



**BULLY
DOG**

ECM TUNER

Cummins® part# 46511 | CAT part# 46521
Detroit/Mercedes® part#46531 | Paccar® part#46541



OWNER'S MANUAL

Not legal for sale or use on pollution controlled vehicles based and registered in California.

Table of Contents

Introduction.....	2-7
<i>Vehicle Application Chart</i>	<i>2</i>
<i>Parts List and Description</i>	<i>3-7</i>
Updating the ECM Tuner	7-17
<i>Overview.....</i>	<i>7-9</i>
<i>Installing the Heavy Duty Update Agent</i>	<i>10</i>
<i>Updating the ECM Tuner</i>	<i>11-17</i>
Physical Installation.....	18-19
Installing the Tune	20-44
<i>About Installing the Tune.....</i>	<i>20</i>
<i>Important Preparation Steps</i>	<i>21-24</i>
<i>Detroit®/Mercedes®, Cummins® and Paccar® Engines....</i>	<i>25-32</i>
<i>Cat® Engines</i>	<i>33-44</i>
Uninstalling the Tune.....	45-49
Operating the ECM Tuner	50-64
<i>The Main Menu & Feature Setup.....</i>	<i>50-64</i>
<i>Install Tuning</i>	<i>51</i>
<i>Special Features.....</i>	<i>52-53</i>
<i>User Options.....</i>	<i>53-61</i>
<i>Vehicle Settings.....</i>	<i>63</i>
<i>Vehicle Diagnostics.....</i>	<i>63-64</i>
<i>Show Settings.....</i>	<i>64</i>
<i>Uninstall Device.....</i>	<i>64</i>
<i>Update Device Software.....</i>	<i>65</i>
<i>Change Vehicle/Engine.....</i>	<i>65</i>
More Information.....	65-67
<i>USB Mode.....</i>	<i>65</i>
<i>Contacting Technical Support</i>	<i>66</i>
<i>Checking GT Status.....</i>	<i>66</i>
<i>Troubleshooting</i>	<i>67</i>
Notes.....	68-69

Important Note: You **MUST** uninstall the tune from your engine before taking your vehicle in for ANY type of service.

CAT®

DETROIT®/MERCEDES

CUMMINS®

PACCAR®

Check online at bullydog.com for a list of applications.

Introduction

Updating

Physical
Installation

Installing the
Tune

Uninstalling
the Tune

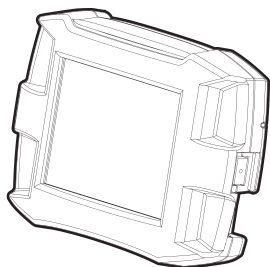
Operating the
HDGT

More
Information

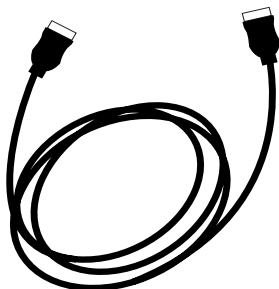
Parts List and Description

Parts List

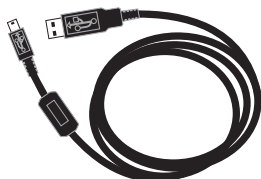
Head Unit



HDMI Cable



Mini-USB Cable



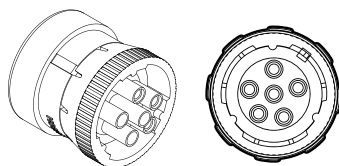
microSD Card



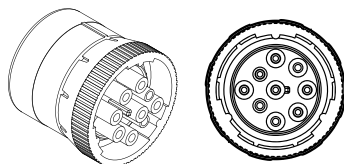
SD Card Reader



6-Pin Data Plug



9-Pin Data Plug



Parts Description

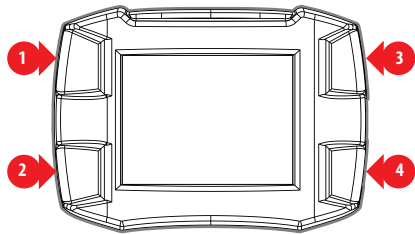
Head Unit

The Head Unit is the interface through which all operating functions are performed.

Note: To access the ports in the head unit of the ECM Tuner, users will have to pull off the enclosing rubber case.

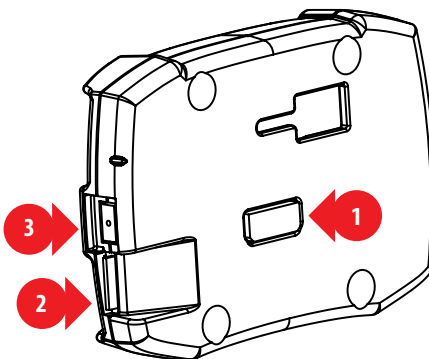
Front Side

The ECM Tuner features a 2.4" LCD screen and four capacitive touch buttons. Capacitive touch buttons are a button style that is sensitive to the presence of your finger. They do not need to be pushed "in" to activate them; they need only to be touched lightly.



Back Side

1. **Mini-USB Port:** Allows the HDGT to be connected to a computer with the included Mini-USB cable.
2. **HDMI Port:** Connects the HDMI cable (which links the Head Unit and the Data Plug).
3. **Micro SD Card Slot:** Houses the included Micro SD card which stores information for the ECM Tuner.

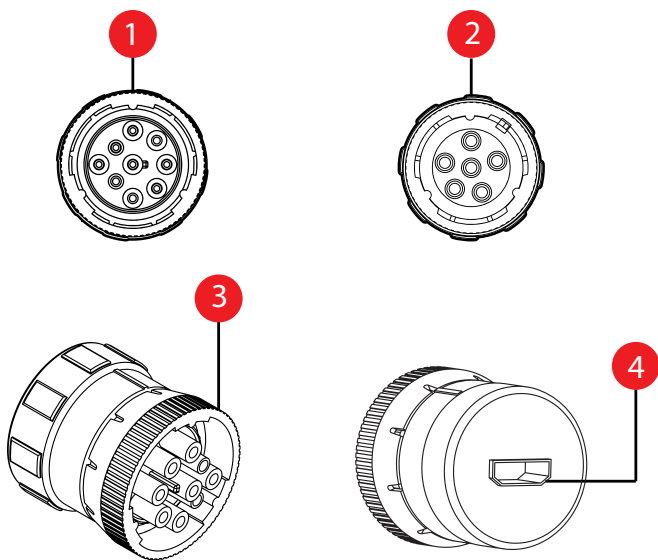


6- and 9-Pin Data Plugs

The 6- and 9-pin data plugs connect the ECM Tuner to the vehicle. Count the number of pins in the vehicle data port and use the matching plug. (If both plug types are present, use the 9-pin connection.)

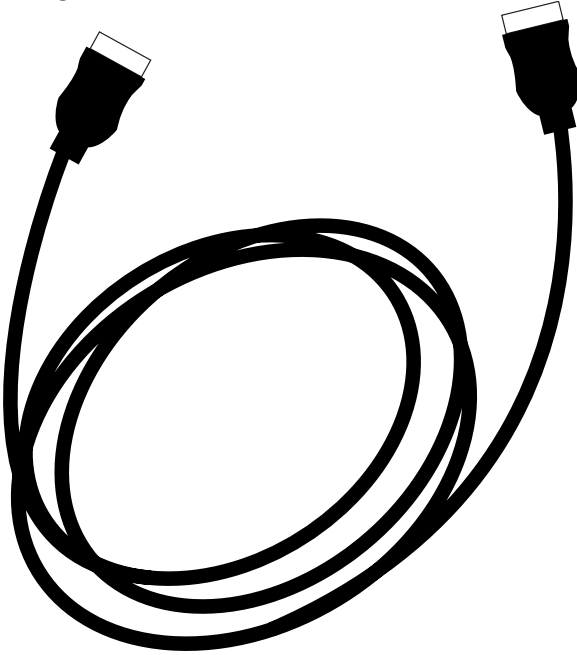
The diagram below shows the important parts of each type of Data Plug:

1. **9-Pin Data Plug Face**
2. **6-Pin Data Plug Face**
3. **Plug lock ring:** Each vehicle data port will have a lock ring receiver. This lock ring will secure the data plug to the port when it is properly seated in the lock ring receiver.
4. **HDMI Port:** Connects the HDMI cable (which links the Data Plug and the Head Unit).



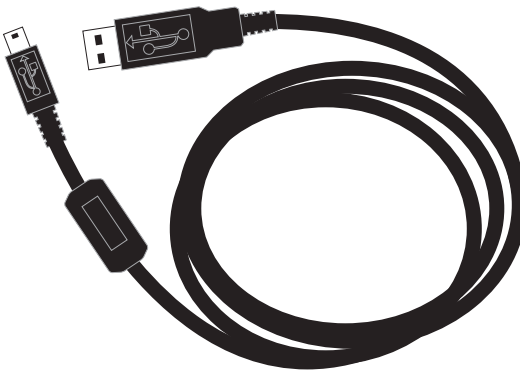
HDMI Cable

The 5 foot HDMI cable connects the ECM Tuner to the Data Plug. It also features a Mini-USB pigtail port for the Bully Dog Sensor Docking Station.



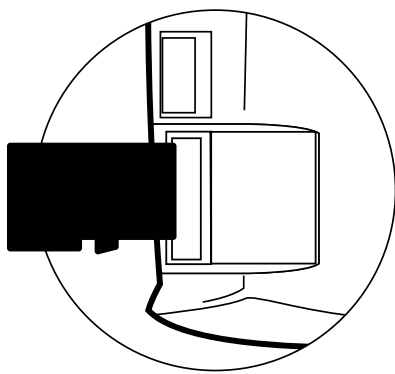
Mini-USB Cable

The Mini-USB cable is a standard, off-the-shelf Mini-USB cable. It can be used to connect the ECM Tuner to a computer.



MicroSD Memory Card

The microSD memory card holds all of the electronic files for the ECM Tuner; the ECM Tuner will not function if the card is not installed. The card can also be removed from the ECM Tuner and connected to a computer via the included card reader.



Updating the ECM Tuner

These instructions are for use with a Microsoft Windows® computer with an Internet connection. There are currently no alternative methods to update using an Apple® or other computer that cannot successfully run applications designed for Microsoft Windows® operating systems.

Overview

Why do I have to update my ECM Tuner?

1. Vehicle manufacturers regularly change the part numbers and other information that the ECM Tuner uses to communicate effectively with the engine computer. If the ECM Tuner doesn't have the updated information, it may not work correctly. In order to give our customers the best support possible, Bully Dog releases updates when necessary to keep up with any changes that vehicle manufacturers may make.
2. The Bully Dog technical support team gathers information about any problems experienced by customers and then works with the engineering team to fix the problems as quickly as possible. If these fixes can help other people avoid similar problems, the engineers include them in the updates that are released for everybody. One of the most important troubleshooting steps is to make sure that the ECM Tuner has been updated to the most recently released software version. Updating is quite often an immediate fix for most problems.
3. Bully Dog engineers are constantly working to expand the features and vehicles that the ECM Tuner is able to support. Once a new vehicle or option is unlocked, they make sure it is available to everyone by including it in the updated software version.

How often should I update?

Make sure to update the ECM Tuner upon receipt. After the first update is complete, there is no need to update the tuner unless there is a glitch or malfunction. The Bully Dog technical support team can provide more information.

What is included in the updates?

Updates include new part numbers and other information from vehicle manufacturers, tested fixes for problems customers may encounter, and any additional features or vehicles that Bully Dog engineers have developed.

How can I tell which software version is currently loaded on my ECM Tuner?

1. Go to the Main Menu (top left button).
2. Highlight **Show Settings** (right button).
3. **SELECT** the highlighted option (bottom left button).

