

GTS+ ECU Flash Reprogramming With Security Signature

Service Category Engine/Hybrid System

Market USA and Mexico

Section Engine Control

Toyota Supports ASE Certification 

Applicability

YEAR(S)	MODEL(S)	ADDITIONAL INFORMATION
2022 - 2024	86, Corolla Cross, Tundra HV	
2024	Grand Highlander, Grand Highlander HV, Highlander, Highlander HV	
2021 - 2024	Mirai, RAV4 Prime, Sienna HV, Tundra, Venza HV	
2023 - 2024	bZ4X, Corolla, Corolla Cross HV, Corolla HV, Crown, GR Corolla, Prius, Prius Prime, Sequoia HV	

REVISION NOTICE

July 25, 2023 Rev2:

- **Applicability has been updated to include 2023 – 2024 model year 86, Corolla, Corolla Cross, Corolla Cross HV, Corolla HV, Crown, GR Corolla, Mirai, Prius, Prius Prime, RAV4 Prime, Sequoia HV, Sienna HV, Tundra, Tundra HV, and Venza HV and 2024 model year bZ4X, Grand Highlander, Grand Highlander HV, Highlander, Highlander HV vehicles.**
- **The Introduction, Parts Information, GTS+ Preparation, Process Overview, and Operation Procedure sections have been updated.**
- **The market indicator has been updated to include the Mexico market.**

July 19, 2022 Rev1:

- **Applicability has been updated to include 2022 model year 86, Corolla Cross, Mirai, Tundra, and Tundra HV vehicles and 2023 model year bZ4X vehicles.**

Any previous printed versions of this bulletin should be discarded.

GTS+ ECU Flash Reprogramming With Security Signature

Introduction

Flash reprogramming allows the Electronic Control Unit (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 Global Techstream+ (GTS+) ECU flash reprogramming procedures and outlines use of the Technical Information System (TIS) and the Calibration Update Wizard+ (CUW+). To ensure the correct ECU software is installed, ECUs will require a Security Signature before the ECU will initialize the flash reprogramming sequence. This bulletin also details the process for acquiring a Security Signature from TIS during the GTS+ ECU flash reprogramming process.

NOTE

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)
- Any other Toyota specific control unit

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Warranty Information

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

Parts Information

For USA Market

PART NUMBER	PART NAME	QTY
00451-00001-LBL	Authorized Modifications Label	1

NOTE

Authorized Modifications Labels may be ordered in packages of 25 from the Materials Distribution Center (MDC) (portal.toyotamdc.com) under item No. 00451-00001-LBL.

For Mexico Market

PART NUMBER	PART NAME	QTY
00451-00002-MEX	Authorized Modifications Label	1

NOTE

Authorized Modifications Labels may be ordered in packages of 25 from the Materials Distribution Center (MDC) (portal.toyotamdc.com) under item No. 00451-00002-MEX.

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Required Tools & Equipment

REQUIRED EQUIPMENT	SUPPLIER	PART NUMBER	QTY
Techstream ADVI*	ADE	TSADVUNIT	1
Techstream 2.0		TS2UNIT	
Techstream Lite		TSLITEPDLR01	
Techstream Lite (Green Cable)		TSLP2DLR01	

*Essential SST.

NOTE

- Only ONE of the Techstream units listed above is required.
- GTS+ software version 2023.02.001.02 or later is required.
- Additional Techstream units may be ordered by calling Approved Dealer Equipment (ADE) at 1-800-368-6787 (USA) or 01-55-50103041 (Mexico).
- Use Techstream or an approved J2534 interface to perform flash reprogramming updates. Visit techinfo.toyota.com for more information regarding J2534 reprogramming.

SPECIAL SERVICE TOOLS (SST)	PART NUMBER	QTY
DSS-5000 Battery Diagnostic Tool*	DSS-5000P T	1
DCA-8000 Battery Diagnostic Tool*	DCA-8000P T	1

*Essential SST.

NOTE

Additional SSTs may be ordered by calling 1-800-933-8335 (USA) or 01-800-504-5330 (Mexico).

GTS+ Preparation

Select the Correct User Type

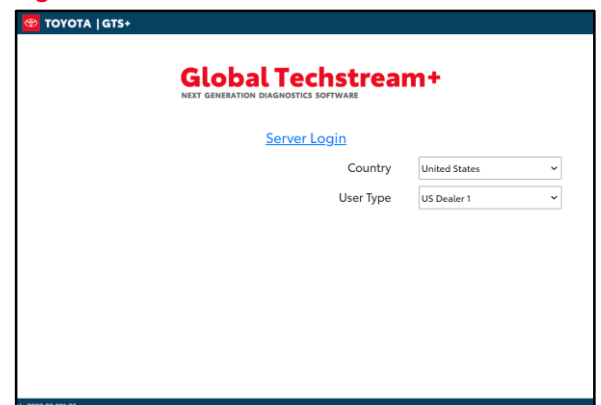
1. Launch GTS+.
2. From the initial login screen select the Country and the User Type.

NOTE

The appropriate User Type **MUST** be selected for GTS+ to function correctly.

