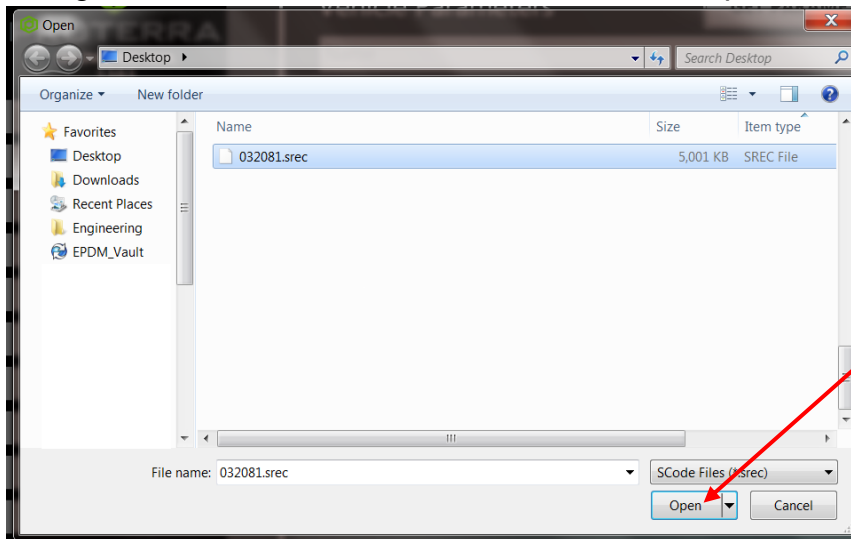
4. In this screenshot, the charge controller software version (middle right hand side) is 2.1.2.
 - a. The numbers after the “2.1.2” are a software version hash for engineering tracking.
5. If the version is not 2.0.4 or 2.1.4, proceed to the next section to update the controller software.

Update Using the Proterra Diagnostic tool

6. Ensure you have the latest software file **CC**.srec** to a known location on the service technician's computer (Folder or Desktop).
IMPORTANT! NEVER access the software from the USB memory device, ALWAYS copy the software files to your computer hard drive and access the software from this location.
7. Turn **ON** the 12/24V rear Master Disconnect located behind the vehicle curbside rear upper access panel.
8. Turn **OFF** the bus High-Voltage Master Switch at the Driver's Workplace and ensure the Dash screen is **OFF**.
9. Once connected to the vehicle with the Proterra Diagnostics tool, Click on the "Configuration Button" to open the Configuration tab and then click the Charge Controller "Start Flash" Button.



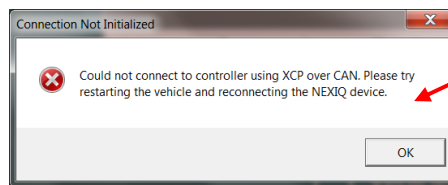
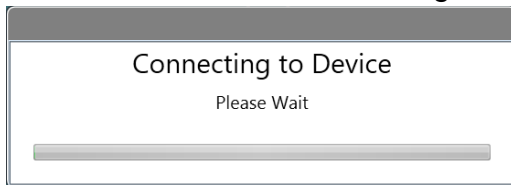
10. The following screen will be displayed. Navigate to the location where you stored the configuration file earlier. Select the file and click “Open” to load the file.



Select the file and Click Open

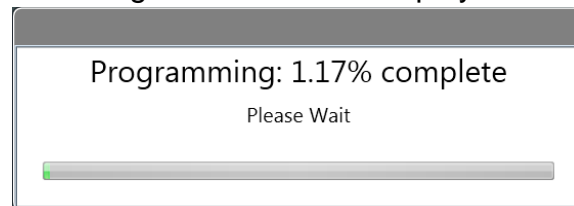
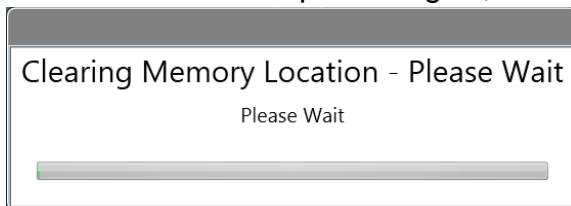
11. The Proterra Diagnostic Tool will attempt to connect to the device.

NOTE: You may receive an error on the first attempt. If so, retry by clicking the Charge Controller Start Flash button again.

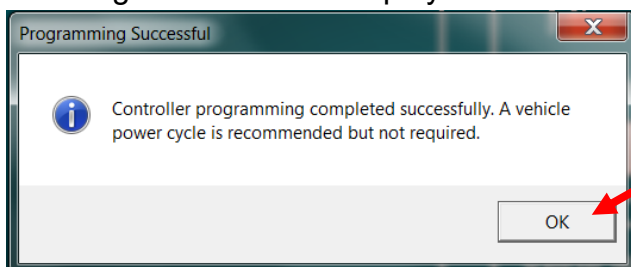


Error message on failed first attempt

12. When the software update begins, and the following screens will be displayed.



13. The software update may take several minutes to complete. When the update is complete the following screen will be displayed. Click the “OK” button to complete the update process.



Click OK

14. The software update is now complete.

Update Using Microboot (alternate method)

The purpose of this procedure is to update the Charge Controller software version.

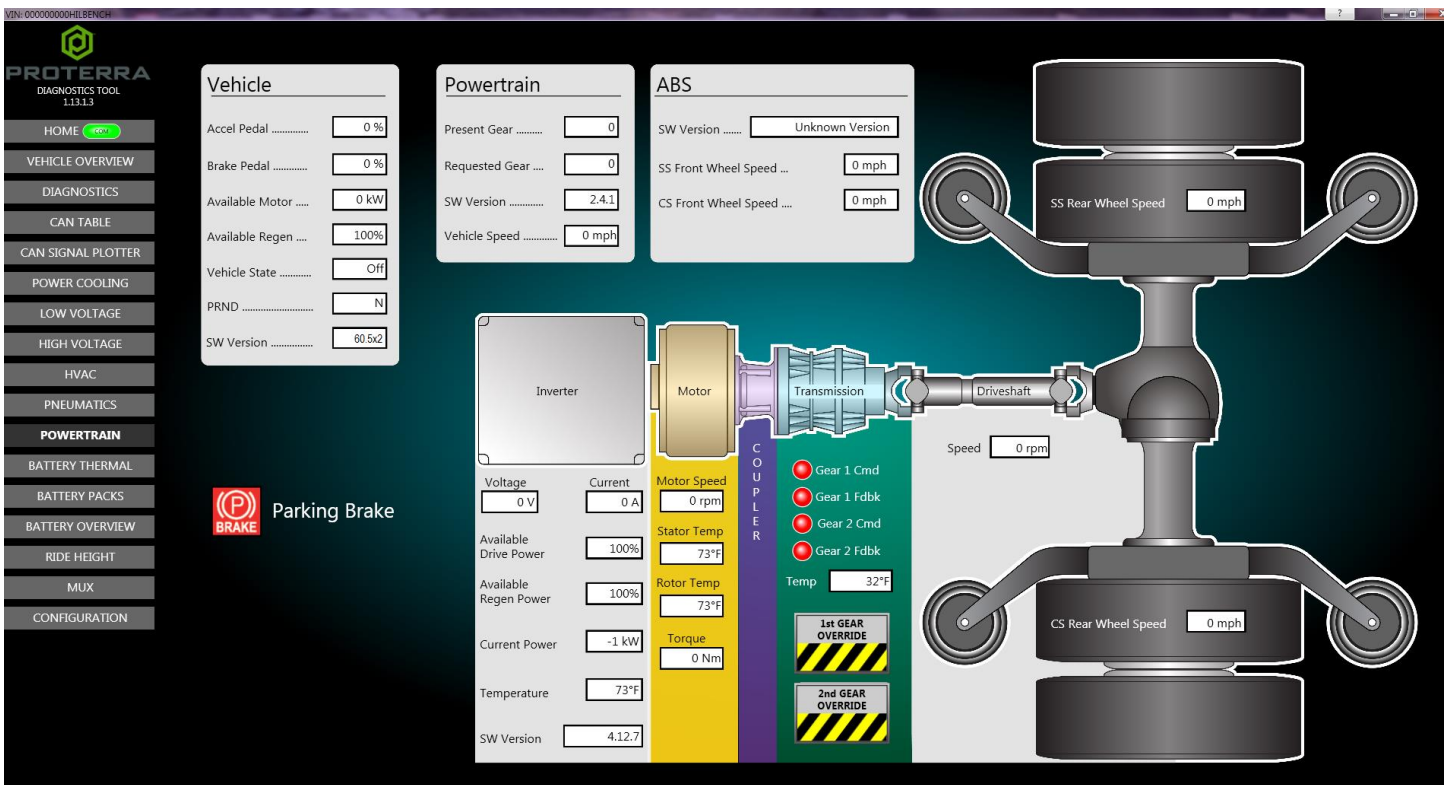
1. Ensure you have the latest Microboot program and software file **CC**.srec** to a known location on the service technician's computer (Folder or Desktop).
IMPORTANT! **NEVER** access the software from the USB memory device, **ALWAYS** copy the software files to your computer hard drive and access the software from this location.
2. Turn **ON** the 12/24V rear Master Disconnect located behind the vehicle curbside rear upper access panel.
3. Turn **OFF** the bus High-Voltage Master Switch at the Driver's Workplace and ensure the Dash screen is **OFF**.
4. Power up (boot) the Proterra-supplied laptop containing the MicroBoot executable file.
5. Connect the octopus cable to the OBD port located in the Rear Deck of the bus.
6. Connect the PCAN dongle to the PCAN connection on the octopus cable.
7. Verify no other CAN utilities are running on the laptop; close PCAN Explorer, Proterra Diagnostic Tool, etc.
8. Connect PCAN dongle to the USB port on the laptop.
9. Launch MicroBoot on the laptop.
10. Use the "Browse" button to navigate to and select the SREC file to be loaded.
 - a. The software will load automatically from this point.
11. The software update may take several minutes to complete. When the update is complete the following screen will be displayed. Click the "OK" button to complete the update process.
12. The software update is now complete.

