



Technical Service BULLETIN

March 9, 2001

Title:

ECU FLASH REPROGRAMMING PROCESS

Models:

Applicable 4Runner, Camry, Highlander, Land
Cruiser, RAV4, Sequoia, Tacoma & Tundra

REVISED

SS002-01

SPECIAL SERVICE TOOLS

TSB REVISION NOTICE:

June 20, 2003: Camry and Tacoma models added; Special Service Tools table updated (page 2). The previous TSB should be discarded.

Introduction ECU flash reprogramming is a new feature for vehicles equipped with 32-bit ECU architecture. This feature allows the ECU software to be updated for changes in vehicle calibrations without removing the ECU from the vehicle.

Flash calibration updates for specific vehicle models/ECUs will be released as field fix procedures described in individual service bulletins. This bulletin details the ECU flash reprogramming process and the applications within TIS and the Toyota Diagnostic Tester used for reprogramming.

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.

- Applicable Vehicles**
- **2001** (and later) model year **4Runner, Highlander, Land Cruiser, RAV4, Sequoia** and **Tundra** vehicles.
 - **2002** (and later) model year **Camry** and **Tacoma** vehicles.
 - Additional models will support ECU flash reprogramming as they adopt 32-bit ECU architecture.

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME
N/A	00451-00001-LBL	Authorized Modifications Label

NOTE:




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

Warranty Information

OP CODE	DESCRIPTION	TIME	OFF	T1	T2
N/A	Not Applicable to Warranty	—	—	—	—



**Required
SSTs**

SPECIAL SERVICE TOOLS (SSTs)		PART NUMBER	QUANTITY
Toyota Diagnostic Tester Kit*		01001271	1
12 Megabyte Diagnostic Tester Program Card with version 10.0a Software (or later)*		01002593-005	1
Midtronics Battery Tester*		00002-MP815-T	1

* Essential SSTs.

NOTE:

Additional Diagnostic Tester Kits, Program Cards or SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.

**Process
Overview**

ECU Flash Reprogramming is a 4-step process:

1. Locate the desired Calibration File on TIS (Technical Information System).

Calibration files may be found in two areas:

- Search by Model and Year for a Technical Service Bulletin addressing a specific product issue.
- Search by VIN or application under the *ECU Flash Reprogramming* section.

2. Download the Calibration File from TIS to the Diagnostic Tester.

The Calibration Update Wizard (CUW) is a new application on TIS which downloads calibration files from TIS to the Diagnostic Tester Program Card. This step is only required when the calibration file is not currently stored on the Diagnostic Tester Program Card.

3. Reprogram the vehicle ECU with the Diagnostic Tester.

Diagnostic Tester Software now incorporates a new function to flash reprogram a vehicle ECU.

4. Confirm successful flash update and affix calibration update sticker.

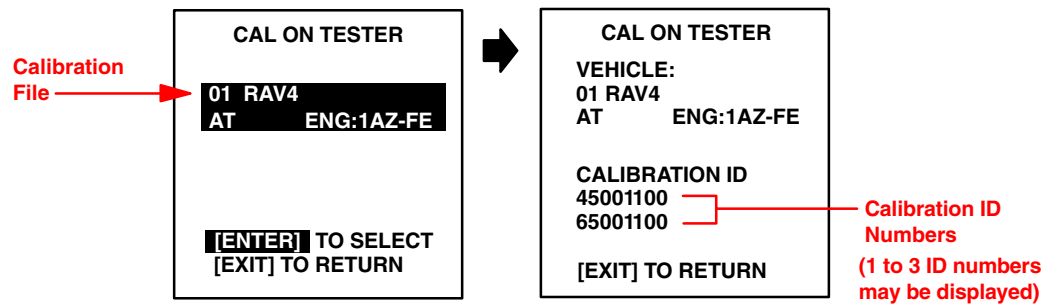
Modifications to ECU calibration files must be recorded and properly displayed on the vehicle using the calibration update sticker.

**Process
Overview**
(Continued)

NOTE:

The Calibration File contains the Calibration ID number(s) for a specific vehicle ECU (see Figure 1).

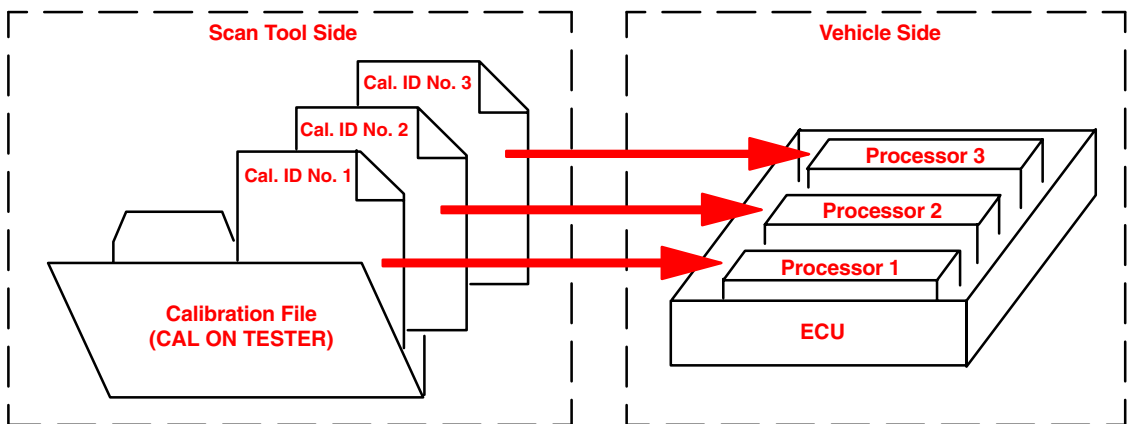
FIGURE 1. SAMPLE CALIBRATION FILE



NOTE:

The total number of Calibration ID numbers corresponds to the number of reprogrammable processors in the ECU (see Figure 2).

