



Technical Service BULLETIN

April 26, 2007

Title: **TECHSTREAM ECU FLASH REPROGRAMMING PROCEDURE**

Models: **'01 – '08 Applicable Toyota**

SS002-07
SPECIAL SERVICE TOOLS

Introduction Flash reprogramming allows the ECU software to be updated without replacing the ECU. Flash calibration updates for specific vehicle models/ECUs are released as field-fix procedures described in individual service bulletins. This bulletin details the Techstream ECU flash reprogramming process and outlines use of the Technical Information System (TIS) and the Calibration Update Wizard (CUW).

Flash calibration updates can only be applied to the vehicle/ECU combination for which they are intended. ECUs have internal security that will not allow them to be programmed with another ECU's information.

NOTE:

Electronic Control Unit (ECU) is a Toyota term used to describe integrated computerized devices responsible for managing the operation of a system or subsystem. For the purposes of this bulletin, the term "ECU" is used as a generic label for the following SAE J1930 standard references:

- Powertrain Control Module (PCM)
- Engine Control Module (ECM)
- Transmission Control Module (TCM)
- Or any other Toyota specific control unit

Applicable Vehicles

- 2001 – 2008 model year **applicable Toyota** vehicles.

NOTE:

NOT all models are capable of flash reprogramming.

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME	QTY
N/A	00451-00001-LBL	Authorized Modification Label	1

NOTE:

Authorized Modification Labels may be ordered in packages of 25 from the Materials Distribution Center (MDC) through the Dealer Daily Dealer Support Materials System, or by calling the MDC at 1-800-622-2033.

Warranty Information

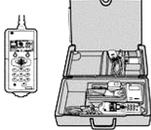
OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	-	-	-	-



Required Tools & Equipment

REQUIRED EQUIPMENT	SUPPLIER	PART NUMBER	QTY
TIS Techstream* NOTE: Software version 2.00.008 or later is required. 	ADE	TSPKG1	1

NOTE:
 Additional Techstream units may be ordered by calling ADE at 1-800-368-6787.

REQUIRED SPECIAL SERVICE TOOLS (SSTs)	SUPPLIER	PART NUMBER	QTY	DRW**
Digital Battery System Analyzer* 	SPX/OTC	00002-V8150-KIT	1	19
GR8 Battery Diagnostic Station* 	SPX/OTC	00002-MCGR8	1	-

* Essential SSTs.
 ** Drawer number in SST Storage System.

NOTE:
 Additional SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.

Process Overview

Techstream ECU flash reprogramming is a 4–step process:

1. Verify the vehicle’s applicability for recalibration and locate desired calibration file.
Vehicle applicability can be determined by the following methods:
 - Techstream ECU Reprogram Function
 - Techstream Health Check Function

NOTE:

Techstream will automatically search TIS for the appropriate service bulletin using the current Calibration ID from the vehicle. Calibration file links can be found embedded in the corresponding service bulletin.

- TIS Calibration Search
- TIS TSB Search

NOTE:

TIS searches can be performed by picking Division/Model/Year, current calibration ID, or VDS code.

2. Connect the GR8 Battery Diagnostic Station.
The GR8 Battery Diagnostic Station includes a Power Supply Mode that maintains battery voltage at 13.5 volts during ECU reprogramming.

NOTE:

ECU damage may occur if the correct battery charger and mode setting are NOT used.

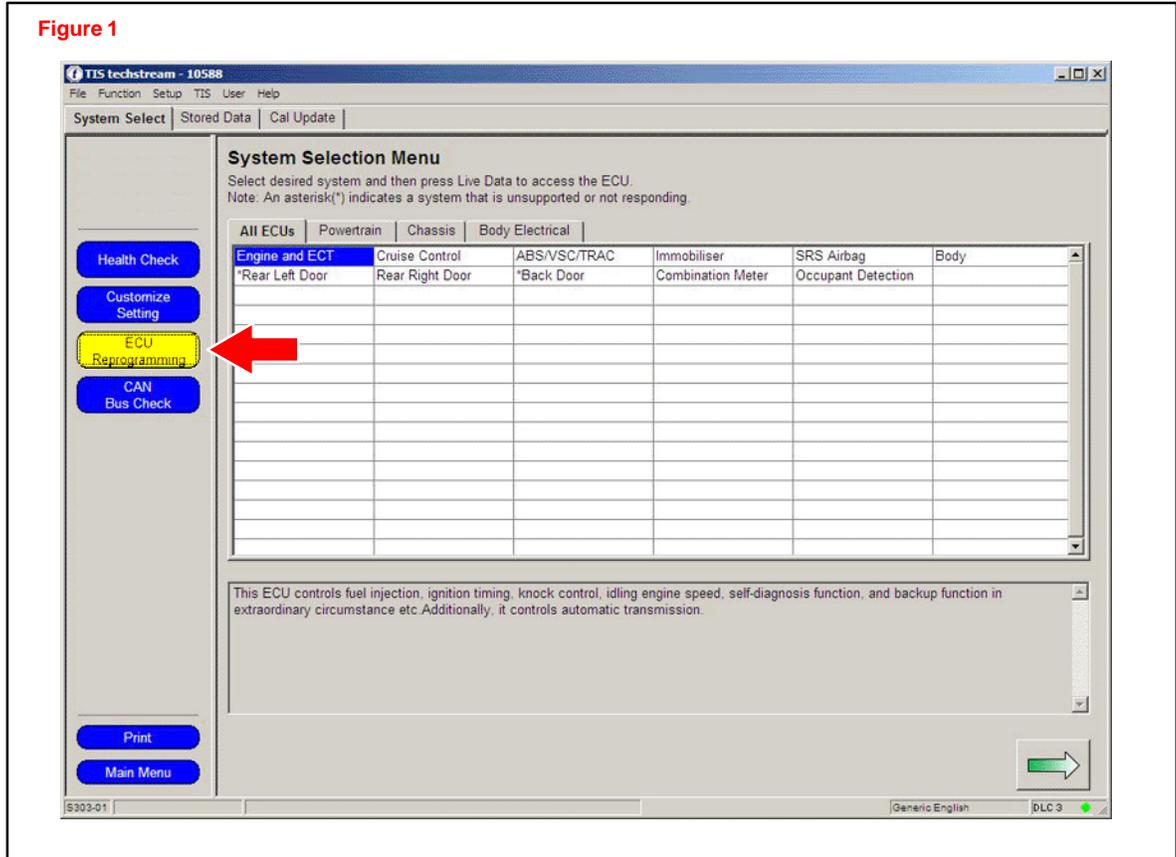
3. Locate appropriate calibration ID and reprogram the vehicle ECU with Techstream.
Techstream uses the Calibration Update Wizard (CUW) application to open calibration files and facilitate the ECU flash reprogramming process.
4. Affix the Authorized Vehicle Modification Label.
Modifications to ECU calibrations MUST be recorded and properly displayed on the vehicle using the Authorized Modification Label.

Operation Procedure The following steps describe how to properly flash reprogram an ECU using the Techstream diagnostic application.

NOTE:
Ensure Techstream has been updated with the latest version of software.

1. Verify the vehicle’s applicability for recalibration and locate desired calibration file.
 - A. ECU Reprogram Method:
 - a. Establish a vehicle connection.
 - b. Click the *ECU Reprogramming* button on the *System Select* tab (Figure 1).