The software version is listed in the middle of the first screen. It is labeled as SWa version and SWb version.

◀ Go Back GT SYSTEM INFO	
GT status:	Unlocked from Vehicle
Serial #:	#####
HW version:	1.5
Memory:	#####
SWa version:	1.0.5.0
SWb version:	7
Tuning version:	4.0.3 CUMMINS EGR
Application:	CUMMINS EGR '03 - '07
Admin. Password:	Disabled
Monitoring Type:	Unknown
Sensor Dock:	Not Connected

How can I check for updates?

Run the Bully Dog Heavy Duty Update Agent with the ECM Tuner connected. It should read "Update Needed" if it is necessary. To complete the update, press the "Update" button and follow the instructions on the screen.

Installing the Heavy Duty Update Agent

1. Open a browser window.
 - Use the browser you are most familiar with, like Mozilla Firefox®, Google Chrome® or Microsoft Internet Explorer®.
2. Go to http://bigrig.bullydog.com/update_agent.php
3. Click on the **Update Agent** button for the HD GT and HD WatchDog™.



4. Let the file finish downloading.
5. Find the setup.exe file and double-click it to run the Heavy Duty Update Agent setup.
6. If a Windows® dialog box pops up and warns you that the publisher could not be verified, click Run and/or Install to continue with the Heavy Duty Update Agent setup.
7. Let the computer finish installing the Heavy Duty Update Agent application.
8. The Heavy Duty Update Agent will automatically run after the installation is complete.



Updating the ECM Tuner

1. Start the Heavy Duty Update Agent (if it is not already running).
 - You can check to see if it is already running by looking for the Bully Dog icon in the System Tray in the bottom right corner of your screen.
 - If the Heavy Duty Update Agent is already installed, you will find it in the following folder on your Windows Start Menu:
All Programs > Bully Dog Technologies > Heavy Duty Update Agent
 - If the Heavy Duty Update Agent is not present in your programs list, you will need to install it.



2. Plug the microSD memory card into the card reader.

3. Plug the card reader (with the microSD memory card) into a computer USB port.

It is possible to update by keeping the memory card installed and connecting the ECM Tuner to a computer via Mini-USB cable; however, this method is slower and not recommended.

4. Your computer and the Heavy Duty Update Agent will automatically recognize the memory card.
 - a. Close the window or click **Continue without scanning** if a dialog box pops up with an option to “scan and fix BDCARD.”



- b. Close the window if you receive an Autoplay pop-up with options like “Open folder to view files.”



- c. Likewise, you should close or ignore any other pop-up messages about the newly detected device that might be generated by your computer or any

anti-virus software that may be running (it is common for these to appear in the System Tray on the bottom right side of your computer screen).



5. The Heavy Duty Update Agent will prompt you to register the ECM Tuner if it has not already been done.
 - a. To register, fill out the fields and click **Submit**.
 - b. To register at a later time, click **Cancel**.

To register at a later date, open the Heavy Duty Update Agent and open the Tools menu; then click Register Product.

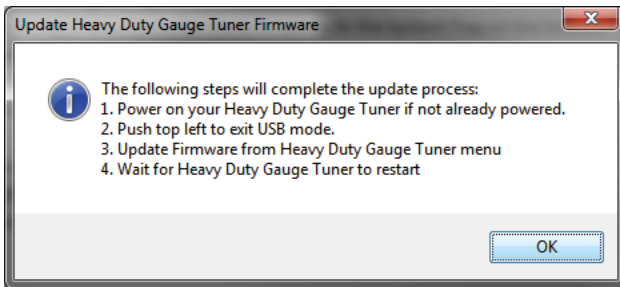
6. The Heavy Duty Update Agent will display the status of the software version on the memory card.
 - If an update is needed, click on the **Update** button and proceed to step seven.



- If no update is needed, you are ready to install the microSD card into the ECM Tuner and connect the ECM Tuner to your vehicle. (You will not need to complete the rest of the update instructions in this section of the manual.)

Up-To-Date, Your device is running the latest software.

7. Once the update is complete, a pop-up will appear with instructions to finish the update (steps 7-13 in this manual).



- a. Click **OK**.
8. The dialogue box will disappear and the ECM Tuner will display the following message:

Re-power Heavy Duty Watchdog and select Change Vehicle or Update from Main Menu

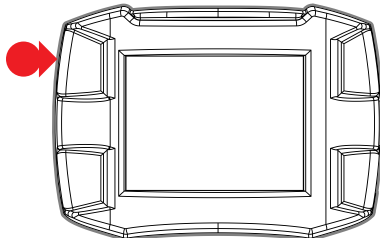
- a. Disconnect the card reader from your computer.
- b. Take the microSD memory card out of the card reader and install it in the ECM Tuner.



Note: To access the ports in the head unit of the ECM Tuner, users will have to pull off the enclosing rubber case.

9. Connect the ECM Tuner to a power source.

- ▶ Use the Mini-USB cable to connect the ECM Tuner to your computer, then press the top left button to exit USB mode when prompted.



OR

- ▶ Connect the ECM Tuner to your vehicle, turn the key to the RUN or ON position and the ECM Tuner will power on. Go to the Main Menu (top left button).

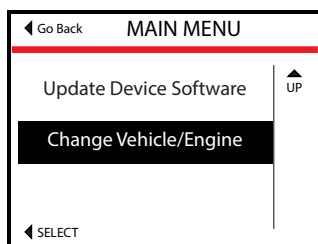
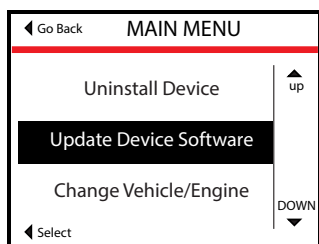
10. Go to the Main Menu (top left button).

11. Use the buttons on the right of the ECM Tuner to scroll down and highlight one of the following options:

- ▶ Update Device Software

OR

- ▶ Change Vehicle/Engine



12. **SELECT** the highlighted option (bottom left button).

13.(a) If you chose **Update Device Software**:

- Confirm that the correct engine/vehicle application is listed.

- b. Press the top right button (**Yes**) to continue and load the updated files to the ECM Tuner.



OR

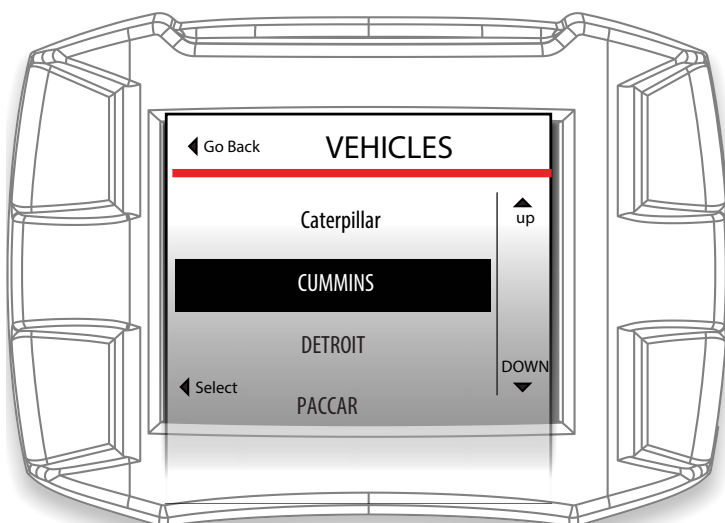
- If the engine/vehicle application is incorrect, press the top left button (**Go Back**). The ECM Tuner will go back to the Main Menu and you can choose **Change Vehicle/Engine** (or **Change Engine/Vehicle**).

13.(b) If you chose **Change Vehicle/Engine** (or **Change Engine/Vehicle**):

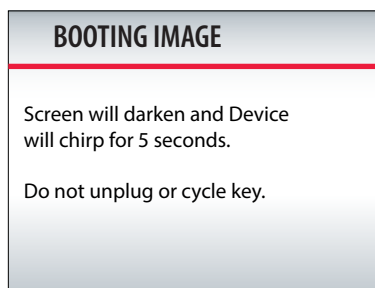
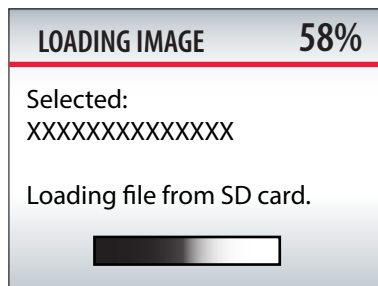
- a. Use the buttons on the right to find and highlight the correct vehicle/engine (or engine/vehicle) application on the list.
- b. Press the bottom left button to **Select** the highlighted vehicle/engine application.
- c. Confirm that the correct vehicle/engine application is listed.
- d. Press the top right button (**Yes**) to continue.

OR

- To choose a different vehicle/engine (or engine/ vehicle) application, press either the bottom right button (**No**) or the top left button (**Go Back**).



14. Once you have confirmed the vehicle/engine application, the ECM Tuner will load the new files and restart. Once the ECM Tuner has restarted, the update process is complete.



Physical Installation

1. Locate the Data Port and Connect the Plug.

The vehicle date port is typically located in one of three different locations:

- Underneath the dash.
 - On the driver's side of the cab.
 - On the lower front part of the dash.
- Near the back of the driver's seat.
- Under the driver's seat.



NOTICE: Some trucks may have two data ports. Use the 9-pin connection.



The data port shown above is in a vulnerable position; it is important to protect the connection in this type of situation.

1. Line up the pin-pattern on the face of the data plug to the hole-pattern on the data port.
2. Press the plug in.
3. Secure the connection by rotating the lock ring on the data plug.

1. Connect ECM Tuner and Complete Install.

1. Plug in the ECM Tuner and let the device power on.
2. Proceed to the “Installing the Tuning” section. *When the install process is complete, users can disconnect the ECM tuner and store it in a safe spot.

SPECIAL NOTE:

Volvo trucks with Cummins® engines, some Cat® engines and Detroit engines® require a direct connection to the engine computer. Bully Dog has created wiring harnesses to address this need. For more information, contact technical support.

Cummins®: 46510-1



Cat®: 46520-2



Detroit® DDEC IV: 46530-1



Installing the Tune

In order to enjoy the advantages of tuning your engine, like additional horsepower and/or fuel economy, you need to use the Install Tuning feature.

The process is basically the same when you are installing the tune, changing certain settings or uninstalling.

CAUTION! This option actively reprograms the engine computer – if the process is interrupted for any reason, it will cause problems which could prevent you from using the HDGT or even being able to drive your vehicle for a few days.

To ensure a successful tune installation, complete the preparation steps.



Important Preparation Steps (for All Engine Types)

Choosing an Appropriate Time and Place to Install

Do NOT install if you will need to use the vehicle to get somewhere soon.

- Do set aside three hours to install the tune.
- Do NOT install if the trailer is loaded.
- Do NOT install if you are at a dock.
- Do NOT install in time sensitive situations.

Do NOT install if the vehicle is in a remote location.

- DO make sure that you have access to a phone and a computer with internet access.
- If you encounter problems during the install, you may need to use a computer with Internet access to get special files from technical support.

A computer with Internet access is required to complete the installation for Cat[®] engines.

Do NOT install if you do not have a way to contact technical support.

- Technical support is open Monday-Friday, 8 a.m. – 5 p.m., Mountain Standard Time.
- If you decide to install on Friday evening and encounter problems, you might not be able to use your vehicle until you can contact technical support on Monday

Managing Other Electronics

Make sure that electrical devices are turned off or disconnected as described below while you are installing the ECM Tuner to your vehicle. Once the tune is installed, you can reconnect them and turn on all of the electronics that you normally use.

IMPORTANT NOTE: Do not use the ECM Tuner with any other electronic device designed to increase horsepower (such as a fooler wire or plug-in box).