FIGURE 2. ECU FLASH REPROGRAMMING PROCESS



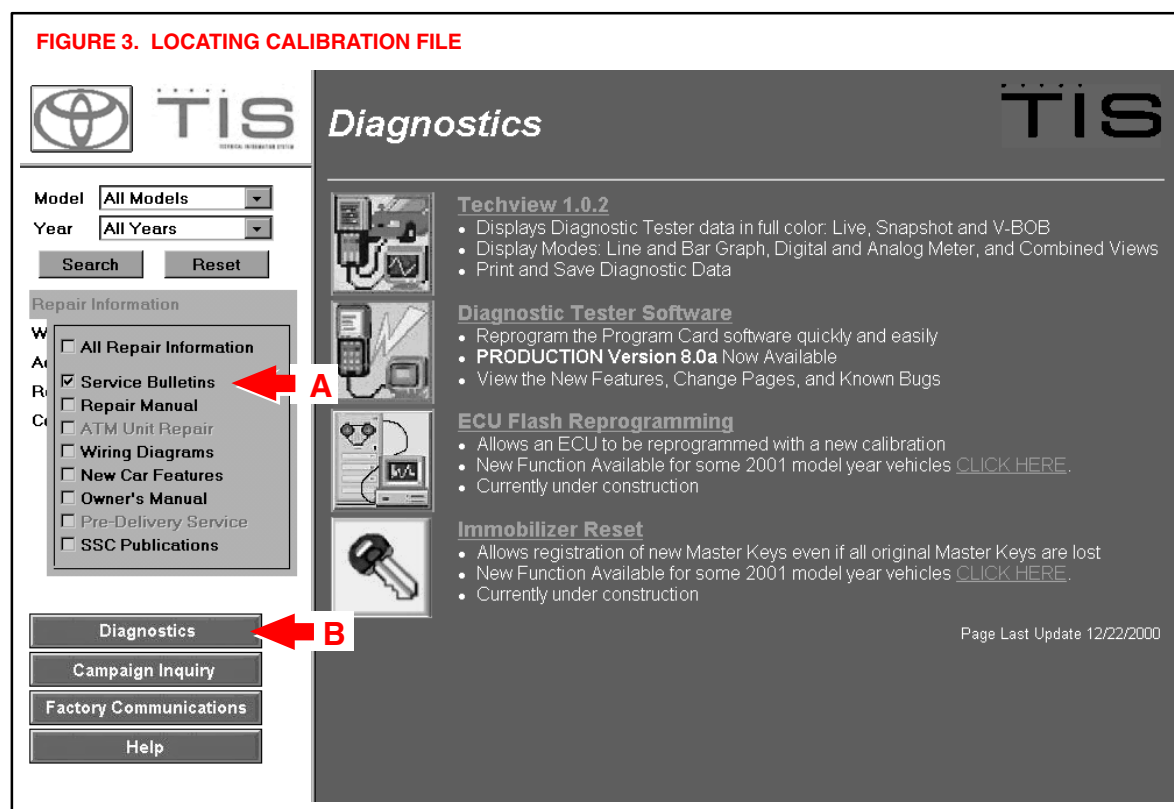
**Operation
Procedure**

The following steps in this bulletin describe how to properly flash reprogram an ECU.

**LOCATE
CALIBRATION
FILE****1. Locate Calibration File on TIS.**

Calibration files may be found in two areas (see Figure 3):

- A. Search by Model and Year for a Technical Service Bulletin addressing a specific Product issue.
 - Within the TSB, click on the link for the Calibration File.
- B. Search by VIN or application under the *ECU Flash Reprogramming* Section.
 - Under the *ECU Flash Reprogramming* section on TIS, a list of the latest calibration files will be displayed.
 - In the future, you may search for the calibration files by VIN or vehicle application.
- C. Proceed to step 2 for instructions on how to download the calibration file from TIS to the Diagnostic Tester Program Card.

FIGURE 3. LOCATING CALIBRATION FILE

**Operation
Procedure**
(Continued)

**DOWNLOAD
FILE TO TESTER**

2. Download the Calibration File to the Diagnostic Tester.

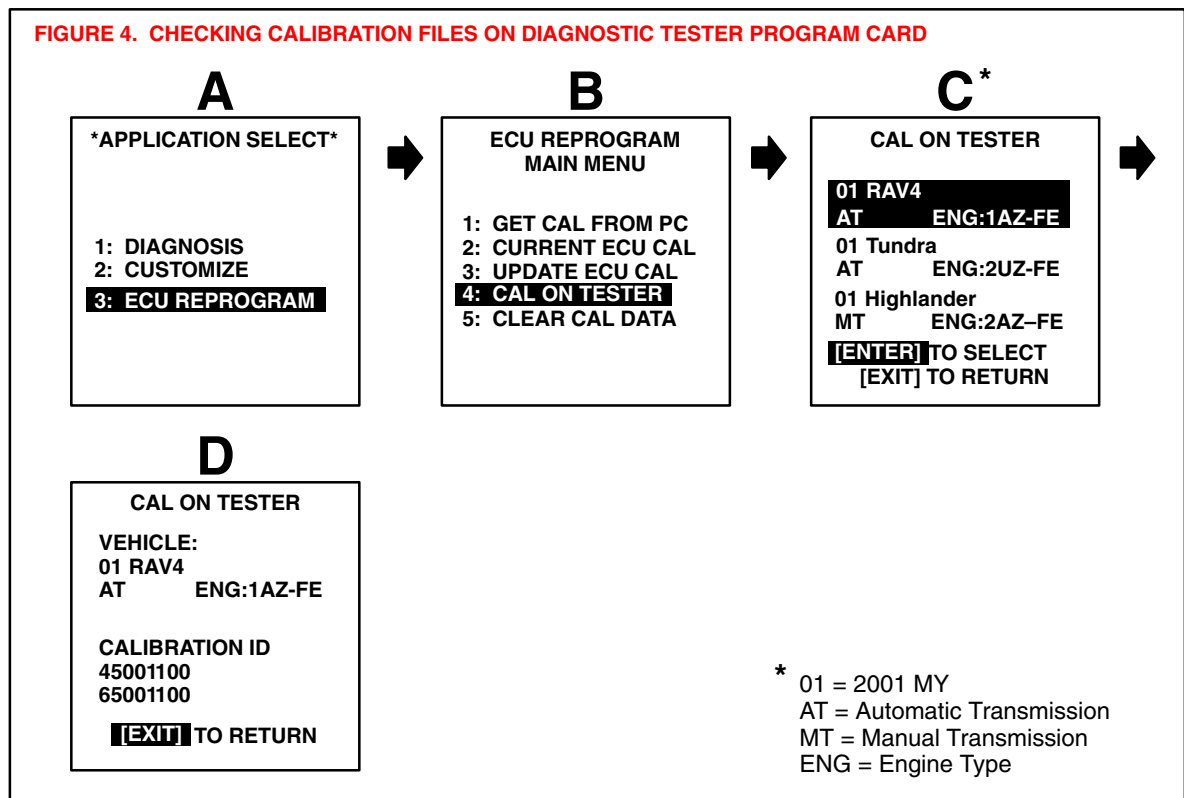
The Calibration Update Wizard (CUW) is a new application on TIS which downloads calibration files from TIS onto the Diagnostic Tester Program Card.

NOTE:

Before you begin, ensure that the Diagnostic Tester is equipped with software version 8.0a, or later. Only a 12 MB program card (P/N 01002593–005) may be used for this process.

- A. Before downloading a new calibration file from TIS, check the current calibration files stored on the Diagnostic Tester Program Card by following the screen flow below (Figure 4).