Figure 1

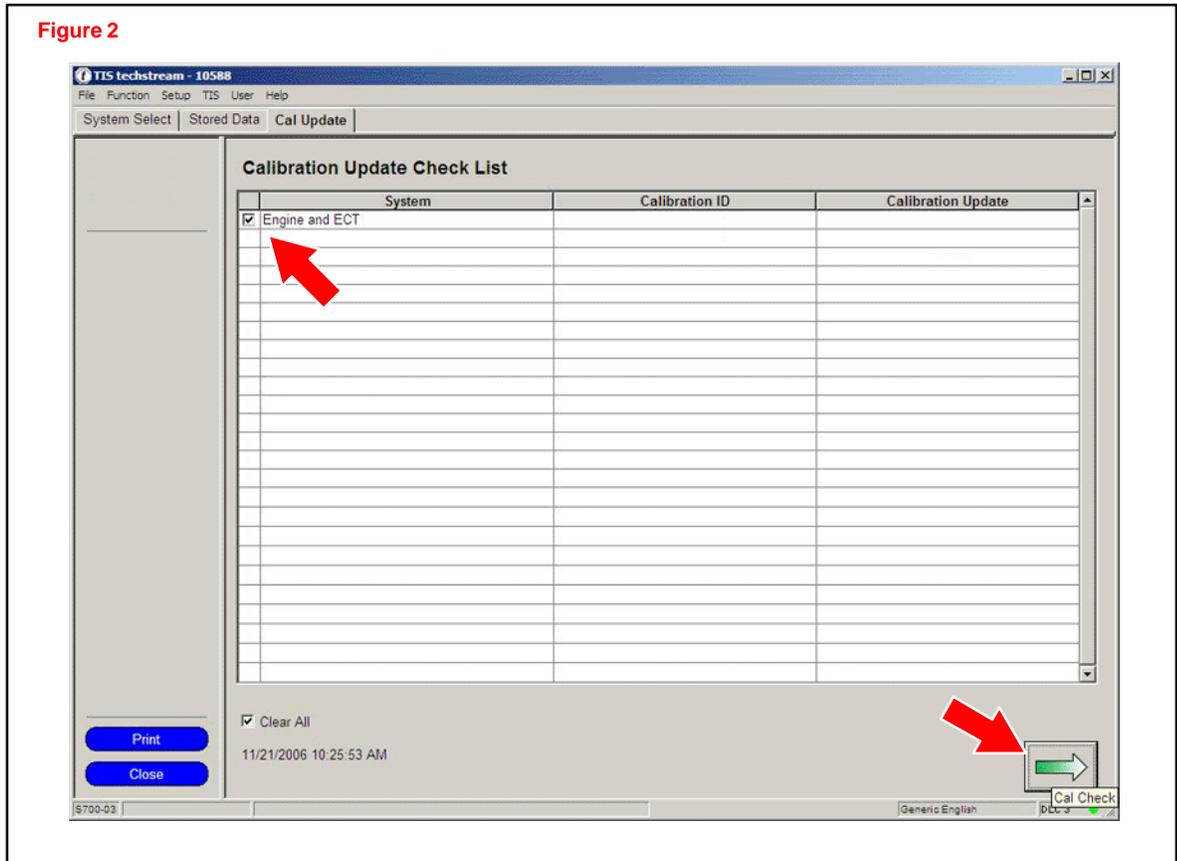


**Operation
Procedure**
(Continued)

- c. Select available ECU(s) from the *Calibration Update Check List* (Figure 2).

NOTE:
Multiple ECUs can be selected.

- d. Click the green arrow button (bottom right of screen) to retrieve current calibration ID(s) and check for available calibration updates.



Operation Procedure
(Continued)

- f. Log in to TIS. (If already logged in, skip this step.)
- g. To access the calibration file, click the service bulletin link in the *Document Title* column of the *Calibration Search Result* portlet (Figure 4).

NOTE:
Only Toyota Certified Technicians and above may access calibration files.

Figure 4

The screenshot shows the TIS web interface. At the top, there are navigation tabs for Home, TIS, and TOYOTA. Below that are sub-tabs for Library, Diagnostics, Tech Assistance, and Vehicle Inquiry. The 'Calibrations' sub-tab is active. The main content area is divided into three sections: 'Calibration Search Form', 'Reference Documents', and 'Diagnostic Support Applications'.

Calibration Search Form: This section allows users to search by 'Division/Model/Year', 'Calibration ID', or 'VDS'. The search criteria are: Division: TOYOTA, Model: Sienna, Year: 2004. There are 'Clear' and 'Search' buttons.

Reference Documents: This section lists several documents, including 'TIS Diagnostic Applications Updates: Release Notes (v.1)', 'Toyota Process Bulletin SS002-01', and 'Toyota Error Bulletin SS004-01'.

Diagnostic Support Applications: This section provides instructions on how to install diagnostic support applications and includes a note about choosing 'Run' or 'Open' when launching the installer.

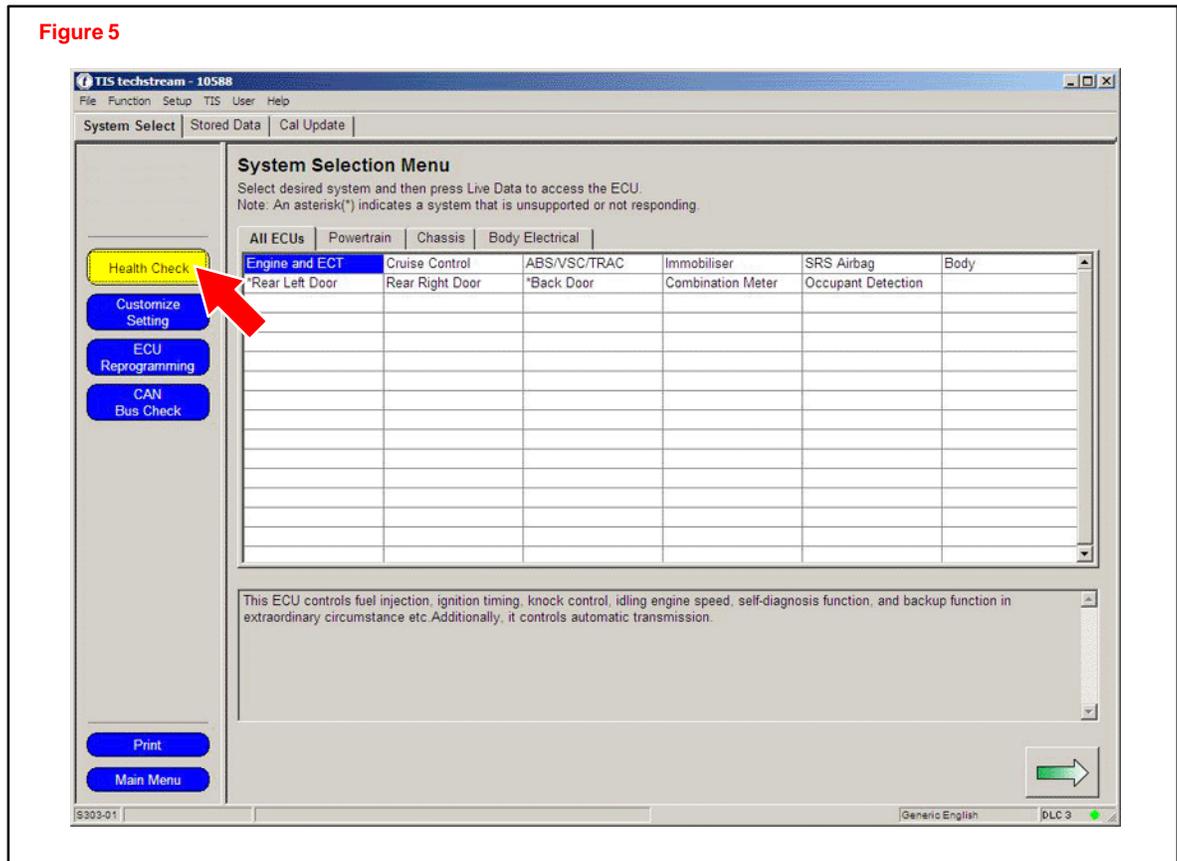
Calibration Search Result: This section displays a table of search results. A red arrow points to the following entry:

Current ECU CAL ID	New ECU CAL ID	Document Title (Release Date)	Year / Model / VDS
30801000			
30801100			
30801200			
30801300			
30804000			
30802000			
30802100	30806000	TC007-03: 04 Sienna: ECM Calibration: Shift Feeling Enhancement (Revised) (2003-11-06)	2004 / Sienna / BA22C
30802200	30807000		2004 / Sienna / BA23C
30802300	50805000		2004 / Sienna / ZA22C
30805000	50806000		2004 / Sienna / ZA23C
50801000			
50801100			
50803000			
50802000			
50802100			
50804000			

Operation Procedure
(Continued)

- B. Health Check Method.
 - a. Establish a vehicle connection.
 - b. Click the *Health Check* button on the *System Select* tab (Figure 5).

