DOCUMENT CREATED DATE:	3/6/2019
SERVICE BULLETIN SUBJECT:	Catalyst E2 Vehicle Software Update
VINs or MODELS AFFECTED:	All Catalyst 40 E2 Buses
REQUESTED COMPLETE BY:	Next Available Service Opportunity
SERVICE BULLETIN #:	SC-19-35

NOTICE! This service bulletin requires that all fleet vehicles affected by SB-18-50, and SB-18-51, and SB-18-52 be done at the same time.

NOTICE! This service bulletin requires the completion of SB-18-38 prior to beginning this work.

NOTICE! It is expected that this process will require 2 hours per bus. Please schedule appropriately to minimize vehicle downtime.

CATALYST 40 E2 VEHICLE SOFTWARE UPDATE

Description

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

- CCS Charger Controller
- DWP/Dash – Recommended but not Required
- Powertrain Controller
- Body Controller (ZR)
- ESM Software

Summary of Software changes:

This update is to expand the max number of vehicles that can dock on the Proterra overhead charging system. It also incorporates important base vehicle functionality updates and numerous customer requested changes into the vehicle software. This includes DC-DC diagnostics, Battery Thermal Management System updates, Ride Height configuration support, and Hill Hold improvements.

IMPORTANT! All of the software sets in this service bulletin (except the dash) are required to be updated at the same time for safety and interoperability requirements.

Tools/Programs Required:

Tools Required:

- Laptop Computer
- NexIQ USB-Link 2
- PCAN Dongle (Optional)
- K-line (ISO/SAE) Adapter
- USB to Serial Adapter
- Proterra OBD Breakout cable “Octopus”
- Programming Harness
- Logena Service Tool and License Dongle
- OBD2 to DB9 Converter

Programs Required:

- Proterra Diagnostic Tool
    - Version 1.5.1+
    - Recommended: Version 1.7+

- MicroBoot (optional)
- ParameterEditor Version 3.03

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Software Files Required:

- *Body Controller Version 40.27:*
  - *043171.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: Refer to SB 18-90/91 for additional details*
  - *Dual Port Version 2.0.2:*
    - *Part Number 40289*
    - *CC_2_0_2.srec*
  - *Single Port Version 2.1.2:*
    - *Part Number 40290*
    - *CC_2_1_2.srec*

- *ESM Controller Version 1.0.2:*
  - *Part Number 035907*
  - *ESM_1_0_2.srec*

- Dash Software - Version 200126 rev 6 (optional):
  - 031728_rev6.zip

- *Customer configuration information is available to cross-check in: CUST_ENG_XXXX.docx*
  - *Document containing configuration parameters for each customer.*

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Update the Overhead Charge Station EEPROM (if applicable):

IMPORTANT! There should be no bus attempting to dock while performing this Service Bulletin. Be sure no buses are docking or charging before beginning work.

1. Press the emergency stop on the charger so that no vehicles may dock.

2. Power up (boot) the Proterra-supplied laptop containing the Proterra/Logena Service Tool software.

3. Verify that the USB hardlock is installed in one of the laptop USB ports and that the USB cable for the Logena Diagnostics Connector is installed in one of the laptop USB ports.

4. Verify that the other end of the USB cable for the Logena Diagnostics Connector is installed in the Logena HS Light Diagnostics Interface Box.

5. Connect the Logena Diagnostics Interface Box to the OBD2 to DB9 Converter.

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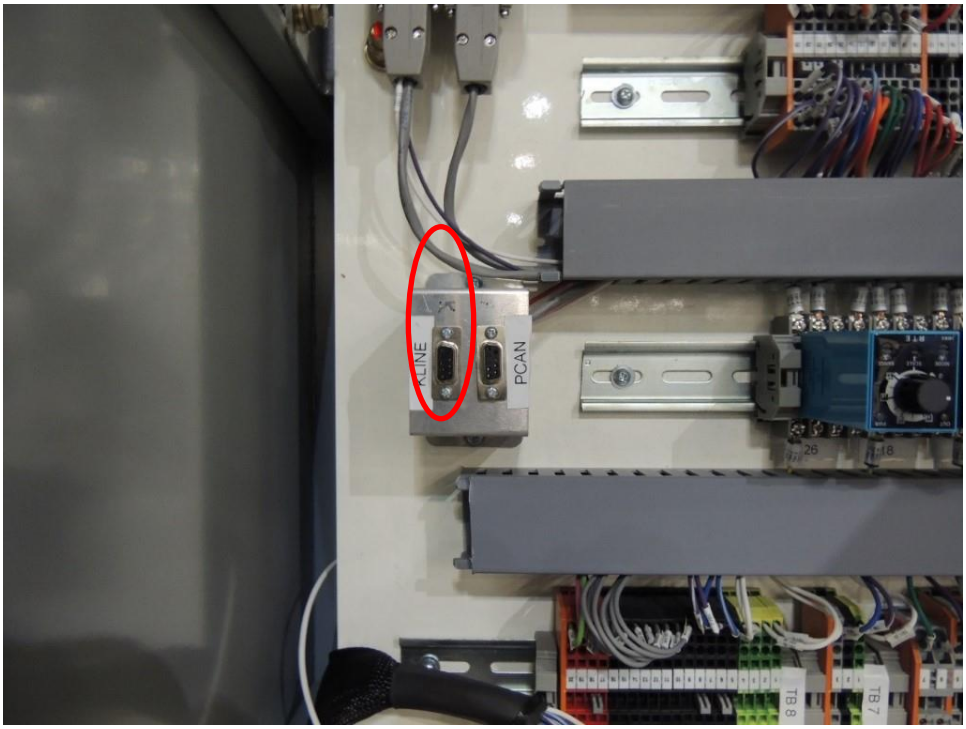
6. Connect the OBD2 to DB9 Converter to the K LINE port **located in the Docking Control Box or Docking Control Module**.



7. On the laptop, double-click on the Logena Service Tool software icon to start the Logena Diagnostics program.

8. On the Logena Service Tool - Login screen, enter your supplied Username and Password, then click the Login button.
   Ensure that you are logged into the "Service" access of Logena!

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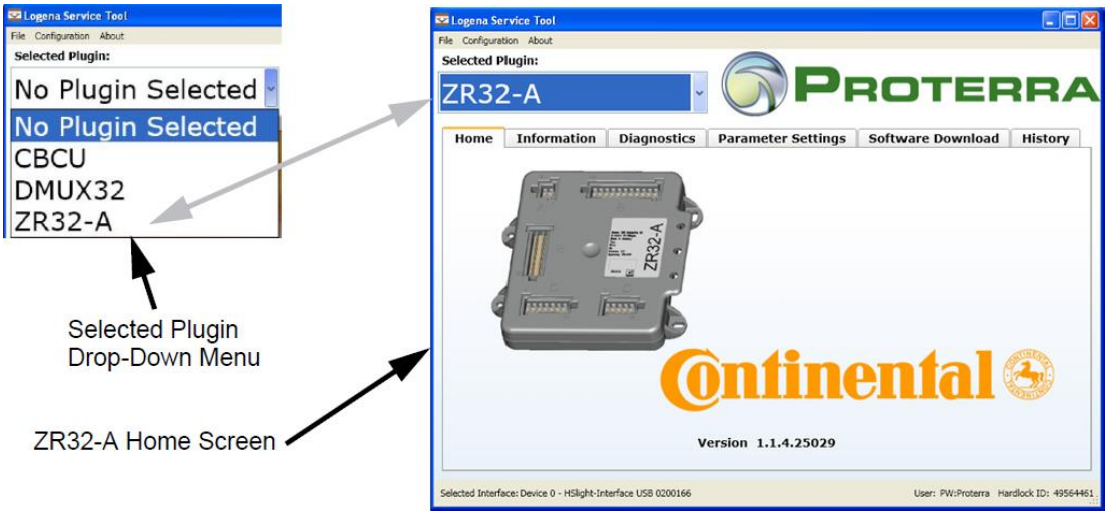
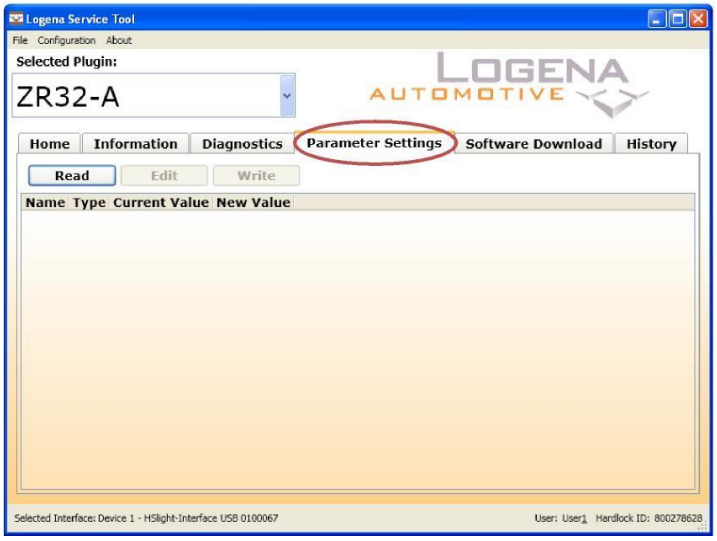
9. From the Logena Service Tool - Home Screen, click the Selected Plugin down arrow and then select ZR32-A from the list. The ZR32-A Home screen will be displayed.



10. From the ZR32-A Home Screen, select the "Parameter Settings" tab.



11. On the Parameter Settings tab, click the "Read" button to read all EEPROM parameters.

12. In the parameters list, locate the variable “**EP_bo_UseLongBusNumber**” by scrolling through the list and/or by sorting by the “Name” column.