Verify and Update Powertrain Software Version

This procedure checks the Powertrain Controller software version and upgrades as necessary.

Verify Current Software Version

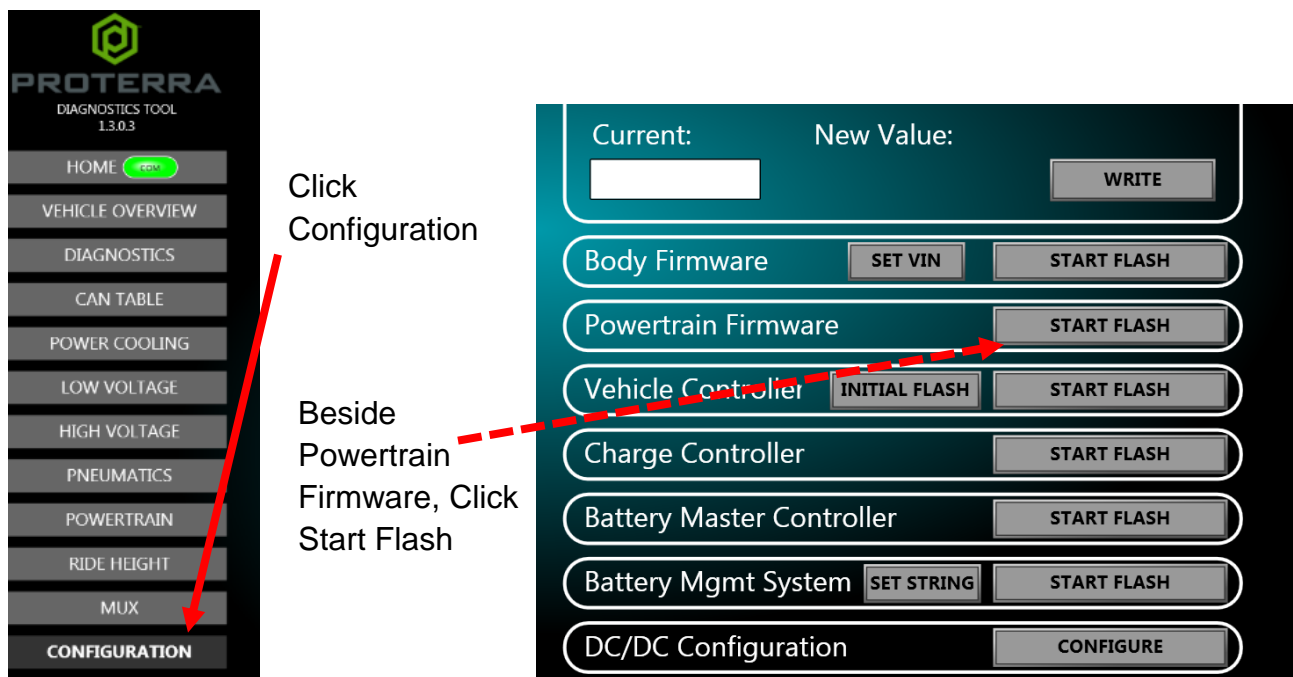
1. Connect Proterra Diagnostics tool to either front or rear OBDII connector.
2. Navigate to the Powertrain Tab.
3. Verify the Powertrain Software version is **2.4.1**, as shown in this screenshot (middle top)
 - a. **NOTE: if updating the SEPTA or NYCT vehicle fleets, These vehicles' software only differ in terms of max speed limit. Verify these software versions:**
 - i. **SEPTA = 2.5.1**
 - ii. **NYCT = 2.6.1**



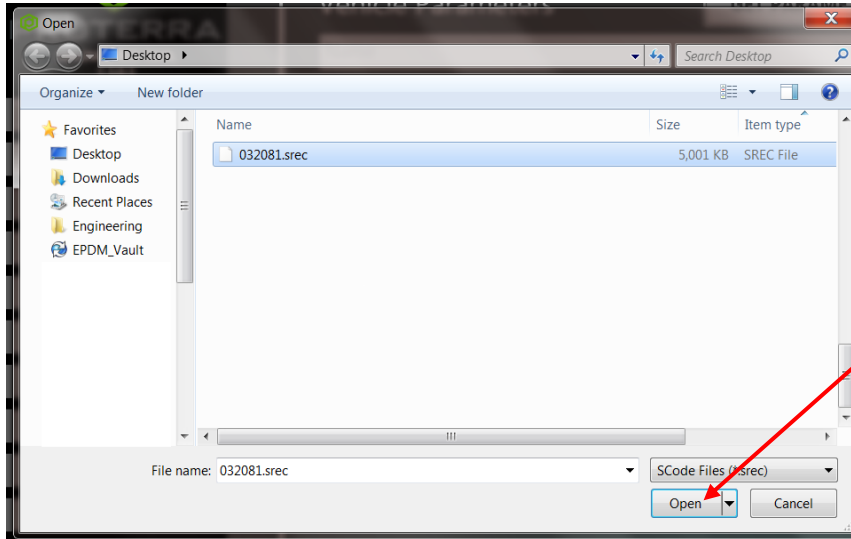
4. If the version is not 2.4.1 (or SEPTA = 2.5.1 or NYCT = 2.6.1), proceed to the next section to update the controller software.

Update Powertrain Software

5. Ensure you have the latest software file *****.hex** to a known location on the service technician's computer (Folder or Desktop).
IMPORTANT! NEVER access the software from the USB memory device, ALWAYS copy the software files to your computer hard drive and access the software from this location.
6. Turn **ON** the 12/24V rear Master Disconnect located behind the vehicle curbside rear upper access panel.
7. Turn **ON** to low voltage the bus High-Voltage Master Switch at the Driver's Workplace and ensure the Dash screen is **ON**.
8. Once connected to the vehicle with the Proterra Diagnostics tool, Click on the "Configuration Button" and then click the Powertrain Firmware "Start Flash" Button.

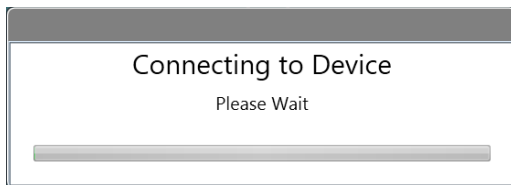


9. The following screen will be displayed. Navigate to the location where you stored the configuration file earlier. Select the file and click “Open” to load the file.

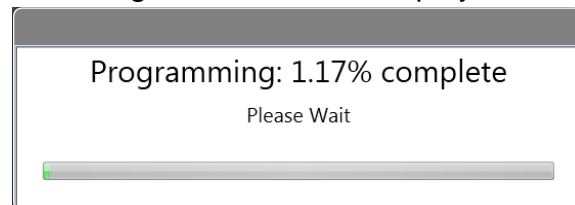
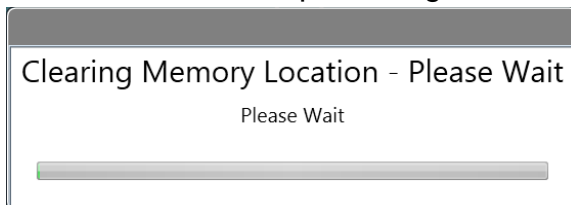


Select the file and
Click Open

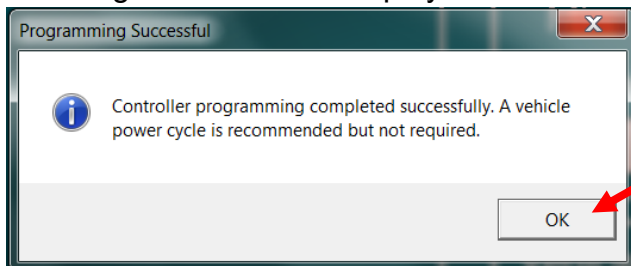
10. The Proterra Diagnostic Tool will attempt to connect to the device.



11. When the software update begins, and the following screens will be displayed.



12. The software update may take several minutes to complete. When the update is complete the following screen will be displayed. Click the “OK” button to complete the update process.