DO disconnect the ABS fuse.

- This can be reconnected after the tune installation is complete.

DO disconnect the trailer wiring from tractor.

- This can be reconnected after the tune installation is complete.

DO turn off all factory installed electronics inside the vehicle. This includes:

- Headlights, header, air conditioning, stereo, DVD players, etc.
- Failing to turn off *ALL* electronics can prevent successful tune installation.

DO disconnect additional electrical appliances. Remove any chargers or electrical devices connected to:

- Cigarette lighters, USB ports, or other types of electrical outlets in the vehicle.

DO disconnect any other aftermarket electronic device. This includes:

- Trailer brakes, stereo, alarm, CB, remote start, DPF delete, Sirius/XM satellite radio, etc.
- Any electrical device that was installed after the vehicle was released from the factory.
- Disconnect these items from the fuse box or other power connection. You do not have to completely physically uninstall them; must make sure they are not getting power.

Make SURE the Battery is Charged

DO make sure that your batteries are fully charged before beginning any download.

- It is a good idea to have a battery charger ready to connect to your vehicle if the batteries begin to lose their charge while you are installing the tune.

IMPORTANT NOTE: It is very important that the tuner is not interrupted while it is writing to your engine computer – if the batteries die and the tune is interrupted it could prevent you from being able to start your vehicle.

Make SURE that the Tuner is Ready

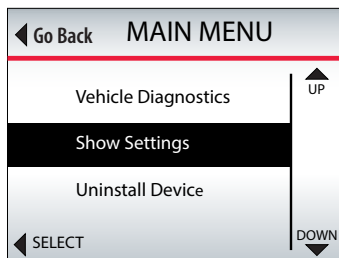
DO update your ECM Tuner.

- Updating requires a computer with Internet access.

Do install the microSD memory card into the ECM Tuner.

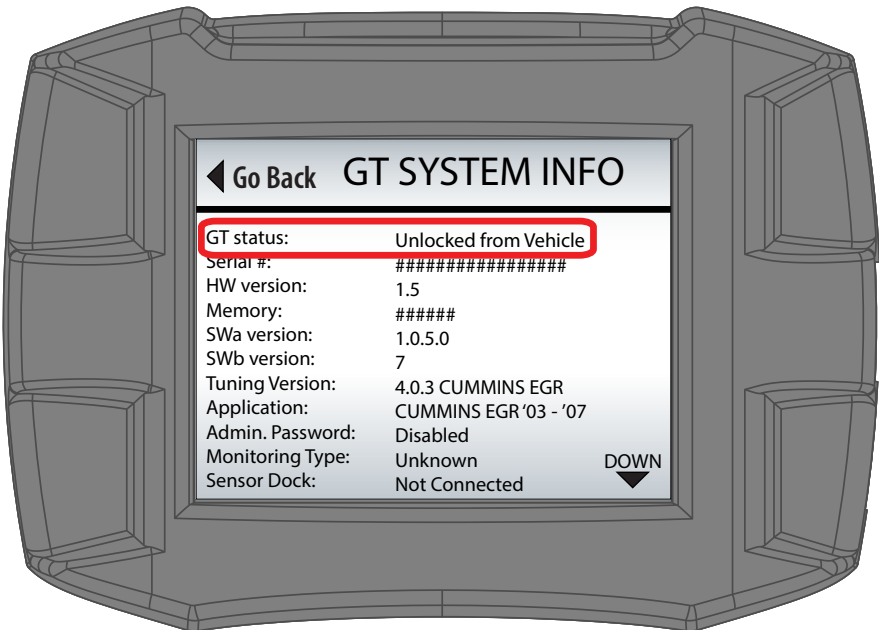
DO make sure that the tune has not already been installed.

1. Go to the Main Menu on the ECM Tuner.
 - From the Main Menu, press the top left button on the ECM Tuner.
2. Choose the **Show Settings** option.
 - Use the buttons on the right to highlight **Show Settings**.
 - Use the bottom left button to **Select** the highlighted option.



3. Check what is showing next to **GT status**

- ▶ The information is displayed at the top of the first screen in the Show Settings option.
- ▶ **Unlocked from Vehicle:** continue with your preparations to install the tune.
- ▶ **Locked to Vehicle:**
 - Connect the ECM Tuner to the original vehicle and uninstall the tune.
 - If this cannot be done, contact technical support (a fee may be required to reset the device).
- ▶ **Recovery:** Contact technical support for further assistance.



Detroit®/Mercedes, Cummins® and Paccar® Engines

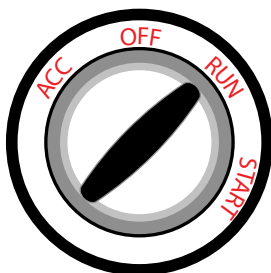
Overview

In order to provide a basic understanding of the install process, this simplified preview has been provided. It is very important that: 1) you have completed the physical installation, 2) you have completed the preparation steps and 3) you are familiar with the detailed instructions provided before you attempt to install the ECM Tuner.

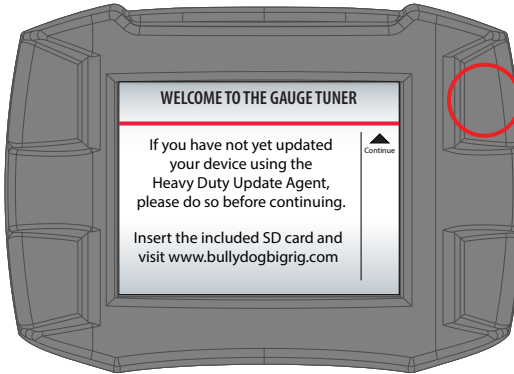
1. Physically install the ECM Tuner.
2. Prepare to install the tune.
3. Turn the key to the RUN (or ON) position.
4. Choose **Install Tuning** from the Main Menu.
5. Follow the onscreen prompts to complete the tune installation.

Detailed Instructions

1. Physically install the ECM Tuner.
2. Prepare to install the tune.
3. Turn the key to the RUN (or ON) position.
 - Do NOT start the engine.

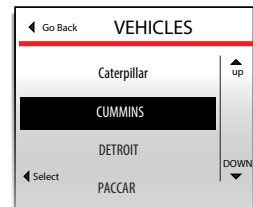


4. Read the disclaimer on the welcome screen.
 - If you have already updated, press **Continue** (top right button).
 - If not, disconnect and update.



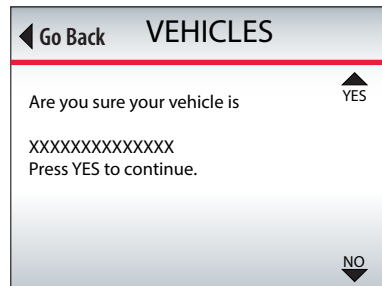
5. If it is the first time the ECM Tuner has been connected to a vehicle, you may need to select an engine type.
 - If you are not prompted to select a vehicle, skip to step 10.

- a. Highlight the correct vehicle type (right buttons).
- b. **SELECT** the highlighted option (bottom left button).



6. Double-check and confirm that you have selected the correct vehicle type.

- If it is not correct, you can choose **NO** (bottom right button) or **Go Back** (top left button) to change to the correct vehicle type.
- Press **YES** (top right button) to continue.



- LOADING IMAGE 58%

Selected:
XXXXXXXXXXXXXXXXXX

Loading file from SD card.



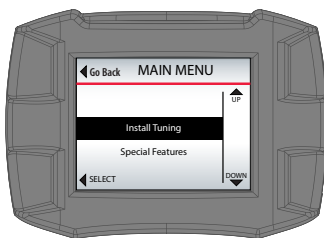
BOOTING IMAGE

Screen will darken and Device will chirp for 5 seconds.

Do not unplug or cycle key.

- ▶ This process is fast and may take one minute or less.
- ▶ The ECM Tuner will show a percentage counter to track its progress.

9. The ECM Tuner will reboot/restart and show the menu.

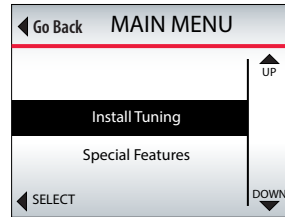


NOTE: At this point in the install process, you can complete an optional backup of your vehicle files through the Heavy Duty Update Agent; simply follow the normal steps to update the ECM Tuner.

10. Go to the Main Menu (top left button).

11. Highlight **Install Tuning** (right buttons).

12. **SELECT** the highlighted option (bottom left button).

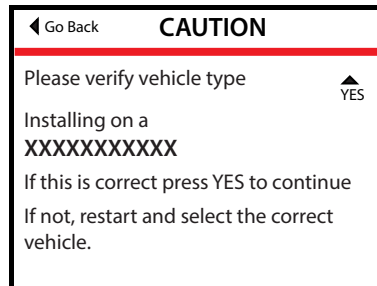


13. You may receive a message stating that the ECM Tuner has not been registered – press **Continue** (top right button) to proceed with the tuning and be sure to register later.



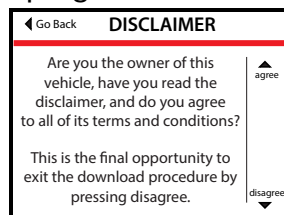
14. Verify that the correct vehicle type is selected and press **YES** to continue (top right button).

- If the vehicle type is not correct, restart the ECM Tuner by cycling the key (to the OFF and then ON or RUN positions; do NOT start the engine). Then choose **Change Vehicle/Engine** from the Main Menu to select the correct vehicle type.

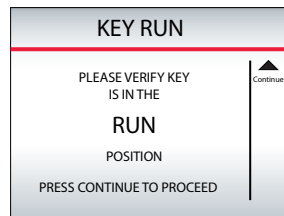


15. Read the disclaimer and press the top right button to **Agree** and continue.

- If you **Disagree**, press the top left button; this will end the tune installation.
- This is the last point at which you can safely exit the tune installation.

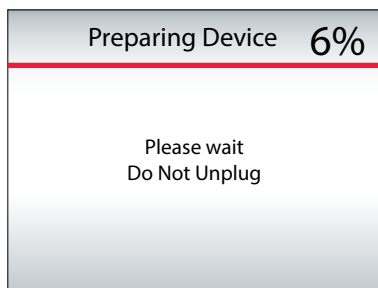


16. Verify that the key is in the RUN (or ON) position and press the top right button to **Continue**.



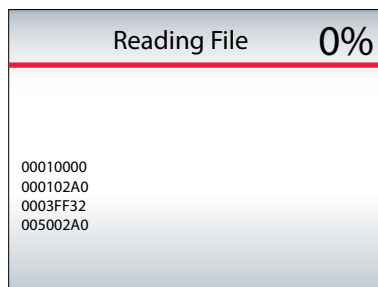
17. The ECM Tuner will prepare to install the tune.

- The ECM Tuner will show a percentage counter to track its progress.
- Do NOT interrupt the ECM Tuner.



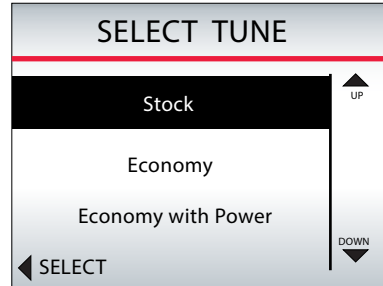
18. The ECM Tuner will read the file.

- This means that the ECM Tuner is reading the stock file from your engine computer.
- This part of the tune installation can take between 30 seconds and 2 hours.
- Do NOT interrupt the ECM Tuner.



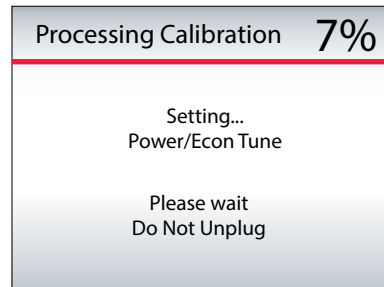
19. When the ECM Tuner is finished reading the file, it will prompt you to select a tune.