13. Click on the “**EP_bo_UseLongBusNumber** line item and click “Edit”.

14. Change the value to **1** and then click “Write”.

15. Again click “Read” to refresh the list of Parameters. The value in the “Parameters” List should now show “1”.

16. Close the Logena program and disconnect the laptop.

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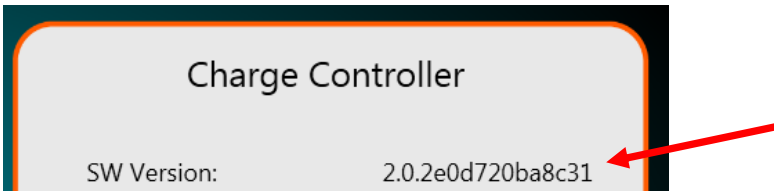
Update the Charge Controller Software for Customer Vehicles (using Proterra Diagnostic Tool):

The purpose of this procedure is to update the Charge Controller software version using the Proterra Diagnostics Tool.
Note: See the APPENDIX for performing this procedure using the alternate Microboot method).

There are different software versions required for each vehicle charge port configuration.

- If a vehicle has two charge ports, the proper software version to use is **040289** (2.0.2).
- If a vehicle has one charge port, the proper software version to use is **040290** (2.1.2).

NOTICE! The current software version can be checked using the Proterra Diagnostic Tool
(Click on the High Voltage Tab and check version as shown below)



Charge Controller Software Version

1. Access the following folder to obtain the new configuration file:
   \\BUS.Local\files\Engineering\Service Bulletins\Service Bulletin Files for SC-19-35\

2. Copy the 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.

3. Turn **ON** the 12/24V rear Master Disconnect located behind the vehicle curbside rear upper access panel.

4. Turn **OFF** the bus High-Voltage Master Switch at the Driver's Workplace and ensure the Dash screen is **OFF**.

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

6. Connect the Nexiq USB Link to the laptop.

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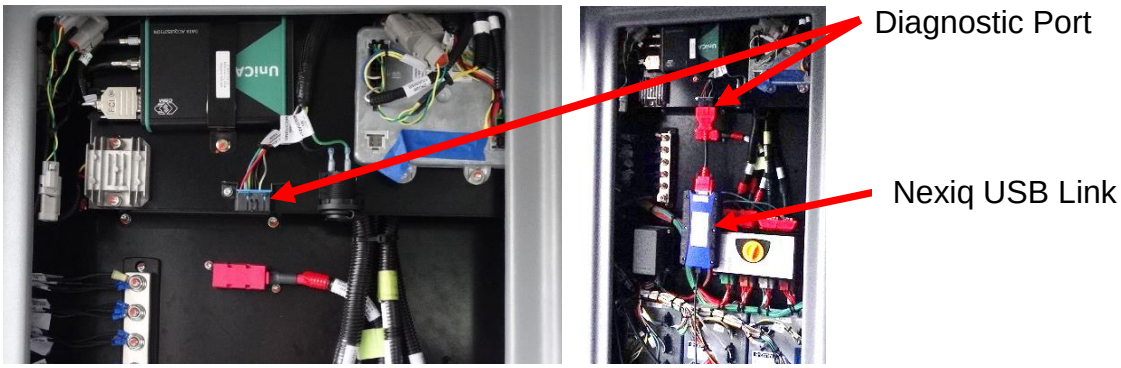
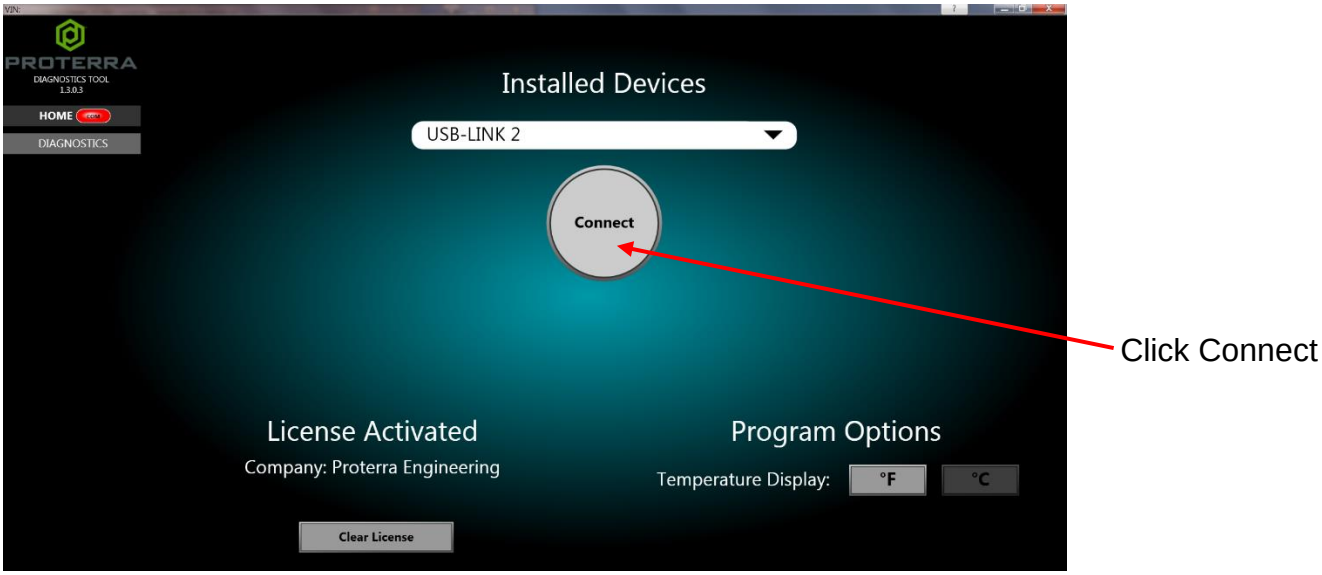
7. Connect the Nexiq USB Link to the Diagnostic Port located on the street side wheel well electronics cabinet (eCab).



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

9. On the Proterra Diagnostics screen, select “USB-LINK 2” in the drop-down box then click the “Connect Button.”



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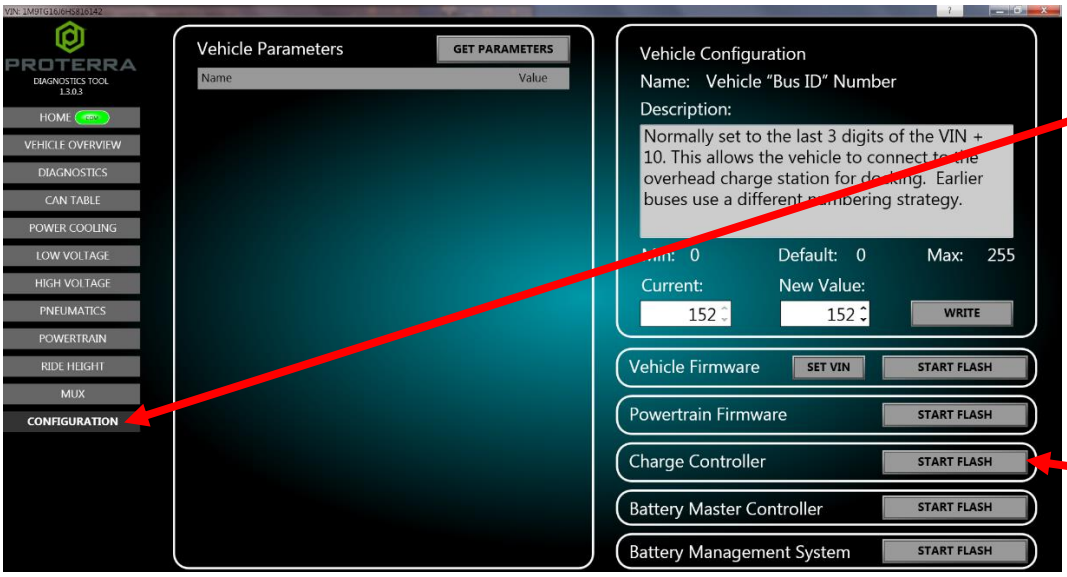
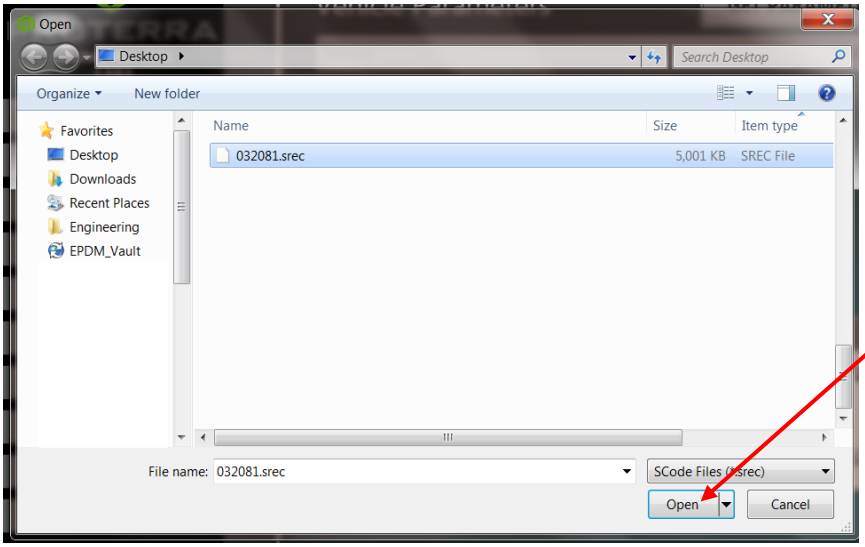
10. The Home screen will open. Click on the “Configuration Button” to open the Configuration screen and then click the Charge Controller “Start Flash” Button.