3. Click Server Login.

Figure 1.



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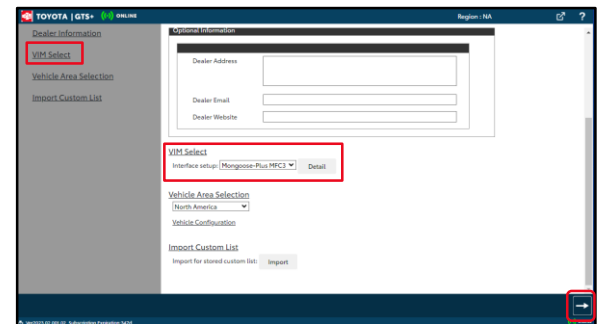
GTS+ Preparation (continued)

Confirm the Correct VIM

GTS+ software requires a VIM selection before it can be used for reprogramming.

1. Select GTS+ Settings from the Main Menu screen.
2. Select VIM Select from the GTS+ Settings menu.
3. Select the correct interface setup from the dropdown list.
 - Mongoose-Plus MFC3 VIM:
 - Techstream Lite w/Blue & Black Case w/Detachable Cable
 - Techstream ADVi w/Grey Case
 - MongoosePro MFC2 VIM:
 - Techstream Lite w/Green Case
 - Techstream ADVi w/Black Case
 - MongoosePro MFC VIM:
 - Techstream Lite w/Blue Case
 - Techstream Lite w/Updated Clear Case
 - Techstream 2.0

Figure 2.



NOTE

The Mongoose driver MUST be installed before Mongoose selections will be available. For additional information, see *TIS – Diagnostics – Scantool*.

4. Click the arrow in the bottom right corner.

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Process Overview

1. Verify the vehicle's applicability for recalibration and locate the desired calibration file by performing the GTS+ Health Check function.

NOTE

- GTS+ will automatically search TIS for the appropriate Service Bulletin using the current calibration ID from the vehicle if the PC is connected to the network (see the figures below).
- Calibration file links can be found embedded in the corresponding Service Bulletin.

Figure 3.

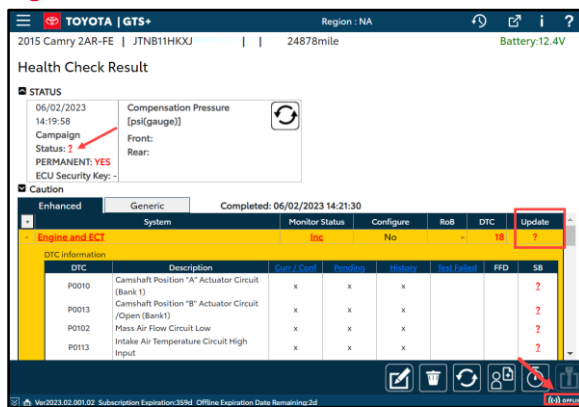
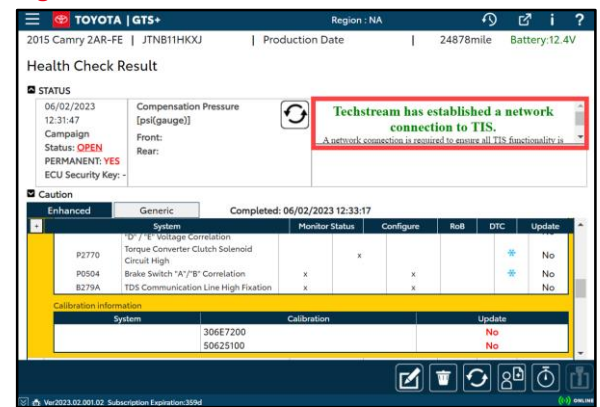


Figure 4.



2. Connect the DCA-8000 battery diagnostic tool using “Power Supply Mode” ONLY. The DCA-8000 battery diagnostic tool includes a power supply mode to help maintain battery voltage at 13.5V during ECU reprogramming.

NOTICE

- ECU damage may occur if the correct battery charger mode setting is NOT used.
- Refer to **Vehicle Reprogramming Tips** for other approved chargers, located at **TIS – Diagnostics – Reprogramming – Reference Documents**.
- The battery diagnostic tool **MUST** be used in Power Supply Mode to maintain battery voltage at 13.5V while flash reprogramming the vehicle.
- For details on how to use the battery diagnostic tool, refer to the [DCA-8000 Instruction Manual](#) located at **TIS – Diagnostics – Tools & Equipment – Battery Diagnostics**.

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Process Overview (continued)

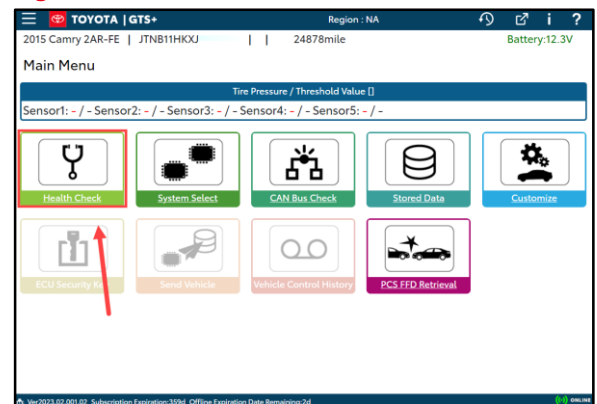
3. Locate the appropriate calibration ID and reprogram the vehicle ECU with GTS+. GTS+ uses the CUW+ application to open calibration files and facilitate the ECU flash reprogramming process.