- Choose between Stock, Economy, Power/Economy and Power.
- Use the buttons on the right to highlight the tune you want.
- Press the bottom left button to **Select** the highlighted tune and continue.



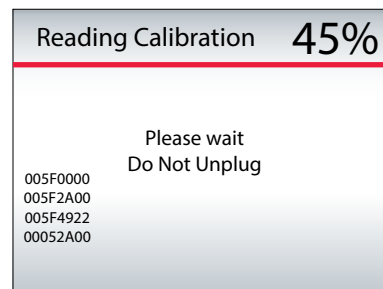
20. The ECM Tuner will process the calibration.

- The ECM Tuner will show a percentage counter to track its progress.
- Do NOT interrupt the ECM Tuner.



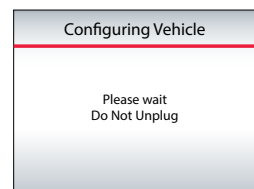
21. The ECM Tuner will read the calibration.

- The ECM Tuner will show a percentage counter to track its progress.
- Do NOT interrupt the ECM Tuner.



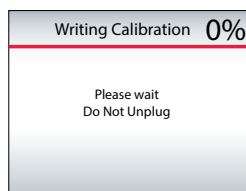
22. The ECM Tuner will configure the vehicle.

- Do NOT interrupt the ECM Tuner.



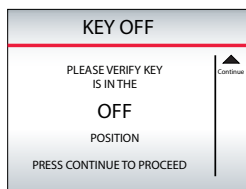
23. The ECM Tuner will write the calibration.

- This means that the ECM Tuner is actively writing the tune to the engine computer.
- This process can take between 15 and 45 minutes; it will take about 30 minutes on most vehicles.
- Do NOT interrupt the ECM Tuner.



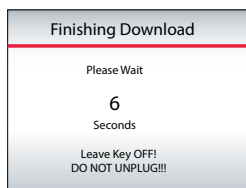
24. When the ECM Tuner has finished writing the tune to the engine computer, it will prompt you to turn the key to the OFF position.

- Turn the key to the OFF position.
- Press **Continue** (top right button).



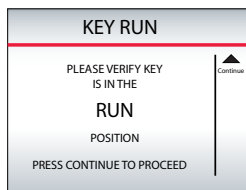
25. The ECM Tuner will display a countdown.

- Leave the key in the OFF position.
- Do NOT interrupt the ECM Tuner.

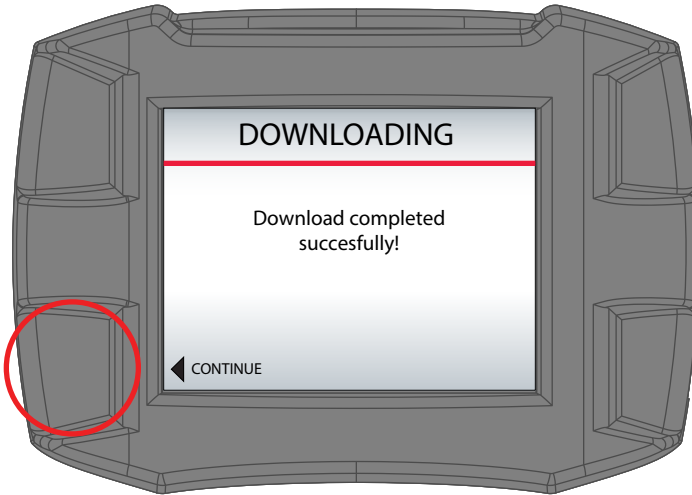


26. After the countdown, the ECM Tuner will prompt you to turn the key to the RUN position.

- Turn the key to the RUN position.
 - Do NOT start the engine.
- Press **Continue** (top right button).

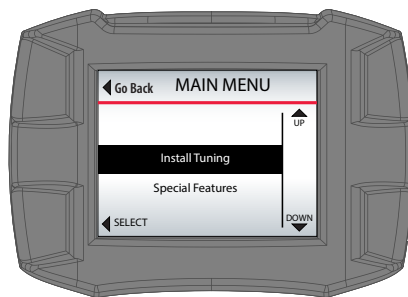


27. The ECM Tuner will complete the tune installation.
- Press **Continue** (bottom left button).



28. The ECM Tuner will reboot and show the Main Menu screen.

- Test to make sure that your vehicle starts and runs correctly. If so, the tune has been successfully installed and you are ready to enjoy your ECM Tuner!
 - Read troubleshooting if your vehicle does not start.
 - If the ECM Tuner freezes or generates an error message, contact technical support.



Cat® Engines

Overview

In order to provide a basic understanding of the install process, this simplified preview has been provided. It is very important that: 1) you have completed the physical installation described, 2) you have completed the preparation steps and 3) you are familiar with the detailed instructions provided before you attempt to install the ECM Tuner.

Phase 1

1. Physically install the ECM Tuner.
2. Prepare to install the tune.
3. Turn the key to the RUN (or ON) position.
4. Choose **Install Tuning** from the Main Menu.
5. Allow the ECM Tuner to collect information from your vehicle.

Phase 2

1. Disconnect the microSD memory card from the ECM Tuner.
2. Use the card reader to connect the memory card to a computer with Internet access.
3. Use the Update Agent to download the Phase 3 files to the memory card.

Using the Update Agent for Phase 2 of the Cat® engine tune installation requires registration.

Phase 3

1. Install the memory card into the ECM Tuner.
2. Turn the key to the RUN (or ON) position.
3. Choose **Install Tuning** from the Main Menu.
4. Follow the onscreen prompts to complete the tune installation.

Detailed Instructions

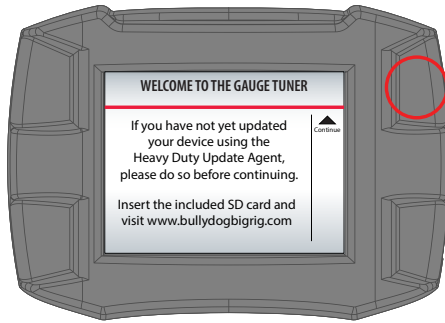
Phase 1

1. Physically install the ECM Tuner.
2. Prepare to install the tune.
 - a. Disconnect the trailer wire.
 - b. Remove ABS/brake fuses.
3. Turn the key to the RUN (or ON) position.
 - a. Do NOT start the engine.

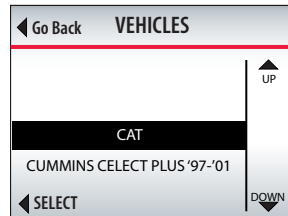


4. Read the disclaimer on the welcome screen.

- If you have already updated, press **Continue** (top right button).
- If not, disconnect and update.

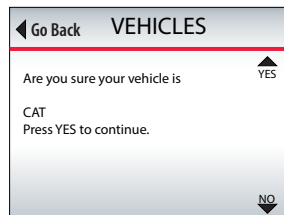


5. If it is the first time the ECM Tuner has been connected to a vehicle, it may require that you select an engine type before you are allowed to continue.
 - If you are not prompted to select a vehicle, skip to step 10.
- a. Use the buttons on the right to highlight the correct vehicle type.
- b. Press the bottom left button to **SELECT** the highlighted vehicle type.



6. Double-check and confirm that you have selected the correct vehicle type.

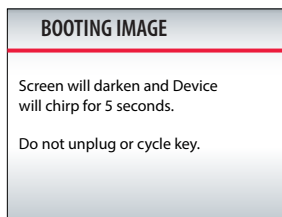
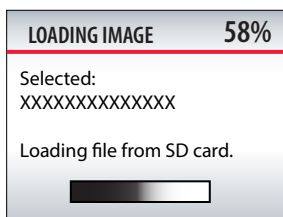
- If the vehicle is not correct, you can choose **NO** (bottom right button) or **Go Back** (top left button) to change to the correct vehicle type.



- a. Press **YES** (top right button) to continue.

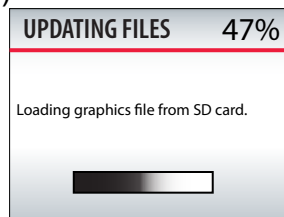
7. The ECM Tuner will then load and boot the image (the vehicle files).

- This process is fast, it should not take longer than three minutes.
- The ECM Tuner will show a percentage counter while it is loading; then the screen will darken and the device will chirp for approximately five seconds while it reboots.

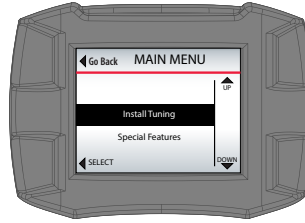


8. The ECM Tuner will update files (load the graphics file from the memory card to the device).

- This process is fast and may take one minute or less.
- The ECM Tuner will show a percentage counter to track its progress.



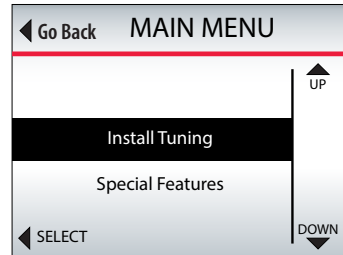
9. The ECM Tuner will restart and show the Main Menu screen in a Demo Mode.



10. Go to the Main Menu (top left button).

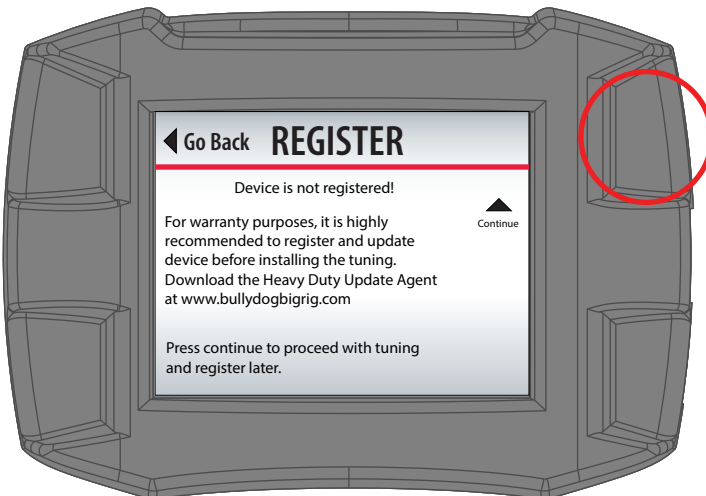
11. Highlight **Install Tuning** (right buttons).

12. **SELECT** the highlighted option (bottom left button).



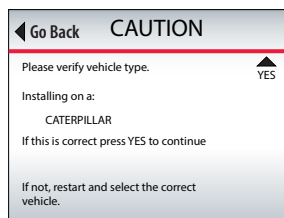
13. You may receive a message stating that the ECM Tuner has not been registered.

- a. Press **Continue** to proceed with the tuning and be sure to register later.



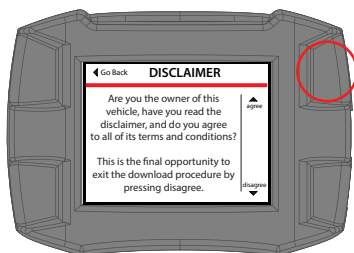
14. Verify that the correct vehicle type is selected and press **Yes** to continue (top right button).

- ▶ If the vehicle type is not correct, restart and select the correct vehicle by cycling the key position and choosing **Change Vehicle/Engine** from the Main Menu.



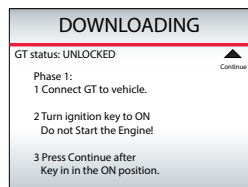
15. Read the disclaimer and press the top right button to **Agree** and continue.