Click Configuration

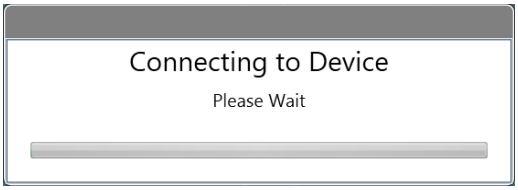
Beside Charge Controller, Click Start Flash

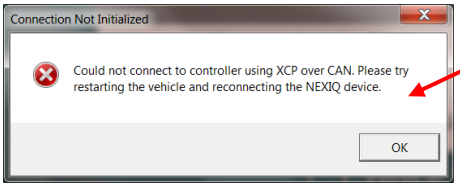
11. The following screen will be displayed. Navigate to the location where you stored the configuration file earlier. Select the file and click “Open” to load the file.



Select the file and Click Open

12. 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

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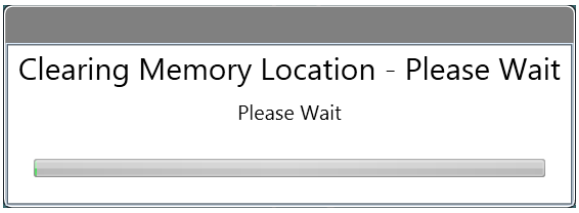
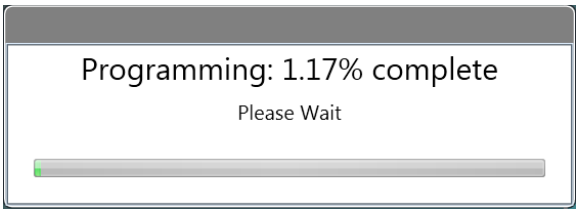
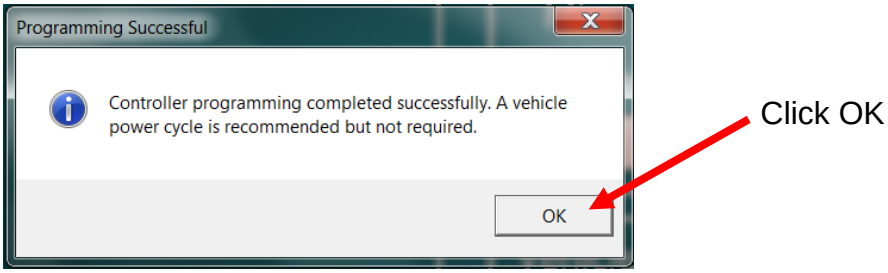
13. When the software update begins, and the following screens will be displayed.





14. 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.



15. The software update is now complete.

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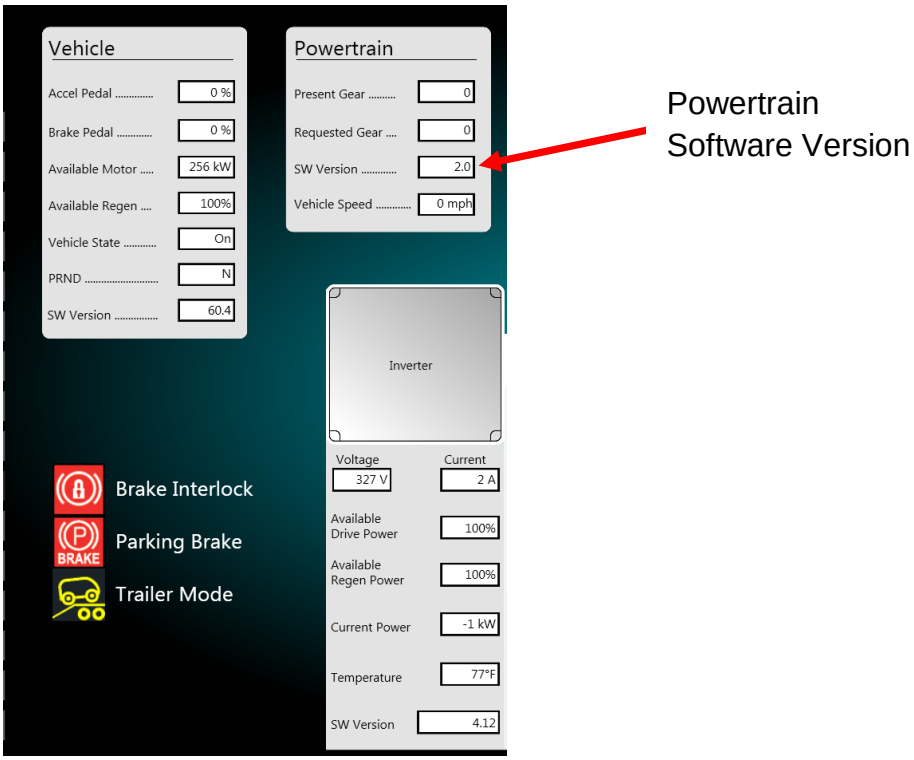
Update the Powertrain Controller Software for Customer Vehicles (Proterra Diagnostic Tool):

The purpose of this procedure is to update the Powertrain Controller software version.
There are different software versions required for depending on the customer configuration:

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

NOTICE! The current software version can be checked using the Proterra Diagnostic Tool (Click on the Powertrain Tab and check version as shown below)



Powertrain
Software Version

1. Access the following folder to obtain the new configuration file:
   \\BUS.Local\files\Engineering\Service Bulletins\Service Bulletin Files for SC-19-35\

2. Copy the 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.

3. Turn **ON** the 12/24V rear Master Disconnect located behind the vehicle curbside rear upper access panel.

4. Turn **ON** to low voltage the bus High-Voltage Master Switch at the Driver's Workplace and ensure the Dash screen is **ON**.

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

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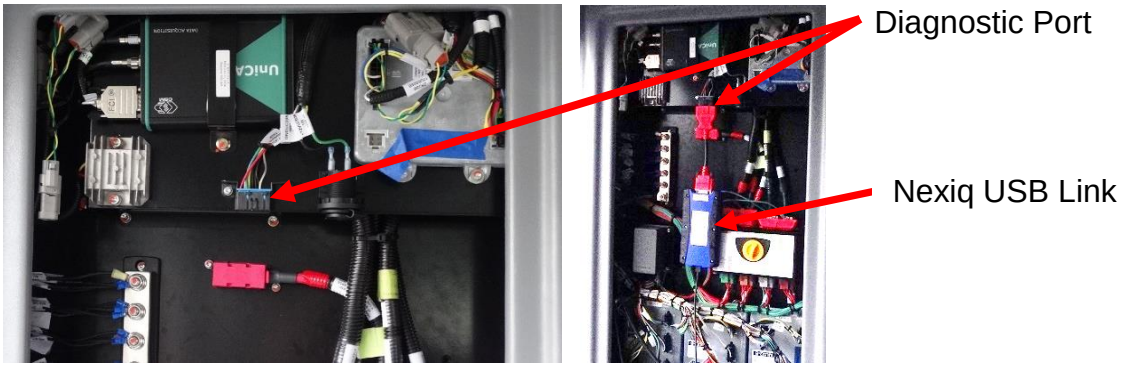
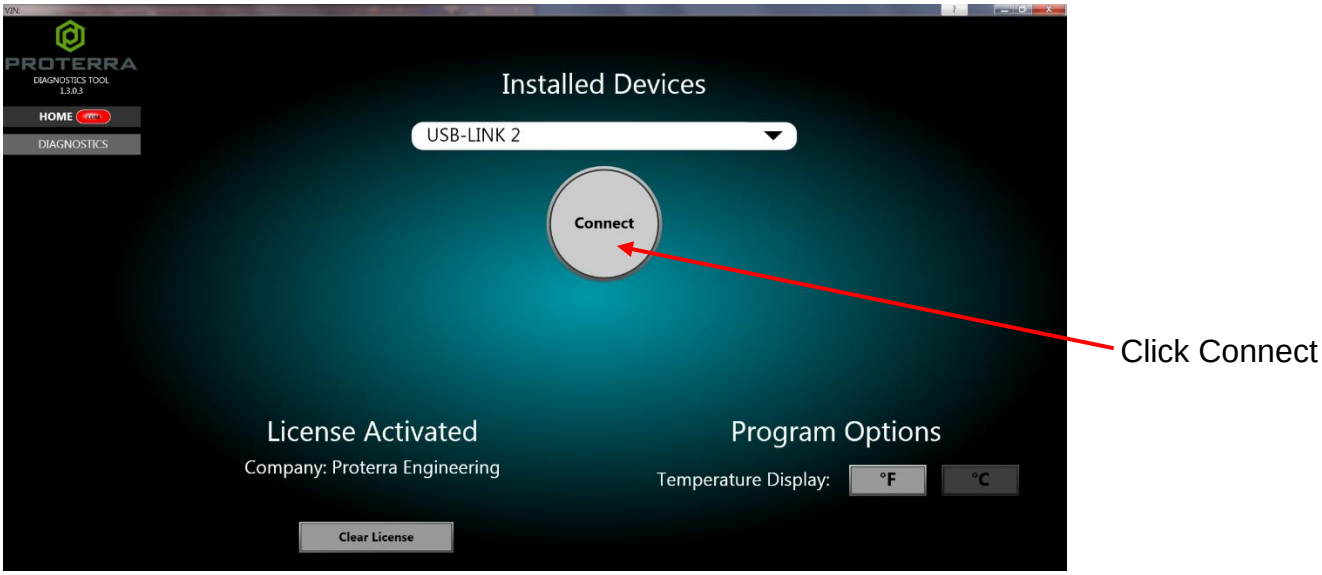
6. Connect the Nexiq USB Link to the laptop.

7. Connect the Nexiq USB Link 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. On the Proterra Diagnostics screen, select “USB-LINK 2” in the drop-down box then click the “Connect Button.”