Click OK

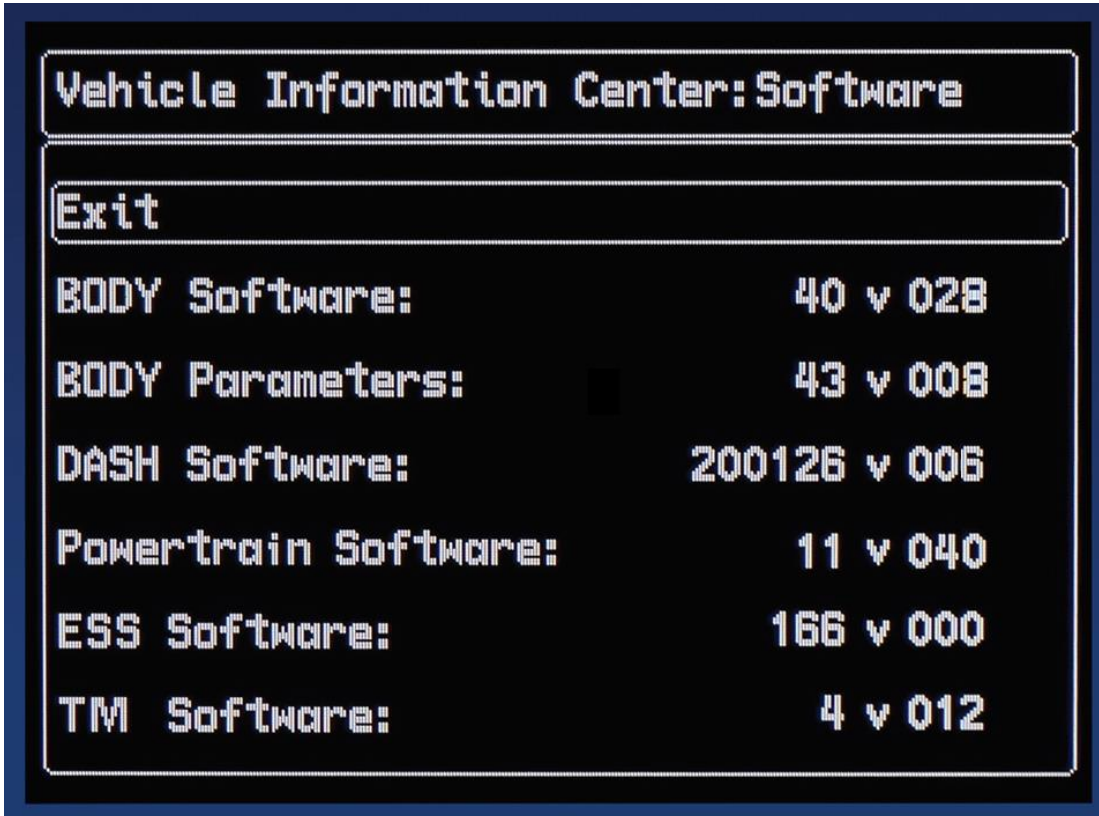
13. The software update is now complete.

Verify and Update Dash Software Version

This procedure checks the Dash Controller software version and upgrades as necessary.

Verify Current Software Version

1. With the vehicle powered on and the dash awake, read the software version from the Maintenance menu for the “Dash”.
 - a. To access this menu:
 - b. Press and hold the down arrow for three seconds.
 - c. Navigate up/down to “Maintenance” and press the select “O” button.
 - d. Navigate up/down to “Software Versions” and press the select “O” button.



2. In this screenshot, the Dash software version (middle) is 200126 v 006.
3. If the version is not “v 006”, proceed to the next section to update the controller software.

Update Dash Software

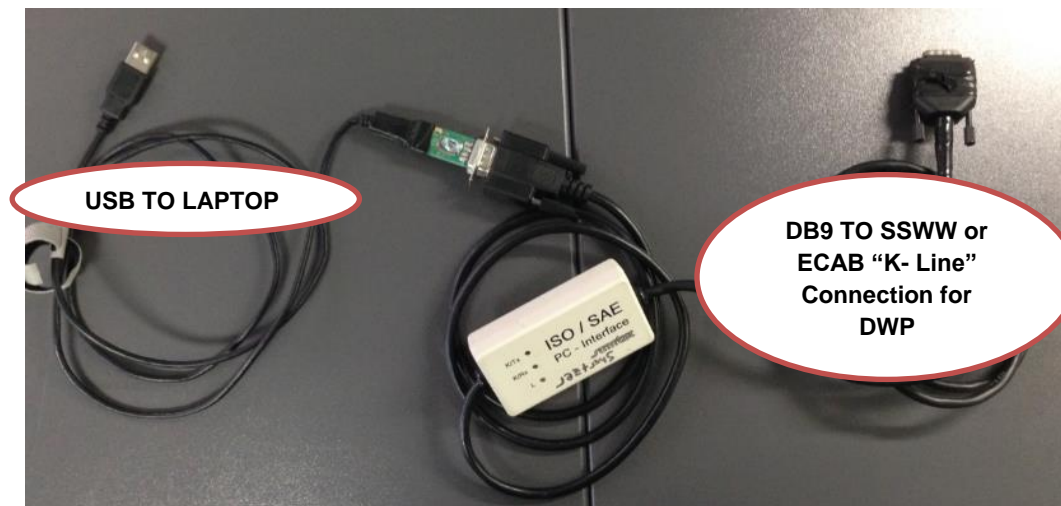
The purpose of this procedure is to update the driver workplace (dash screens) configuration to deploy the new look of the Proterra Dash.

4. Ensure you have the latest software file **031728_rev6.ZIP** to the service technician's laptop's local drive.

NOTICE: DO NOT Unzip the archive to a directory on your computer's hard drive. The download will use the zip file. Simply copy the zip file to your computer's hard drive.

5. Connect the USB-Serial Port adapter to your computer. Connect the K-Line Adapter to the USB to serial adapter. Connect the K-Line Adapter to the OBD Breakout "K-Line" programming port (and connect it to the OBD connection at the street side front wheel well).

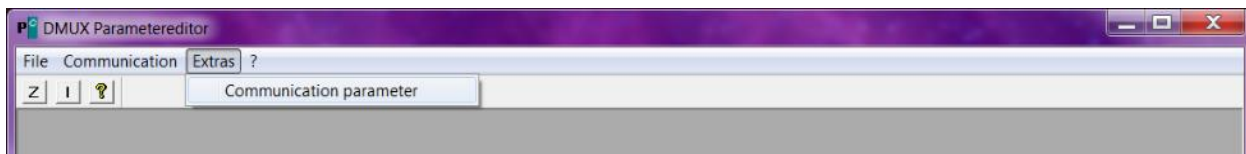
NOTE: Make sure you have the K-Line adapter connected to the K-Line connection to the OBD Breakout cable and not the PCAN DB9.



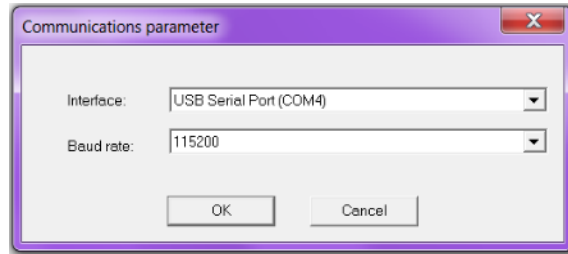
6. Open the "Parametereditor" version 3 software. If you do not have this version, please contact Proterra Engineering.



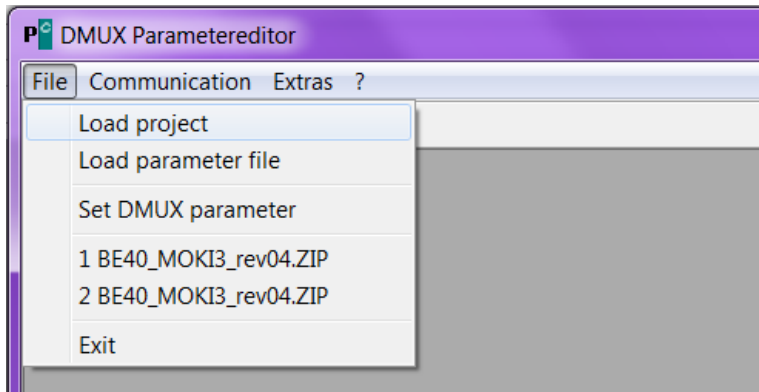
7. On the Parametereditor toolbar, select "Extras" and then "Communications Parameter".



8. Ensure the communication parameters are correctly set. Your COM port may be a different number.



9. On the Parametereditor toolbar, select “File” and then “Load Project”.



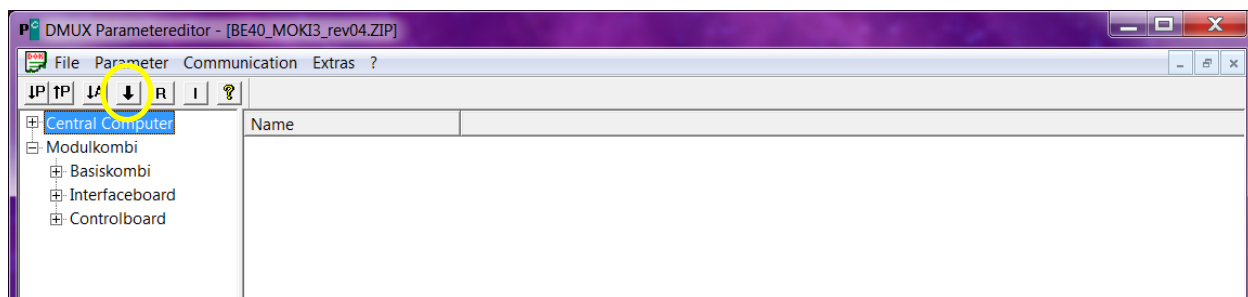
10. Open the folder where the Driver Work Place configuration is stored, and select the appropriate *.ZIP file from above.

