

# GTS+ ECU Flash Reprogramming Procedure

**Service Category** Engine/Hybrid System

**Market** USA and Mexico

**Section** Engine Control

Toyota Supports  
ASE Certification 

## Applicability

YEAR(S)	MODEL(S)	ADDITIONAL INFORMATION
2001 - 2023	4Runner, Highlander	
2017 - 2020, 2022	86	
2013 - 2022	Avalon HV	
2001 - 2022	Avalon, Corolla, Prius, Sequoia, Tacoma	
2007 - 2024	Avanza, Camry HV	
2017 - 2022	C-HR, Prius Prime	
2007 - 2024	Camry HV	
2001 - 2024	Camry, RAV4	
2001 - 2005	Celica, Echo	
2008 - 2014	Corolla BR-Prod	
2020 - 2022	Corolla HV, Supra	
2019 - 2022	Corolla Hatchback	
2007 - 2014	FJ Cruiser	
2006 - 2024	Hiace	
2006 - 2023	Highlander HV	
2004 - 2024	Hilux	
2001 - 2011, 2013 - 2021	Land Cruiser	
2001 - 2006	MR2 Spyder	
2003 - 2014	Matrix	
2016 - 2021	Mirai	
2012 - 2021	Prius C	
2010, 2012 - 2015	Prius PHV	
2012 - 2018	Prius V	
2001 - 2003, 2012 - 2014	RAV4 EV	
2016 - 2024	RAV4 HV	
2022 - 2024	Raize	
2001 - 2020	Sienna	
2001 - 2010	Solara	
2001 - 2021	Tundra	
2009 - 2016	Venza	
2016 - 2020	Yaris R	
2016 - 2020	Yaris SD MEX-Prod	
2004 - 2019, 2022 - 2023	Yaris	
2017 - 2018	iA, iM	

## GTS+ ECU Flash Reprogramming Procedure

### **SUPERSESION NOTICE**

The information contained in this bulletin supersedes Service Bulletin Nos. T-SB-0134-16 and T-SB-0165-19.

- Applicability has been updated to include 2021 model year Land Cruiser, Mirai, Prius C, and Tundra; 2004 – 2024 model year; Hilux 2006 – 2024 model year Hiace; 2007 – 2024 model year Avanza; 2008 – 2014 model year Corolla Br-Prod; 2016 – 2020 model year Yaris R; 2020 – 2022 model year Supra; 2021 – 2022 model year Avalon, Avalon HV, C-HR, Corolla, Corolla Hatchback, Corolla HV, Prius, Prius Prime, Sequoia, and Tacoma; 2021 – 2023 model year 4Runner, Highlander, and Highlander HV; 2021 – 2024 model year Camry, Camry HV, RAV4, and RAV4 HV; 2022 – 2024 model year Raize; and 2022 – 2023 model year Yaris vehicles.
- Applicability has been updated to remove 2012 model year Land Cruise; 2001 – 2002, 2015 – 2020 model year Matrix; 2001 – 2003 and 2020 model year Yaris; 2001 – 2005 model year Highlander HV; 2001 – 2006 model year Camry HV; 2001 – 2006 and 2015 – 2020 model year FJ Cruiser; 2001 – 2008 and 2017 – 2020 model year Venza; 2001 – 2009 and 2011, and 2016 – 2020 model year Prius PHV; 2001 – 2011 model year Prius C; 2001 – 2011 and 2019 – 2020 model year Prius V; 2001 – 2012 model year Avalon HV; 2001 – 2015 model year Mirai and RAV4 HV; 2001 – 2016 model year C-HR and Prius Prime; 2001 – 2016 and 2019 – 2020 model year iA and iM; 2001 – 2018 model year Corolla Hatchback; 2001 – 2019 model year Corolla HV; 2004 – 2011 and 2015 – 2020 model year RAV4 EV; 2006 – 2020 model year Celica and Echo; 2007 – 2020 model year MR2 Spyder; and 2011 – 2020 model year Solara vehicles.
- The Introduction, GTS+ Preparation, Process Overview, and Operation Procedure sections have been updated.
- The market indicator has been updated to include the Mexico market.