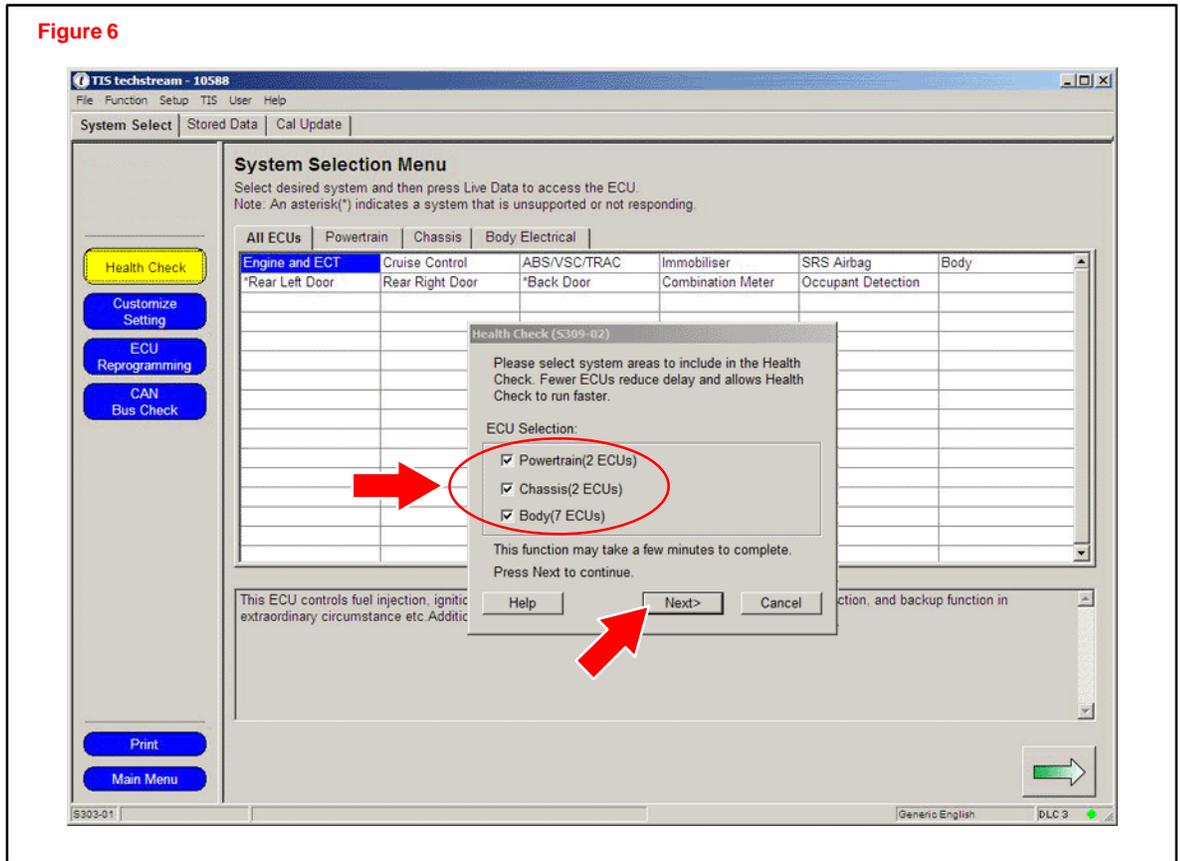
Figure 5



Operation Procedure
(Continued)

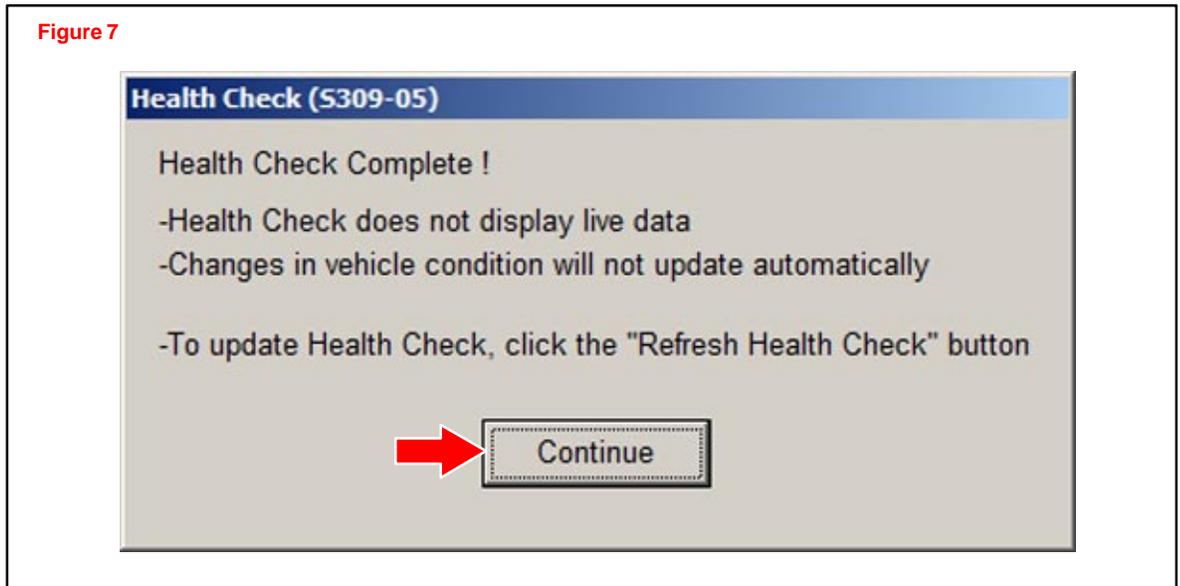
- c. Choose desired ECU group(s) in the *Health Check* dialog box (Figure 6).
- d. Click *Next*.

Figure 6



- e. Click *Continue* to view Health Check results (Figure 7).

Figure 7



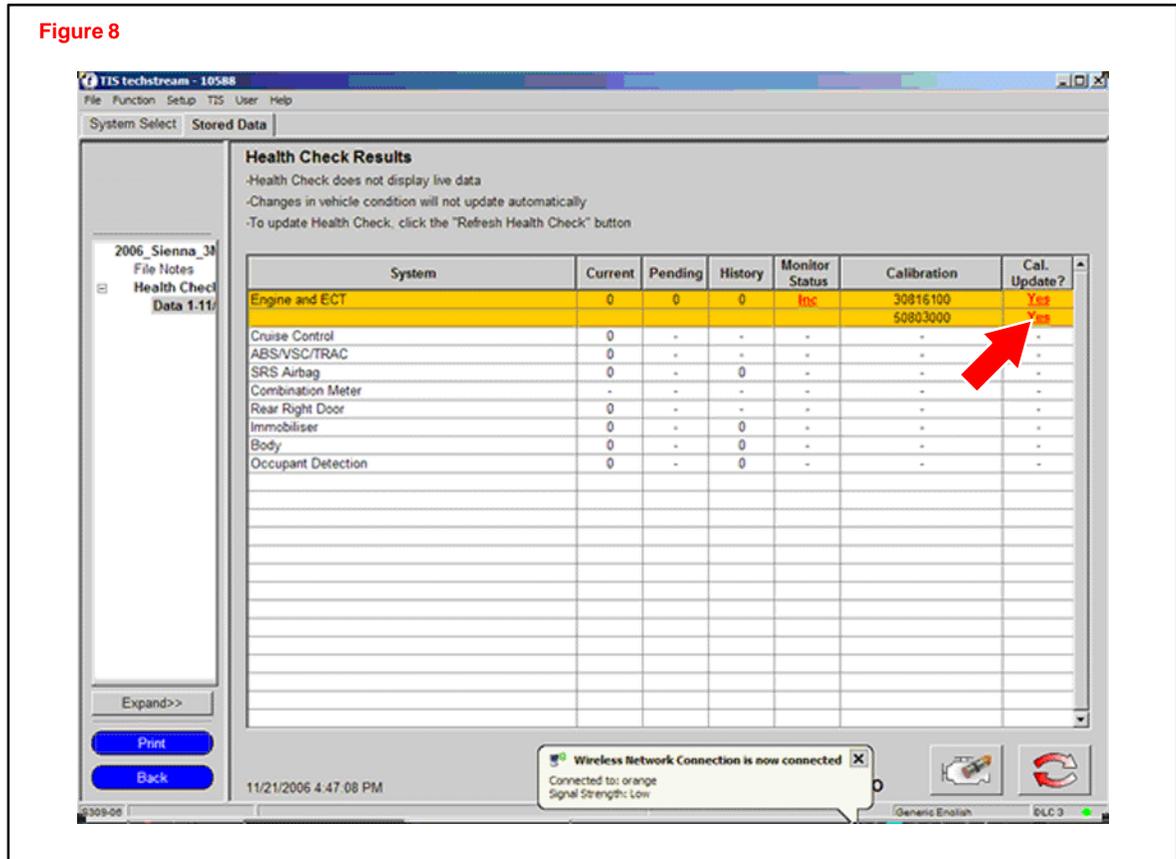
Operation Procedure
(Continued)

- f. Available calibration updates are indicated by a **Yes** link in the *Cal. Update?* column. Click the **Yes** link to access the appropriate service bulletin on TIS (Figure 8).