- ▶ If you **Disagree**, press the top left button; this will end the tune installation.
- ▶ This is the last point at which you can safely exit the tune installation.



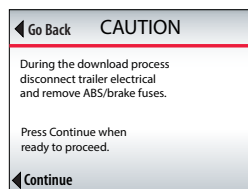
16. Confirm that the key is in the RUN (or ON) position.

17. Press **Continue** (top right button).

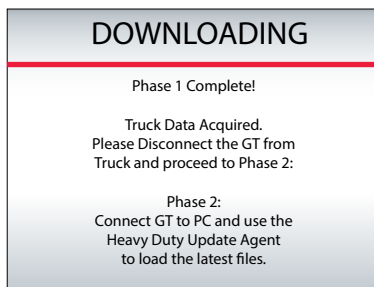


18. Confirm that you have disconnected the trailer wire and removed the ABS/ brake fuses.

19. Press **Continue** (top right button).



20. Once the ECM Tuner shows that Phase 1 is complete, begin Phase 2.



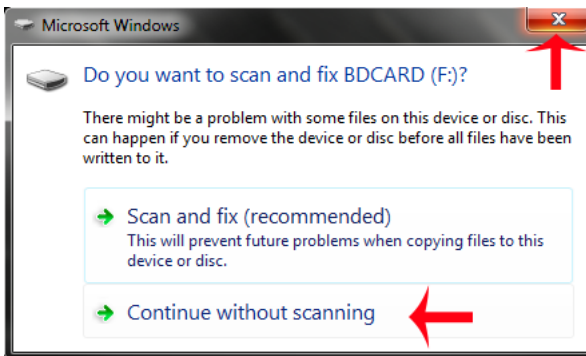
Phase 2

The following installation steps can only be completed with a Microsoft Windows® computer that has Internet access. If you do not have access to a suitable computer, contact your Bully Dog dealer for installation help.

1. Remove the microSD memory card from the ECM Tuner.
2. Run the Heavy Duty Update Agent on a computer with Internet access.
3. Plug the microSD memory card into the card reader.
4. Plug the card reader (with the microSD card) into a computer USB port.



- ▶ Close the Autoplay window if it pops up.
- ▶ Close the window or click **Continue** without scanning if a dialog box pops up with an option to “scan and fix BDCARD.”

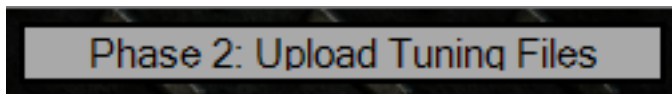


5. The Update Agent should automatically recognize the memory card.
 - The Update Agent may prompt you to complete registration; this is required to continue with Phase 2 of the Cat® engine tune installation.
 - If the ECM Tuner is already registered, no registration prompt should appear.

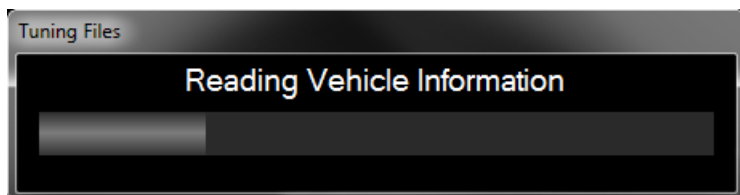
Device Registration

Owner Information					
First Name*:		Last Name*:		Address 1:	
Company Name:			Address 2:		
Phone Number:		Country:		State/Province:	
Email Address*:			City:		Zip Code:
☒ Yes, please send me updates and newsletters from Bully Dog.					
Truck Information			Product Information		
Make*:		Model*:		Product Name*:	
Year:	Engine Make*:	Engine Model*:		Serial Number*:	
Place of Purchase*:				Date of Purchase*:	
Registration information is used for warranty confirmation, proof of ownership, and improvements in product development. * Indicates required field.					
Submit				Cancel	

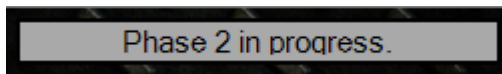
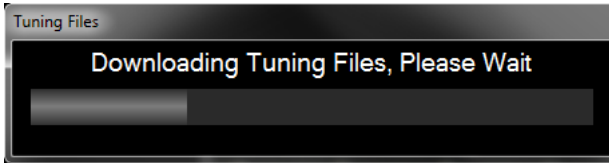
6. Click **Phase 2: Upload Tuning Files**.



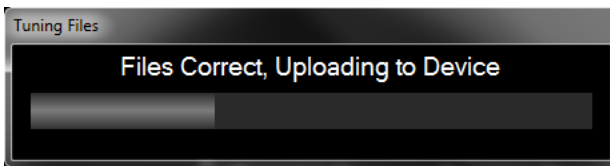
7. The Update Agent will read information collected about the vehicle during Phase 1.



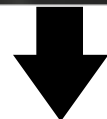
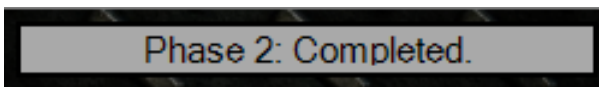
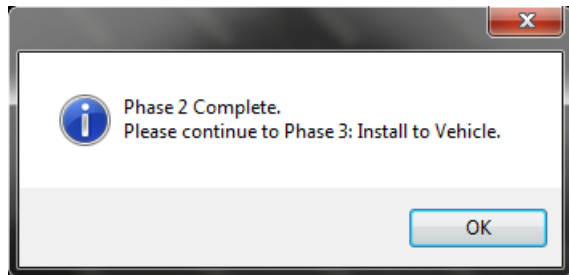
8. Two more progress bars will be displayed. Give the Update Agent time to complete the following tasks:
 - **Download tuning files:** The Update Agent will retrieve the correct tuning files from the Bully Dog website.



- **Files correct, Uploading to Device:** The Update Agent is transferring the tuning files to the memory card.



9. Click **OK** when the Update Agent indicates that Phase 2 is complete.



10. Put the memory card back into the ECM Tuner.
11. Continue to Phase 3.

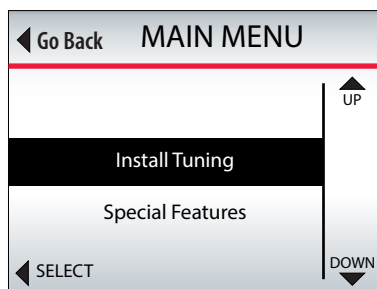


Phase 3

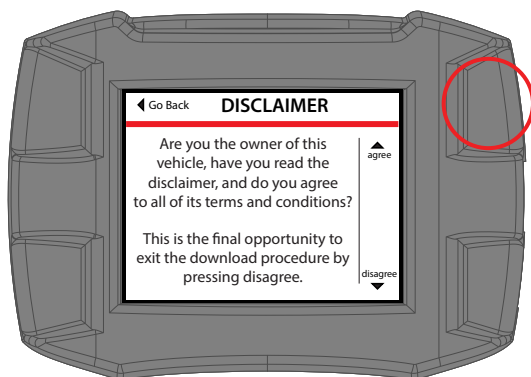
1. Turn the key to the RUN (or ON) position.
 - Do NOT start the engine.



2. Go to the Main Menu by pressing the top left button.
3. Use the buttons on the right to highlight **Install Tuning**.
4. Press the bottom left button to **SELECT** the highlighted option.

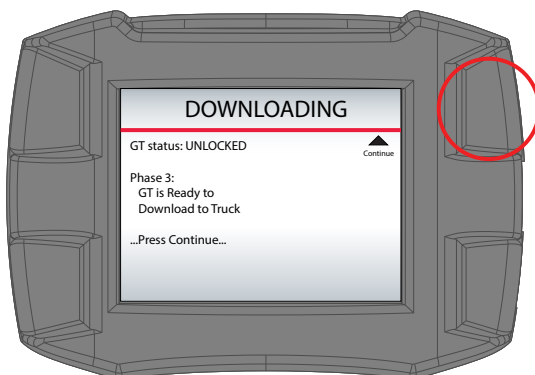


5. Read the disclaimer and press the top right button to **Agree** and continue.
 - If you **Disagree**, press the top left button; this will end the tune installation.
 - This is the last point at which you can safely exit Phase 3 of the tune installation.

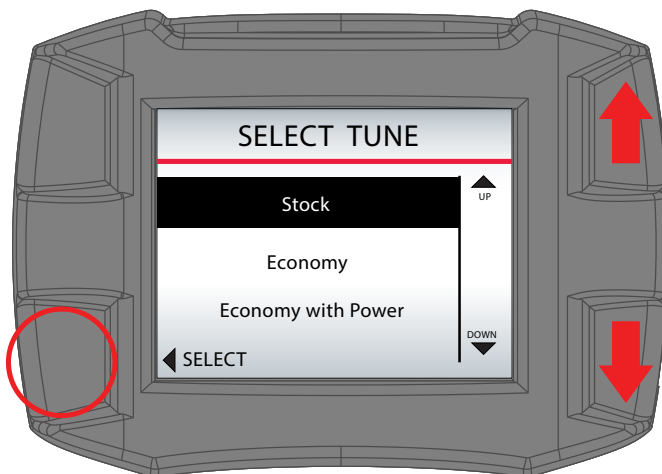


After this point, it is extremely important that the ECM Tuner and vehicle are not disturbed. If the process is interrupted, the engine computer may need to be recovered.

6. The ECM Tuner will display the Phase 3 initiation screen.
7. Press the top right button to **Continue**.



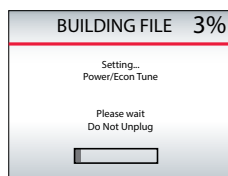
8. The ECM Tuner will provide a list of available engine tunes. Select the tune you prefer:
 - **Stock:** Original factory power levels.
 - **Economy:** 6-12% improvement in fuel mileage (with good driving habits).
 - **Power/Economy:** 6-12% improvements in fuel mileage (with good driving habits) plus approximately 18% gain in engine power output.



After the tune is selected, do not unplug or disturb the ECM Tuner or vehicle in any way. If the process is interrupted, the engine computer may need to be recovered.

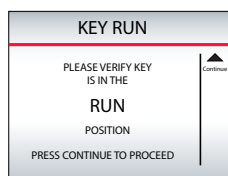
9. The ECM Tuner will build the file.

- This process is fast; it should take a minute or less.
- Do NOT interrupt the ECM Tuner.



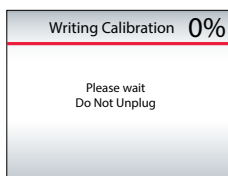
10. Verify that the key is in the RUN (or ON) position.

- a. Press CONTINUE (top right button).



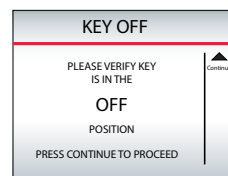
11. The ECM Tuner will write the calibration.

- Do NOT interrupt the ECM Tuner.



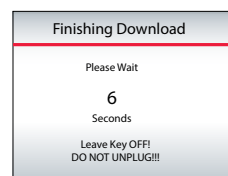
12. Turn the key to the OFF position.

- a. Press Continue (top right button).



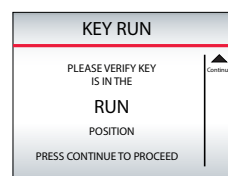
13. The ECM Tuner will finish the download.

- Leave the key in the OFF position.
- Do NOT interrupt the ECM Tuner.