Service Bulletin Nos. T-SB-0134-16 and T-SB-0165-19 are obsolete and any printed versions should be discarded.

### 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+). 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**

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

## GTS+ ECU Flash Reprogramming Procedure

---

### Table of Contents

• <a href="#">Warranty Information</a> .....	4
• <a href="#">Parts Information</a> .....	4
• <a href="#">For USA Market</a> .....	4
• <a href="#">For Mexico Market</a> .....	4
• <a href="#">Required Tools &amp; Equipment</a> .....	5
• <a href="#">GTS+ Preparation</a> .....	5
• <a href="#">Select the Correct User Type</a> .....	5
• <a href="#">Confirm the Correct VIM</a> .....	6
• <a href="#">Process Overview</a> .....	7
• <a href="#">Operation Procedure</a> .....	8

## GTS+ ECU Flash Reprogramming Procedure

---

### Warranty Information

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

### Parts Information

#### For USA Market

PART NUMBER	PART NAME	QTY
00451-00001-LB L	Authorized Modifications Label	1

#### NOTE

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

## GTS+ ECU Flash Reprogramming Procedure

### 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](https://techinfo.toyota.com) for more information regarding J2534 reprogramming.

SPECIAL SERVICE TOOLS (SST)	PART NUMBER	QTY
DSS-5000 Battery Diagnostic Tool*	<a href="#">DSS-5000P T</a>	1
DCA-8000 Battery Diagnostic Tool*	<a href="#">DCA-8000P T</a>	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

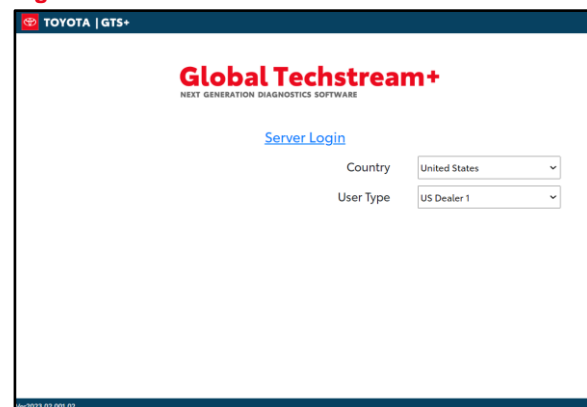
- Launch GTS+.
- From the initial login screen select the Country and the User Type.

#### NOTE

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

- Click Server Login.

Figure 1.



# GTS+ ECU Flash Reprogramming Procedure

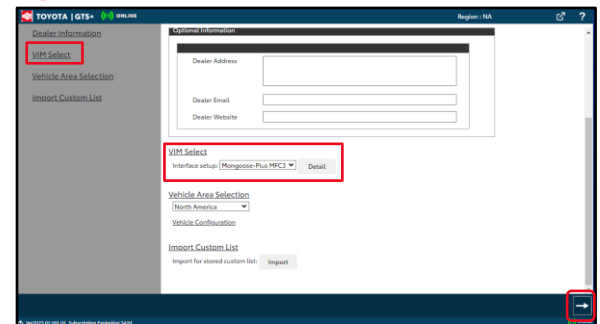
## GTS+ Preparation (continued)

### 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.

# GTS+ ECU Flash Reprogramming Procedure

## 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 figures below).
- Calibration file links can be found embedded in the corresponding Service Bulletin.

Figure 3.