FIGURE 4. CHECKING CALIBRATION FILES ON DIAGNOSTIC TESTER PROGRAM CARD



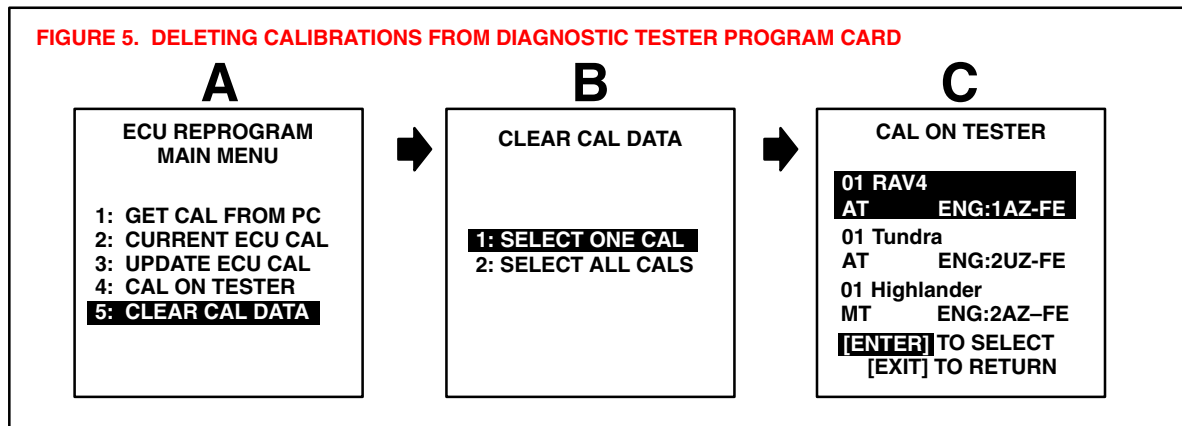
NOTE:

- Screen C may be blank if no calibrations are stored on the Diagnostic Tester Program Card.
- If the desired Calibration File is already on the Diagnostic Tester, proceed to Step 3 (page 11 of this bulletin).
- A maximum of four Calibration Files may be loaded on the tester at one time.

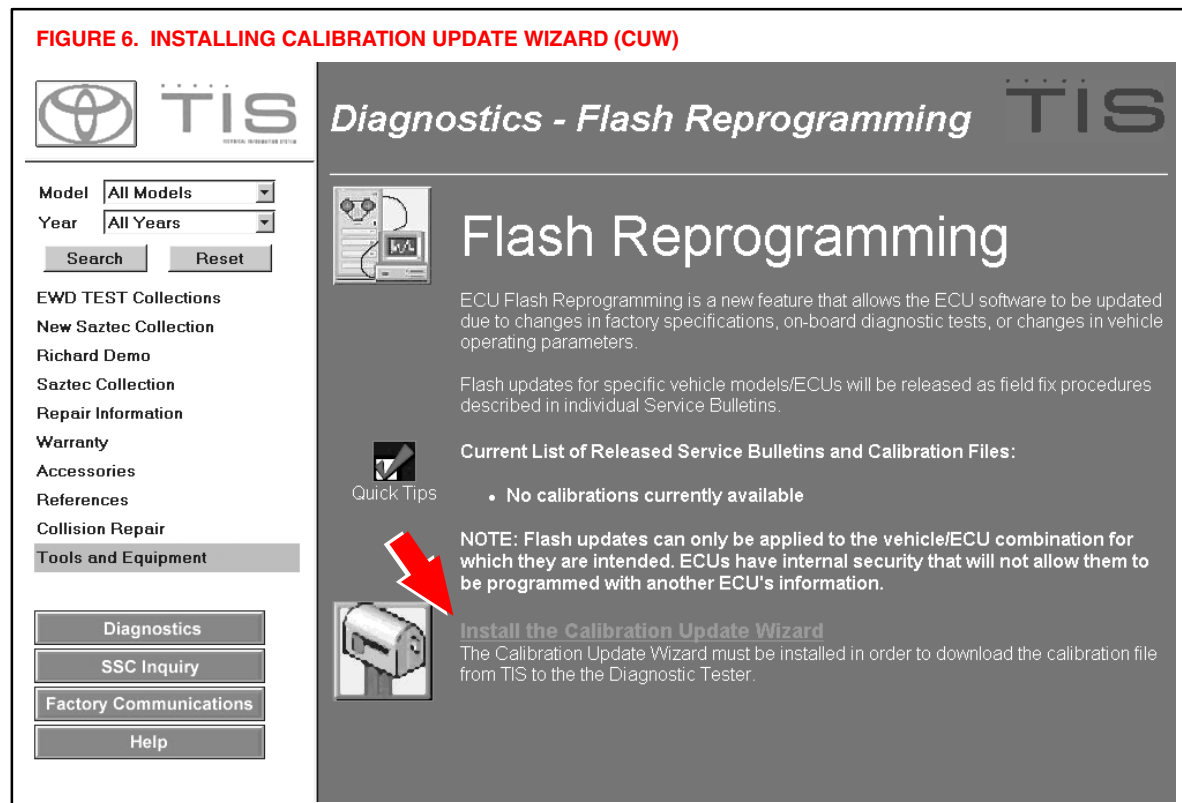
Operation Procedure (Continued)

DOWNLOAD FILE TO TESTER

- B. You have the option to delete calibrations off the tester before downloading a new calibration. The CUW also provides this option if there is not enough room for the new calibration. To delete one or all of the calibrations, follow the screen flow below (Figure 5).



- C. If this is the first time you have downloaded a calibration file from TIS to the Diagnostic Tester Program Card, you **MUST** first install the latest version of the Calibration Update Wizard (CUW) onto your TIS workstation PC, as shown in Figure 6. Follow the step-by-step install instructions on TIS.