4. Attach the Authorized Modifications Label. Modifications to ECU calibrations MUST be recorded and properly displayed on the vehicle using the Authorized Modifications Label.

Operation Procedure

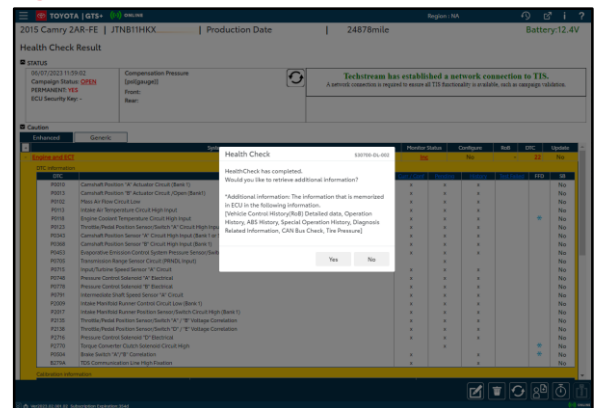
1. Verify the vehicle’s applicability for recalibration and locate the desired calibration file.
 - A. Connect GTS+ and establish a vehicle connection.
 - B. Click the Health Check button on the Main Menu.

Figure 5.



- C. A Health Check completed window opens. To continue, click either Yes or No.
 - (1) Click Yes to include additional information in the Health Check.
 - (2) Click No if additional information is NOT desired.

Figure 6.



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Operation Procedure (continued)

- D. Available calibration updates are indicated by a Yes in the Calibration Update column. Click the Yes link in the calibration information section to access the appropriate Service Bulletin on TIS.

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 7.

The screenshot shows the Toyota GTS+ interface for a 2015 Camry 2AR-FE. It displays a 'Health Check Result' section with status information and a 'Caution' section. Below these is a table of DTCs (Diagnostic Trouble Codes) with columns for DTC, Description, and various status indicators. At the bottom, there is a 'Calibration Information' table with columns for System, Calibration, and Update. A red arrow points to the 'Update' button in the 'Update' column of the 'Calibration Information' table.

DTC	Description	Set / Clear	Present	History	Test Failed	FFD	SB
P0010	Camshaft Position "A" Actuator Circuit (Bank 1)	x	x	x			No
P0013	Camshaft Position "W" Actuator Circuit, Open (Bank1)	x	x	x			No
P0102	Mass Air Flow Circuit Low	x	x	x			No
P0113	Intake Air Temperature Circuit High Input	x	x	x			No
P0118	Engine Coolant Temperature Circuit High Input	x	x	x			No
P0133	Throttle/Pedal Position Sensor/Switch "A" Circuit High Input	x	x	x			No
P0343	Camshaft Position Sensor "A" Circuit High Input (Bank 1 or Single Sensor)	x	x	x			No
P0366	Camshaft Position Sensor "B" Circuit High Input (Bank 1)	x	x	x			No
P0453	Engine/Emission Control System Pressure Sensor/Switch High Input	x	x	x			No
P0705	Transmission Range Sensor Circuit (PRNDL Input)	x	x	x			No
P0715	Input/Turbine Speed Sensor "A" Circuit	x	x	x			No
P0748	Pressure Control Solenoid "A" Electrical	x	x	x			No
P0778	Pressure Control Solenoid "B" Electrical	x	x	x			No
P0791	Intermediate Shaft Speed Sensor "A" Circuit	x	x	x			No
P2009	Intake Manifold Runner Control, Circuit Low (Bank 1)	x	x	x			No
P2017	Intake Manifold Runner Position Sensor/Switch Circuit High (Bank 1)	x	x	x			No
P2135	Throttle/Pedal Position Sensor/Switch "A" / "B" Voltage Correlation	x	x	x			No
P2138	Throttle/Pedal Position Sensor/Switch "D" / "E" Voltage Correlation	x	x	x			No
P2716	Pressure Control Solenoid "D" Electrical	x	x	x			No
P2770	Torque Converter Clutch Solenoid Circuit High	x	x	x			No
P0504	Brake Switch "A"/"B" Correlation	x	x	x			No
B2764	TDS Communication Line High Fixation	x	x	x			No

System	Calibration	Update
206E7100		Yes
50623100		No

- E. Login to TIS.

HINT

If already logged in, skip this step.