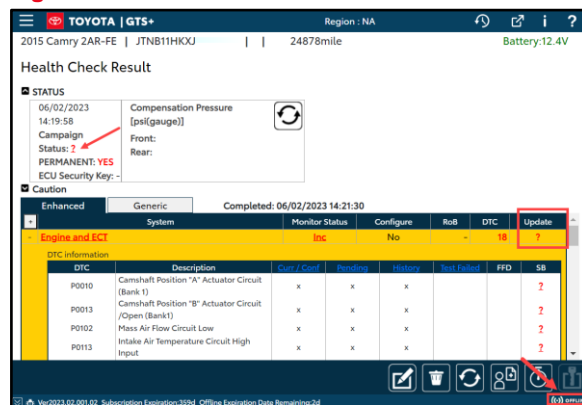
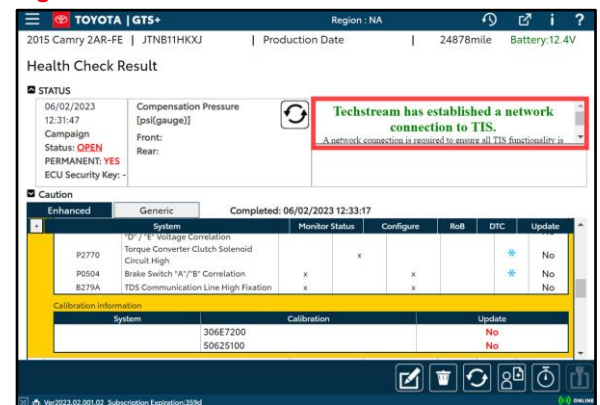


Figure 4.



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**.

# GTS+ ECU Flash Reprogramming Procedure

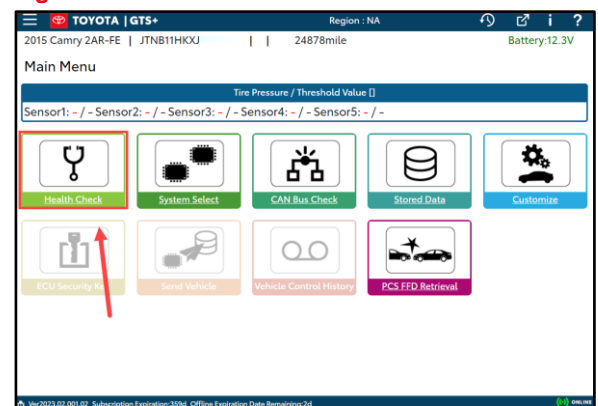
## Process Overview (continued)

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

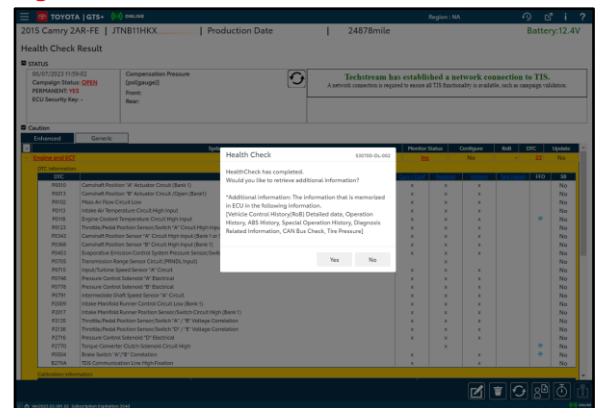
1. Verify the vehicle's applicability for recalibration and locate the desired calibration file.
  - A. Connect GTS+ and establish a vehicle connection.
  - B. Click the Health Check button on the Main Menu.

**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.**





# GTS+ ECU Flash Reprogramming Procedure

## 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.

Health Check Result	
<b>STATUS</b> 05/31/2023 13:52:06 Campaign Status: <b>OPEN</b> PERMANENT: <b>YES</b> ECU Security Key: -	<b>Compensation Pressure</b> [psi(gauge)] Front: Rear:

DTC Information	
DTC	Description
P0010	Camshaft Position "A" Actuator Circuit (Bank 1)
P0013	Camshaft Position "B" Actuator Circuit/Open (Bank1)
P0102	Mass Air Flow Circuit Low
P0113	Intake Air Temperature Circuit High Input
P0118	Engine Coolant Temperature Circuit High Input
P0121	Throttle/Pedal Position Sensor/Switch "A" Circuit High Input
P0343	Camshaft Position Sensor "A" Circuit High Input (Bank 1 or Single Sensor)
P0368	Camshaft Position Sensor "B" Circuit High Input (Bank 1)
P0453	Evaporative Emission Control System Pressure Sensor/Switch High Input
P0705	Transmission Range Sensor Circuit (PRNDL Input)
P0715	Input/Turbine Speed Sensor "A" Circuit
P0748	Pressure Control Solenoid "A" Electrical
P0779	Pressure Control Solenoid "B" Electrical
P0791	Intermediate Shaft Speed Sensor "A" Circuit
P2009	Intake Manifold Runner Control Circuit Low (Bank 1)
P2017	Intake Manifold Runner Position Sensor/Switch Circuit High (Bank 1)
P2135	Throttle/Pedal Position Sensor/Switch "A" / "B" Voltage Correlation
P2138	Throttle/Pedal Position Sensor/Switch "D" / "E" Voltage Correlation
P2716	Pressure Control Solenoid "D" Electrical
P2770	Torque Converter Clutch Solenoid Circuit High
P0504	Brake Switch "A"/"B" Correlation
B2764	TDS Communication Line High Frequency

Calibration Information	
System	Calibration
206E7100	556C5105

- E. Login to TIS.

### HINT

If already logged in, skip this step.

# GTS+ ECU Flash Reprogramming Procedure

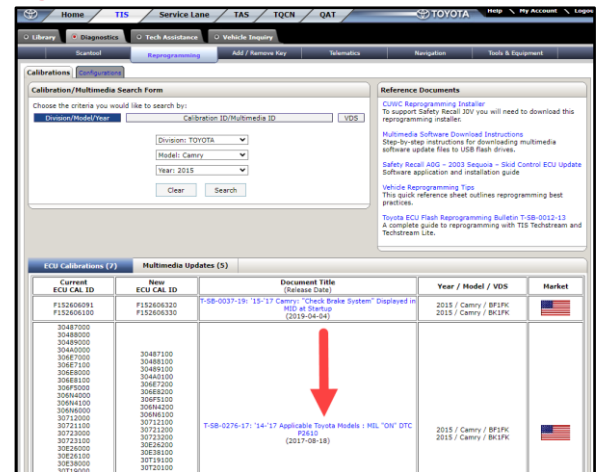
## Operation Procedure (continued)

- 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*.

## GTS+ ECU Flash Reprogramming Procedure


### 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-0276-17

August 18, 2017

Page 5 of 11

MIL "ON" DTC P2610

---

Calibration Information (Continued)

MODEL	YEAR	ENGINE	DRIVETRAIN	CALIBRATION ID	
				PREVIOUS	NEW
Camry	2015	2GR-FE	–	306F5000	<a href="#">306F5100</a>
	2016 – 2017			306N6000	<a href="#">306N6100</a>
	2015 – 2017	2AR-FE	LE Grade	306E7000 306E7100	<a href="#">306E7200</a>
			SE Grade	306E8000 306E8100	<a href="#">306E8200</a>

## GTS+ ECU Flash Reprogramming Procedure


### 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.


T-SB-0276-17


T-0022-17 (6).csv

Page 5 of 11

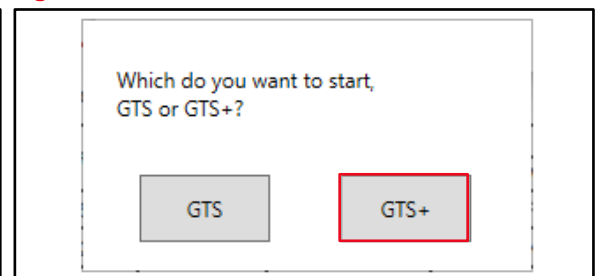
MIL "ON" DTC P2610

### Calibration Information (Continued)

MODEL	YEAR	ENGINE	DRIVETRAIN	CALIBRATION ID	
				PREVIOUS	NEW
Camry	2015	2GR-FE	-	306F5000	306F5100
	2016 – 2017			306N6000	306N6100
	2AR-FE	LE Grade	306E7000	306E7200	
			306E7100	306E7200	
		SE Grade	306E8000	306E8200	
				306E8100	306E8200

Figure 11.