11. Switch the vehicle Low Voltage On to give power to the Driver’s Work Place.

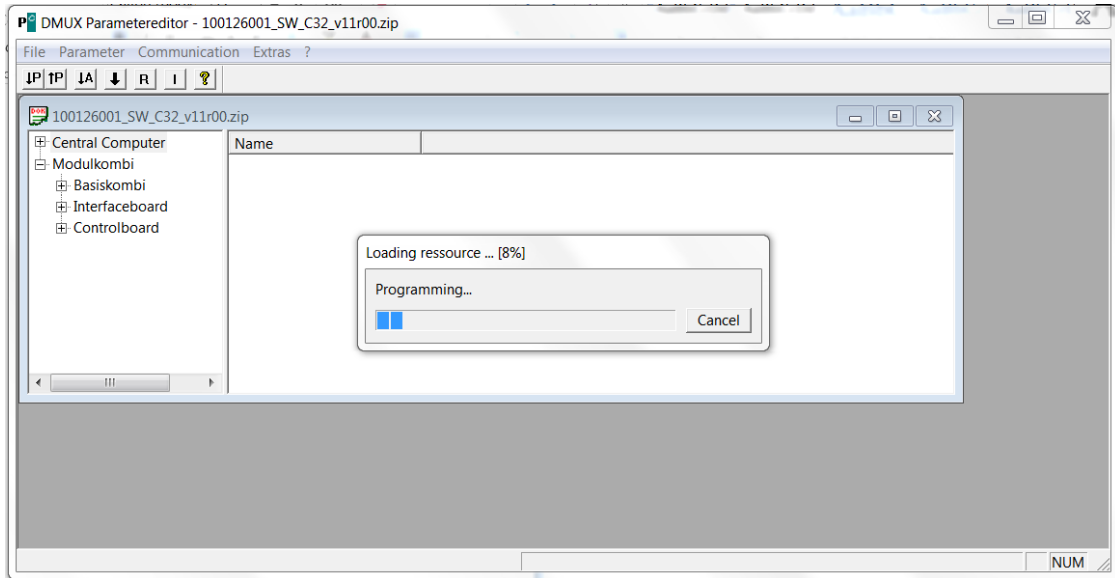
12. **IMPORTANT!** Before downloading the selected software:

- Ensure that the 12/24V rear Master Disconnect is switched **ON**.
- Ensure the Driver’s Workplace Master Switch is switched **OFF**.
- Ensure the Driver’s Hazard switch is switched **ON** and the Dash screen is **ON**.

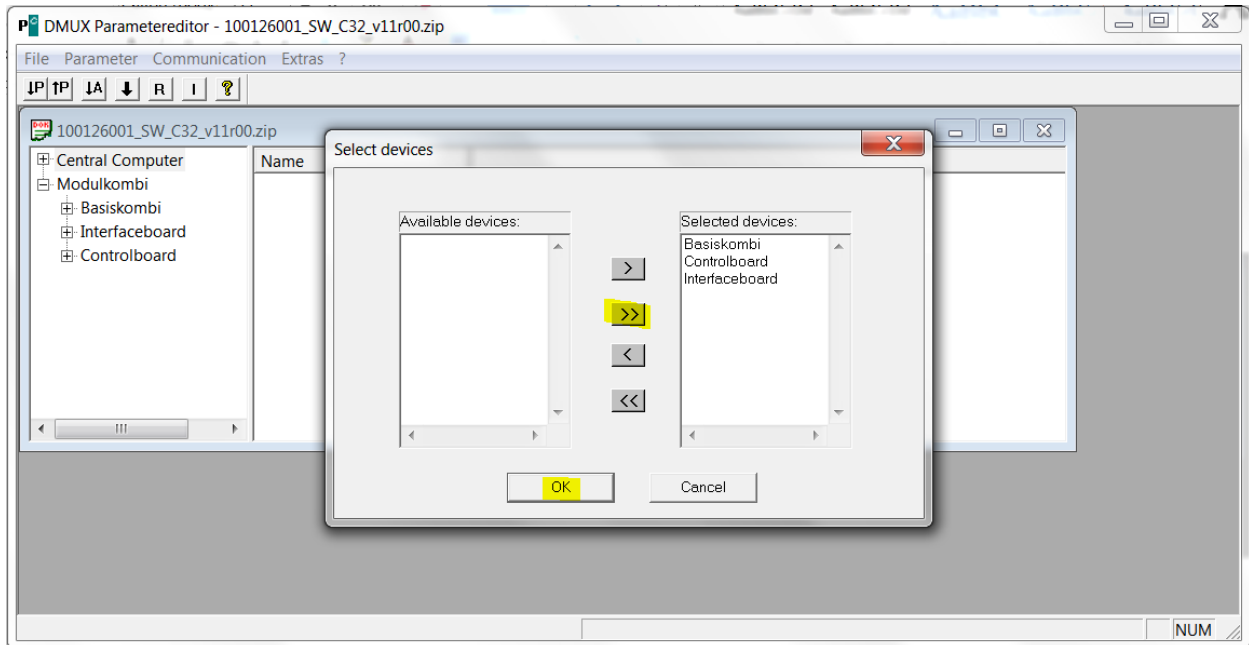
13. **Select** “Load All” (the large down arrow with no letter label next to it):



14. The download should begin and takes about 10 minutes (approximately):
- a. The vehicle dash may flash on and off a few times during the process.
 - b. The low voltage contactors may cycle on and off a few times during the process.
 - c. Ensure that the 12/24V batteries remain charged during the download.

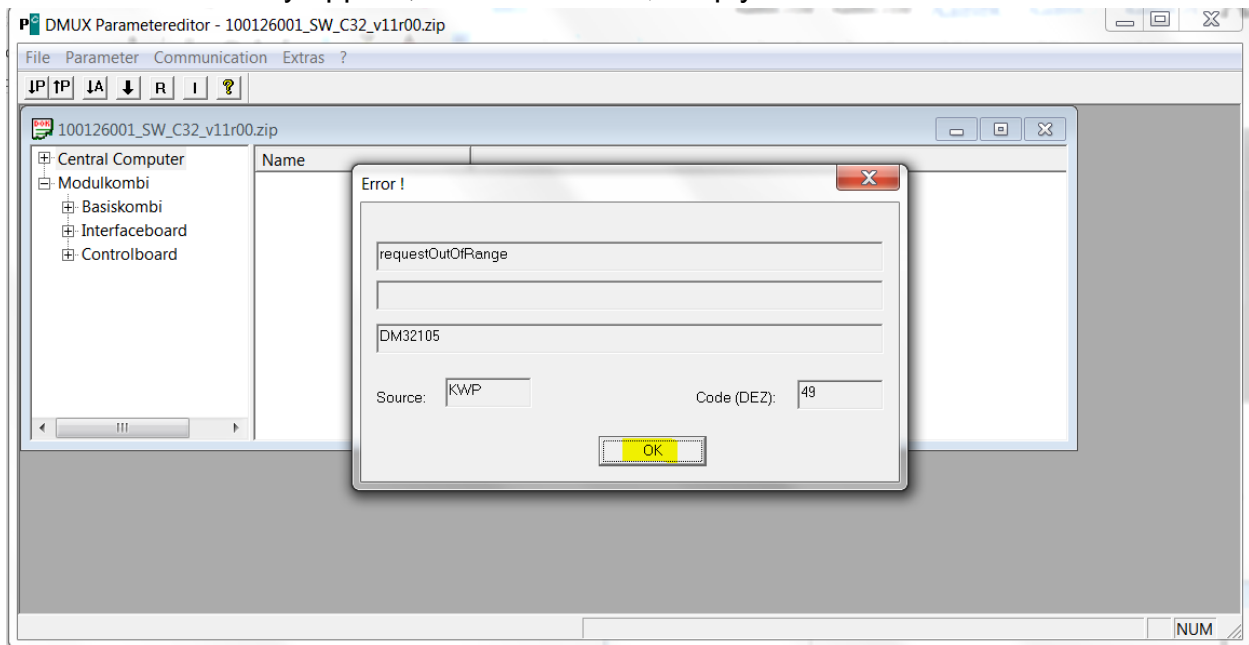


15. When “Select Devices” screen appears, select the double arrows to the right and click “OK”.



16. Wait about 1 minute.

17. An Error screen may appear, which is normal, simply click “OK”.



18. Wait 1 minute.

19. When the download is complete, the lights on the dash should stop flashing.

20. The DMUX/DWP is now configured and you can proceed to the next task.

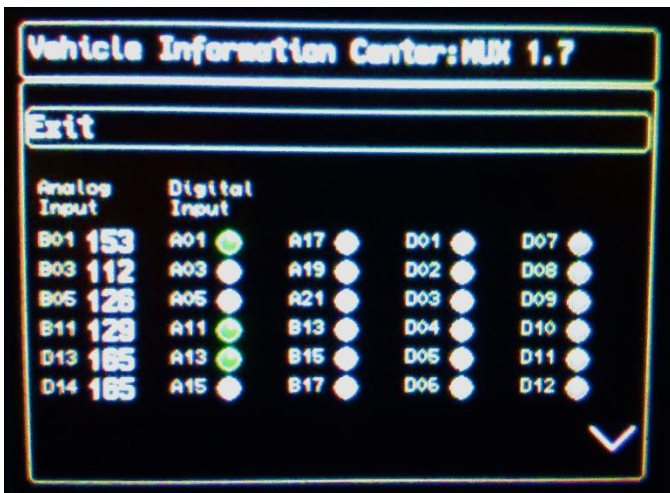
Verify and Update Body Software Version

This procedure checks the Powertrain Controller software version and upgrades as necessary.