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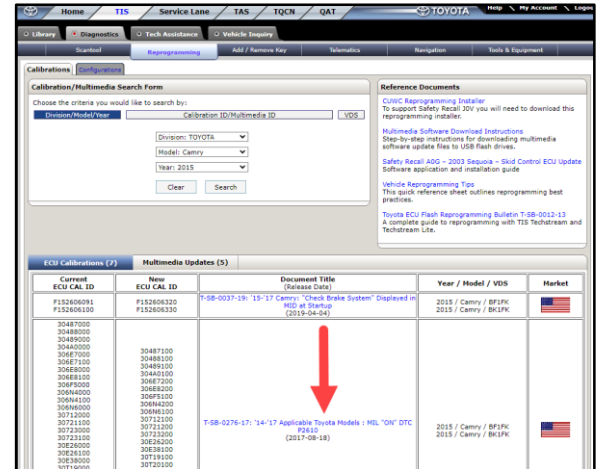
Operation Procedure (continued)

- F. To review the Service Bulletin 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 other authorized users may access calibration files.

Figure 8.



2. Connect the DCA-8000 battery diagnostic tool.

NOTE

Refer to [Vehicle Reprogramming Tips](#) for other approved chargers, located at *TIS – Diagnostics – Reprogramming – Reference Documents*.

- A. Connect the DCA-8000 battery diagnostic tool to the vehicle and turn it ON.
 B. Select Power Supply Mode.

NOTICE

- ECU damage may occur if the correct battery charger and mode setting are NOT used.
- The battery diagnostic tool MUST be used in Power Supply Mode to maintain battery voltage at 13.5V while flash reprogramming the vehicle.
- For details on how to use the battery diagnostic tool, refer to the [DCA-8000 Instruction Manual](#) located at *TIS – Diagnostics – Tools & Equipment – Battery Diagnostics*.

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Operation Procedure (continued)

3. Click the appropriate calibration ID and reprogram the vehicle's ECU with GTS+.
 - A. AFTER reviewing the procedures outlined in the selected Service Bulletin, 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. Review the selected Service Bulletin carefully.

Figure 9.

		T-SB-0111-22	December 16, 2022	Page 6 of 8
Hesitation From Stop and Surge Concerns				
Calibration Information				
MODEL	DRIVETRAIN	CALIBRATION ID		
		PREVIOUS		NEW
Tundra	2WD	8A2100C01200 8A2100C01300		8A2100C01400
	4WD	8A2100C03200 8A2100C03300		8A2100C03400

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Operation Procedure (continued)

- B. Click Open to load the calibration file information. If prompted to choose GTS or GTS+, select GTS+.

NOTE

- GTS+ downloads calibration files as needed to ensure the latest calibration file is used.
- Do NOT save calibrations locally on the hard drive or other media for future use.

Figure 10.

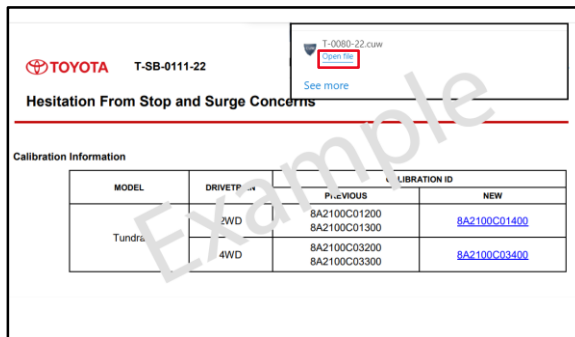
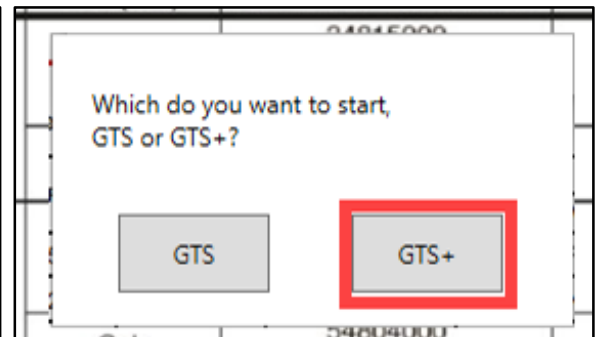


Figure 11.



NOTICE

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

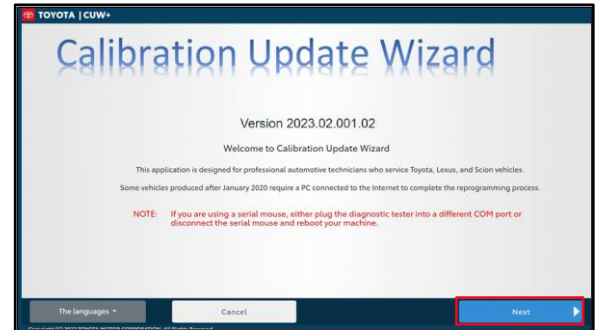
- Battery voltage **MUST NOT FALL BELOW 12V** during reprogramming. Confirm battery voltage is higher than 12V but be sure voltage **DOES NOT RISE ABOVE 16.0V** during reprogramming.
- Turn **OFF ALL** vehicle accessories (audio system, A/C, interior lights, DRL, etc.).
- Do **NOT** add to or significantly 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 the parking brake.
- Complete **ALL** flash calibration updates provided for each ECU.
- If the battery's State-Of-Charge (SOC) or capacity is in question, test with SST No. [DSS-5000P T](#) (Battery Diagnostic Tool), and follow the [DSS-5000 Instruction Manual](#) located at *TIS – Diagnostics – Tools & Equipment – Battery Diagnostics*.
- The DCA-8000 battery diagnostic tool **MUST** be used in Power Supply Mode to maintain battery voltage at 13.5V while flash reprogramming the vehicle. For details on how to use the DCA-8000 battery diagnostic tool, refer to the [DCA-8000 Instruction Manual](#) located at *TIS – Diagnostics – Tools & Equipment – Battery Diagnostics*.