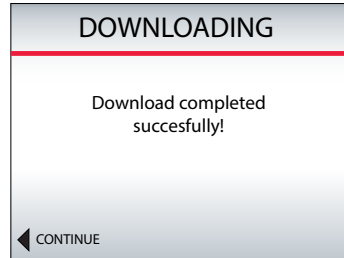


14. Turn the key to the RUN (or ON) position.

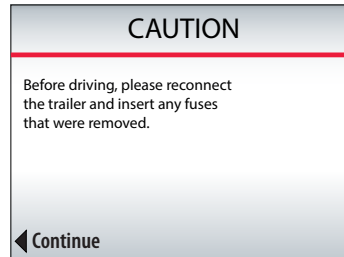
- Do NOT start the engine.
- a. Press Continue (top right button).



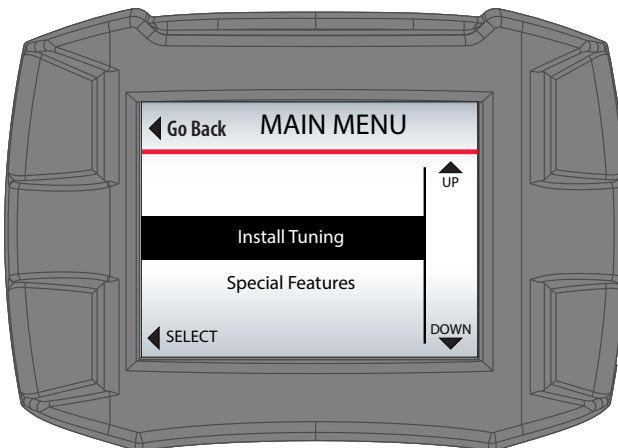
15. Once the download has been successfully completed, press Continue (bottom left button).



16. Reconnect the trailer wire and replace the ABS/brake fuse(s).
- Press Continue when you are ready to proceed (bottom left button).



17. The ECM Tuner will reboot to the menu.
- Start vehicle and make sure it runs correctly. If so, the tune has been successfully installed and you are ready to enjoy your ECM Tuner!
 - See troubleshooting if your vehicle does not start.
 - If the ECM Tuner freezes or generates an error message, contact technical support.



Uninstalling the Tune

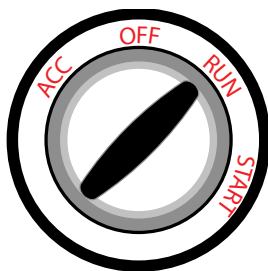
The process of uninstalling the tune or “returning to stock” is very similar to the original process of installing the tune because the ECM Tuner actively reprograms the engine computer. This means that the same important preparation steps must be taken to ensure that the engine computer does not need to be recovered.

Overview

1. Prepare the vehicle to uninstall the tune.
2. Turn the key to the RUN (or ON) position.
3. Choose Uninstall Device from the Main Menu.
4. Follow the prompts on the ECM Tuner screen.

Detailed instructions.

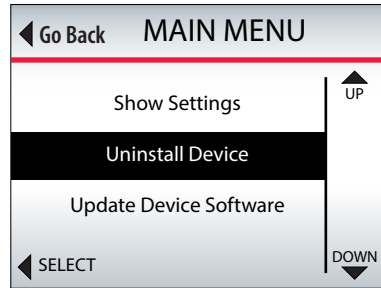
1. Prepare the vehicle to uninstall the tune.
2. Turn the key to RUN (or ON).



3. Go to the Main Menu (top left button).

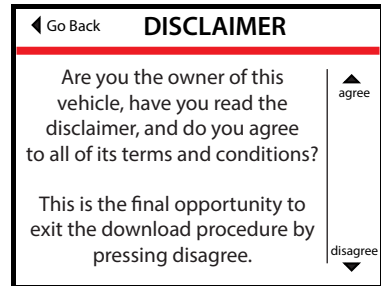
4. Highlight **Uninstall Device** (right buttons).

5. **SELECT** the highlighted option (bottom left button).



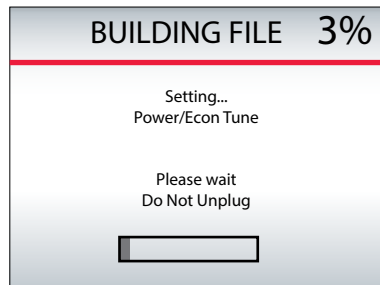
6. Read the disclaimer and press the top right button to **Agree** and continue.

- If you **Disagree**, press the bottom left button; this will end the tune installation.
- This is the last point at which you can safely exit the uninstall process.



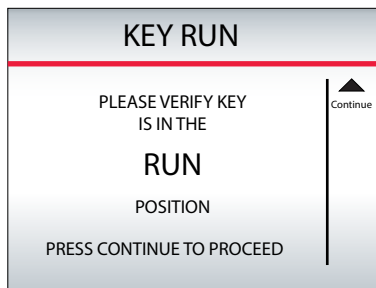
7. The ECM Tuner will build the file.

- This process is fast; it should take about one minute.
- The ECM Tuner will show a percentage counter to track its progress.
- Do NOT interrupt the ECM Tuner.



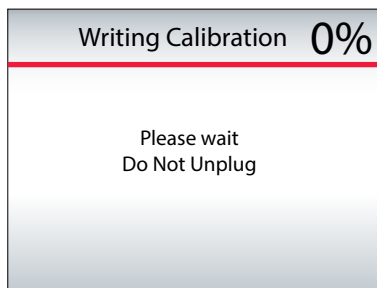
8. When the ECM Tuner has finished preparing to uninstall the tune, it will prompt you to turn the key to the RUN position.

- a. Turn the key to the RUN (or ON) position.
- b. Press Continue (top right button).



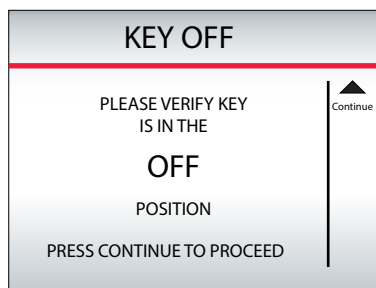
9. The ECM Tuner will connect to the engine computer and write the calibration.

- This means that the ECM Tuner is actively writing the tune to the engine computer.
- This process can take between 15 and 45 minutes; it will take about ½ hour on most vehicles.
- Do NOT interrupt the ECM Tuner.



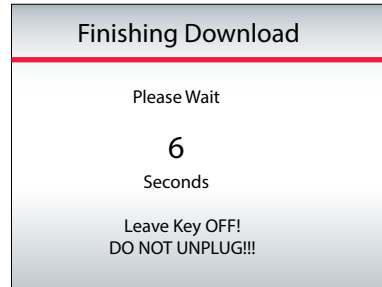
10. When the ECM Tuner has finished uninstalling the tune from the engine computer, it will prompt you to turn the key to the OFF position.

- a. Turn the key to the OFF position.
- b. Press Continue (top right button).



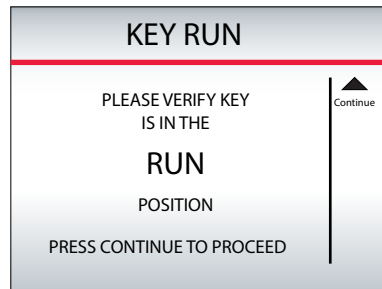
11. The ECM Tuner will display a countdown.

- ▶ Leave the key in the OFF position.
- ▶ Do NOT interrupt the ECM Tuner.



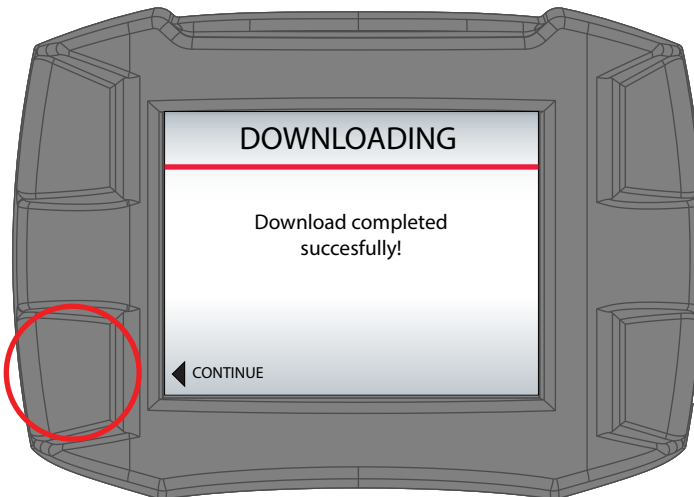
12. After the countdown, the ECM Tuner will prompt you to turn the key to the RUN position.

- a. Turn the key to the RUN (or ON) position.
 - a. Do NOT start the engine.
- b. Press Continue (top right button).

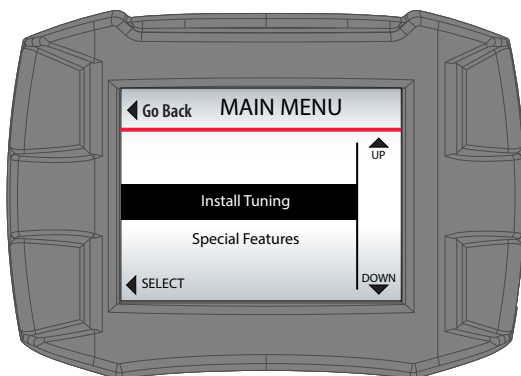
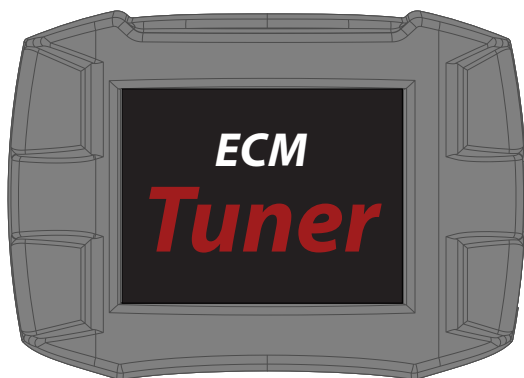


13. The ECM Tuner will complete the uninstall download.

- a. Press Continue (top right button).



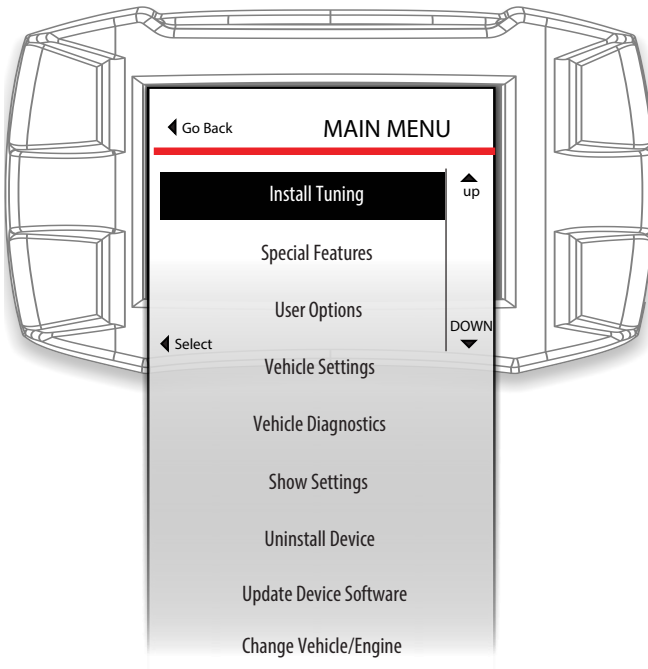
14. The ECM Tuner will reboot and show the Main Menu screen.
 - a. Test to make sure that your vehicle runs correctly.
 - If your vehicle does not start, contact technical support.
 - b. Check the status of the ECM Tuner to make sure that it shows Unlocked.
 - If the ECM Tuner freezes or generates an error message, contact technical support.



Operating the ECM Tuner

Menu and Feature Setup

This section is a comprehensive explanation of the options available on the Main Menu. It includes detailed instructions for features that require setup.