NOTE:

- Note any DTCs stored in systems that will be flash reprogrammed.
- Clicking the **Yes** link will automatically launch TIS and perform a calibration search.

Figure 8



- g. Log in to TIS. (If already logged in, skip this step.)

Operation Procedure
(Continued)

- h. To review the TSB and access the calibration file, click the service bulletin link in the *Document Title* column of the *Calibration Search Result* portlet.

NOTE:

Only Toyota Certified Technicians and above may access calibration files.

Figure 9

The screenshot shows the Toyota TIS web interface. At the top, there are navigation tabs for Home, TIS, and TOYOTA. Below that are sub-tabs for Library, Diagnostics, Tech Assistance, and Vehicle Inquiry. The main content area is divided into several sections:

- Calibration Search Form:** Contains search criteria options: Division/Model/Year (selected), Calibration ID, and VDS. Fields for Division (TOYOTA), Model (Sienna), and Year (2004) are present, along with Clear and Search buttons.
- Reference Documents:** Lists TIS Diagnostic Applications Updates, Release Notes (v.1), Toyota Process Bulletin SS002-01, and Toyota Error Bulletin SS004-01.
- Calibration Search Result:** A table with columns: Current ECU CAL ID, New ECU CAL ID, Document Title (Release Date), and Year / Model / VDS. A red arrow points to the entry: "TC007-03: 04 Sienna: ECM Calibration: Shift Feeling Enhancement (Revised) (2003-11-06)".
- Diagnostic Support Applications:** Lists TIS Diagnostic Applications Installer and provides instructions for installation.

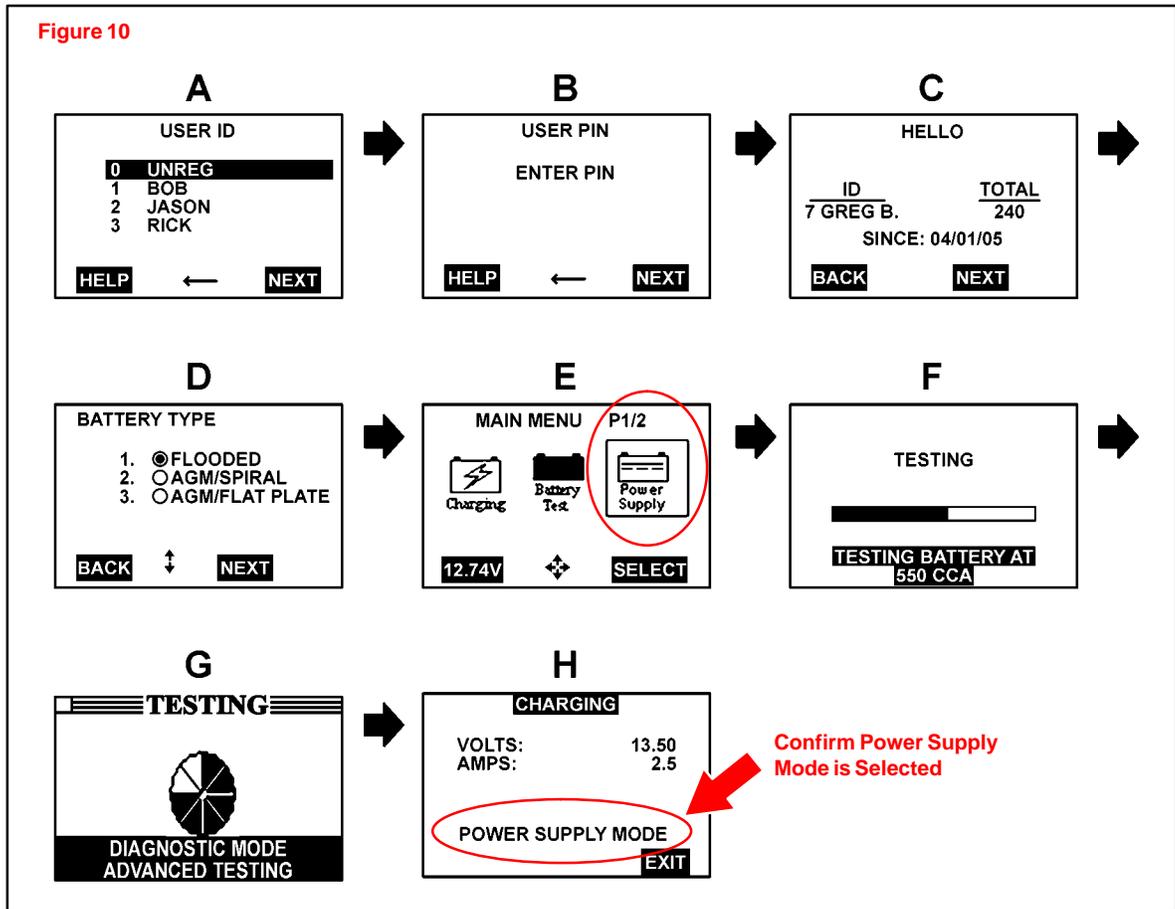
Current ECU CAL ID	New ECU CAL ID	Document Title (Release Date)	Year / Model / VDS
30801000			
30801100			
30801200			
30801300			
30804000			
30802000			
30802100	30806000		2004 / Sienna / BA22C
30802200	30807000	TC007-03: 04 Sienna: ECM Calibration: Shift Feeling Enhancement (Revised) (2003-11-06)	2004 / Sienna / BA23C
30802300	50805000		2004 / Sienna / ZA22C
30805000	50806000		2004 / Sienna / ZA23C
50801000			
50801100			
50803000			
50802000			
50802100			
50804000			

Operation Procedure
(Continued)

2. Connect the GR8 Battery Diagnostic Station.
 - A. Connect the GR8 Battery Diagnostic Station to the car and turn it on.
 - B. Select *Power Supply Mode* by following the screen flow below (Figure 10).

NOTE:

- ECU damage may occur if the correct battery charger and mode setting are NOT used.
- Power Supply Mode is used to maintain battery voltage at 13.5 volts while flash reprogramming the vehicle.
- For details on how to use the GR8 Battery Diagnostic Station, please refer to the GR8 Instructions Manual, located on TIS, *Diagnostics – Battery*.



Operation Procedure
(Continued)

3. Click the appropriate calibration ID (Figure 11) and reprogram the vehicle’s ECU with Techstream.
 - A. After reviewing the procedures outlined in the selected TSB, click the appropriate calibration ID link by matching the vehicle’s current calibration ID to the Previous Calibration ID in the Calibration Identification Chart.

NOTE:

- Calibration files are embedded as live links in the service bulletin.
- Some vehicles require special preparation — please review the selected TSB carefully.