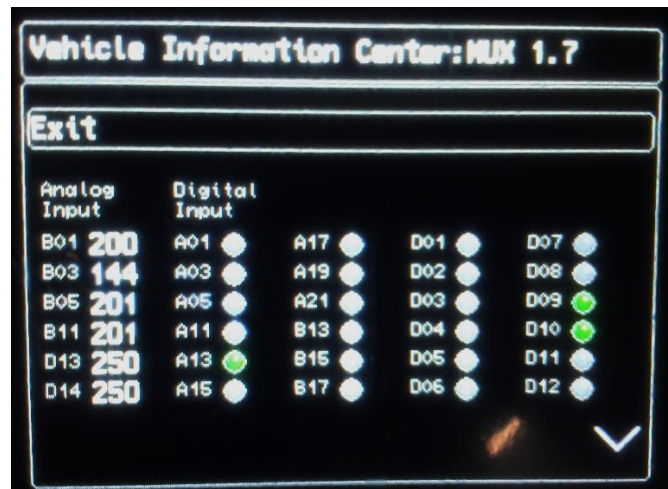
BTMS HVIL Fault Input

NOTICE! Prior to flashing body software – Check at the dash to verify the functionality of the BTMS HVIL input.

With Low voltage / Key on, check input **M1.7A01**, the status light on the dash maintenance I/O screen should be **Green**.



GOOD



BAD!

If it is **Grey** or **Red** – please verify wiring based on your vehicle schematic to ensure proper function before proceeding.

This BTMS HVIL wiring will be actively used in the new software release.

If the wiring is not correct, the vehicle will not start and will have an HVIL fault.

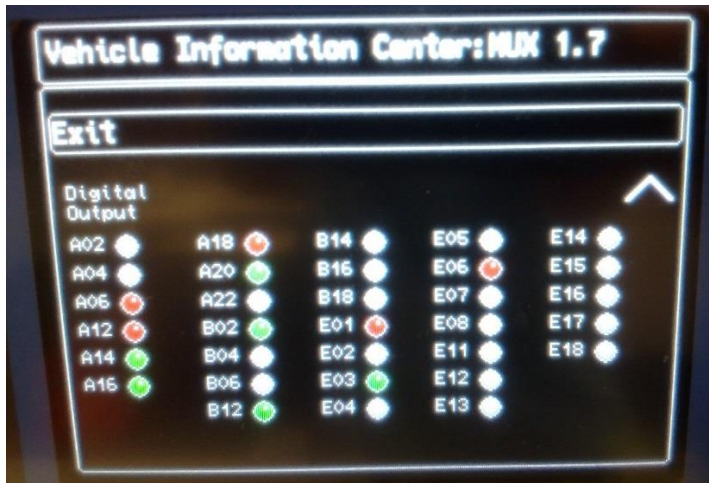
The most likely place the wiring is swapped is at the connections to the Grayson BTMS box.

Only perform wiring checks on this system with the vehicle fully powered off and locked out!

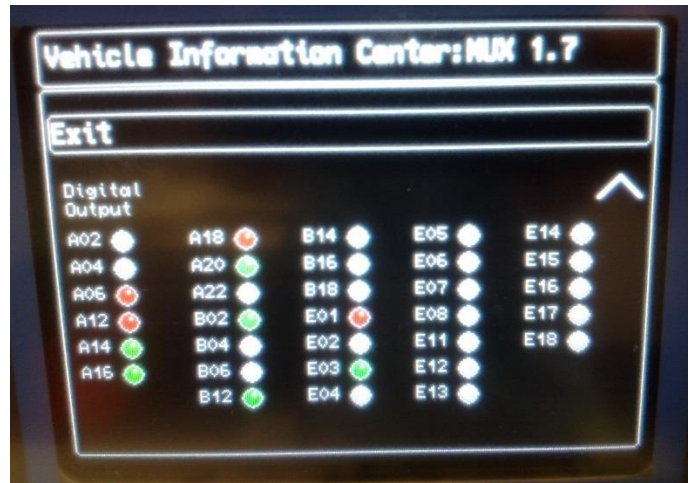
NOTICE! Prior to flashing body software – Check at the dash to verify the functionality of the Pre-Charge Contactor Input.

This functionality is required to protect the vehicles from using the incorrect software configuration and possibly damaging hardware.

With Low voltage / Key on, check input **M1.7E06**, the status light on the dash maintenance I/O screen should be **RED**.



GOOD



BAD!

If it is Grey or Green – please verify wiring based on your vehicle schematic to ensure proper function before proceeding.

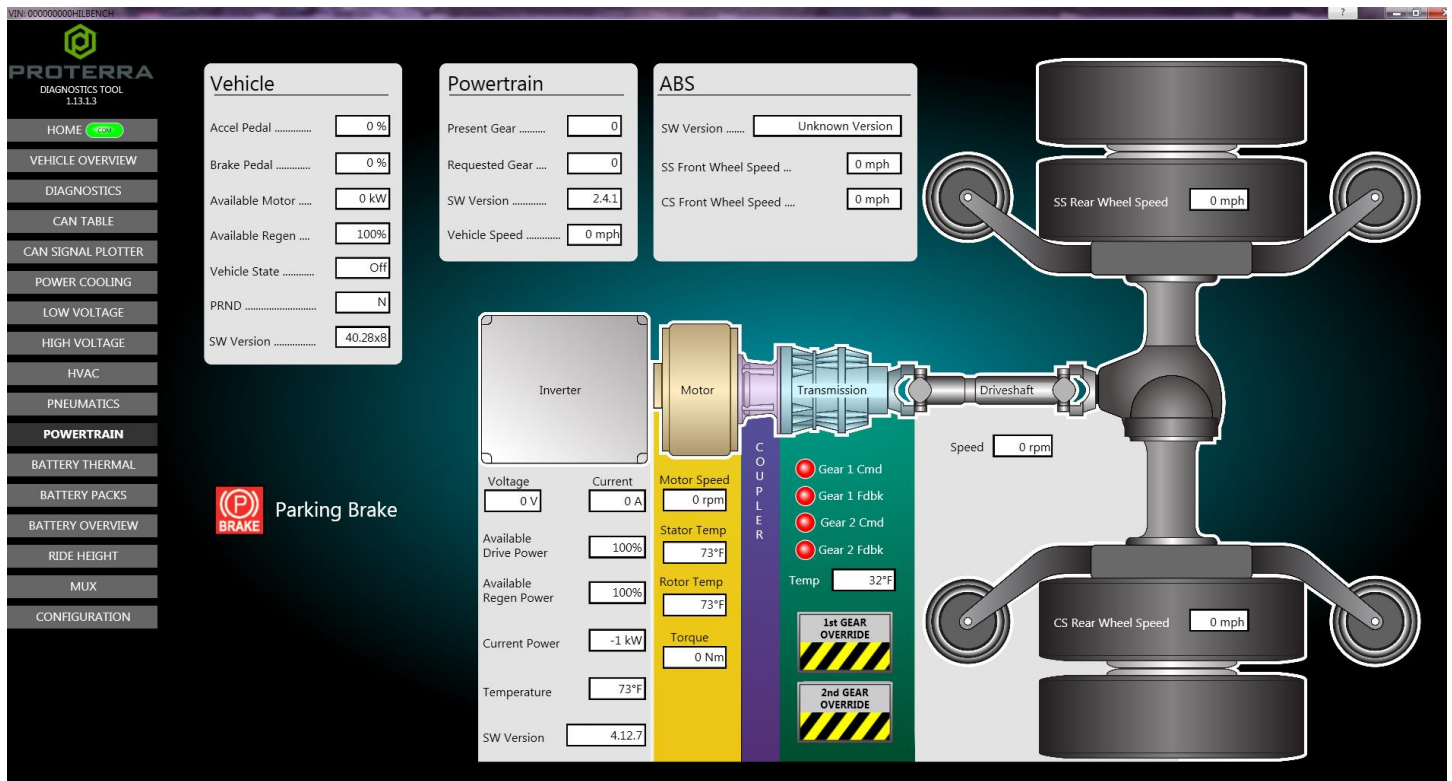
This Output wiring is subject to proper power being provided by the circuit breaker number CB318 out of the Rear deck VEC (Pin E connector JC168 / 12V UNSW). This powers the Mux Group E by applying power to Mux1.7E10.

If the wiring is not correct, the vehicle will not start and will have an HVIL fault.

Only perform wiring checks on this system with the vehicle fully powered off and locked out!