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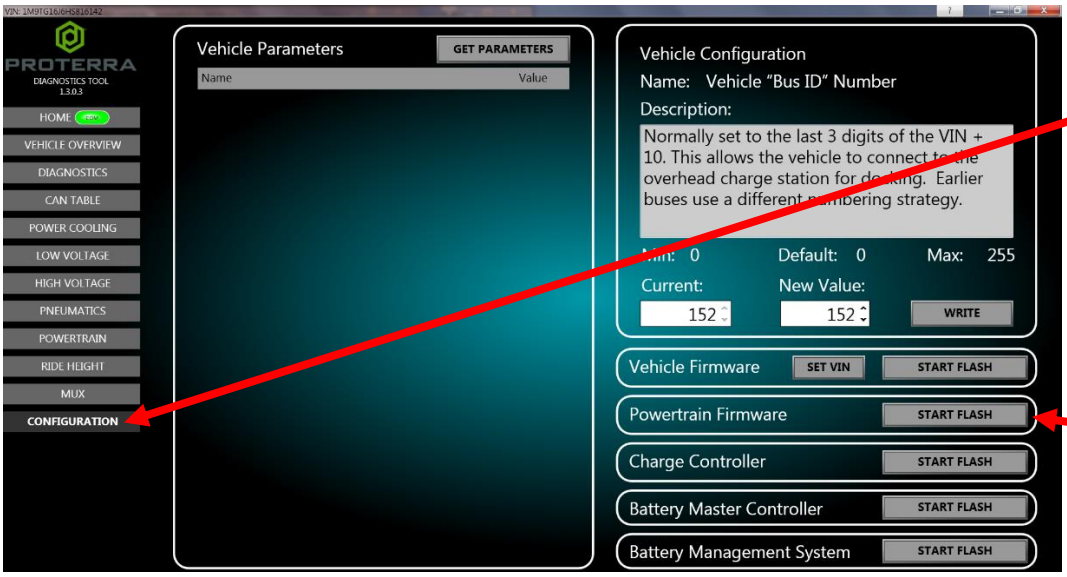
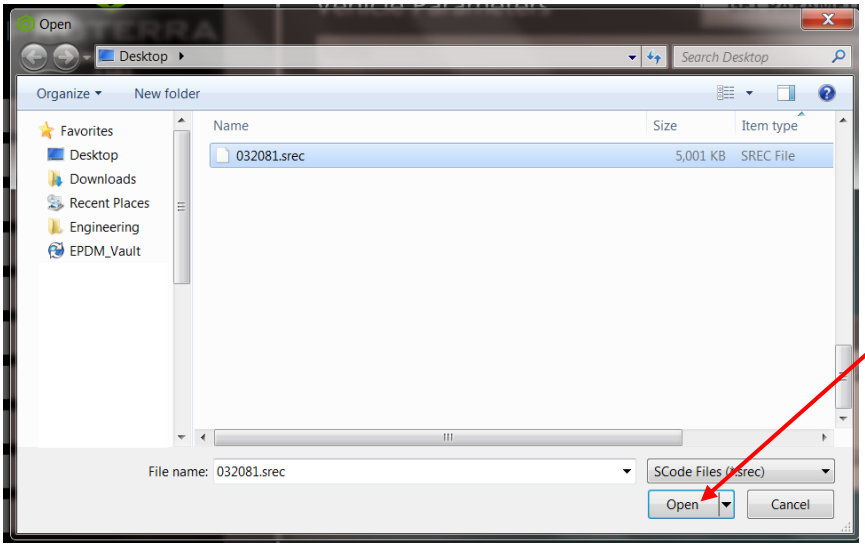
10. The Home screen will open. Click on the “Configuration Button” to open the Configuration screen and then click the Powertrain Firmware “Start Flash” Button.



Click Configuration

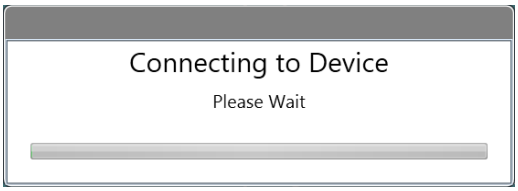
Beside Powertrain, Click Start Flash

11. 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

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



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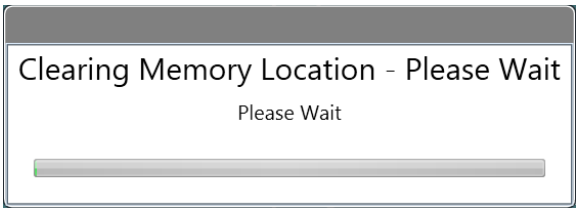
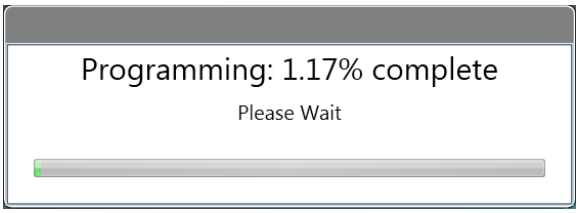
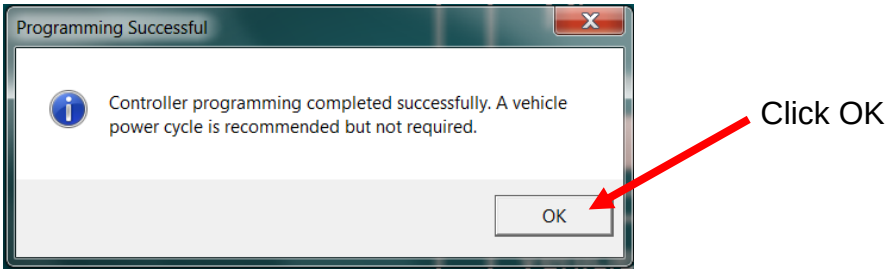
13. When the software update begins, and the following screens will be displayed.





14. 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.



15. The software update is now complete.

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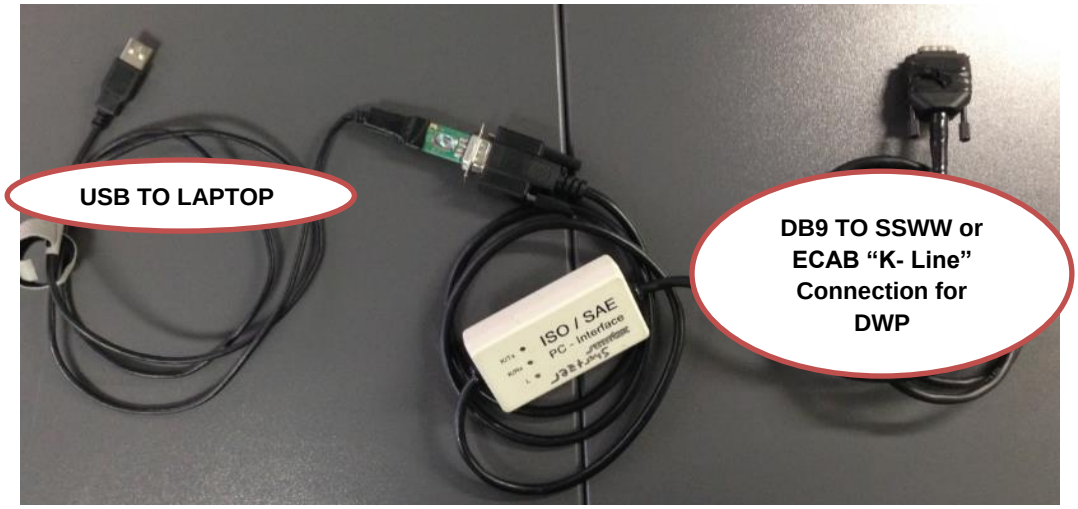
Update DWP - Driver Workplace Configuration:

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

1. Access the following folder to obtain the new configuration file:
   \\BUS.Local\files\Engineering\Service Bulletins\Service Bulletin Files for SC-19-35\

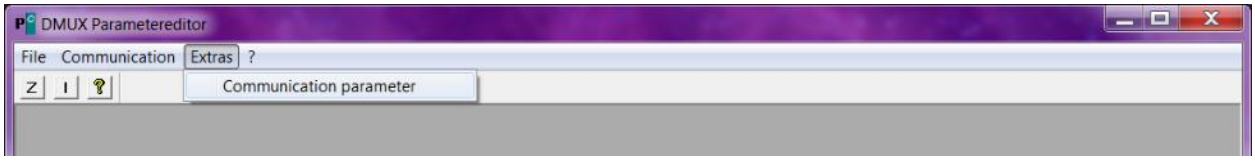
2. Copy file **031728_rev6.ZIP** to the service technician's laptop's local drive.
   NOTICE: DO NOT Unzip the archive to a directory on your computer's hard drive. The download will use the zip file. Simply copy the zip file to your computer's hard drive.

3. 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.



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

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



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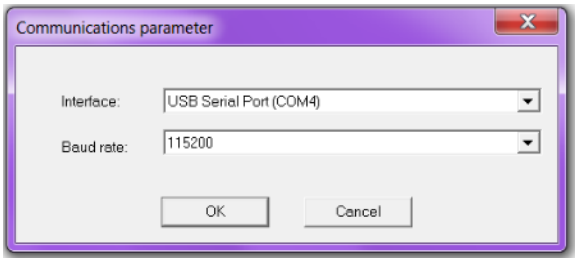
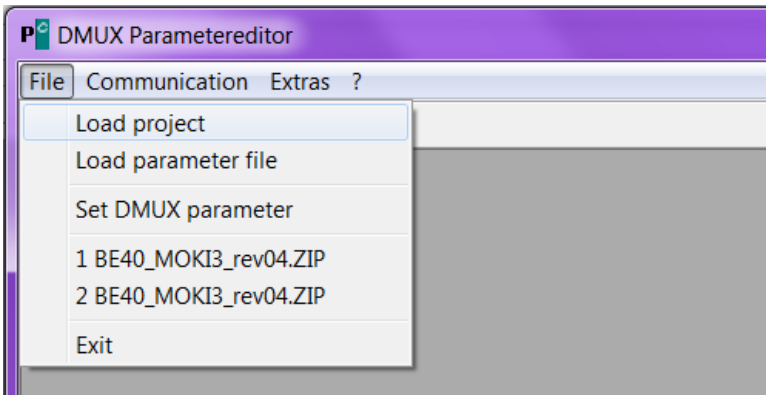
6. Ensure the communication parameters are correctly set. Your COM port may be a different number.