**Operation
Procedure**
(Continued)

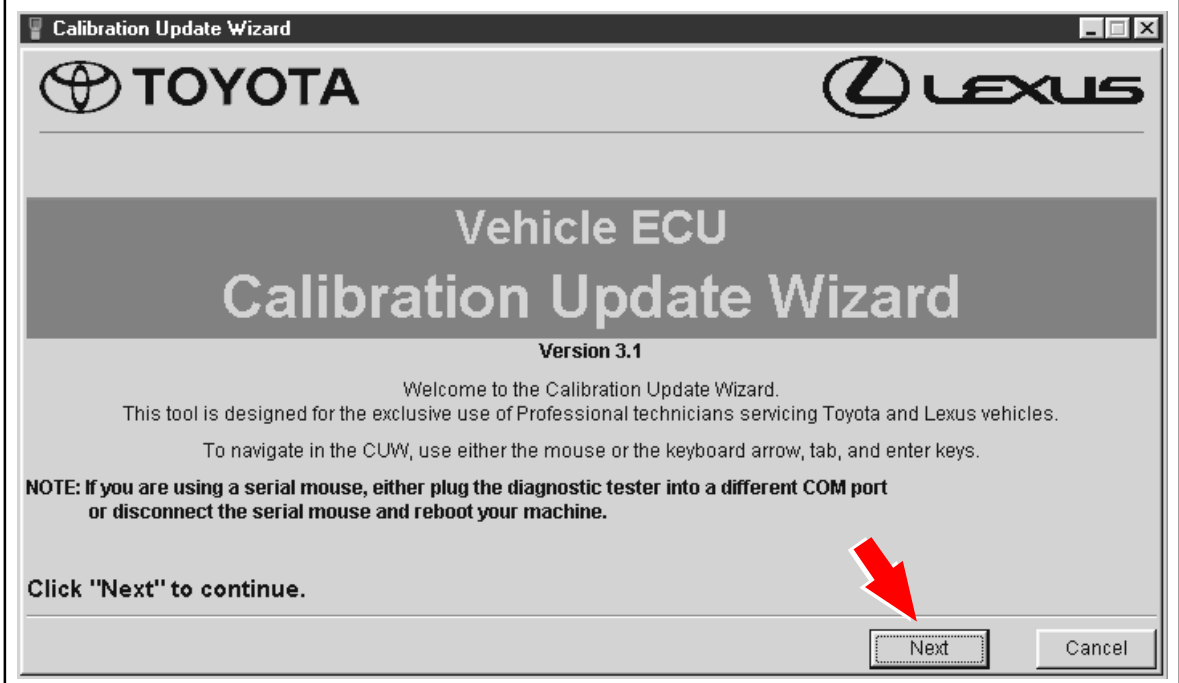
**DOWNLOAD
FILE TO TESTER**

- D. The Calibration Update Wizard (CUW) launches automatically when a calibration file link is selected (or clicked). The CUW will guide you through the steps to download the calibration file to the Diagnostic Tester Program Card. Click **NEXT** on the first screen (Figure 7).

NOTE:

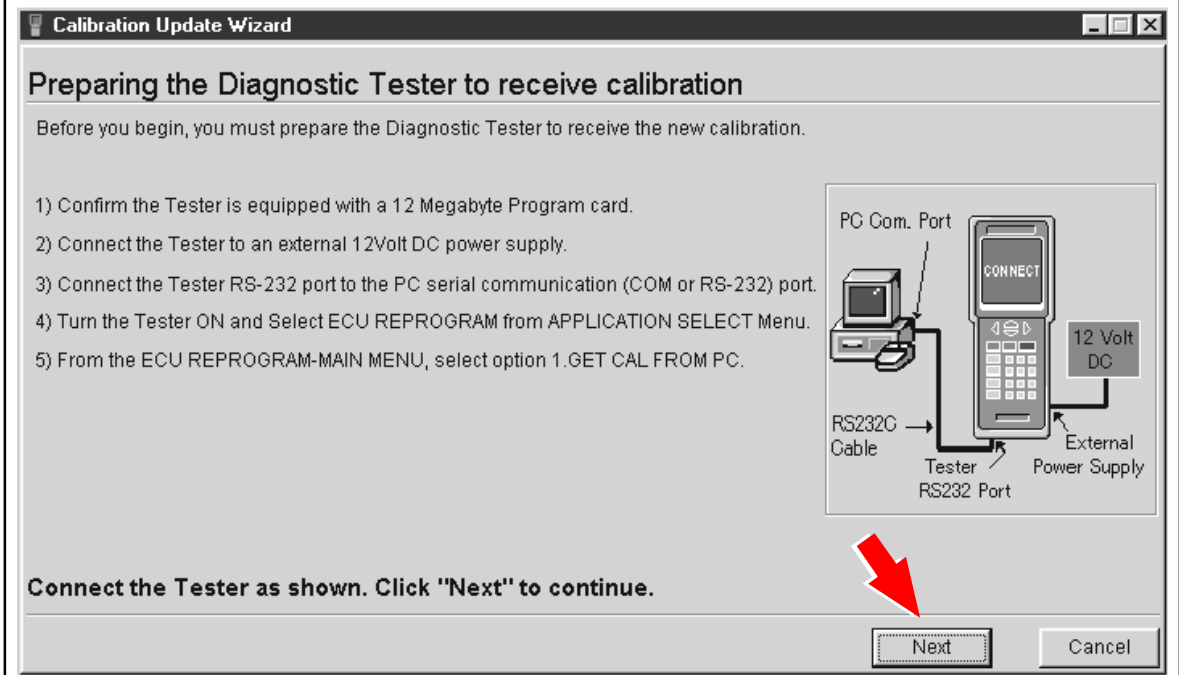
If the CUW does not launch, the CUW Installation and specific installation instructions are located under *Diagnostics* → *ECU Flash Reprogramming* (Figure 5).

FIGURE 7. LAUNCHING CALIBRATION UPDATE WIZARD



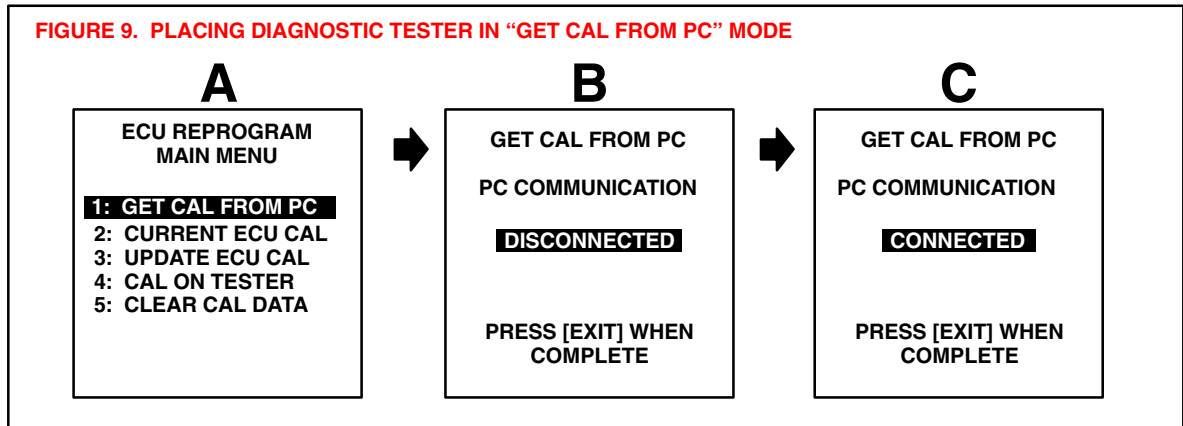
- E. Confirm the Diagnostic Tester connections to the TIS workstation are correct.