#### NOTICE

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

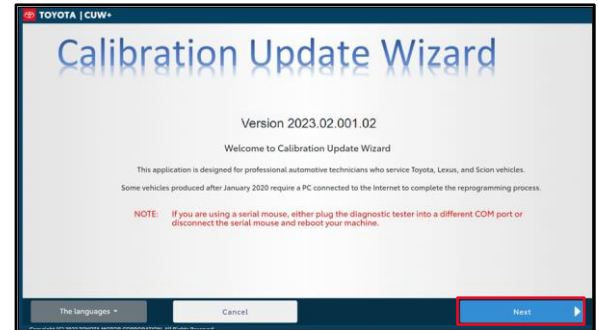
- Battery voltage **MUST NOT FALL BELOW 12V** during reprogramming. Confirm battery voltage is higher than 12V but be sure voltage **DOES NOT RISE ABOVE 16.0V** during reprogramming.
- Turn **OFF ALL** vehicle accessories (audio system, A/C, interior lights, DRL, etc.).
- Do **NOT** add to or significantly 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*.

## GTS+ ECU Flash Reprogramming Procedure

### Operation Procedure (continued)

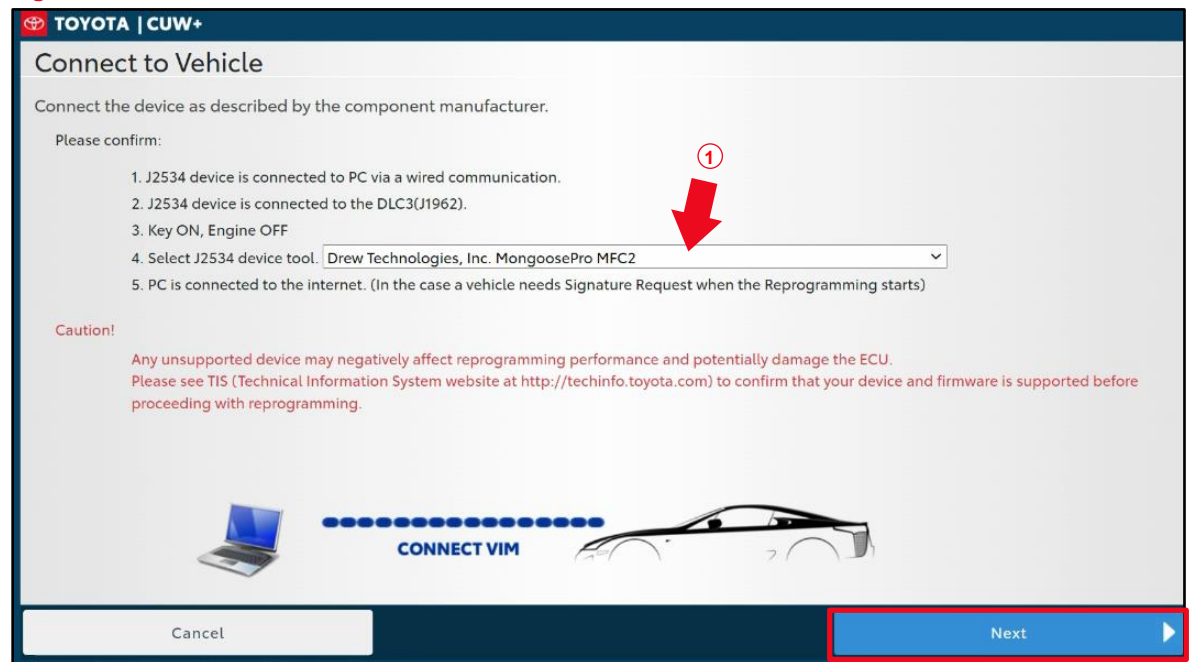
- C. Click Next to start the calibration update process.