Figure 11

ECM CALIBRATION: SHIFT FEELING ENHANCEMENT – TC007-03 Revised

November 7, 2003

Calibration Identification Chart	MODEL YEAR	MODEL	ECM (CPU)	PREVIOUS CALIBRATION ID	NEW CALIBRATION ID	VDS
	2004	2WD	Main	30801000	30806000	ZA22C ZA23C
				30801100		
			30801200			
			30801300			
	2005	4WD	Main	30804000	50805000	BA22C BA23C
				50801000		
			50801100			
			50803000			
		Sub	30802000	30807000		
			30802100			
		30802200				
		30802300				
		Sub	30805000	50806000		
			50802000			
		50802100				
		50804000				



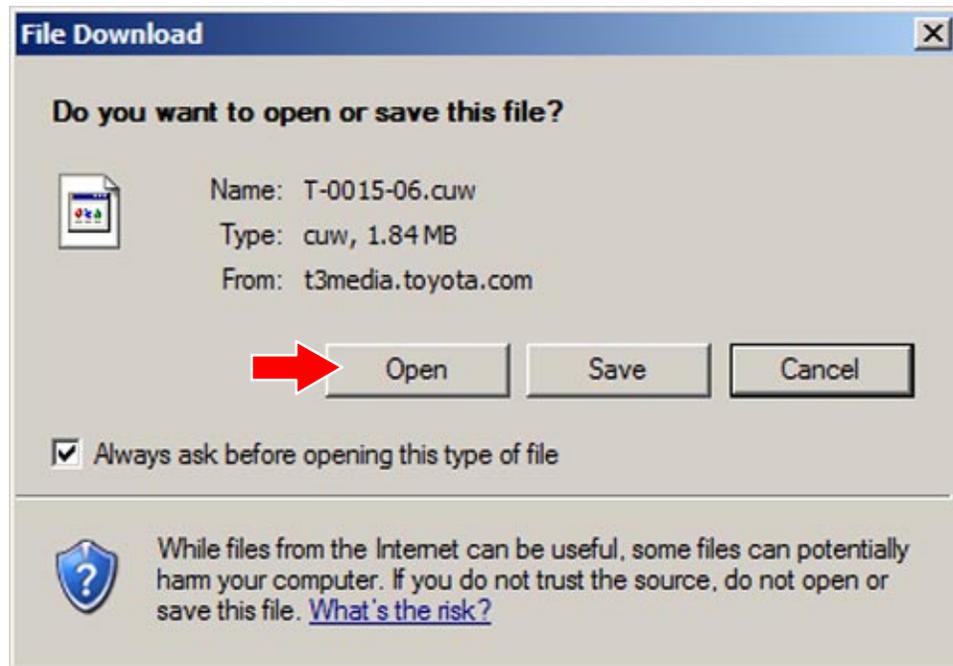
**Operation
Procedure**
(Continued)

B. Click *Open* to load calibration file information (Figure 12).

NOTE:

Techstream pulls calibration files as needed to ensure the latest calibration file is used. Do NOT save calibrations locally on the hard drive or other media.

Figure 12



Operation
Procedure
(Continued)

NOTE:

Errors during the flash reprogramming process can permanently damage the vehicle ECU. Minimize the risk by following the steps below.

- Battery voltage **MUST NOT FALL BELOW 11.4 volts** during reprogramming. Confirm battery voltage is higher than 11.4 volts, but be sure voltage **DOES NOT RISE ABOVE 16.0 volts** during reprogramming.
- Turn OFF all vehicle accessories (e.g. audio system, A/C, interior lights, DRL, etc.). Do NOT add to or significantly change the vehicle's electrical load while reprogramming.
- Confirm the hood is open and ensure under hood temperature does NOT exceed 158°F (70°C).
- Confirm cable connections between the vehicle and Techstream are secure.
- Do NOT disconnect or turn off Techstream or vehicle ignition during reprogramming.
- Set parking brake.
- Complete ALL flash calibration updates provided for each ECU.
- If the battery's state of charge or capacity are in question, test with SST. No. 00002-V8150-KIT "Digital Battery Analyzer," and follow TSB No. PG001-06, "Battery Maintenance for In-Stock Vehicles & Pre-Delivery".
- The GR8 Battery Diagnostic Station MUST be used in Power Supply Mode to maintain battery voltage at 13.5 volts while flash reprogramming the vehicle. For details on how to use the GR8 Battery Diagnostic Station, please refer to the GR8 Instructions Manual, located on TIS, *Diagnostics – Battery*.

C. Click *Next* to start the calibration update process.

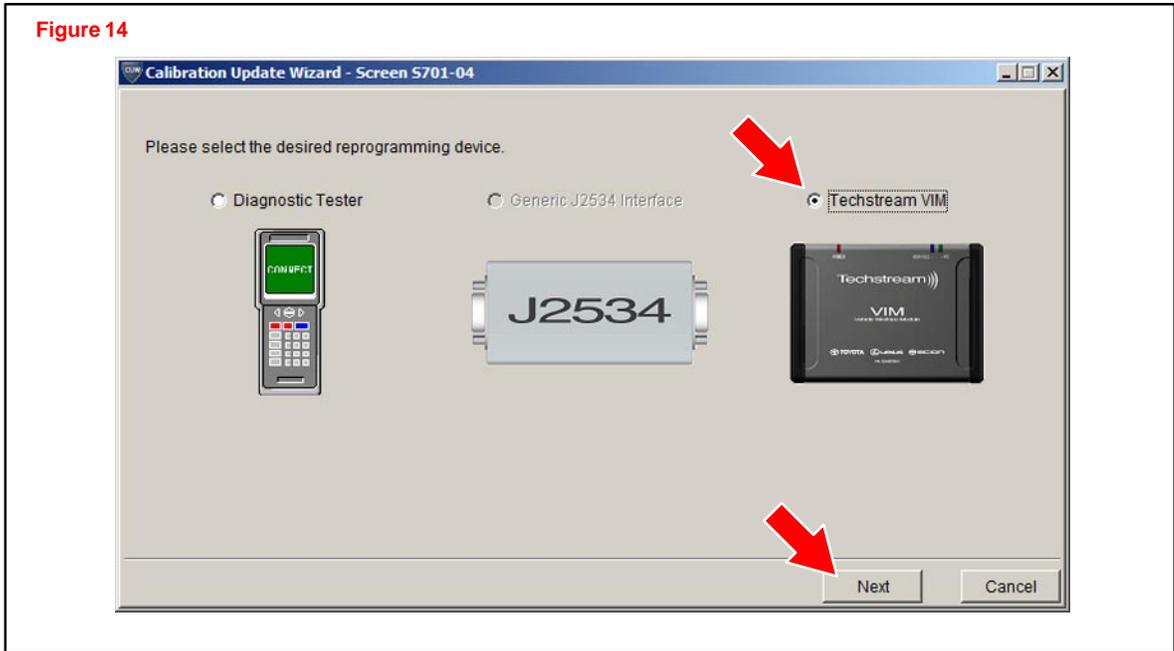
Figure 13



Operation Procedure
(Continued)

D. Select *Techstream VIM* as the desired programming device. Then click *Next*.

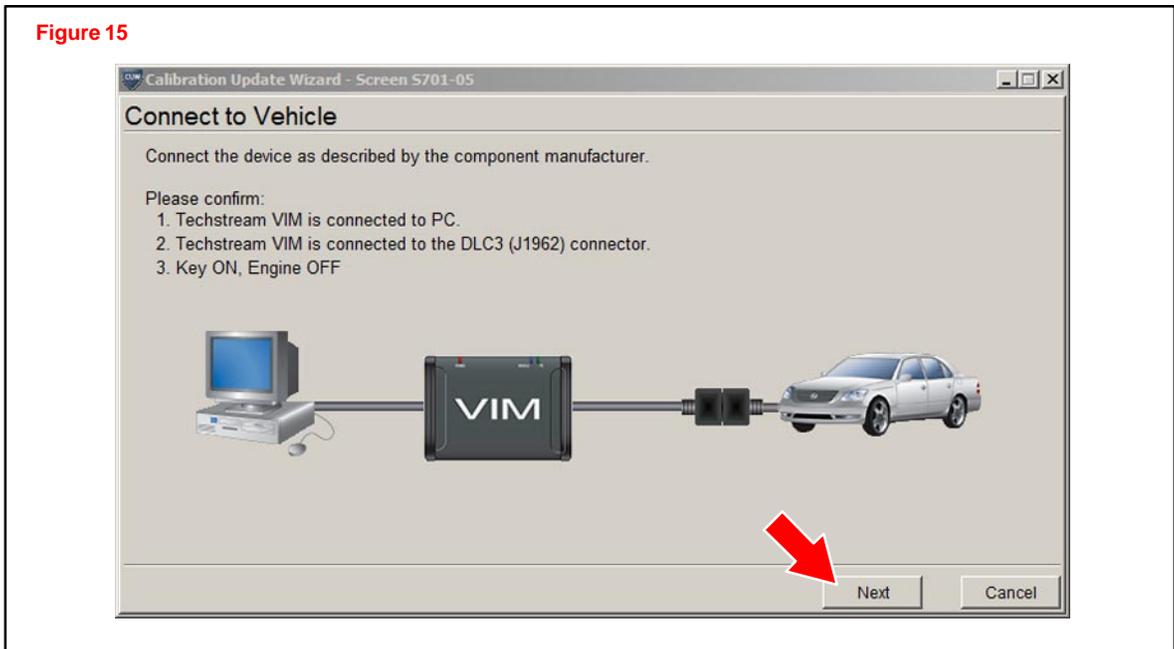
Figure 14



E. Confirm the following:

- PC is connected to VIM.
- VIM is connected to DLC3 connector.
- Ignition is ON and engine is OFF or “READY” OFF (hybrid vehicles).