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

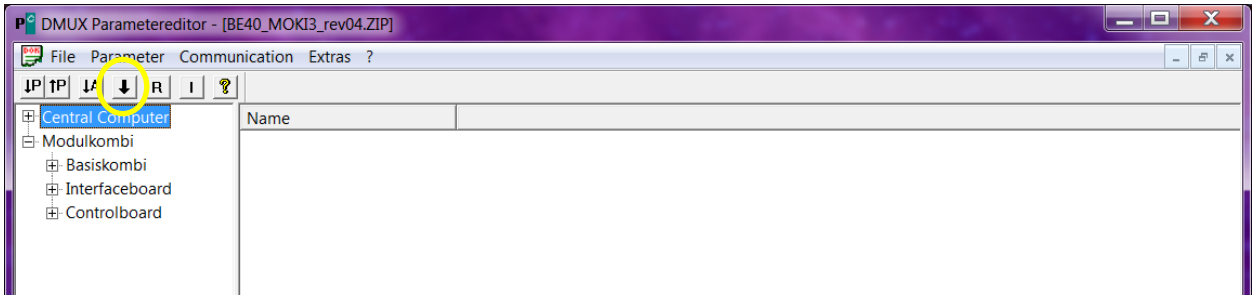


8. Open the folder where the Driver Work Place configuration is stored, and select the appropriate *.ZIP file from above.

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

10. **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**.

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



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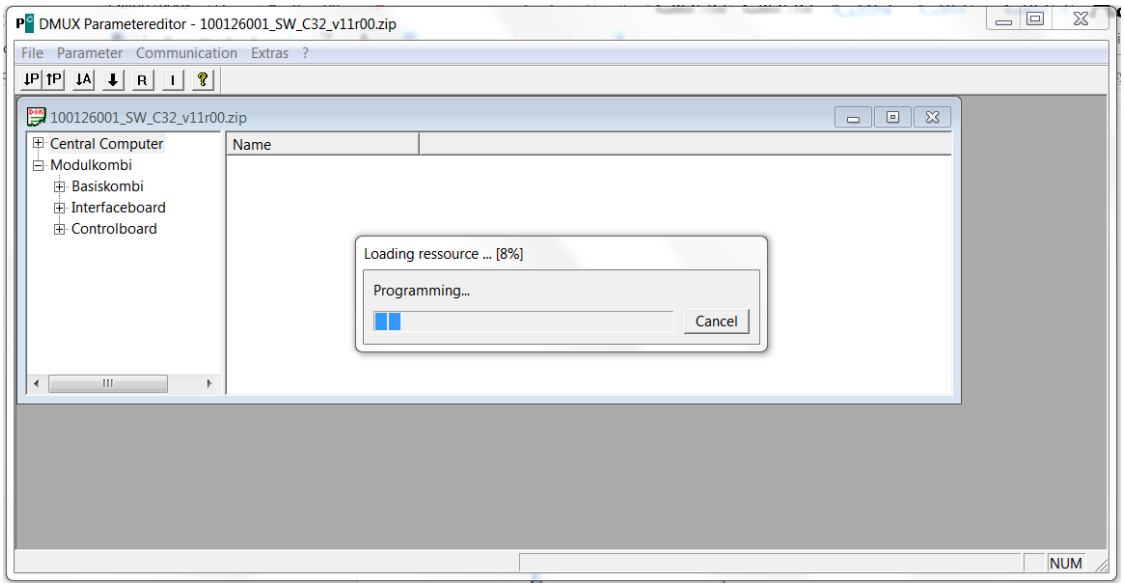
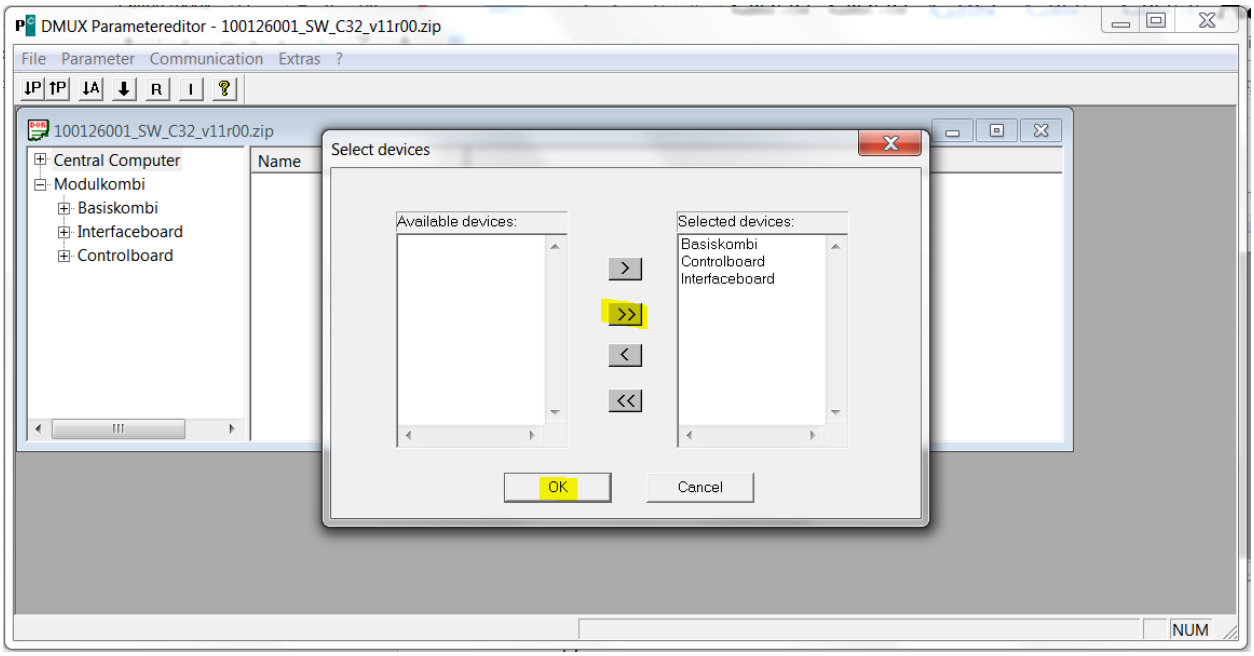
12. The download should begin and takes about 10 minutes (approximately):
    a. The vehicle dash may flash on and off a few times during the process.
    b. The low voltage contactors may cycle on and off a few times during the process.
    c. Ensure that the 12/24V batteries remain charged during the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



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



14. Wait about 1 minute.

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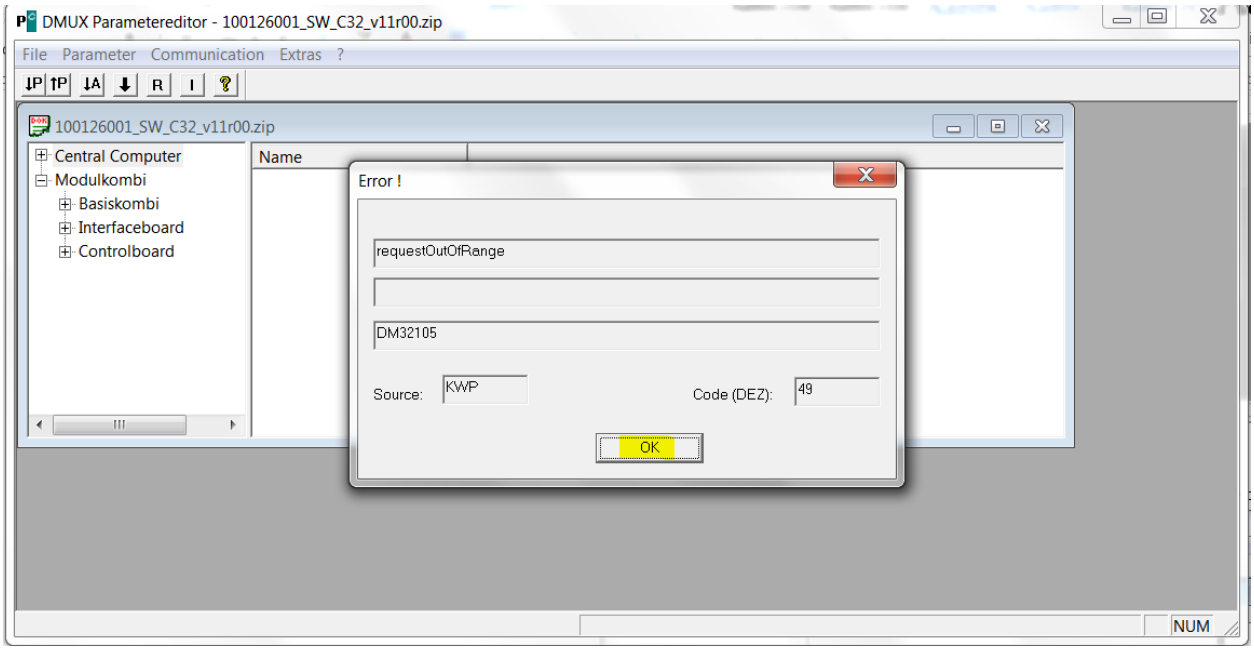
15. An Error screen may appear, which is normal, simply click “OK”.



16. Wait 1 minute.

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

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

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Update the ESM Controller Software for Customer Vehicles (Proterra Diagnostic Tool):

The purpose of this procedure is to update the ESM Controller software version.
Note: See the APPENDIX for performing this procedure using the alternate Microboot method).