**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)
---	---

## GTS+ ECU Flash Reprogramming Procedure

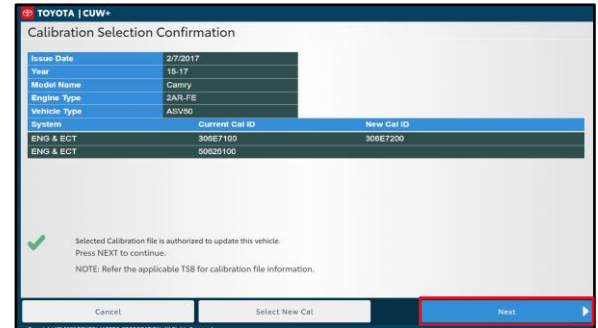
### Operation Procedure (continued)

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

#### NOTICE

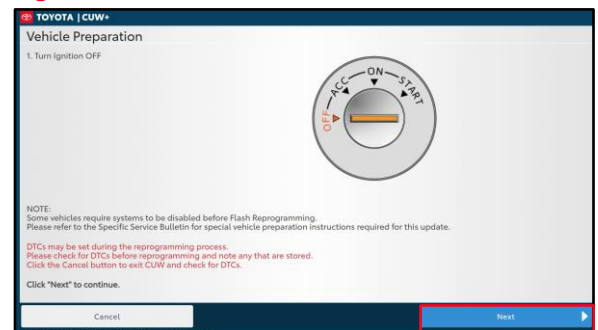
- The total number of calibration IDs in the calibration file corresponds to the number of reprogrammable processors in the ECU.
- The figure to the right shows an example of the update procedure for a two-processor ECU.

Figure 14.



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

Figure 15.



## GTS+ ECU Flash Reprogramming Procedure

### 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

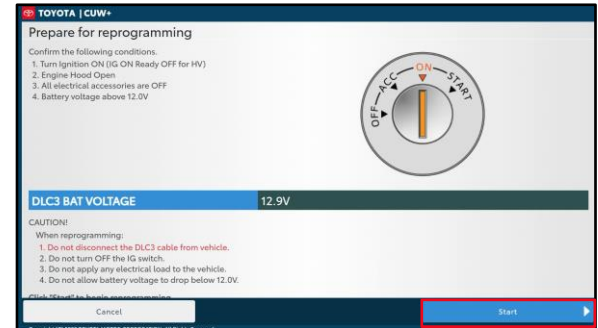
Verify the vehicle is connected to a battery charger before continuing. If battery voltage falls below 12V, ECU damage may occur.

Then, click Start.

#### NOTE

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

Figure 16.

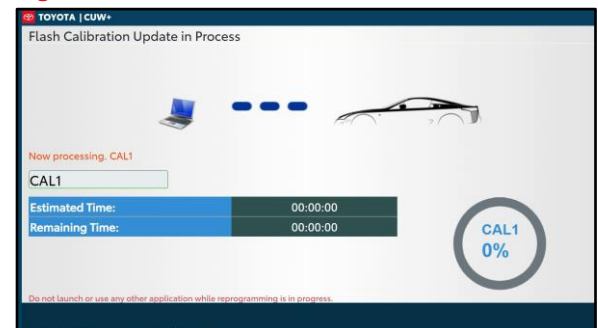


- I. Do NOT disturb the vehicle during flash reprogramming.

#### 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 17.



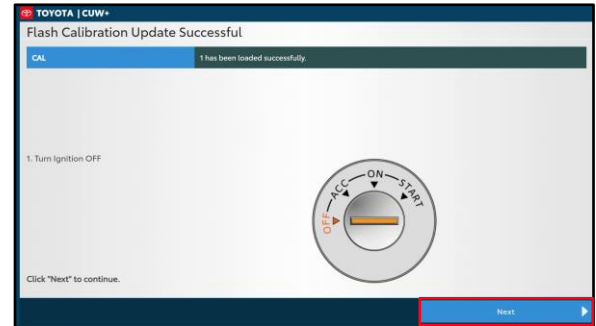
- J. Does the vehicle require only ONE calibration update?
- **YES** — Go to sub step P.
  - **NO** — If the vehicle requires a SECOND calibration update, continue as follows:
    - For serial communication vehicles, continue to sub step K.
    - For CAN communication vehicles, go to sub step M.