FIGURE 8. CONFIRMING DIAGNOSTIC TESTER CONNECTIONS



**Operation
Procedure**
(Continued)
**DOWNLOAD
FILE TO TESTER**

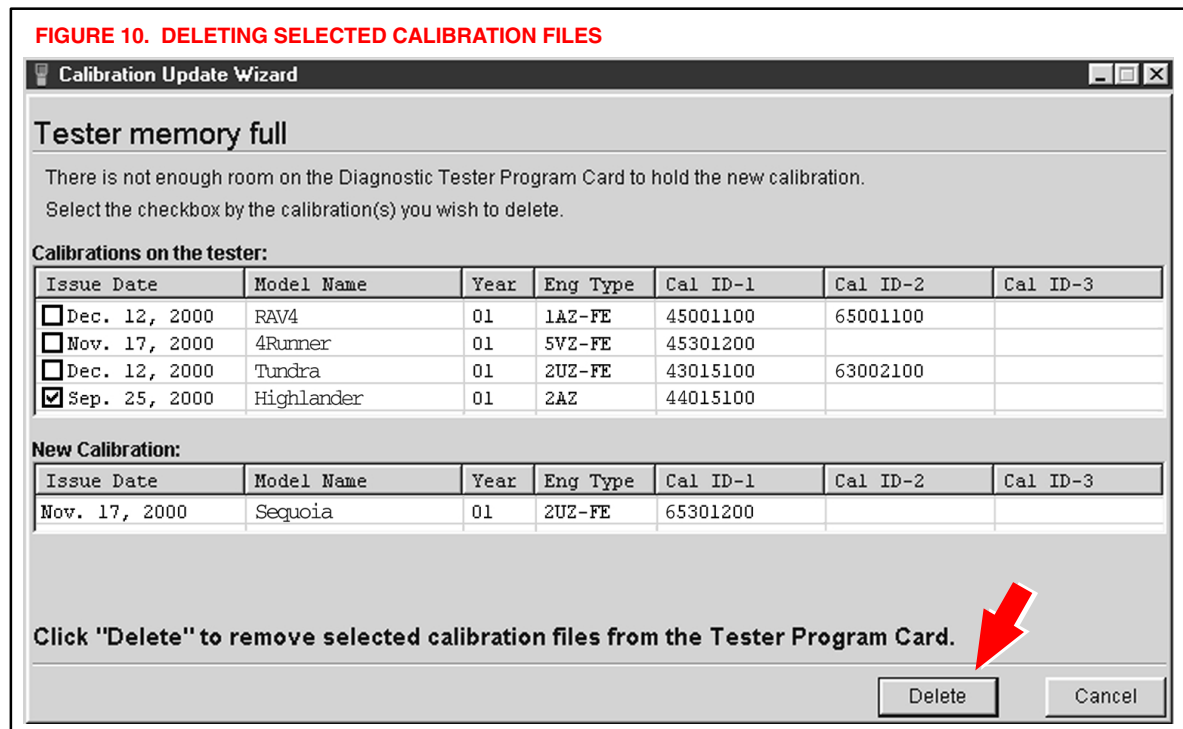
- F. Place the Diagnostic Tester in the “GET CAL FROM PC” mode to receive the calibration file (Figure 9).
Click **NEXT** on the TIS workstation. Once communications begin between the PC and the Diagnostic Tester, the Diagnostic Tester display will flash **CONNECTED**.



- G. The CUW determines if there is room to store the calibration file on the Diagnostic Tester Program Card. If there is insufficient room, the CUW will ask you to select the calibration file(s) to delete from the Program Card to make room for the new calibration file.
If necessary, check the calibration file(s) to delete, as shown in Figure 10.
Click **DELETE**.

NOTE:

If there is room to store the calibration file, skip to Step I, page 9.