1. Access the following folder to obtain the new configuration file:
   \\BUS.Local\files\Engineering\Service Bulletins\Service Bulletin Files for SC-19-35\

2. Copy the 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.

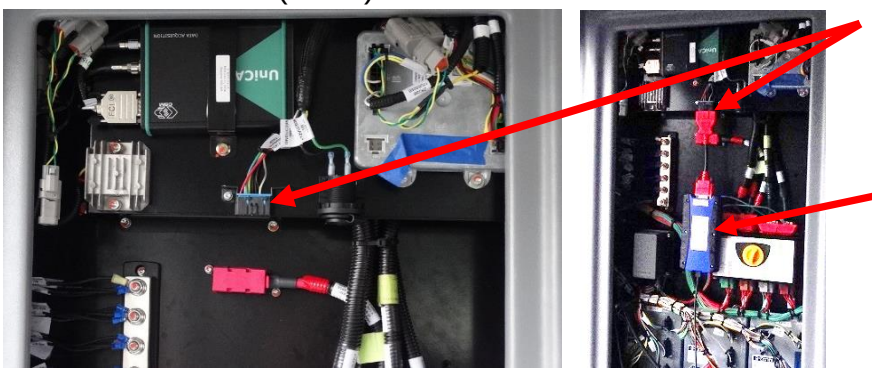
3. Turn **ON** the 12/24V rear Master Disconnect located behind the vehicle curbside rear upper access panel.

4. Turn **OFF** the bus High-Voltage Master Switch at the Driver's Workplace and ensure the Dash screen is **OFF**.

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

6. Connect the Nexiq USB Link to the laptop.
   Note: Using a USB cable connection, rather than Wi-Fi, is highly recommended.

7. Connect the Nexiq USB Link to the Diagnostic Port located on the street side wheel well electronics cabinet (eCab).



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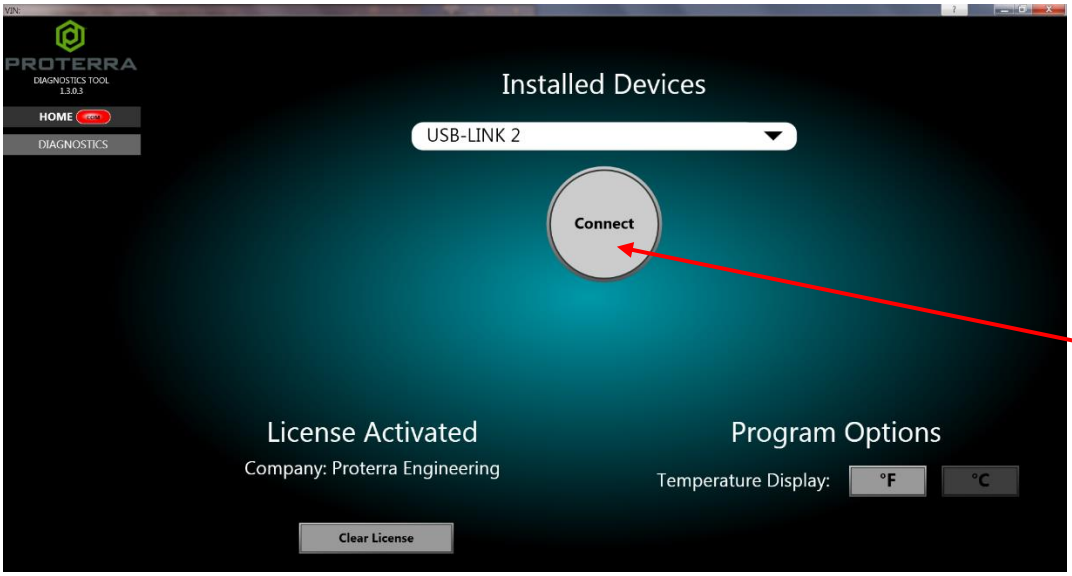
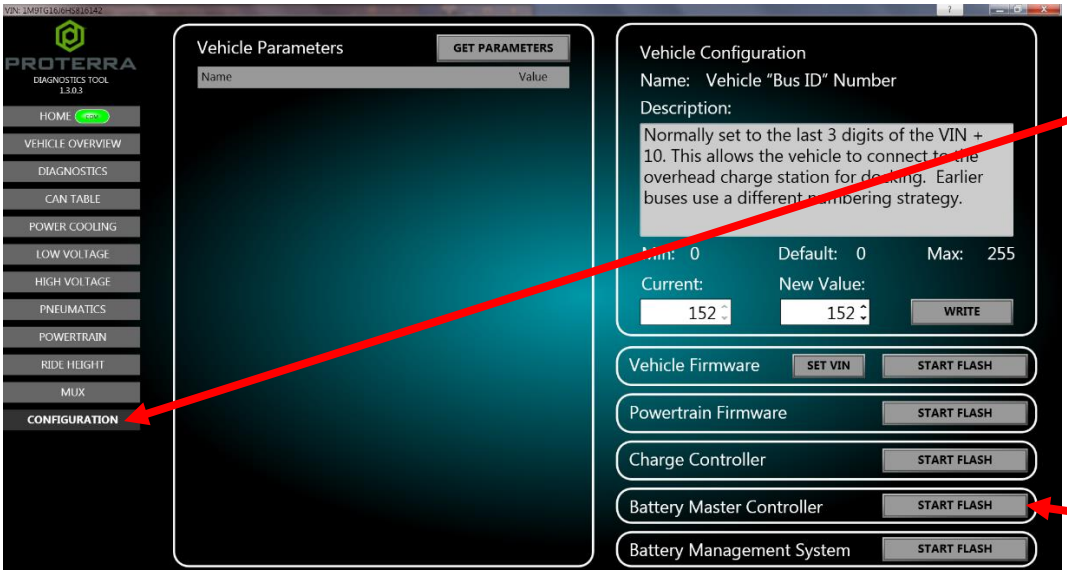
8. On the laptop, double-click on the Proterra Diagnostics Tool software icon to start the software.

9. On the Proterra Diagnostics screen, select “USB-LINK 2” in the drop-down box then click the “Connect Button.”



Click Connect

10. The Home screen will open. Click on the “Configuration Button” to open the Configuration screen and then click the Battery Master Controller “Start Flash” Button.



Click Configuration

Beside Battery Master Controller, Click Start Flash

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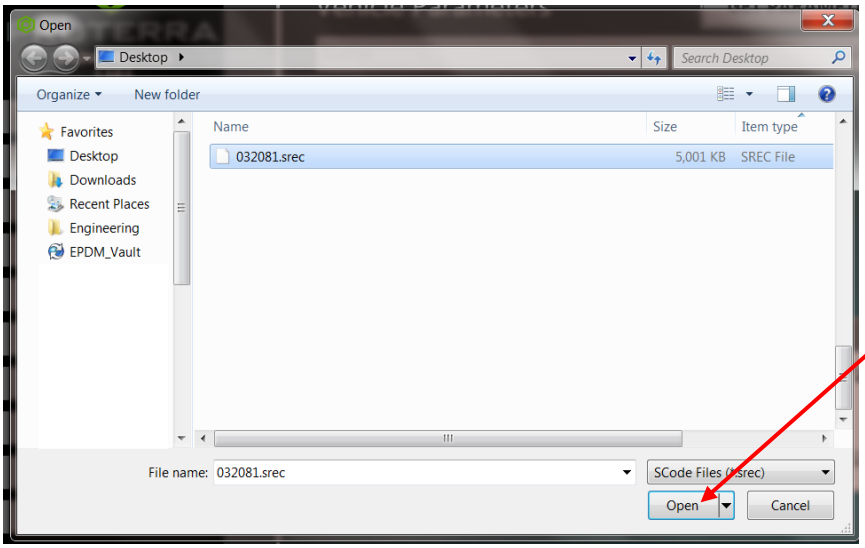
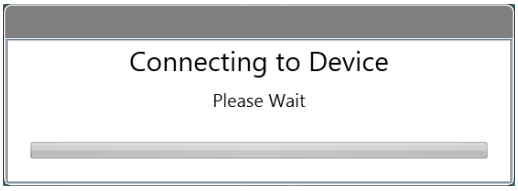
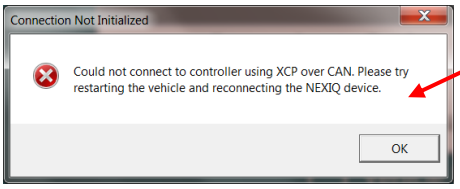
11. The following screen will be displayed. Navigate to the location where you stored the configuration file earlier. Select the file and click “Open” to load the file.



Select the file and Click Open

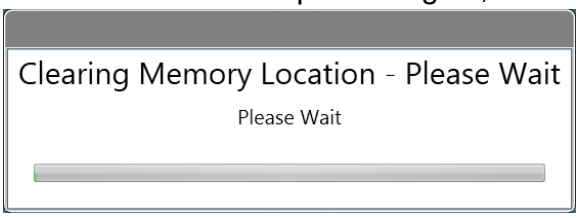
12. The Proterra Diagnostic Tool will attempt to connect to the device.
NOTE: You may receive an error on the first attempt. If so, retry by clicking the Battery Master Controller Start Flash button again.

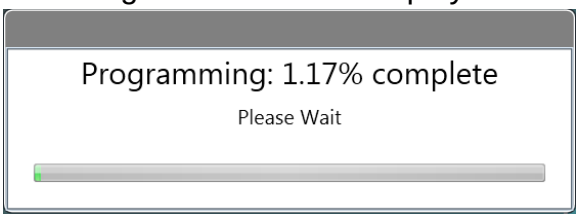




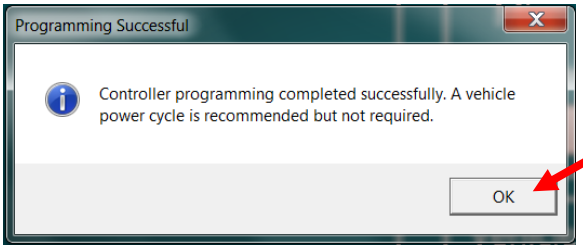
Error message on failed first attempt

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





14. 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

15. The software update is now complete.

16. Reset the bus and proceed to *Configure Body Controller (ZR) Software for Customer Vehicles*.

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Update the Body Controller Software for Customer Vehicles (Proterra Diagnostic Tool):

The purpose of this procedure is to update the Body Controller software version. This update process has been designed to maintain body controller parameter configuration data across the flash download of new software. Certain added EEPROMs may need to be checked in the new version after flash is complete.