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Operation Procedure (continued)

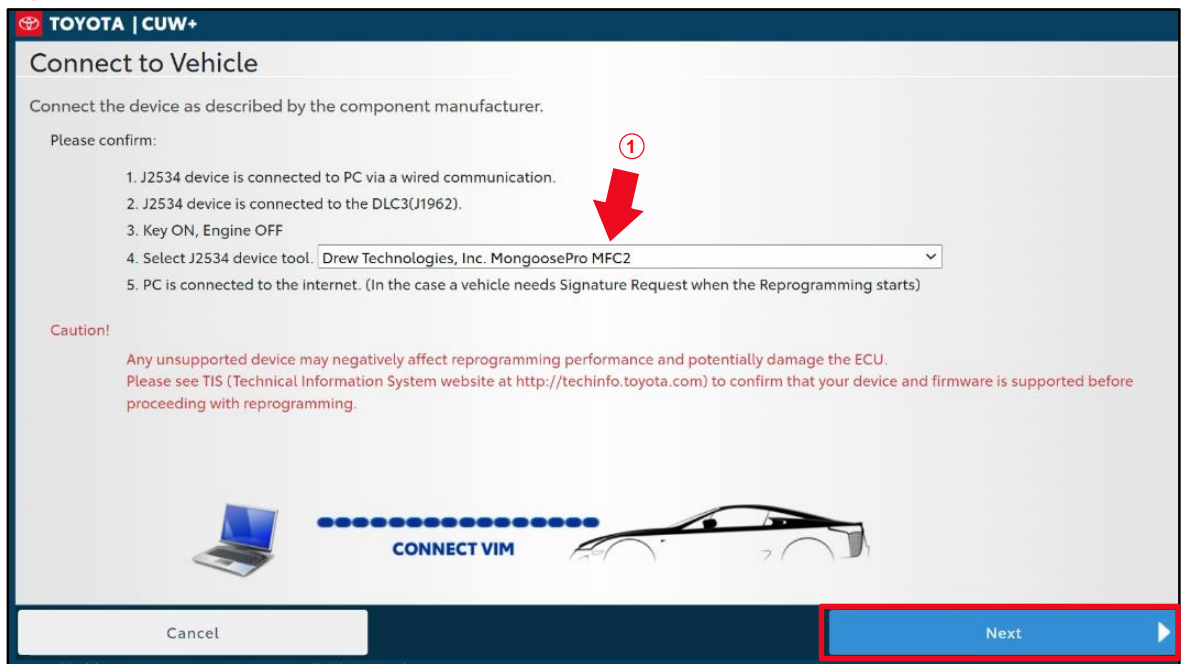
- C. Click Next to start the calibration update process.

Figure 12.



- D. Confirm the following:
 - The PC is connected to VIM.
 - The VIM is connected to DLC3 connector.
 - The Ignition is ON and the engine is OFF or READY-OFF (hybrid vehicles).
 Then, click Next.

Figure 13.



1	Select the Correct Device Tool (“MongoosePro MFC,” “MongoosePro MFC2,” or “Mongoose-Plus MFC3” VIM)
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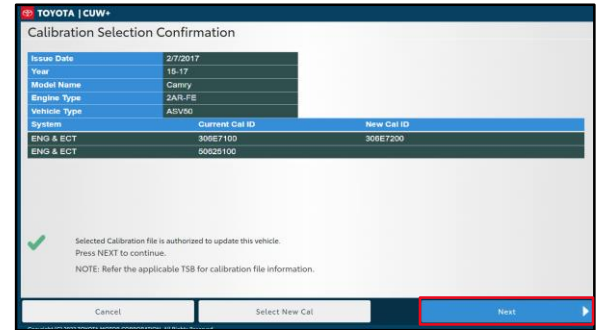
Operation Procedure (continued)

- E. Verify the correct current and NEW calibration information, then click Next.

NOTICE

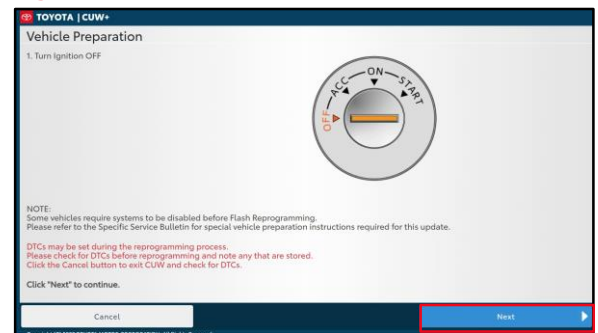
- The total number of calibration IDs in the calibration file corresponds to the number of reprogrammable processors in the ECU.
- The figure to the right shows an example of the update procedure for a two-processor ECU.