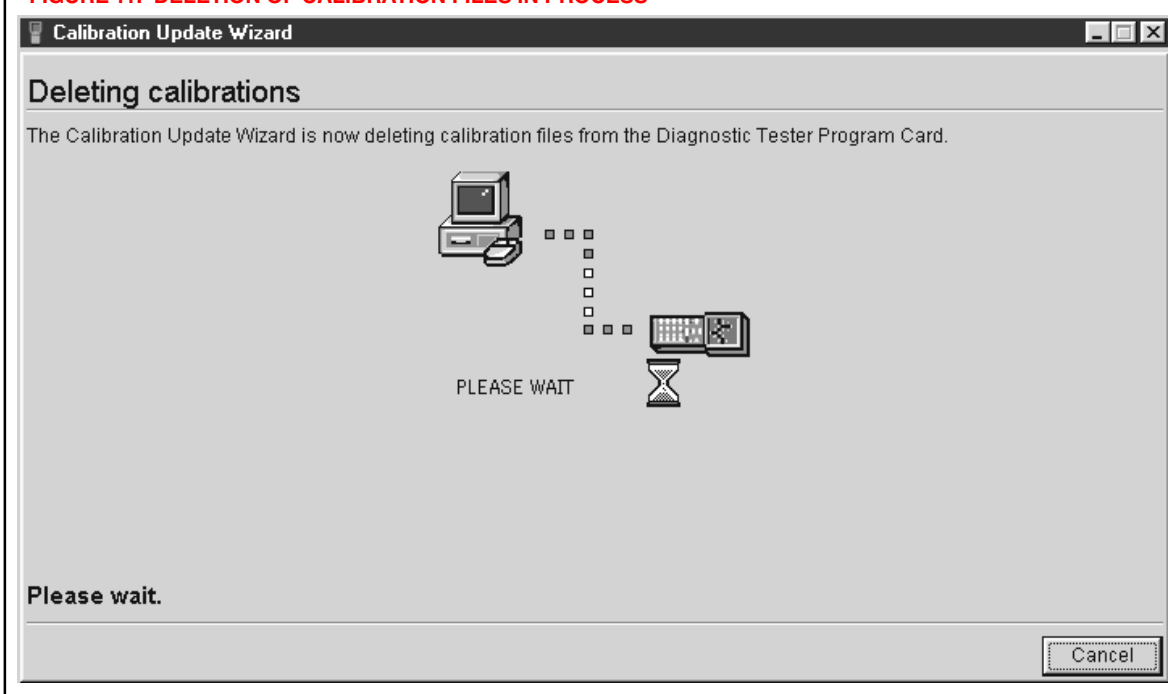


**Operation
Procedure**
(Continued)

**DOWNLOAD
FILE TO TESTER**

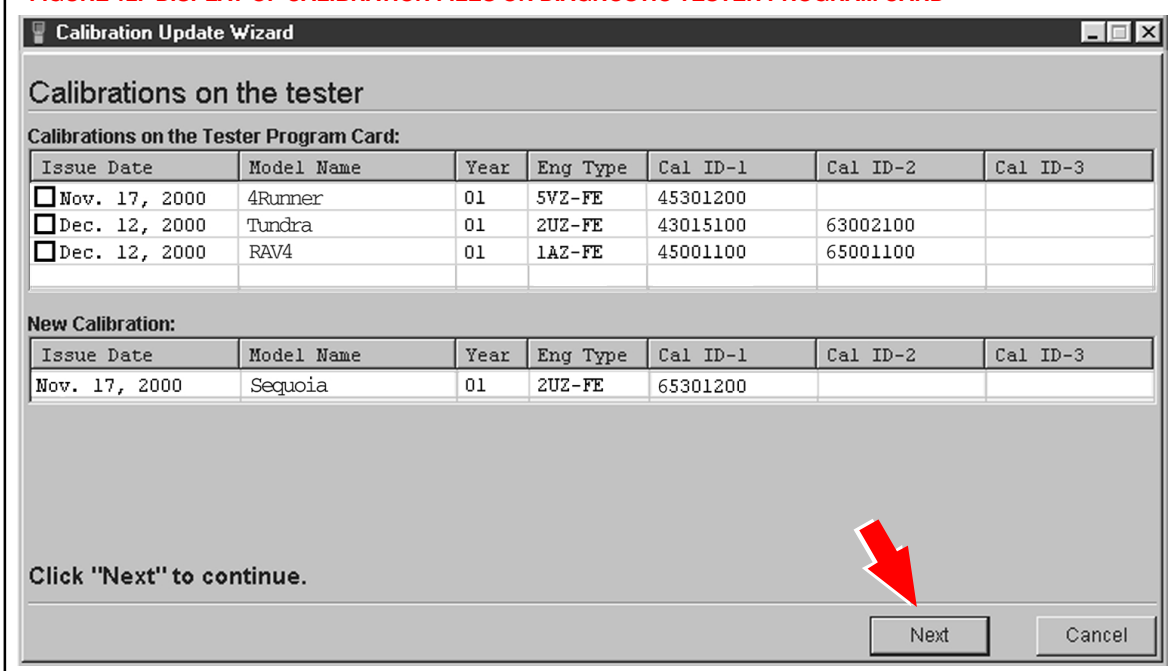
H. The CUW will now delete the calibration file(s) selected (see Figure 11).

FIGURE 11. DELETION OF CALIBRATION FILES IN PROCESS



I. The top half of the CUW screen displays the calibrations currently stored on the Diagnostic Tester Program Card. The bottom half of the screen displays the new calibration to be loaded onto the Program Card (see Figure 12). Click **NEXT** to continue the process.

FIGURE 12. DISPLAY OF CALIBRATION FILES ON DIAGNOSTIC TESTER PROGRAM CARD

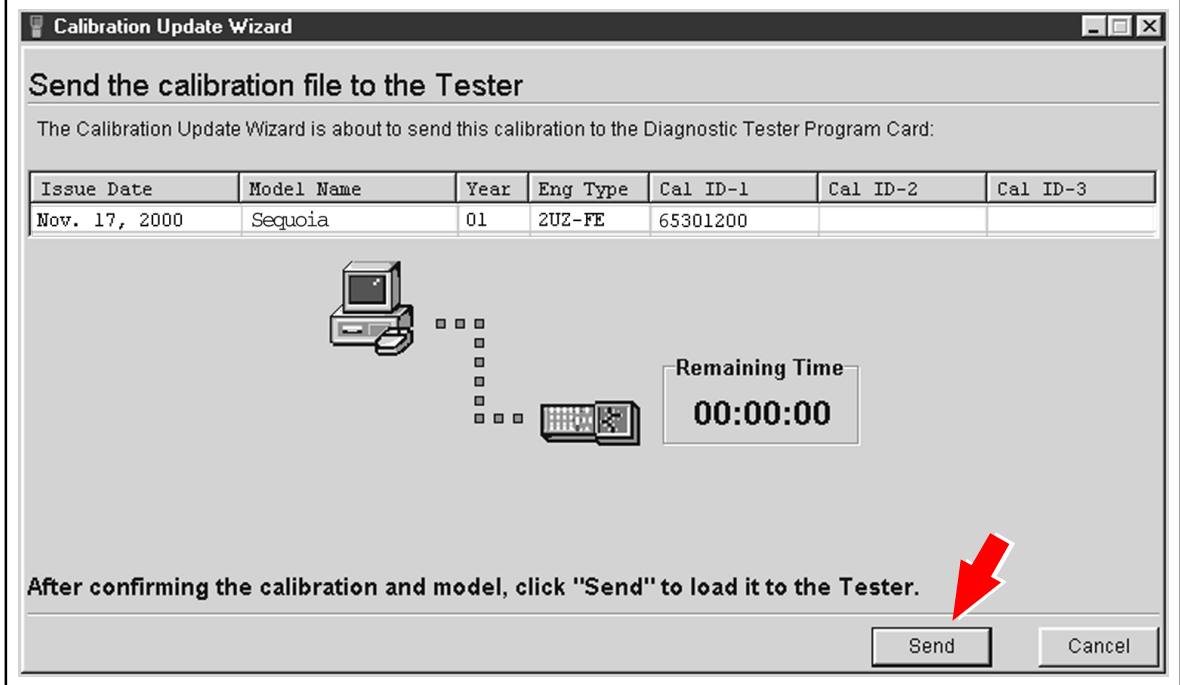


**Operation
Procedure
(Continued)**

**DOWNLOAD
FILE TO TESTER**

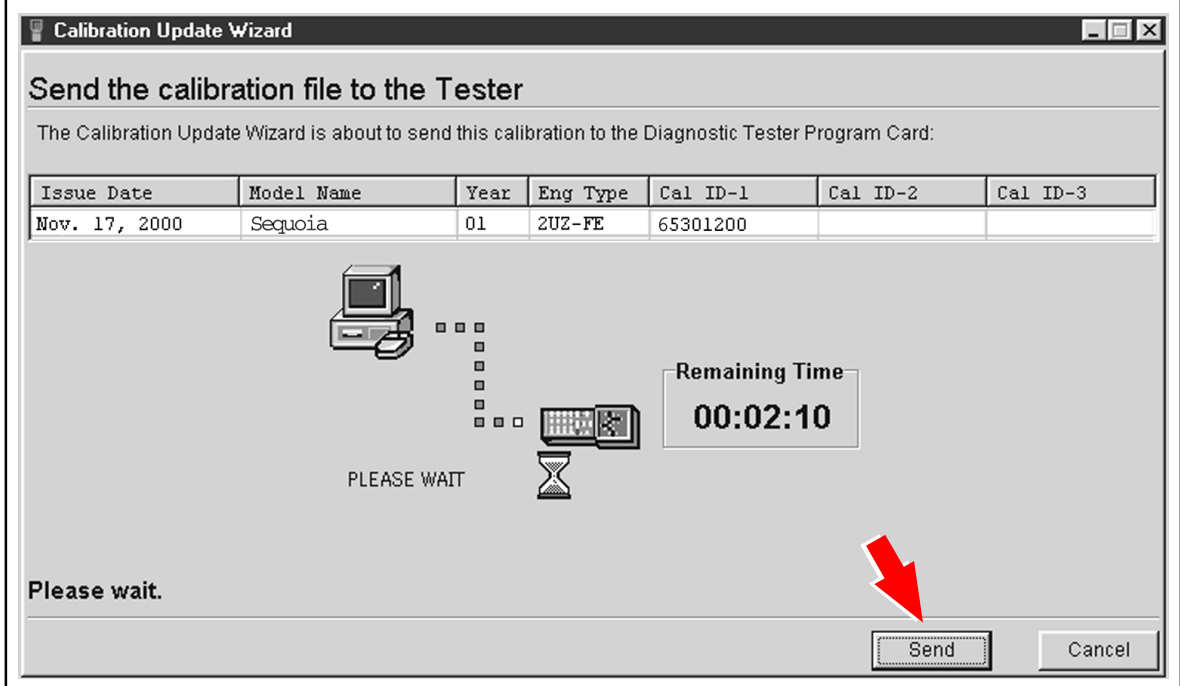
- J. Confirm the calibration file to be sent to the Diagnostic Tester Program Card (Figure 13). Click **SEND**.