Note: See the APPENDIX for performing this procedure using the alternate Microboot method).

1. Access the following folder to obtain the new configuration file:
   \\BUS.Local\files\Engineering\Service Bulletins\Service Bulletin Files for SC-19-35\

2. Copy the software file **XXXXXX.ZR32A_A** 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.

3. Turn **ON** the 12/24V rear Master Disconnect located behind the vehicle curbside rear upper access panel.

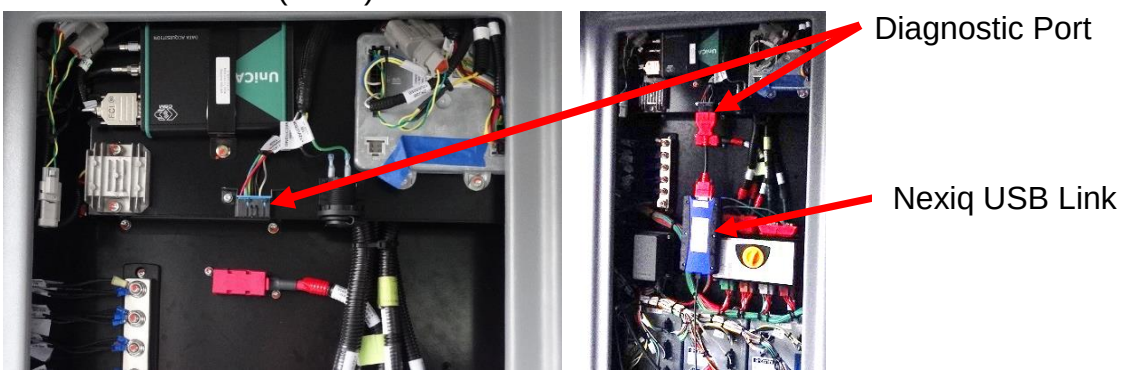
4. Turn **OFF** the bus High-Voltage Master Switch at the Driver's Workplace and ensure the Dash screen is **OFF**.

5. Turn **ON** the bus "programming switch" at the streetside wheel well box.

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

7. Connect the Nexiq USB Link to the laptop.
   Note: Using a USB cable connection, rather than Wi-Fi, is highly recommended.

8. Connect the Nexiq USB Link to the Diagnostic Port located on the street side wheel well electronics cabinet (eCab).



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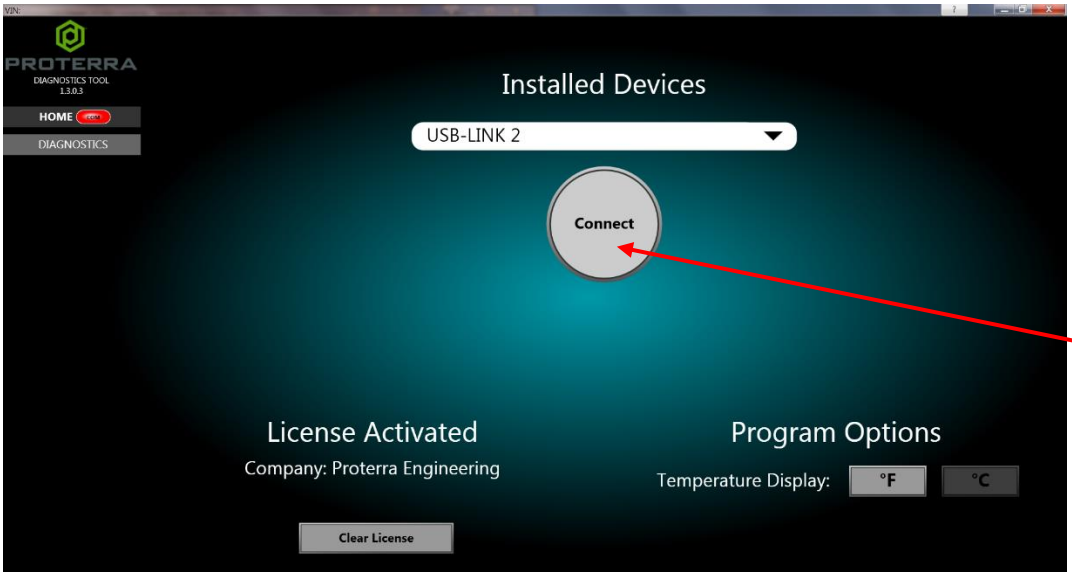
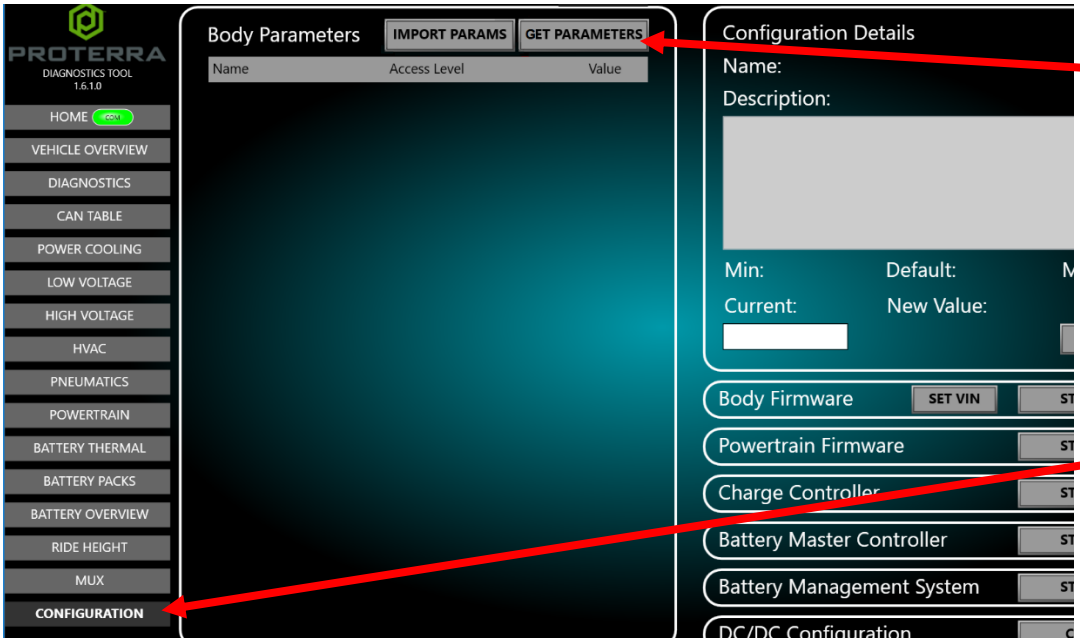
9. On the laptop, double-click on the Proterra Diagnostics Tool software icon to start the software.

10. On the Proterra Diagnostics screen, select “USB-LINK 2” in the drop-down box then click the “Connect Button.”



11. Once connected, click the “Configuration” Button to open the configuration screen and then click the “GET PARAMETERS” button at the top of the screen.



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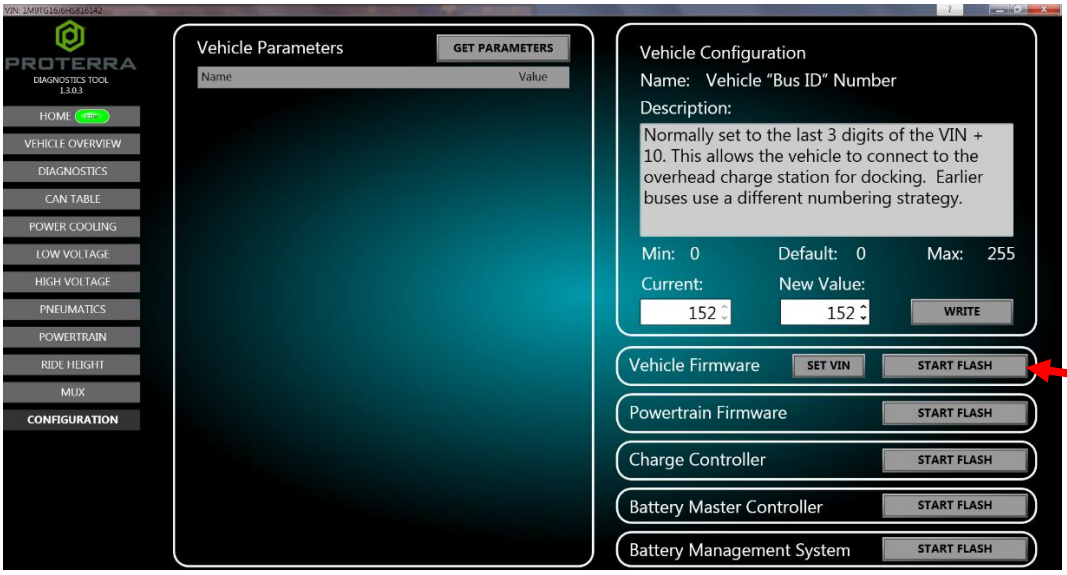
12. When “GET PARAMETERS” is clicked, the EEPROM Parameters and Values from the vehicle will be saved to a Zip file with the name **<VIN number>.zip** in the **C:\Logs** folder on your laptop.
(For Example: *1M9TG16JXJS816361.zip*)