Figure 14.



- F. Turn the ignition OFF, click Next, and wait at least 10 seconds before proceeding.

Figure 15.



GTS+ ECU Flash Reprogramming With Security Signature

Operation Procedure (continued)

- G. Turn the Ignition ON (IG ON Ready-OFF for hybrid vehicles).

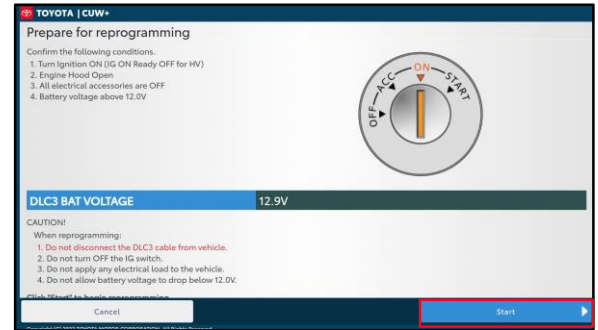
- H. Confirm the following:
 - The PC is connected to VIM.
 - The hood is open.
 - ALL accessories are OFF.
 - Battery voltage is above 12V.

NOTICE

Verify the vehicle is connected to a battery charger before continuing. If battery voltage falls below 12V, ECU damage may occur.

Then, click Start.

Figure 16.



NOTE

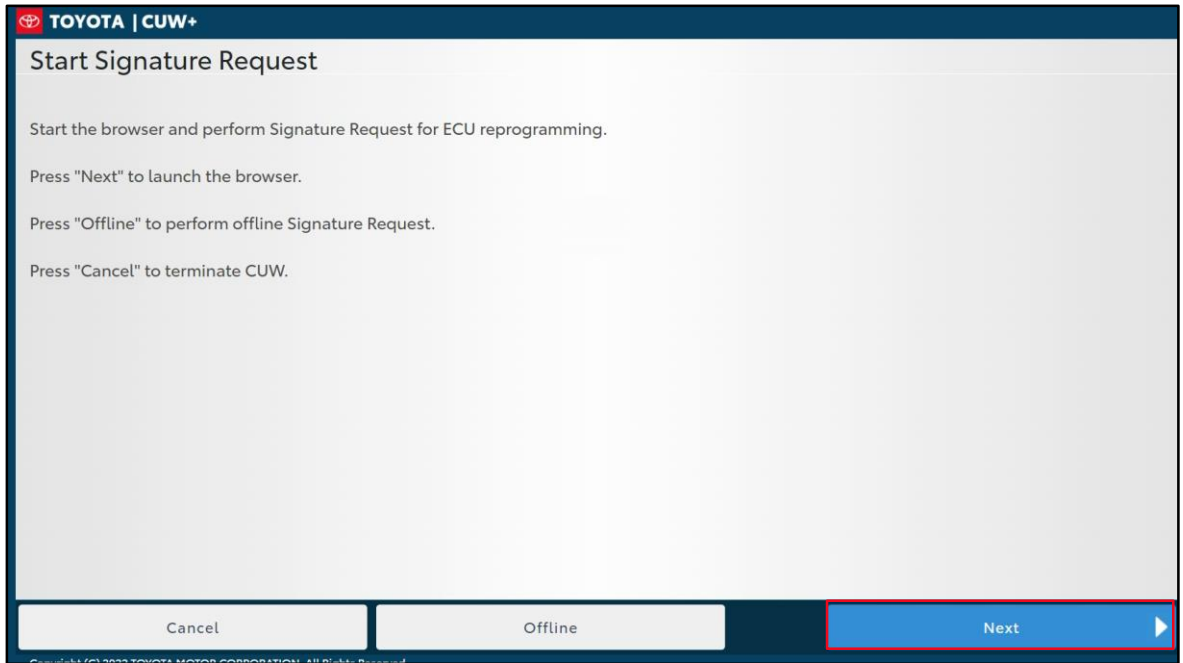
If the key cycle is NOT done properly, reprogramming will fail, and an error message will appear prompting you to restart.

GTS+ ECU Flash Reprogramming With Security Signature

Operation Procedure (continued)

- I. This vehicle is equipped with additional security measures requiring a Signature from TIS. Select Next to open TIS and retrieve the Signature.

Figure 17.



- J. Input TIS login credentials and select Login.

Figure 18.



GTS+ ECU Flash Reprogramming With Security Signature

Operation Procedure (continued)

- K. Input TIS login credentials for secondary authentication and select Login.

Figure 19.

The screenshot shows a window titled "Secure Reprogramming" with the heading "Receive Secure Reprogramming Signature". Below the heading, there are fields for "User ID: 1XXXXX" and "Password:". At the bottom of the form, there are three buttons: "Clear", "Login", and "Switch User". The "Login" button is highlighted with a red box.

- L. Select Send.

Figure 20.