NOTE: From the Main Menu, use the right buttons to scroll through the list. The bottom left button will **SELECT** the highlighted option and the top left button will **Go Back** to the Main Menu.

Install Tuning

Install the ECM Tuner tune to your vehicle engine.

IMPORTANT NOTE: This step actively reprograms the engine computer (ECM/ECU); therefore, it is very important to be fully informed and prepared before beginning the tune installation.

Special Features

The special features described in this section are not available for every vehicle. If a feature is available for a vehicle, then it will appear in the Special Features menu on the ECM Tuner. In order to access the Special Features, the correct vehicle application must be selected on the ECM Tuner; the special features list will change based on the vehicle that has been selected.

To access the Special Features on the ECM Tuner:

1. Turn the key to the RUN (or ON) position.
 - Do NOT start the engine.
2. Go to the Main Menu (top left button).
3. Choose Special Features.
 - a. Use the buttons on the right to scroll up and down the Main Menu and highlight **Special Features**.
 - b. Press the bottom left button to **SELECT** the highlighted option.
4. Verify that the key is in the RUN position.
 - a. Press **Continue** (top right button).
5. The ECM Tuner will gather data from your vehicle.
 - Do NOT interrupt this process.
 - Do not disconnect the ECM Tuner or cycle the key.
6. Once the ECM Tuner has finished gathering data from your vehicle, it will display the Special Features screen.
 - The screen will change depending on which features are available for your vehicle.
 - It will look similar to the illustration below:

◀ Go Back

SPECIAL FEATURES

	Current	Original	
Speed Limiter	74	75	▲ UP DOWN ▼
Cruise Low	15	30	
Cruise High	74	73	
Idle Timer	0	0	

Modifying these features will lock device to this vehicle. Unlock by returning to original settings.

◀ SELECT

Current refers to the value that is currently programmed into the engine computer.

Original refers to the stock vehicle setting.

To modify the current programmed value for any of the available special features highlight the special feature using the right scroll buttons and hit select.

Speed Limiter

Adjust top speed available on the vehicle.

Fuel Economy Tip: Limiting the top speed can dramatically reduce fuel consumption; even dropping down by 1-2 mph will have an effect.

Cruise Low

Set the lowest speed at which the cruise control can be set.

Cruise High

Set the highest speed at which the cruise control can be set.

Idle Timer

(Cat® Only)

Set the maximum amount of time that the vehicle is allowed to run at idle before the engine is automatically shut off.

Fuel Economy Tip: Reduce idle time to a minimum to save money and conserve fuel.

How to Adjust Special Features

1. Access the Special Features as described on page 51.
2. Highlight the feature that you want to change (right buttons).
3. **SELECT** the highlighted feature (bottom left button).
4. Change the value (right buttons).
5. Save the change by pressing **SELECT** (bottom left button).
 - If you do not want to save the change, press **Go Back** (top left button).

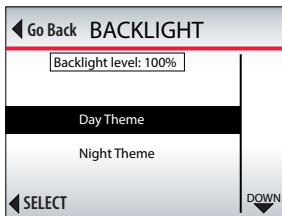
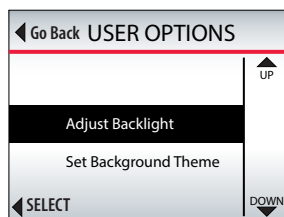
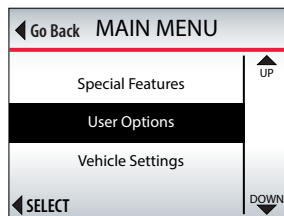
User Options

Set personal preferences on the ECM Tuner.

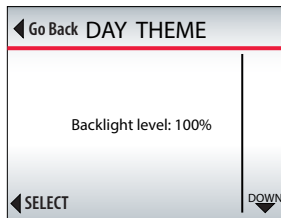
Adjust Backlight

Adjust the brightness of the screen; separate settings are available for day and night modes.

1. Go to the Main Menu (top left button).
2. Highlight **User Options** (right buttons).
3. **SELECT** the highlighted option (bottom left button).
4. Highlight **Adjust Backlight** (right buttons).
5. **SELECT** the highlighted option (bottom left button).
6. Highlight the theme you wish to adjust (right buttons).
 - The screen will display the highlighted mode.
 - The current backlight setting for the highlighted mode will be displayed at the top of the screen.
7. **SELECT** the highlighted mode (bottom left button).



8. Choose the desired backlight percentage (right buttons).
 - The screen brightness will change to demonstrate the backlight percentage option that is displayed.
 - It is possible to exit without changing the setting. To exit, press **Go Back** (top left button).
9. To set the currently displayed backlight percentage, press **SELECT** (bottom left button).
 - The ECM Tuner will automatically return to the previous screen.

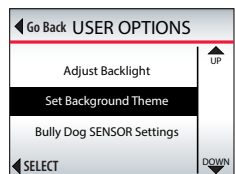
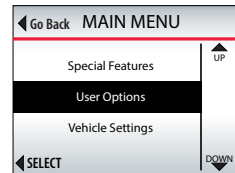


Set Background Theme

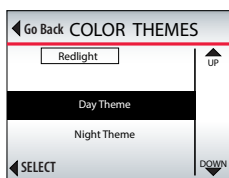
Change the color theme; separate settings are available for day and night modes. Choose from eight preset color themes or create your own customized color theme.

Selecting a Color Theme

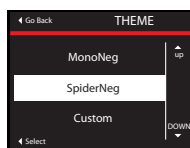
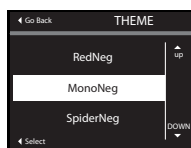
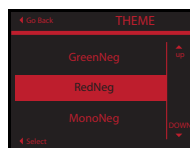
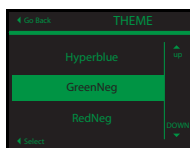
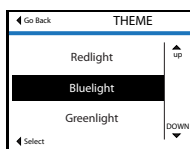
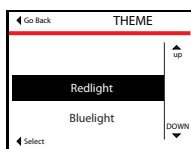
1. Go to the Main Menu (top left button).
2. Highlight **User Options** (right buttons).
3. **SELECT** the highlighted option (bottom left button).
4. Highlight **Set Background Theme** (right buttons).
5. **SELECT** the highlighted option (bottom left button).



6. Highlight the mode you wish to adjust (right buttons).
 - The screen will display highlighted mode.
 - The current color theme for the highlighted mode will be displayed at the top of the screen.

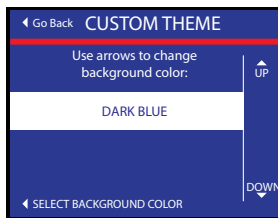


7. **SELECT** the highlighted mode (bottom left button).
8. Highlight the desired color theme.
 - The screen will display the highlighted color theme.
9. **SELECT** the highlighted theme (bottom left button).
 - If a preset color theme is selected, the ECM Tuner will automatically return to the previous screen.
 - Additional steps are required to set a customized theme, see the next section.



Creating a Custom Color Theme

1. Follow the steps listed in the previous section to select a custom background color theme.
2. Change the background color (right buttons).
 - The screen will display a preview of each color option.
3. To set the currently displayed color and advance to the next screen, press **SELECT** (bottom left button).
 - It is possible to exit without changing the setting. To exit, press **Go Back** (top left button).



4. Change the foreground color (right buttons).
 - The screen will display a preview of each color option.
 - The foreground color affects the text and directional arrows on the screen.
5. To set the currently displayed color and advance to the next screen, press **SELECT** (bottom left button).
 - It is possible to exit without changing the setting. To exit, press **Go Back** (top left button).



6. Change the border color.
 - The screen will display a preview of each color option.
7. To set the currently displayed color and advance to the next screen, press **SELECT** (bottom left button).
 - The ECM Tuner will go back to the background color (step 2) and the cycle will continue until you exit the CUSTOM THEME menu.



8. To exit, press **Go Back** (top left button).

If a color has been selected for one option (background, foreground or border), it will not be available for the other options. For example: If the background is green, then green will not be displayed for the other options until the background is changed to a different color.

Administrator Password

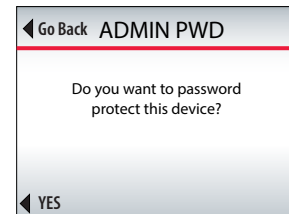
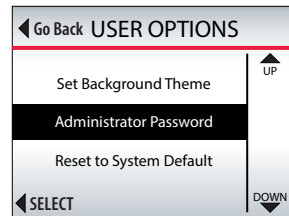
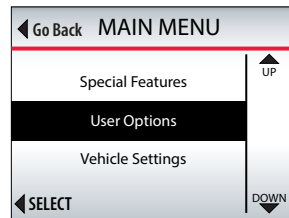
Password protect the following ECM Tuner functions:

- Reset to System Defaults
- Change Driving Coach Levels
- Install Tuning
- Reset Driving Coach Stats
- Special Features
- Uninstall Device
- Assign Truck Number
- Change Vehicle

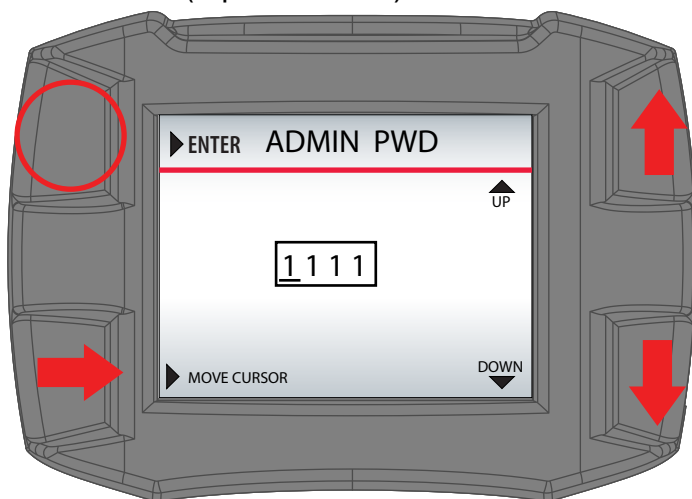
The ECM Tuner Administrator Password is a four digit code that can consist of numbers, spaces and letters.

Activating Password Protection

1. Go to the Main Menu (top left button).
2. Highlight **User Options** (right buttons).
3. **SELECT** the highlighted option (bottom left button).
4. Highlight **Administrator Password** (right buttons).
5. **SELECT** the highlighted option (bottom left button).
6. Press **YES** to confirm that you want to set a password (bottom left button).
 - It is possible to exit without setting a password. To exit, press **Go Back** (top left button).



7. Enter the Administrator Password.
 - To change the digit currently highlighted by the cursor, use the buttons on the right.
 - To move the cursor to the right, press **MOVE CURSOR** (bottom left button). If you need to correct a digit to the left of the cursor, press the button repeatedly until it cycles back to correct digit.
8. Press **ENTER** (top left button).



9. Confirm the password by entering it into the ECM Tuner a second time.

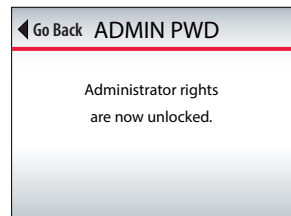
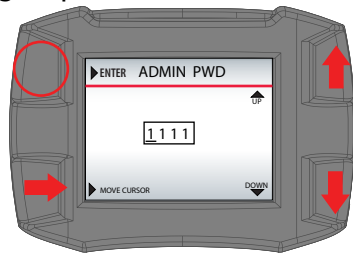
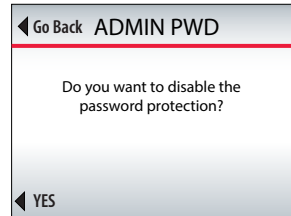
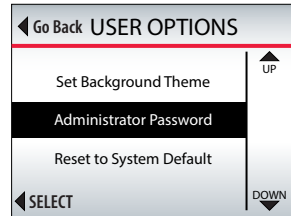
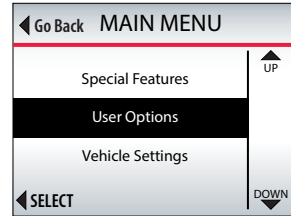
If the passwords do not match, the Administrator Password will not be set.