## GTS+ ECU Flash Reprogramming Procedure

### Operation Procedure (continued)

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

**Figure 18.**

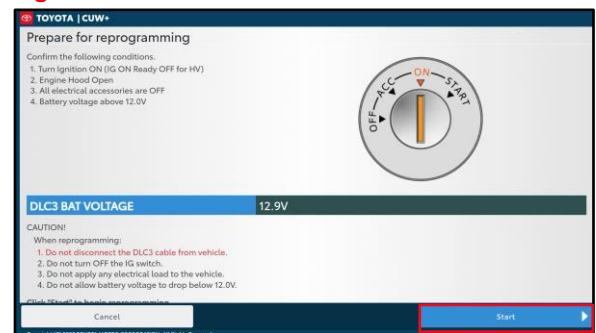


- L. Turn the ignition to the ON position, then click Start.

**NOTE**

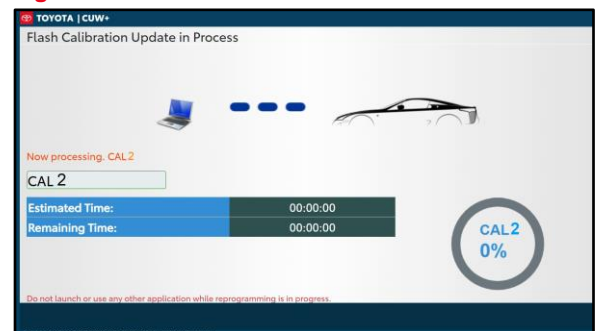
If the key cycle is NOT done properly, reprogramming may fail, and an error message will appear prompting you to restart Cal 2.

**Figure 19.**



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

**Figure 20.**



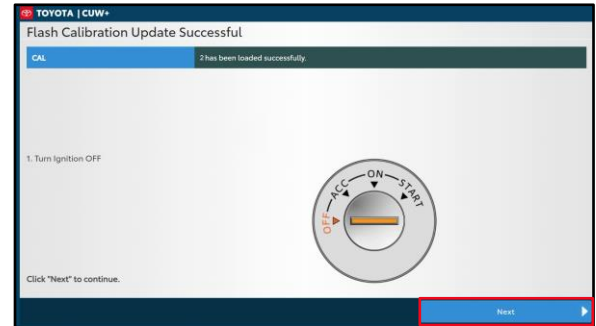


## GTS+ ECU Flash Reprogramming Procedure

### Operation Procedure (continued)

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

**Figure 21.**



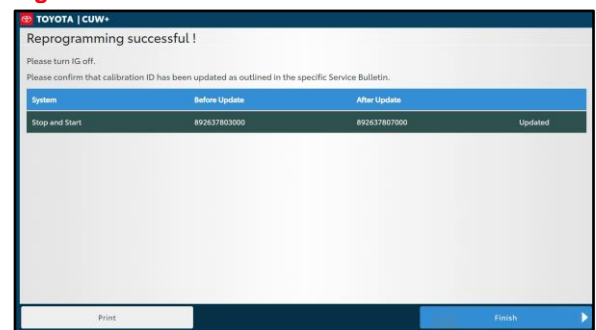
- O. Turn the ignition to the ON position, then click Next.

**Figure 22.**



- P. Confirm calibrations were updated and click Finish.

**Figure 23.**



### 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 Techstream. 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 Procedure

### 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 24.**

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

<b>1</b>	<b>Replacement ECU Part Number</b>
<b>2</b>	<b>Calibration ID(s)</b>
<b>3</b>	<b>Dealer Code</b>

<b>4</b>	<b>Date Completed</b>
<b>5</b>	<b>Service Bulletin or Campaign Number</b>

- 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.