The screenshot shows a window titled "Secure Reprogramming" displaying the following user details:
User ID: Technician 1
Technician Name: Technician 1
Distributor Code: 11111
Distributor Name: TMNA
Dealer Code: 12345
Dealer Name: Toyota
Vehicle VIN: 12345678912345678
Software ID: 123abc123abc123abc123abc123abc123abc
At the bottom right of the window, there is a "Send" button highlighted with a red box.

- M. Click Copy to Clipboard to copy the signature from TIS.

Figure 21.

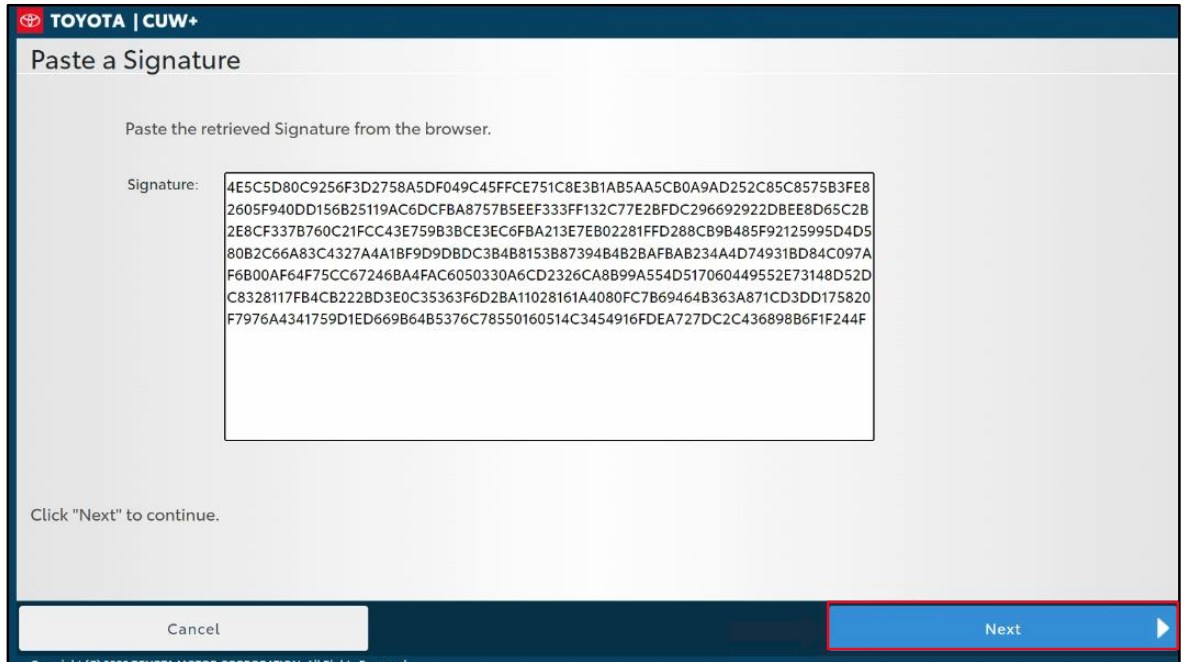
The screenshot shows a window titled "Secure Reprogramming" with the heading "Signature calculation result". Below the heading, it says "Input below signature to Calibration Update Wizard and press 'Next'". A long alphanumeric signature is displayed: "Signature: 3D8DB618EDFA60DEF6C6979FCB0C5123AC290032F3121430E1AC6CC130C54409B871B964FDA6A6E589233467F8037C833945845872018C77A6C2FAE1232F52348B6D6E8554E8F496A9F2FC4". At the bottom left, there is a "Copy to Clipboard" button highlighted with a red box.

GTS+ ECU Flash Reprogramming With Security Signature

Operation Procedure (continued)

N. Paste the Signature into CUW+ and select Next.

Figure 22.

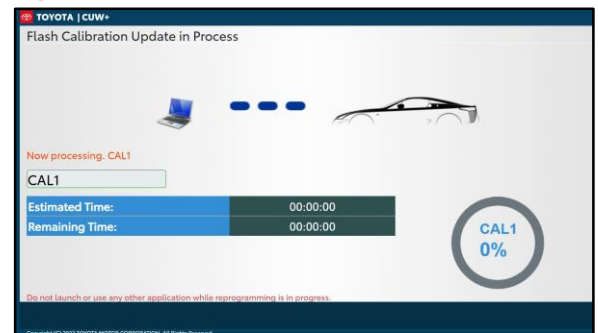


O. Do NOT disturb the vehicle during flash reprogramming.

NOTE

- ECU flash reprogramming may take 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 23.



P. Does the vehicle require only ONE calibration update?

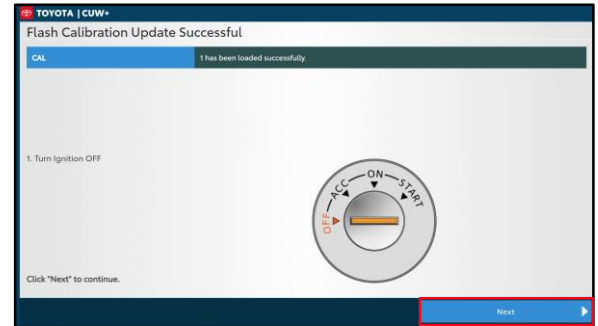
- **YES** — Go to sub step T.
- **NO** — If the vehicle requires a SECOND calibration update, continue as follows:
 - For serial communication vehicles, continue to sub step Q.
 - For CAN communication vehicles, go to sub step S.