Figure 15



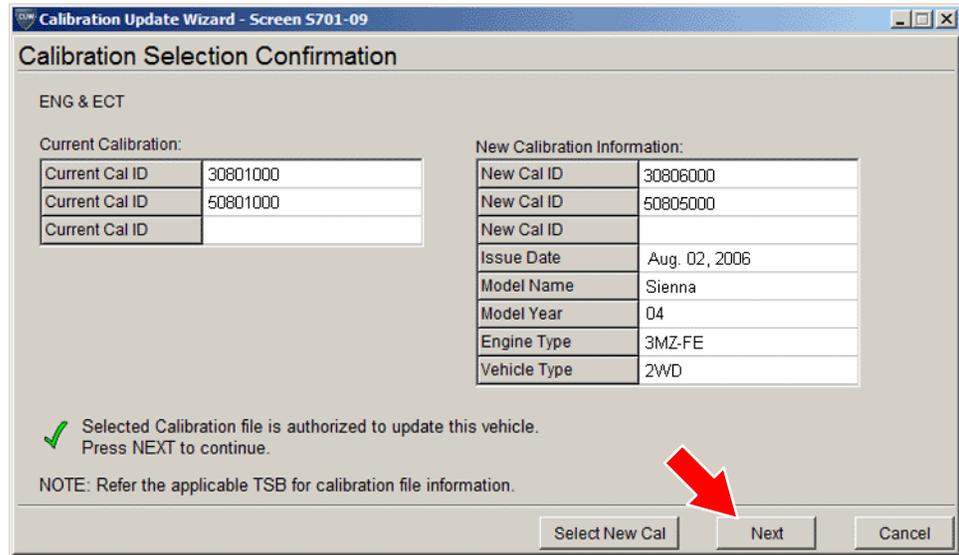
Operation Procedure
(Continued)

F. Verify correct current calibration and new calibration information.

NOTE:

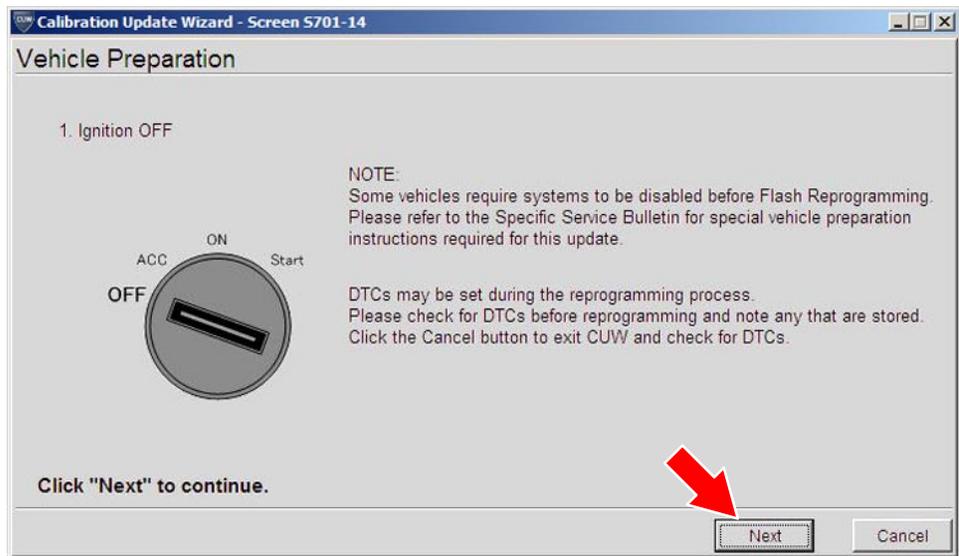
- The total number of calibration IDs in the calibration file corresponds to the number of reprogrammable processors in the ECU.
- Each calibration file may contain up to three separate calibrations.
- Figure 16 shows an example of the update procedure for a two-processor ECU.

Figure 16



G. Turn ignition OFF.

Figure 17

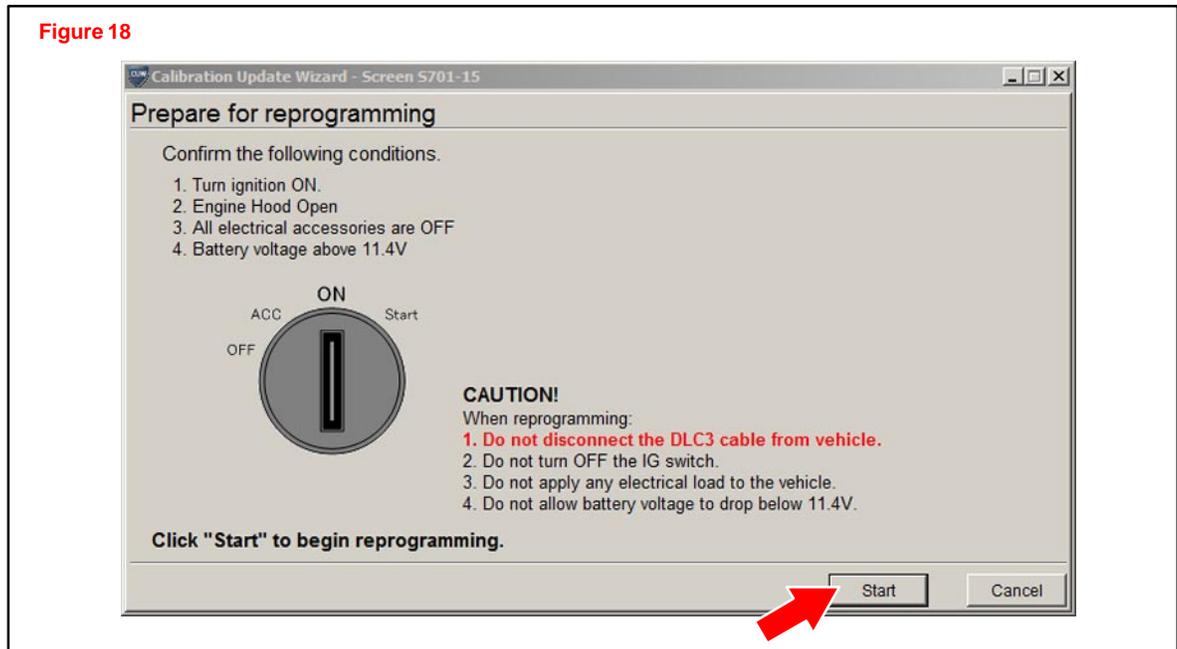


**Operation
Procedure**
(Continued)

- H. Confirm the following:
- Ignition is ON and engine is OFF or “READY” OFF (hybrid vehicles).
 - Hood is open.
 - All accessories are OFF.
 - Battery voltage is above 11.4 volts.

NOTE:

Verify the vehicle is connected to a battery charger before continuing — If battery voltage falls below 11.4 volts, ECU damage may occur.

Figure 18**NOTE:**

If key cycle is NOT done properly, reprogramming will stop at 10% and Cal 1 will fail to load.

**Operation
Procedure**
(Continued)

- I. Do NOT disturb the vehicle during flash reprogramming.

NOTE:

- ECU flash reprogramming may take anywhere from 3 – 30 minutes per calibration file.
- Reprogramming time will vary depending on model and ECU communication protocol. Vehicles using CAN communication protocol will reprogram much faster (2 – 7 minutes).