Verify Current Software Version

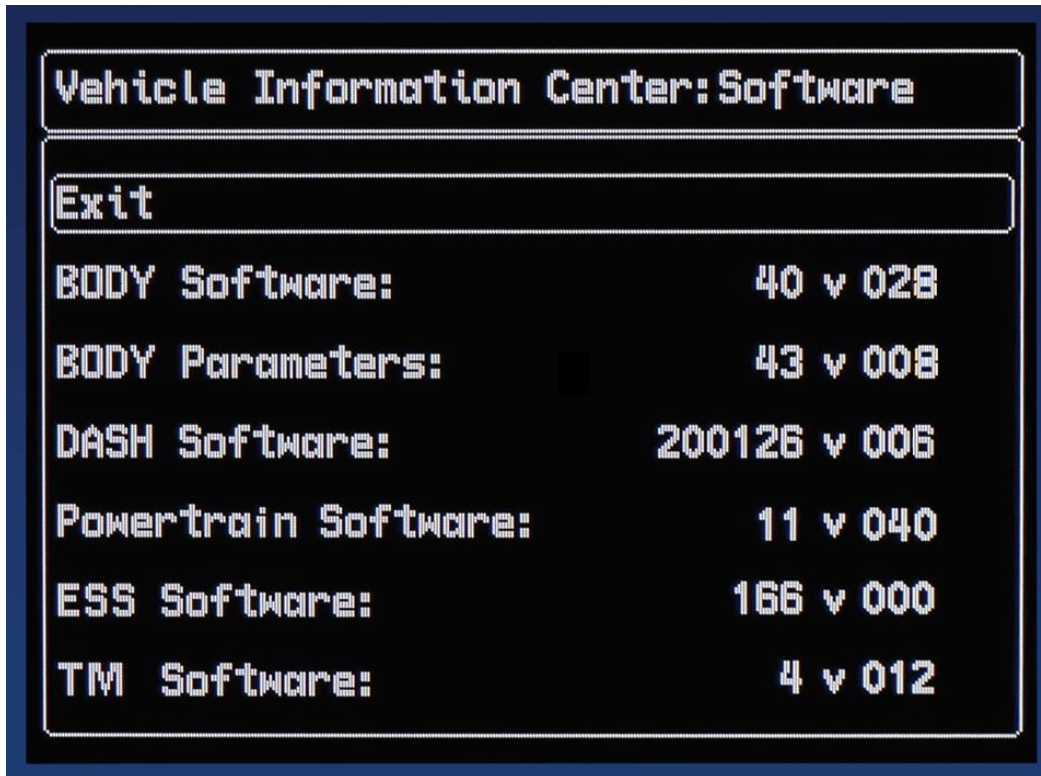
1. Connect Proterra Diagnostics tool to the front OBDII connector, and navigate to the Powertrain Tab.
2. Verify the Vehicle Software version is **40.28** or **40.28x8**.



3. In this screenshot, the Body Controller software version (Under the vehicle block at the bottom) is **40.28x8**.

Alternative method:

4. With the vehicle powered on and the dash awake, read the software version from the Maintenance menu for the “Dash”.
 - a. To access this menu:
 - b. Press and hold the down arrow for three seconds.
 - c. Navigate up/down to “Maintenance” and press the select “O” button.
 - d. Navigate up/down to “Software Versions” and press the select “O” button.

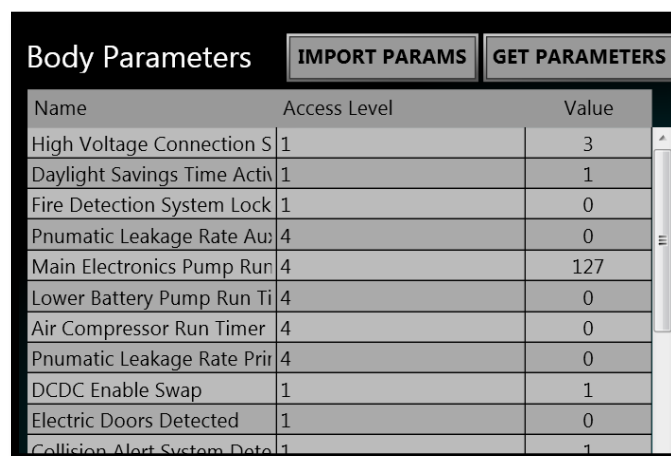


5. In this screenshot, the Body software version is 40.28 and the "008" in the Body Parameters is the "x8" revision identifier.
6. If the version is not 40.28 or 40.28x8, proceed to the next section to update the controller software.

Update Body Controller Software

This procedure updates the Body Controller software version and maintains the body controller parameter configuration data across the flash download of new software.

12. Ensure you have the latest software file **047344.ZR32A_A** in a known location on the service technician's computer (Folder or Desktop).
IMPORTANT! NEVER access the software from a remote server or from a USB memory device, ALWAYS copy the software files to your computer hard drive and access the software from this location.
13. Turn **ON** the 12/24V rear Vehicle Master Disconnect located behind the vehicle curbside rear upper access panel.
14. Turn **OFF** the bus Master Switch at the Driver's Workplace and ensure the Dash screen is **OFF**.
15. Turn **ON** the bus "programming switch" inside the **street side** wheel well box.
16. After connecting to the vehicle using the Proterra Diagnostic tool at the **front OBDII Port (SSWW Ecab)**, navigate to the Configuration Tab.
17. Wait at least 10 seconds after starting the tool, then click the "Get Parameters" button at the top of the page.
 - a. **NOTE: This ensures that we have a backup copy of the original configuration parameters stored in a "zip" file, contained in the C:/Logs folder on your computer in case we need to refer to it later.**

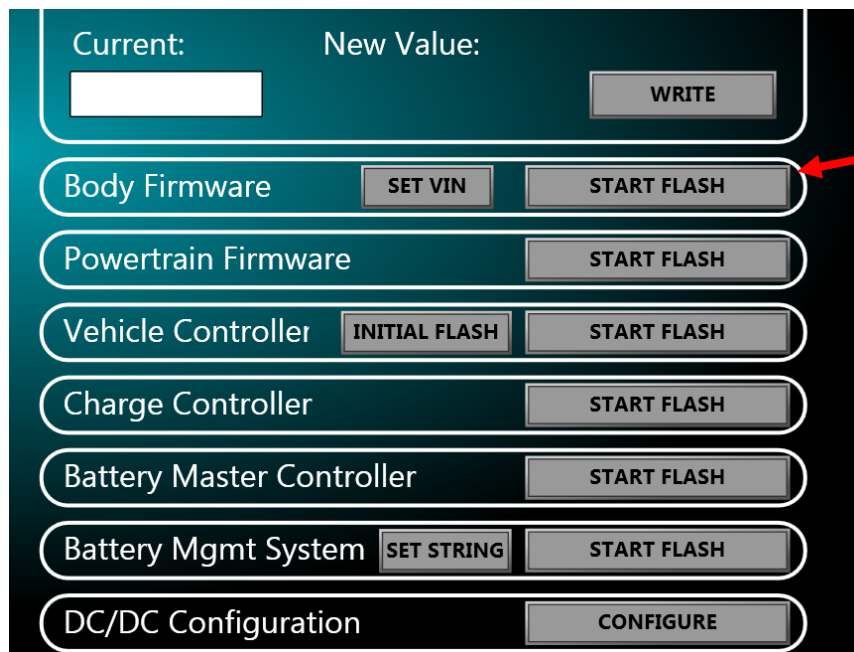


Name	Access Level	Value
High Voltage Connection S	1	3
Daylight Savings Time Acti	1	1
Fire Detection System Lock	1	0
Pnumatic Leakage Rate Au	4	0
Main Electronics Pump Run	4	127
Lower Battery Pump Run Ti	4	0
Air Compressor Run Timer	4	0
Pnumatic Leakage Rate Pri	4	0
DCDC Enable Swap	1	1
Electric Doors Detected	1	0
Collision Alert System Det	1	1

18. After the parameters file is saved, and the parameter list is fully populated, write down the following values from the list:
- NOTE:** These will have to be manually cross checked at the end of this download process to ensure they are consistent after flash.
 - If not checked and updated after this download, the software download process will deploy the default values.**
 - Additional point:** With updated 5 Position switch logic, the front door will now be able to “auto close” after a sensitive edge / obstruction trip event. This new feature may affect the customer’s desire to have the front sensitive edge disabled. Please verify with a customer representative and demonstrate this new door control behavior.

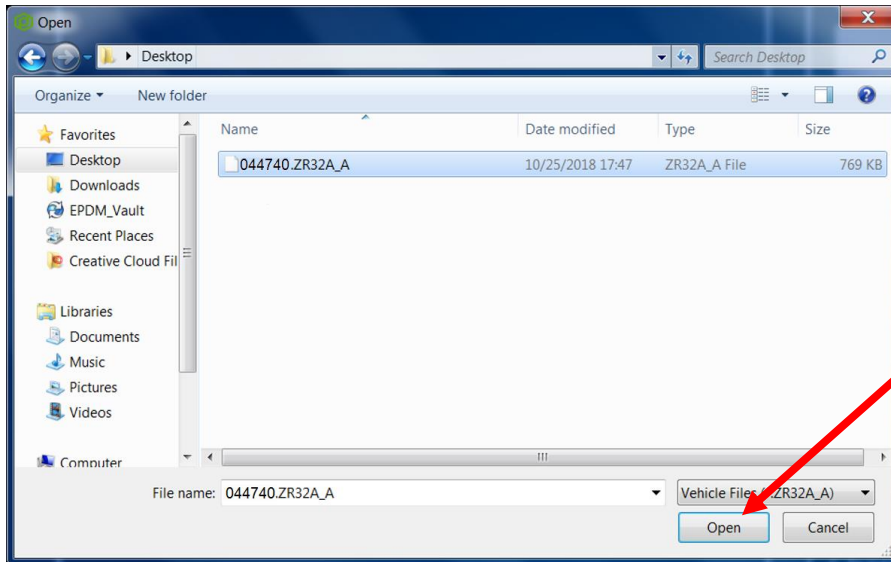
EEPROM / Parameter Name:	Value (before software download):	Default Value
EP_bo_DOOR_FSensitiveEdgeReopenDisable		False (0)
EP_bo_EXLI_DaytimeRunningLightsActive		False (0)
EP_bo_RAMP_ParkBrakeForRamp		True (1)