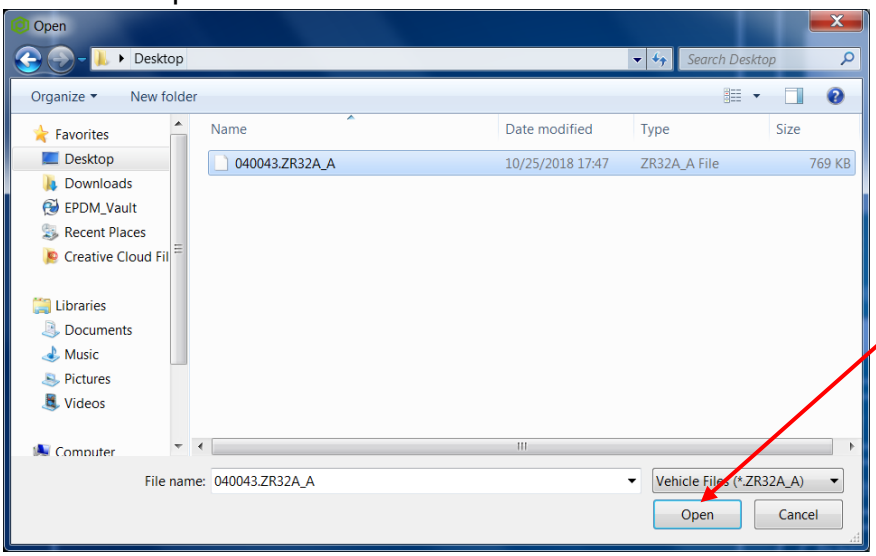
IMPORTANT! Move this *.zip file from the Logs folder to the desktop of the laptop, to prevent it from being overwritten when the Body Controller software is flashed.

13. After the parameters file is saved to your desktop, click the Vehicle Firmware “Start Flash” Button.



Beside Vehicle Firmware, Click Start Flash

14. The following screen will be displayed. Navigate to the location where you stored the configuration file earlier. Select the software file **XXXXXX.ZR32A_A** downloaded previously and click “Open” to load the file.



Select the file and Click Open

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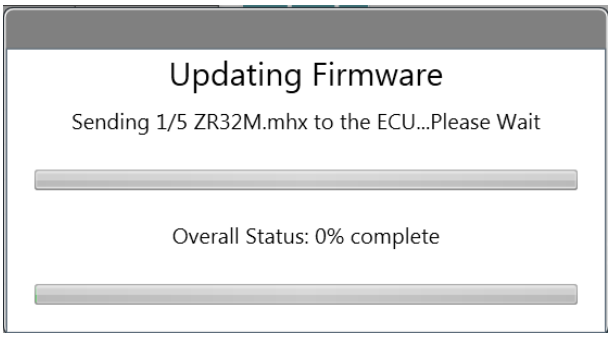
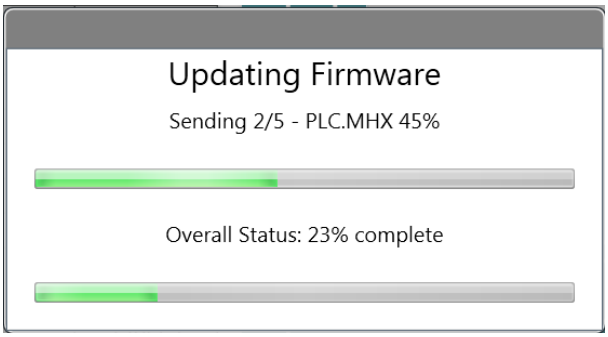
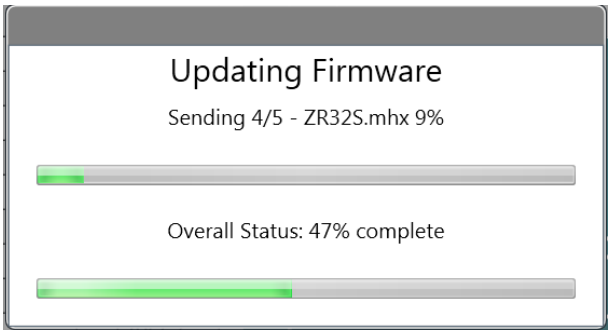
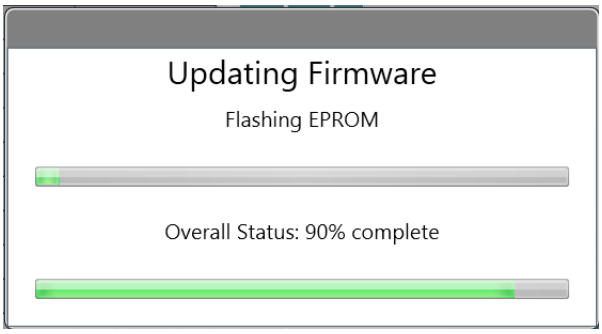
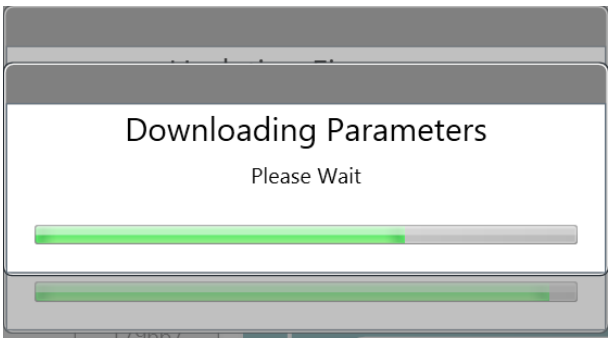
15. The Proterra Diagnostic Tool will connect to the device, and the following screens are displayed.



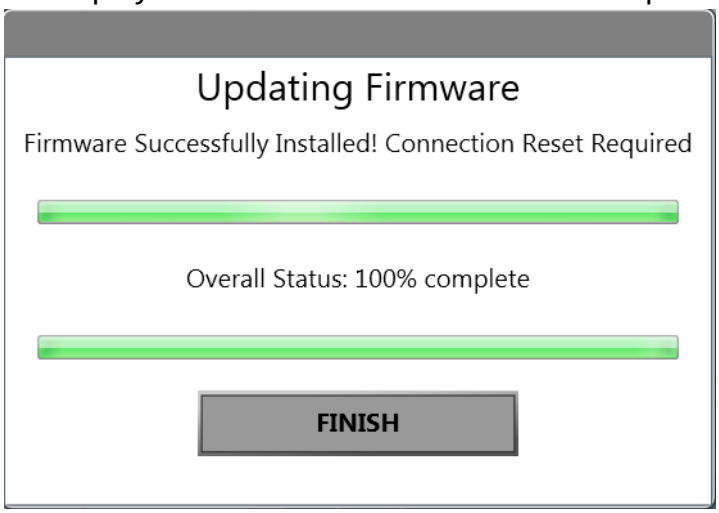








16. The software update will take several minutes to complete. When the update is complete the following screen will be displayed. Click the “Finish” button to complete the update process.



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Verification of Customer Configuration:

The purpose of this verification is to ensure that through this Service Bulletin the vehicle software has been properly configured for the customer.

Please complete and return the verification or Test Plan Documents located in the following folder for each Vehicle/VIN that has been upgraded.

\\BUS.local\files\Engineering\Service Bulletins\Service Bulletin Files for SC-19-35\

PLEASE NOTE: This could be a liability concern if the Verification plan is not performed and documented completely, as the customer expects the vehicle to perform in a certain way which can only be guaranteed by following the configuration process.

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

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APPENDIX: Alternate Controller Programming Methods

Update the Charge Controller Software for Customer Vehicles (Microboot, alternate method):

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

1. Access the following folder to obtain the new configuration file: \\BUS.Local\files\Engineering\Service Bulletins\Service Bulletin Files for SC-19-35\
2. Copy the 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.
3. Turn **ON** the 12/24V rear Master Disconnect located behind the vehicle curbside rear upper access panel.
4. Turn **OFF** the bus High-Voltage Master Switch at the Driver's Workplace and ensure the Dash screen is **OFF**.
5. Power up (boot) the Proterra-supplied laptop containing the MicroBoot executable file.
6. Connect the octopus cable to the OBD port located in the Rear Deck of the bus
7. Connect the PCAN dongle to the PCAN connection on the octopus cable.
8. Verify no other CAN utilities are running on the laptop; close PCAN Explorer, Proterra Diagnostic Tool, etc.
9. Connect PCAN dongle to the USB port on the laptop
10. Launch MicroBoot on the laptop
11. Use the "Browse" button to navigate to and select the SREC file to be loaded.
    a. The software will load automatically from this point
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
13. The software update is now complete.

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Update the ESM Controller Software for Customer Vehicles (Microboot, alternate method):

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

1. Access the following folder to obtain the new configuration file: \\BUS.Local\files\Engineering\Service Bulletins\Service Bulletin Files for SC-19-35\
2. Copy the 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.
3. Turn **ON** the 12/24V rear Master Disconnect located behind the vehicle curbside rear upper access panel.
4. Turn **OFF** the bus High-Voltage Master Switch at the Driver's Workplace and ensure the Dash screen is **OFF**.
5. Power up (boot) the Proterra-supplied laptop containing the MicroBoot executable file.
6. Connect the octopus cable to the OBD port located in the Rear Deck of the bus
7. Connect the PCAN dongle to the PCAN connection on the octopus cable.
8. Verify no other CAN utilities are running on the laptop; close PCAN Explorer, Proterra Diagnostic Tool, etc.
9. Connect PCAN dongle to the USB port on the laptop
10. Launch MicroBoot on the laptop
11. Use the "Browse" button to navigate to and select the SREC file to be loaded.
    a. The software will load automatically from this point
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
13. The software update is now complete.
14. Reset the bus and proceed to *Configure Body Controller (ZR) Software for Customer Vehicles*.

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