Figure 19

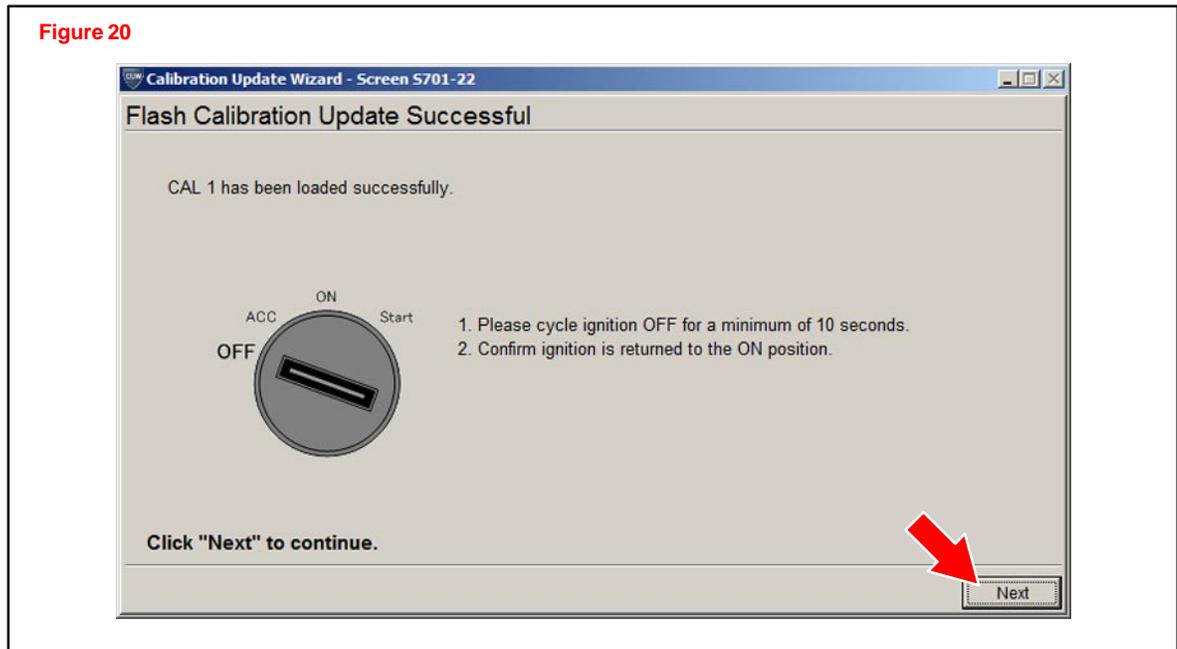


NOTE:

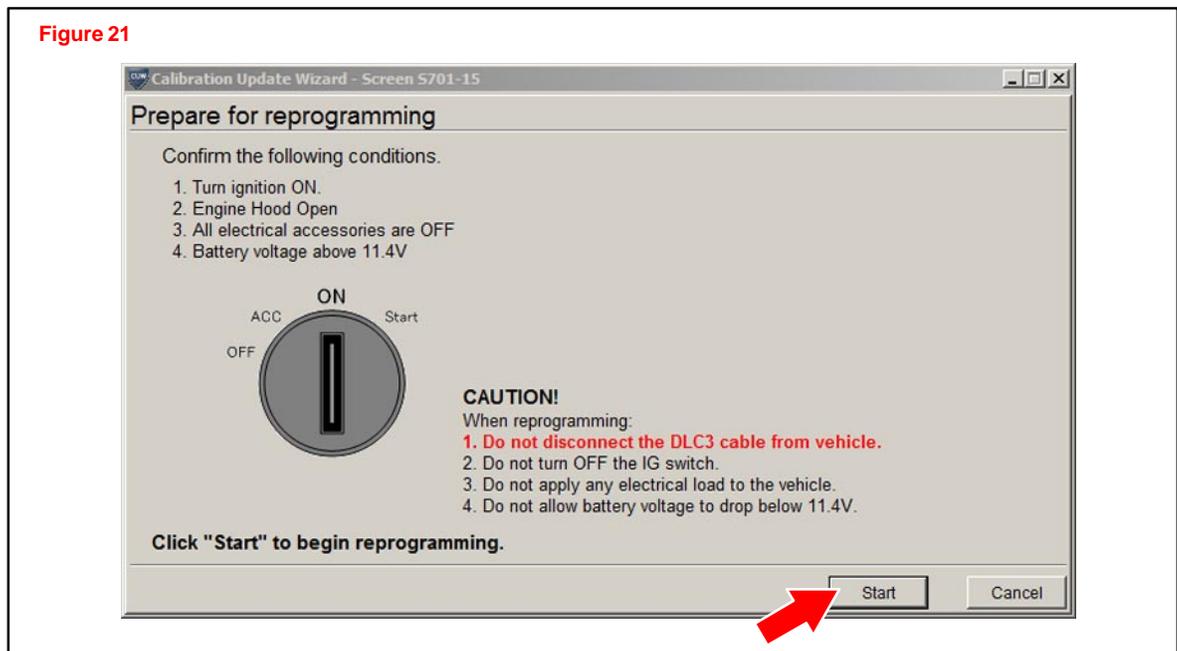
- If vehicle requires only ONE calibration update, then proceed to step N in this bulletin.
- If vehicle requires a SECOND calibration update, then continue as follows:
 - For serial communication vehicles, go to step J.
 - For CAN communication vehicles, go to step L.

**Operation
Procedure**
(Continued)

- J. Cal 1 has completed the update process.
- Turn ignition OFF for a minimum of 10 seconds.
 - Confirm ignition is returned to the ON position.

Figure 20

- K. Confirm ignition is ON.

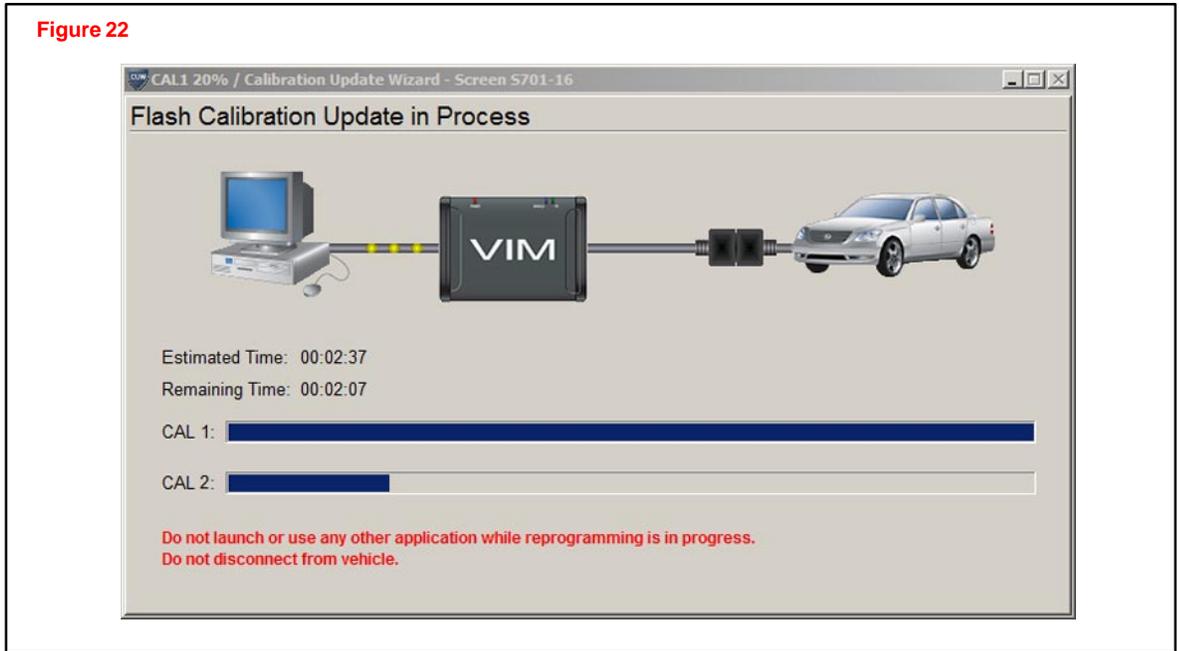
Figure 21**NOTE:**

If key cycle is NOT done properly, reprogramming will stop at 10% and Cal 1 will fail to load.