19. Now we are ready to click the Body Firmware “Start Flash” Button.



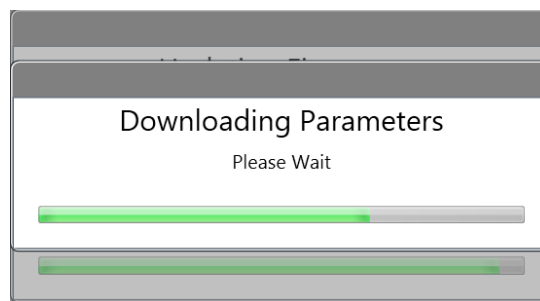
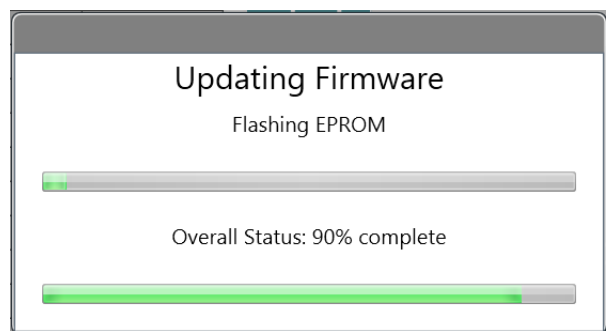
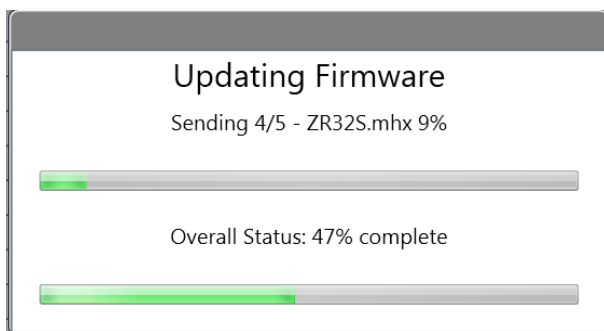
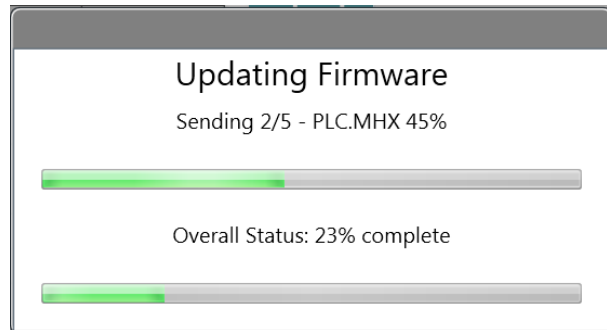
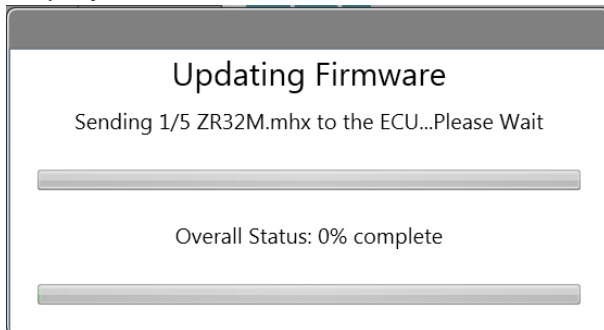
Beside Body Firmware, Click Start Flash

20. The following screen will be displayed. Navigate to the location where you stored the configuration file earlier. Select the software file downloaded previously and click “Open” to load the file.

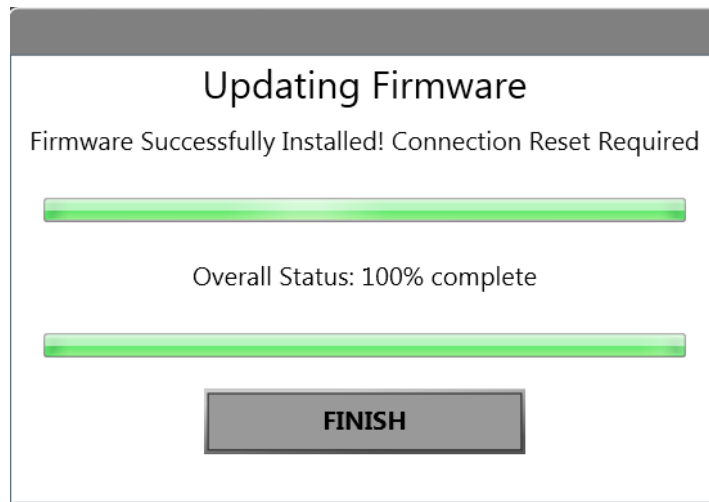


Select the file and
Click Open

21. The Proterra Diagnostic Tool will connect to the device, and the following screens are displayed.



22. The software update will take several minutes to complete. When the update is complete the following screen will be displayed. Click the “Finish” button to complete the update process.

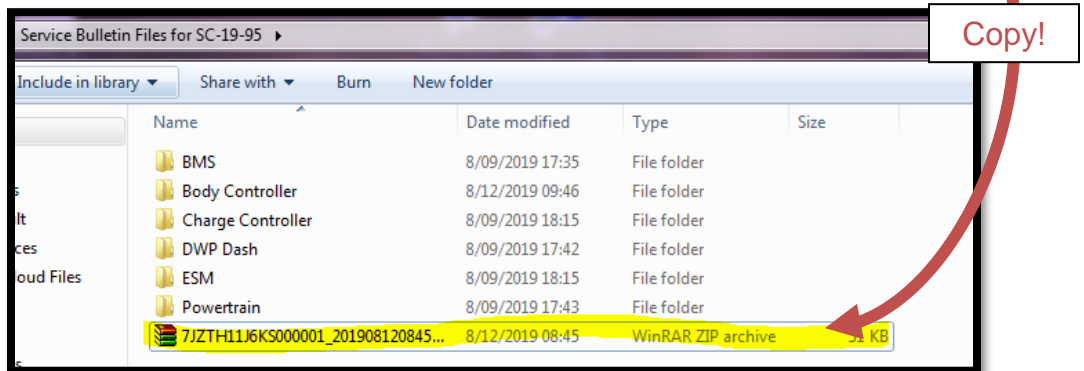
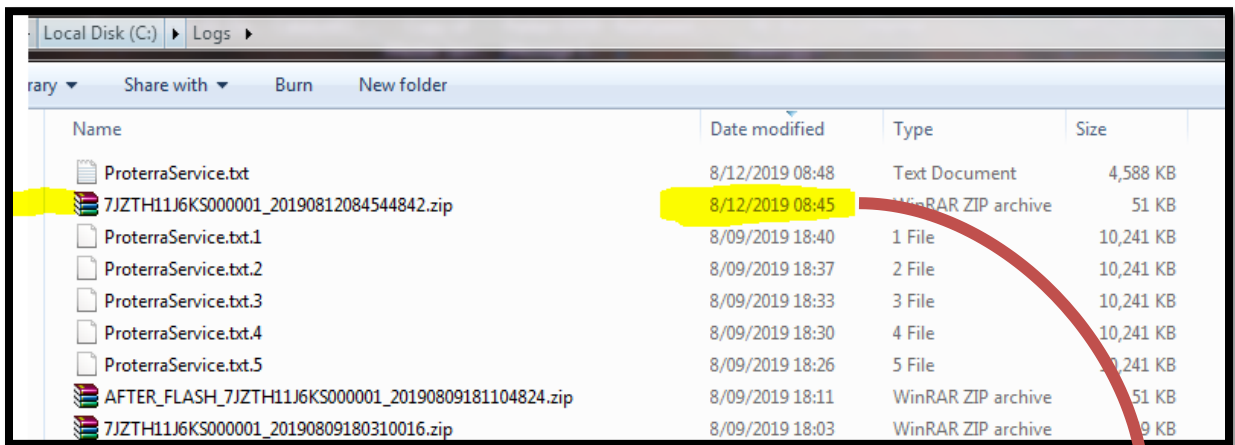


Store/Import Customer Configuration Dataset

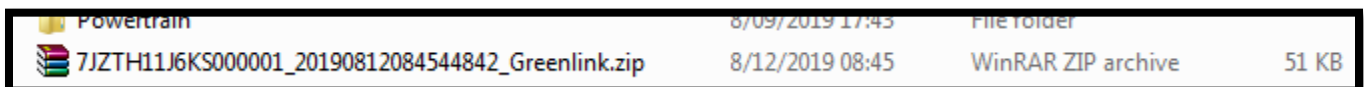
After completing the first vehicle in a customer's fleet, it is recommended that you download the final body controller parameters for that vehicle in order to use them to ensure consistency with the rest of the fleet.

Store Parameters

1. After first vehicle has been completed and verified, disconnect the Proterra Diagnostic tool and then re-connect.
2. Navigate to the Configuration tab and click the "Get Parameters" button. This will download the latest parameter set to the "C:\Logs" folder on your machine.
3. In windows file explorer, navigate to the C:\Logs folder. Copy the latest downloaded *.zip file to your desktop location with the Service Bulletin files.