FIGURE 13. SENDING NEW CALIBRATION FILE TO DIAGNOSTIC TESTER PROGRAM CARD



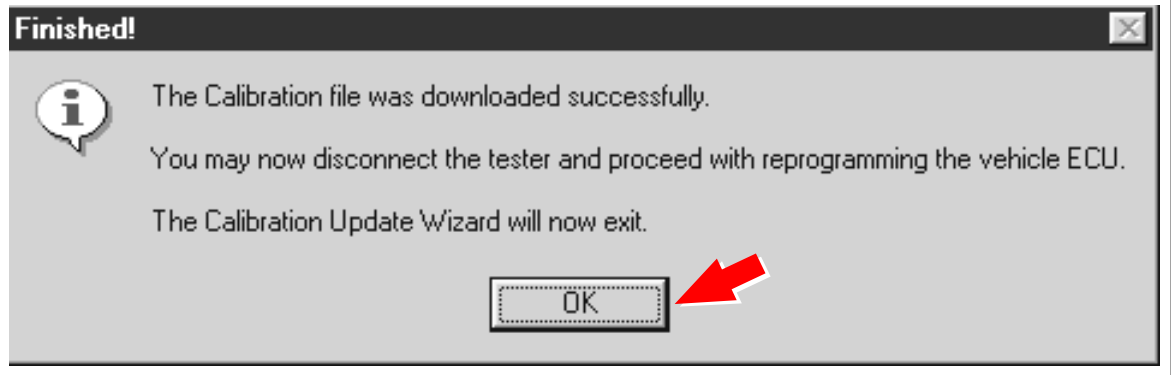
- K. The calibration file will now be downloaded to the Diagnostic Tester Program Card. This process takes approximately 2-6 minutes (see Figure 14).

FIGURE 14. DOWNLOADING OF CALIBRATION FILE IN PROCESS



**Operation
Procedure**
(Continued)**DOWNLOAD
FILE TO TESTER**

- L. The CUW will prompt when the calibration file is completely downloaded. Click **OK** to close the CUW (Figure 15).

FIGURE 15. DOWNLOAD OF CALIBRATION FILE COMPLETED**NOTE:**

With the calibration file loaded on the Diagnostic Tester Program Card, it is not necessary to repeat the above steps to reprogram a different vehicle needing the same calibration file. The steps above are only required when a new calibration file must be loaded onto the Diagnostic Tester Program Card.

The Diagnostic Tester now has the calibration file stored and you may proceed to the next step to reprogram the vehicle ECU.

Operation
Procedure
(Continued)

REPROGRAM
ECU WITH
TESTER

3. Reprogram the vehicle ECU with the Diagnostic Tester.

NOTICE:

Errors during the flash reprogramming process can permanently damage the vehicle ECU. Minimize the risks 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 electrical accessories (e.g. Audio system, A/C, interior lights, etc.).
- Do not add to or significantly change the vehicle's electrical load while reprogramming.
- Confirm the hood is open and ensure under hood temperatures do not exceed 158°F.
- Confirm cable connections between the vehicle and Diagnostic Tester are secure.
- Do not disconnect or turn off the Diagnostic Tester or the vehicle ignition during reprogramming.
- Set the 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-MP815-T, "Midtronics Battery Tester," and follow recommendations.

To ensure stable battery voltage, a battery charger may be connected during reprogramming if:

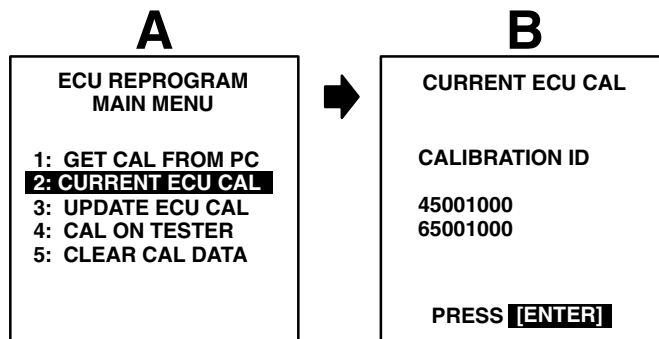
- Voltage does not fall below 11.4 volts.
- Voltage does not rise above 16.0 volts.
- Setting is on SLOW charge and not BOOST.

- A. Connect the Diagnostic Tester to the vehicle and select *CURRENT ECU CAL* from the *ECU REPROGRAM MAIN MENU*. Determine the vehicle's current ECU calibration. (See Figure 16.)

NOTE:

The vehicle may contain up to 3 separate calibration ID numbers. In the example shown below, the vehicle ECU contains only 2 calibration IDs.