Operation Procedure
(Continued)

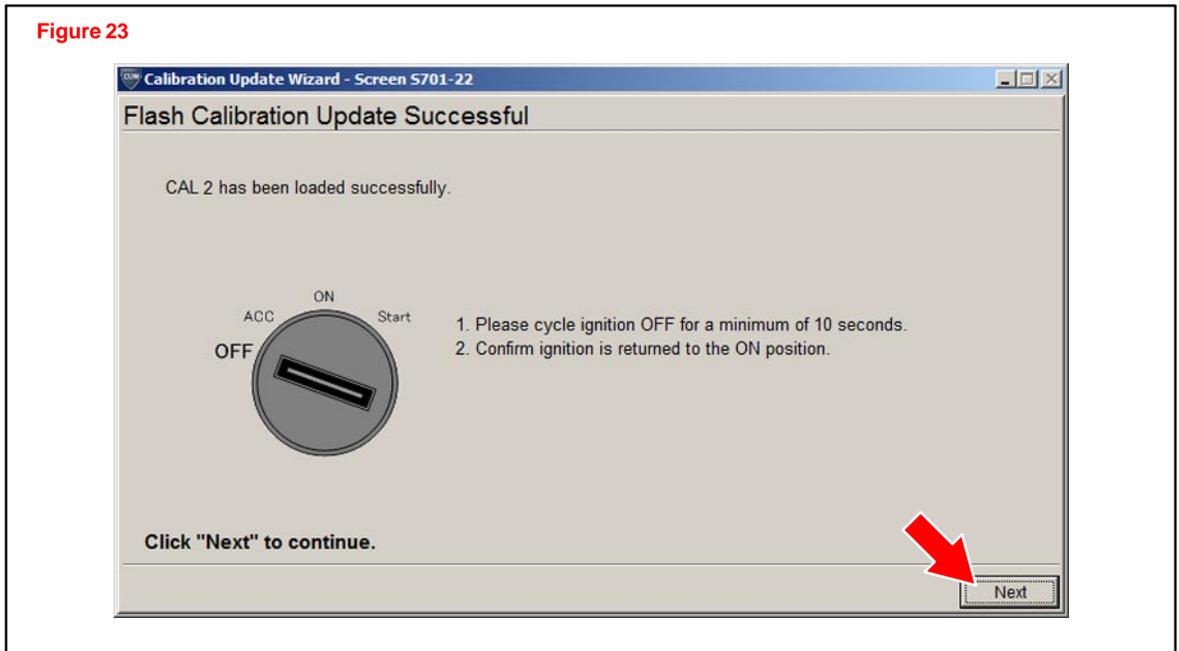
L. Do NOT disturb the vehicle during flash reprogramming.

Figure 22



M. Turn ignition OFF for a minimum of 10 seconds. Then confirm ignition is returned to the ON position.

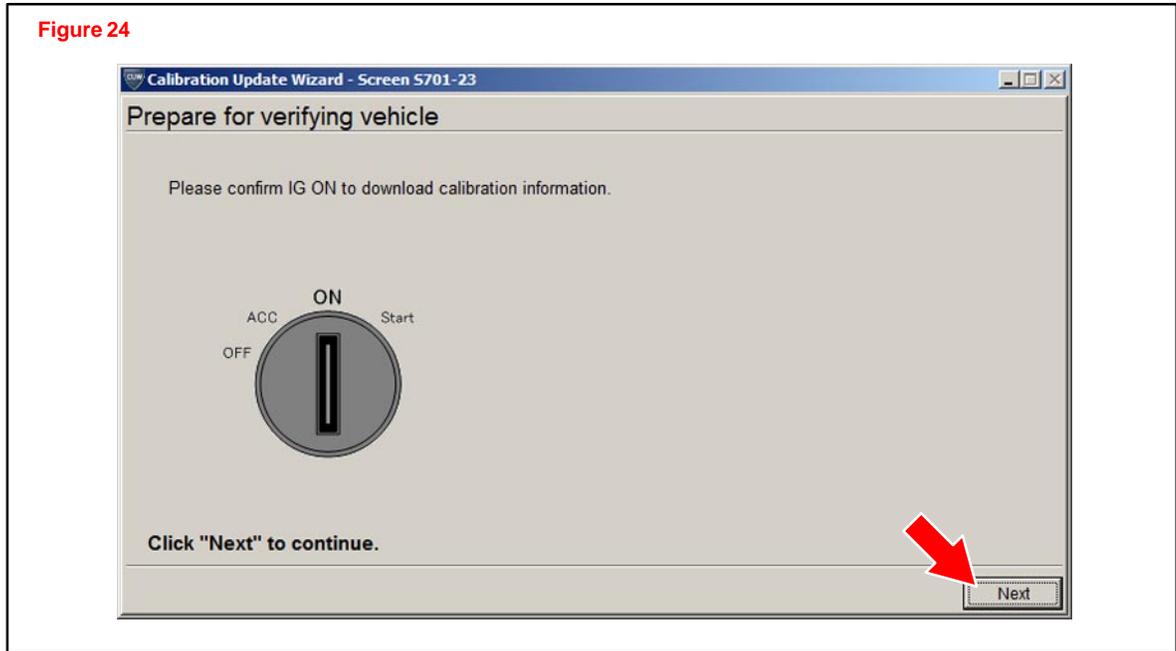
Figure 23



Operation Procedure
(Continued)

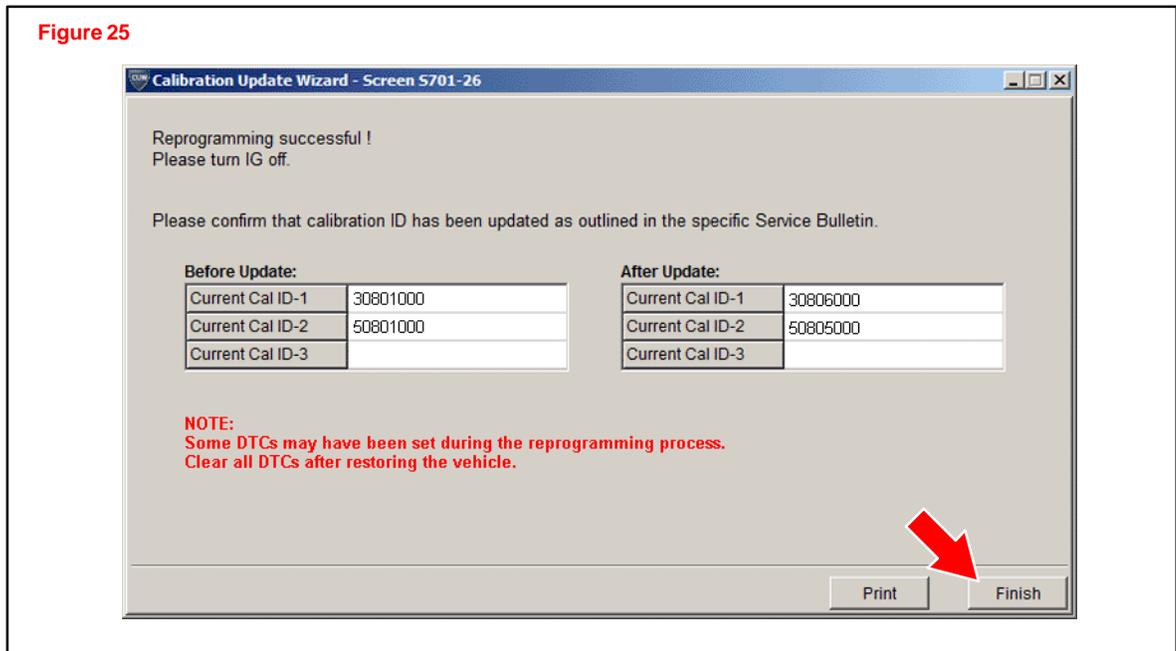
N. Confirm ignition is ON.

Figure 24



O. Confirm all calibrations were updated as specified in the service bulletin.

Figure 25



NOTE:
Some DTCs may have been set during the reprogramming process. Clear all DTCs after restoring vehicle.

Operation Procedure
(Continued)

4. Affix Authorized Modification Label.
- A. Using a permanent marker or ball point pen, complete the Authorized Modifications Label and attach to the vehicle (Figure 26). The Authorized Modifications Label is available through the MDC, P/N 00451-00001-LBL.

Figure 26. **SAMPLE OF COMPLETED AUTHORIZED MODIFICATIONS LABEL**

TOYOTA MOTOR CORPORATION	
AUTHORIZED MODIFICATIONS	
THE FOLLOWING MODIFICATIONS HAVE BEEN MADE:	
Replacement ECU Part Number	89661-08120
Calibration ID(s)	30806000, 50805000
THESE MODIFICATIONS HAVE BEEN APPROVED AS APPROPRIATE BY EPA AND CARB	
Dealer Code	DEALER CODE: 31301
	DATE: 8/2/06
	CHANGE AUTHORITY: TSB TC007-03

Date Completed

TSB or Campaign Number

- B. Attach the label under the hood in the location determined by the specific vehicle TSB or Campaign.

NOTE:

Wait 60 – 90 seconds for ink to set before handling.