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Operation Procedure (continued)

- Q. When Cal 1 completes the update process, turn the ignition OFF, click Next, and wait a MINIMUM of 10 seconds before proceeding.

Figure 24.



- R. Turn the ignition to the ON position, then click Start.

NOTE

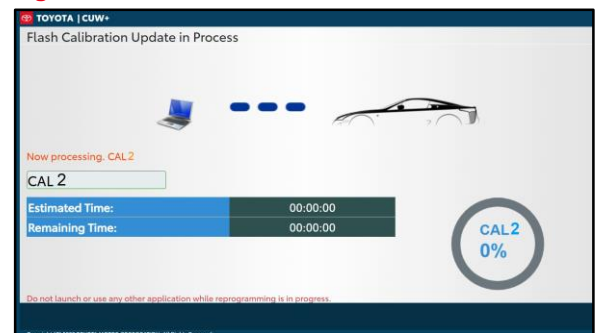
If the key cycle is NOT done properly, reprogramming may fail, and an error message will appear prompting you to restart Cal 2.

Figure 25.



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

Figure 26.

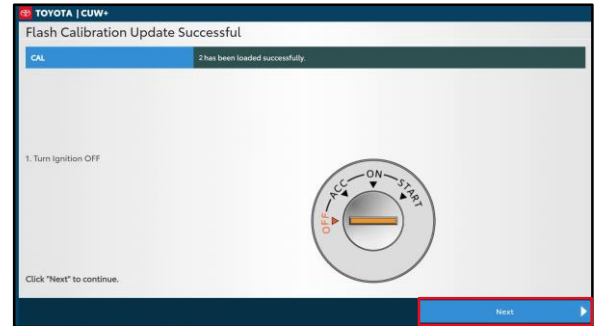


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Operation Procedure (continued)

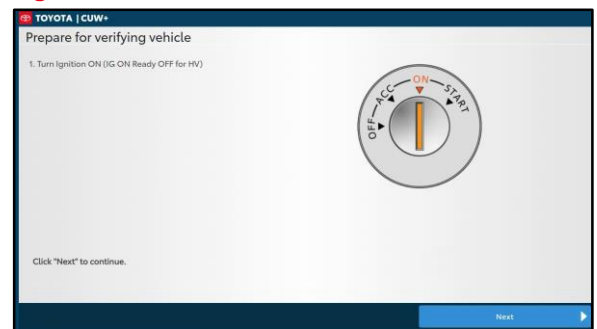
- T. Turn the ignition OFF, click Next, and wait a MINIMUM of 10 seconds before proceeding.

Figure 27.



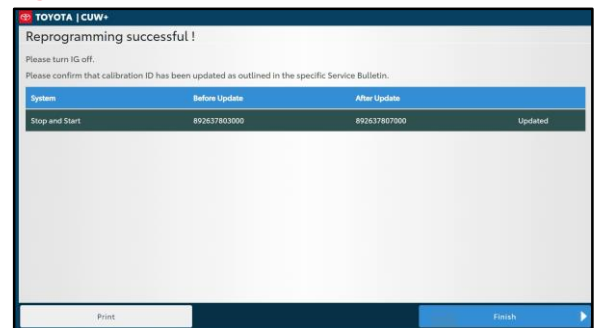
- U. Turn the ignition to the ON position, then click Next.

Figure 28.



- V. Confirm calibrations were updated and click Finish.

Figure 29.



NOTE

On some models, DTCs may set as a result of reprogramming. If DTCs are present, clear codes and run the Health Check again. Troubleshoot ANY remaining current, pending, or history codes. Permanent codes will NOT be cleared using GTS+. Permanent codes do NOT illuminate the MIL and do NOT require troubleshooting. They will clear during normal driving once the Universal Trip Drive Pattern is performed.

GTS+ ECU Flash Reprogramming With Security Signature

Operation Procedure (continued)

4. Attach the Authorized Modifications Label.
 - A. Using a permanent marker or ballpoint pen, complete the Authorized Modifications Label and attach it to the vehicle. The Authorized Modifications Label is available through the MDC, P/N 00451-00001-LBL (USA) or 00451-00002-MEX (Mexico).

Figure 30.

TOYOTA MOTOR CORPORATION	
AUTHORIZED MODIFICATIONS	
THE FOLLOWING MODIFICATIONS HAVE BEEN MADE:	
① →	
② →	
THESE MODIFICATIONS HAVE BEEN APPROVED AS APPROPRIATE BY EPA AND CARB	
③ →	DEALER CODE: _____ DATE: _____
	CHANGE AUTHORITY: _____ ← ④
	⑤ ←

1	Replacement ECU Part Number
2	Calibration ID(s)
3	Dealer Code

4	Date Completed
5	Service Bulletin or Campaign Number

- B. Attach the Authorized Modifications Label under the hood in the location determined by the specific Service Bulletin or Campaign.

NOTE

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