4. Add a name to the end of the file so that you can more easily remember to which fleet it applies.



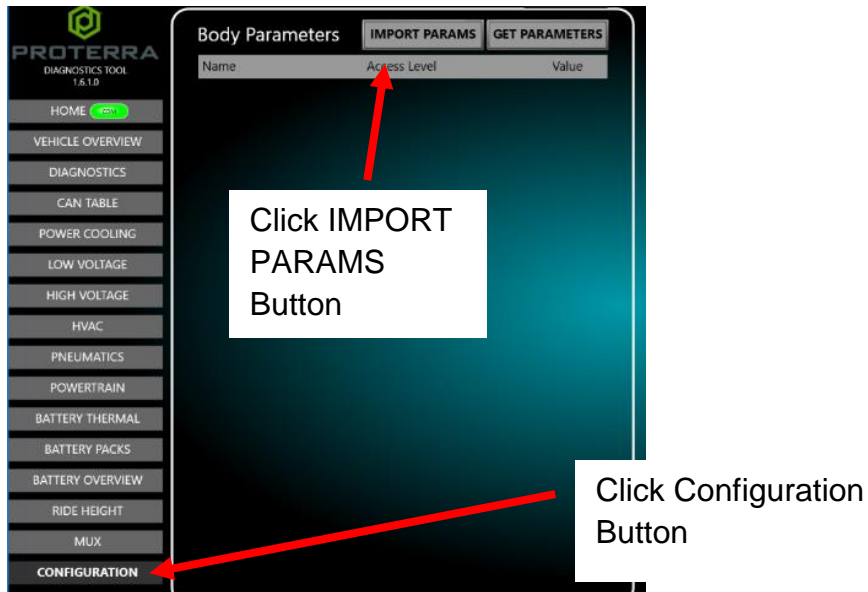
5. Copy this parameter file back up to the network folder location for uploading configuration files:

<\\BUS.local\files\Engineering\Service Bulletins\Service Bulletin Files for SC-19-97\Configuration Upload>

Import Parameters

For the second and rest of the fleet vehicles, use the configuration file that was created previously for this customer configuration. In this example, we are using “Greenlink”:

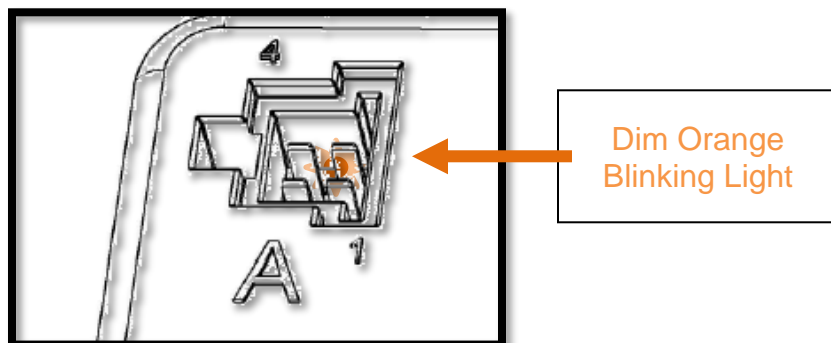
1. After downloading vehicle software, disconnect and re-connect the Proterra diagnostic tool.
2. Once connected, wait at least ten seconds then click the “Configuration” Button to open the configuration screen, and click the “IMPORT PARAMS” button at the top of the screen.



3. In the pop-up window, select the file created previously:



4. Click OK, and the EEPROM Parameters and Values from the vehicle will be downloaded and saved to the body controller.
5. When this process has finished, disconnect the diagnostic tool by clicking “Disconnect” on the Home Tab.
6. Turn off the Programming switch and all dash switches, and allow the Body Controller 10 seconds to go to sleep. Verify at the ZR32 mounted on the ECAB that the very dim orange blinking light inside the A connector has extinguished (this indicates fully asleep).



Verification of Customer Configuration

For all customer vehicles, please verify after programming that any customer-specific features or functions operate as expected.

Particularly, ensure these three EEPROMs have been updated properly for this customer's desired configuration:

EEPROM / Parameter Name:
EP_bo_DOOR_FSensitiveEdgeReopenDisable
EP_bo_EXLI_DaytimeRunningLightsActive
EP_bo_RAMP_ParkBrakeForRamp

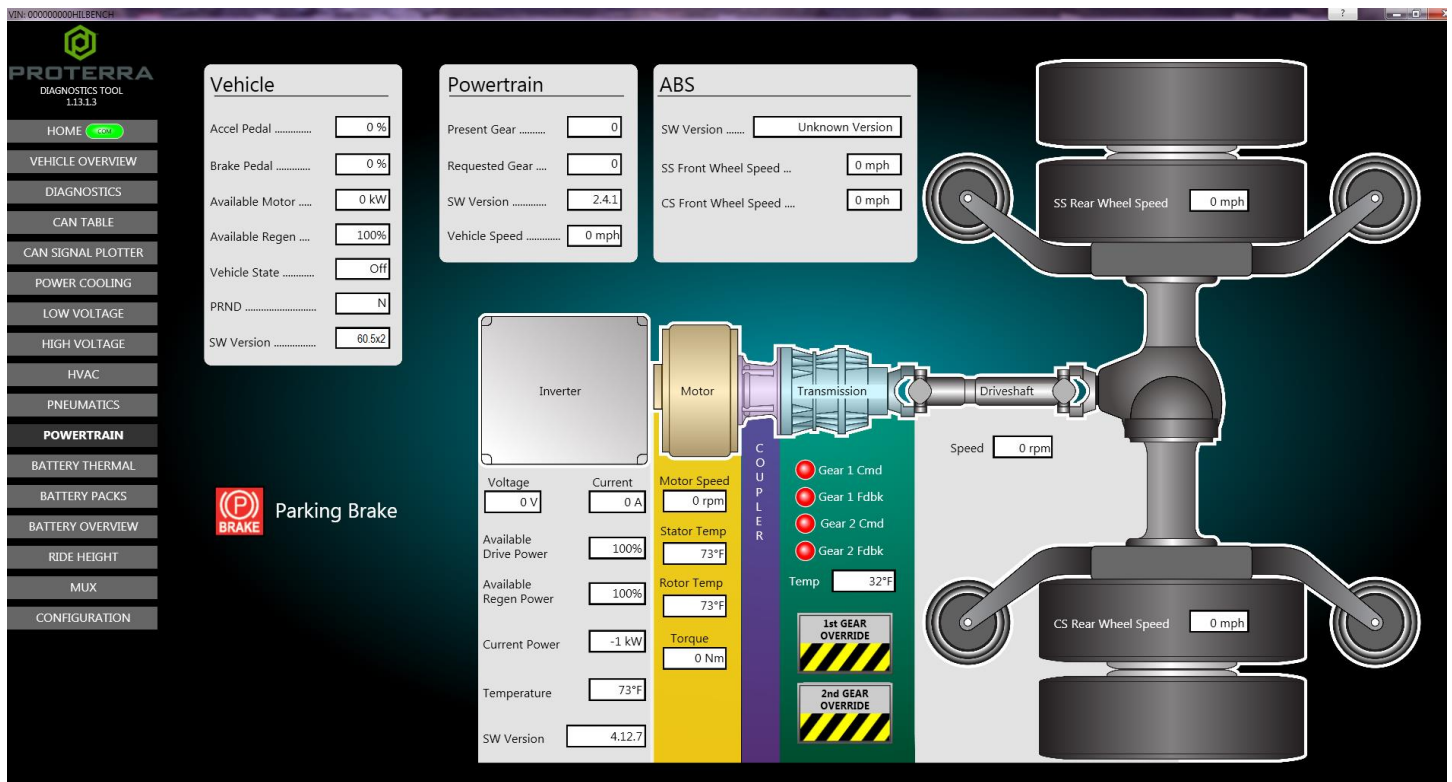
IMPORTANT! After verifying customer configuration, ensure that the vehicle powers up with no faults and is capable of Charging at the Charge Station.

Verify Traction Motor Software Version

This procedure checks the Traction Motor Inverter software version for verification purposes only. Firmware update was covered in a previous service bulletin but is important to have consistent for proper vehicle software operation.

Verify Current Software Version

1. Connect Proterra Diagnostics tool to either front or rear OBDII connector, and navigate to the Powertrain Tab.
2. Verify the Traction Motor Inverter Software version is **4.12.7**, shown in the screenshot below at the bottom middle of the page.



3. If the Traction Motor Inverter software version is not 4.12.7, contact Proterra Customer Service for assistance with updating this device. It requires special tools that are not available at every customer location.

Check List for Software Versions Deployed

The following check list should be used for verifying the software versions downloaded during the Service Campaign.

<i>Device</i>	<i>Software Version</i>	<i>Verified By</i>	<i>Name and Date</i>
<i>BMS - Pack 1 SC</i>	117340A		
<i>BMS - Pack 2 SC</i>	117340A		
<i>BMS - Pack 3 SC</i>	117340A		
<i>BMS - Pack 4 SC</i>	117340A		
<i>BMS - Pack 1 Main</i>	117340D		
<i>BMS - Pack 2 Main</i>	117340D		
<i>BMS - Pack 3 Main</i>	117340D		
<i>BMS - Pack 4 Main</i>	117340D		
<i>Battery Master ESM</i>	2.0.0		
<i>Charge Controller</i>	2.0.4 or 2.1.4		
<i>Powertrain</i>	2.4.1 2.5.1 (SEPTA) 2.6.1 (NYCT)		
<i>Dash</i>	200126 v 006		
<i>Body Controller</i>	40.28x8		
<i>Traction Motor</i>	4.12.7		