- Press **Go Back** (top left button).
- Try again, beginning with step 4.

10. Press **ENTER** (top left button).
11. The ECM Tuner will display a screen confirming that the Administrator Password has been set.
12. Press **Go Back** (top left button).

Disabling Password Protection

1. Go to the Main Menu (top left button).
2. Highlight **User Options** (right buttons).
3. **SELECT** the highlighted option (bottom left button).
4. Highlight **Administrator Password** (right buttons).
5. **SELECT** the highlighted option (bottom left button).
6. Press **YES** to confirm that you want to disable password protection (bottom left button).
7. Enter the Administrator Password.
 - To change the digit currently highlighted by the cursor, use the buttons on the right.
 - To move the cursor to the right, press **MOVE CURSOR** (bottom left button). If you need to correct a digit to the left of the cursor, press the button repeatedly until it cycles back to correct digit.
8. Press **ENTER** (top left button).
9. The ECM Tuner will display a screen confirming that the Administrator Password has been removed.
10. Press **Go Back** (top left button).

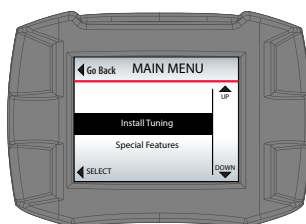
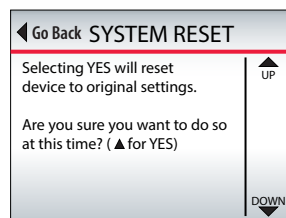
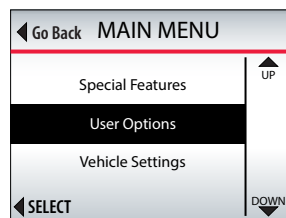


Reset to System Default

Reset the ECM Tuner user options.

The ECM Tuner will remain locked to a vehicle if the Install Tuning or Special Features options have been used, even if the defaults are reset. To unlock the ECM Tuner, you must go through the Uninstall Device process.

1. Go to the Main Menu (top left button).
2. Highlight **User Options** (right buttons).
3. **SELECT** the highlighted option (bottom left button).
4. Highlight **Reset to System Default** (right buttons).
5. **SELECT** the highlighted option (bottom left button).
6. Press **Yes** to confirm the reset (top right button).
 - It is possible to exit without resetting the ECM Tuner. To exit, press **NO** (bottom right button) or **Go Back** (top left button).
7. The ECM Tuner will reset and reboot.



Vehicle Settings

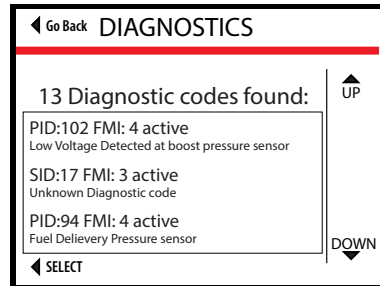
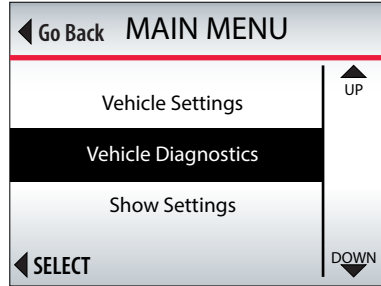
Change communication protocol settings.

Vehicle Diagnostics

Read and erase Diagnostic Trouble Codes (DTCs) from the engine computer. (The tune does not have to be installed to use this function of the ECM Tuner.)

To Read DTCs:

1. Go to the Main Menu (top left button).
2. Highlight **Vehicle Diagnostics** (right button).
3. **SELECT** the highlighted option (bottom left button).
4. The ECM Tuner will check for DTCs.
 - If DTCs are detected, the ECM Tuner will display them on the screen. Keep reading for more information about what to do if DTCs are detected..
 - If no DTCs are found, the ECM Tuner will display a message that no codes are present.
 - If the ECM Tuner reports an “Error reading codes,” contact technical support.
5. To exit, press **Go Back** (top left button).



What to do if DTCs are detected:

- Write down the code number and any description that is displayed.
- It is a good idea to discuss any codes that are detected with an OEM certified mechanic.

- A helpful website for looking up DTC codes:
<http://engine-codes.com>
- You can also search for information about DTC codes with your favorite search engine.

IMPORTANT NOTE: Most DTCs indicate a problem with the engine, not the ECM Tuner. To determine if the ECM Tuner is causing a DTC, follow these steps:

1. Uninstall the tune.
2. Drive the vehicle for about one week.
 - If the DTC comes back during this time, there is a problem with your vehicle and you should contact an OEM certified mechanic.
 - If the DTC doesn't come back during this time, proceed to the next step.
3. Reinstall the tune.
4. Drive the vehicle for about one week.
 - If the DTC comes back while the tune is reinstalled, contact Bully Dog technical support.

Show Settings

View ECM Tuner and vehicle information. See “Checking GT Status” section for more information about checking the ECM Tuner status to determine if the unit has been locked to a vehicle.

Uninstall Device

Begin the process of uninstalling the ECM Tuner tune from the engine computer.

IMPORTANT NOTE: This step actively reprograms the engine computer (ECM/ECU); therefore, it is very important to be fully informed and prepared before beginning the uninstall process.

Update Device Software

Complete the update process by transferring files from the microSD memory card to the ECM Tuner.

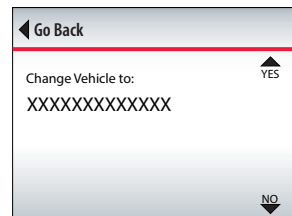
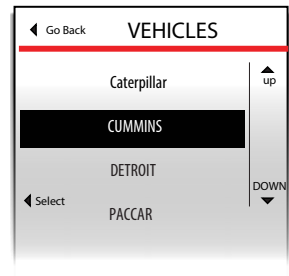
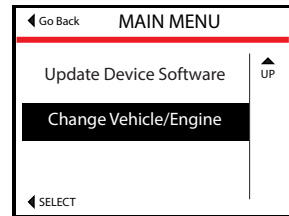
Change Vehicle/Engine

Specify the vehicle engine type.

IMPORTANT NOTE: The correct vehicle **MUST** be selected, or none of the ECM Tuner functions will work properly.

To Change the Vehicle/Engine:

1. Go to the Main Menu (top left button).
2. Highlight **Change Vehicle/Engine** (right buttons).
3. **SELECT** the highlighted option (bottom left button).
4. Highlight the correct vehicle/engine type (right buttons).
5. **SELECT** the highlighted option (bottom left button).
6. Highlight the correct engine type/ year (right buttons).
7. **SELECT** the highlighted option (bottom left button).
8. Press **YES** to confirm the file and continue (top right button).
 - To exit without changing the vehicle type, press **NO** (bottom right button) or **Go Back** (top left button).
9. The ECM Tuner will load the vehicle files and reboot.
 - Do NOT interrupt the ECM Tuner during this process.



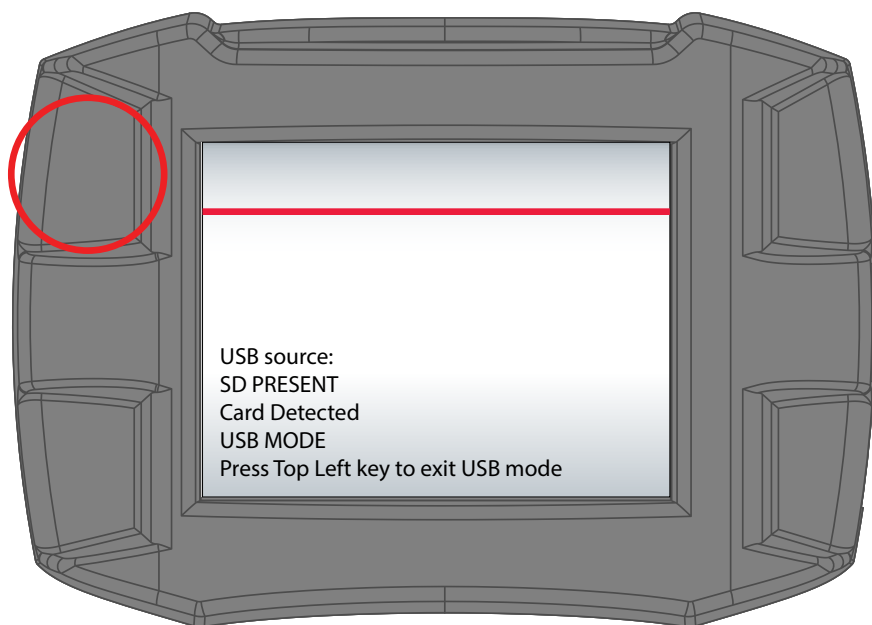
More Information

USB Mode

When you connect the ECM Tuner to a computer via USB cable, it enters USB mode.

In order to use the Update Agent, keep the ECM Tuner in USB Mode.

If you want to use your computer to power the ECM Tuner and access some of the functions without connecting it to a vehicle, you can exit USB mode by pressing the top left button as shown in the illustration below:



Contacting Technical Support

Technical support is open Monday-Friday 8 a.m. – 5 p.m., Mountain Standard Time.

Reduced level services are available for emergencies after hours.

The phone number to contact the heavy duty technical support team is (888) 844-6260.

You should have all of the following items available when contacting technical support:

- Your ECM Tuner
- Your vehicle
- A computer with Internet access

Checking GT Status

There are two different aspects of the ECM Tuner that can affect whether or not it can be installed on a vehicle.

1. If the tune on the ECM Tuner has been installed on a vehicle, it is locked and cannot be installed until it has been uninstalled from the original vehicle.
2. If the speed limiter has been adjusted with the ECM Tuner Special Features, it is locked and cannot be installed on another vehicle until it has been uninstalled from the original vehicle.

To Check the Status of the ECM Tuner:

1. Go to the Main Menu (top left button).
2. Highlight **Show Settings** (right buttons).
3. **SELECT** the highlighted option (bottom left button).
4. The status of the ECM Tuner is listed on the top line of the first screen.

NOTE: The Show Settings screens will also indicate if the ECM Tuner is locked because the tune has been installed and/or a Special Feature has been used. The screens are different for each vehicle/engine type. To navigate through the Show Settings screens, press UP (top right button) and DOWN (bottom right button).



Troubleshooting

SD Card Not Recognized

1. Make sure that the microSD memory card is inserted correctly in the ECM Tuner.
2. If it is already installed, remove it and then reinstall it.
3. If the error persists, contact technical support

Vehicle Does Not Start

1. Uninstall the tune.
2. Try to start the vehicle.
3. If the vehicle still does not start, contact technical support.

NOTES

Doc. #46511 v1.0

AFTERMARKET TURBOCHARGERS

- Quicker Spool Up over Stock
- Improve Horsepower and Fuel Economy
- Increase Boost Pressure 6-10 lbs. over Stock Turbos
- Cartridge 100% Balanced for Fast Spool and Longer Life
- No Core Charge
- One Year Warranty



CERAMIC COATED EXHAUST MANIFOLDS

- 18% More Airflow Over Stock
- Two Year Warranty
- EGT Temperatures 300° Cooler vs. Stock
- Improve Fuel Economy
- Additional HP to the Rear Wheels
- Hand Ported and Polished
- Ceramic Coated Finish