FIGURE 16. DETERMINING CURRENT ECU CALIBRATION

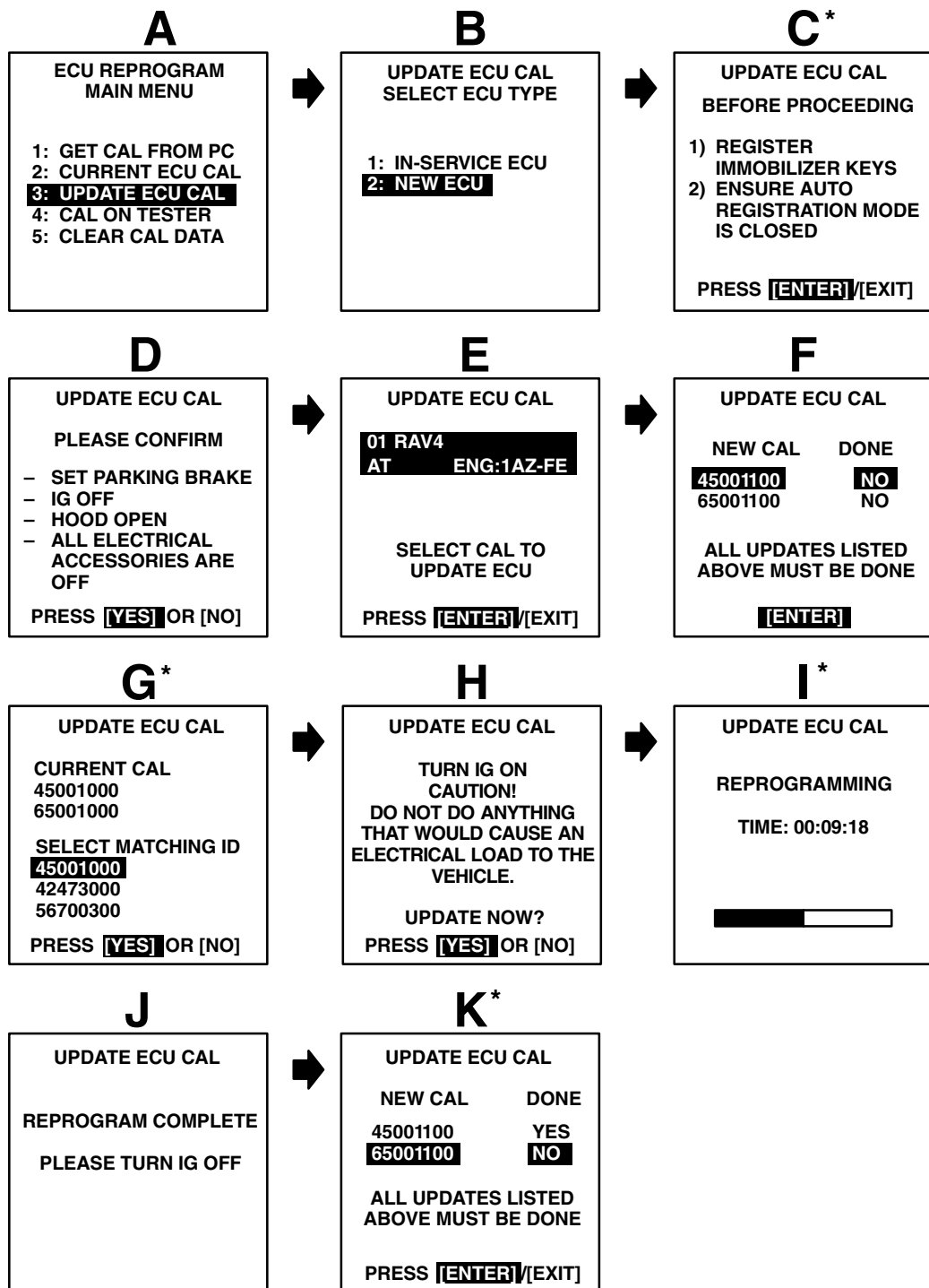


**Operation
Procedure**
(Continued)

REPROGRAM
ECU WITH
TESTER

- B. Continue to update the ECU Calibration File following the screen flow below (Figure 17). Details for selected screens are shown in Figure 18.

FIGURE 17. ECU REPROGRAMMING OVERVIEW



* See Figure 18 for more detail on this step.

**Operation
Procedure**
(Continued)

REPROGRAM
ECU WITH
TESTER

NOTE:

- Each flash calibration update will take approximately 15 to 30 minutes.
- Screens G through K (Figure 17) will need to be repeated for each flash calibration update (calibration ID number).
- All updates must display “YES” to complete the entire calibration file update for the vehicle ECU.
- Failure to complete all updates may result in **PERMANENT ECU DAMAGE!**

FIGURE 18. ECU REPROGRAMMING DETAIL

C

**UPDATE ECU CAL
BEFORE PROCEEDING**

- 1) REGISTER IMMOBILIZER KEYS
- 2) ENSURE AUTO REGISTRATION MODE IS CLOSED

PRESS **[ENTER]**/[EXIT]

Screen C is only displayed if attempting to reprogram a new ECU.

REPROGRAMMING WILL NOT BEGIN IF THE IMMOBILIZER KEYS ARE NOT REGISTERED FIRST.

- Refer to TSB No. SS001–99, “*Scantool Immobilizer Key Code Utility*,” for instructions on Immobilizer key registration.
- Refer to Repair Manual procedure “Engine Immobilizer System Registration” for vehicles with separate Transponder and Engine ECUs.

G

UPDATE ECU CAL

CURRENT CAL
45001000
65001000

SELECT MATCHING ID
45001000
42473000
56700300

PRESS **[YES]** OR [NO]

This screen displays the current ECU calibration. Scroll through the list of matching ID numbers and select a number that matches the current ECU calibration. Press ENTER.

I

UPDATE ECU CAL

REPROGRAMMING

TIME: 00:09:18



It may take up to 2 minutes for the progress bar to begin moving.

K

UPDATE ECU CAL

NEW CAL	DONE
45001100	YES
65001100	NO

**ALL UPDATES LISTED
ABOVE MUST BE DONE**

PRESS **[ENTER]**/[EXIT]

Flash Calibration Update Completed = “YES”
Flash Calibration Update NOT Completed = “NO”
(1 to 3 updates may be displayed)

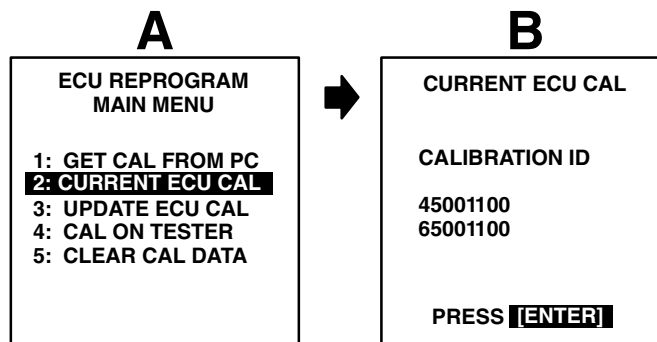
- Scroll down to the update displaying “NO” and press “ENTER” to begin the second flash sequence (see Steps G through J in Figure 17).
- If all updates display “YES”, press “EXIT” to complete the reprogramming process.

**Operation
Procedure**
(Continued)

**CONFIRM
UPDATE**

4. **Confirm successful flash calibration update and affix calibration update sticker.**
Follow these steps to confirm the calibration was reprogrammed to the ECU.
- A. The new calibration file should be displayed as the current ECU calibration file.

FIGURE 19. CONFIRMATION OF ECU REPROGRAMMING



- B. Using a permanent marker or ball point pen, enter the required information on the Authorized Modifications Label (Figures 20 and 21).

FIGURE 20. AUTHORIZED MODIFICATIONS LABEL

TOYOTA MOTOR CORPORATION	
AUTHORIZED MODIFICATIONS	
THE FOLLOWING MODIFICATIONS HAVE BEEN MADE:	
THESE MODIFICATIONS HAVE BEEN APPROVED AS APPROPRIATE BY EPA AND CARB	
DEALER CODE:	DATE:
CHANGE AUTHORITY:	

FIGURE 21. SAMPLE OF COMPLETED AUTHORIZED MODIFICATIONS LABEL

TOYOTA MOTOR CORPORATION	
AUTHORIZED MODIFICATIONS	
THE FOLLOWING MODIFICATIONS HAVE BEEN MADE:	
Replacement ECU Part Number →	89661-48241
Calibration ID(s) →	45001100, 65001100
THESE MODIFICATIONS HAVE BEEN APPROVED AS APPROPRIATE BY EPA AND CARB	
Dealer Code →	DEALER CODE: 31301
	DATE: 6/2/03
	CHANGE AUTHORITY: TSB EG###-03
	← Date Completed
	← TSB or Campaign Number

- C. Affix this 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.