T-SB-0043-13

14



Toyota Supports

RAV4 EV ECU Flash Reprogramming Procedure

Service

Category Engine/Hybrid System

Section	Hybrid/Battery Control System	Market USA	ASE Certification

Applicability

YEAR(S)	MODEL(S)	ADDITIONAL INFORMATION	
2012 – 2013	RAV4 EV		

Introduction

Flash reprogramming allows the ECU software to be updated without replacing the ECU. Flash calibration updates for the RAV4 EV are released as field-fix procedures described in individual Service Bulletins. This bulletin details the ECU flash reprogramming process and outlines use of the Techstream Health Check Function and the Tesla Powertrain Service Diagnostics program.

NOTE

Flash reprogramming of the RAV4 EV ECU can only be performed with the Tesla Powertrain Service Diagnostics program.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	-	1	1	Ì

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME	QTY
00451-00001-LBL	Same	Authorized Modification Labels	1

NOTE

Authorized Modification Labels may be ordered in packages of 25 from the Materials Distribution Center (MDC) through Dealer Daily – Dealer Support Materials Orders.

Required Tools & Equipment

REQUIRED EQUIPMENT	SUPPLIER	PART NUMBER	QTY
Techstream 2.0*	ADE	TS2UNIT	1

NOTE

- · Only Techstream 2.0 should be used for this update.
- Techstream Software version 8.00.034 or later is required.
- · Tesla Powertrain Service Diagnostic Software version 0.5.23 or later is required.
- Additional Techstream units may be ordered by calling Approved Dealer Equipment (ADE) at 1-800-368-6787.

SPECIAL SERVICE TOOLS (SST)	PART NUMBER	QTY
GR8 Battery Diagnostic Station*	00002-MCGR8	1
EV HV Powertrain Diagnostic Cable Kit**	82824-36150-01	1

NOTE

Additional SSTs may be ordered by calling 1-800-933-8335.

* Essential SST.

** Special order.

Techstream Preparation

Selecting the Correct VIM.

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

Perform the following:

- 1. Select "Setup" from the Techstream Main Menu screen.
- 2. Select "VIM Select" from the Setup drop down menu.

Figure 1.



Techstream Preparation (Continued)

3. Select the correct Interface Setup from the drop down list.

For Techstream 2.0, select "MongoosePro MFC".

NOTE

Mongoose Driver MUST be installed before Mongoose selections will be available.

Refer to the Technical Information System (TIS), *Diagnostics – Scantool* page for additional information.

4. Click "OK".

Process Overview

Techstream ECU flash reprogramming is a 4-step process:

1. Verify the vehicle's applicability for recalibration and locate desired calibration file by performing the 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.

2. Connect the GR8 Battery Diagnostic Station using "Power Supply Mode" only.

The GR8 Battery Diagnostic Station includes a Power Supply Mode to help maintain battery voltage at 13.5 volts during ECU reprogramming.

NOTICE

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

Perform the RAV4 EV ECU software update using the Tesla Powertrain Service Diagnostics program.

Launch the Tesla Powertrain Service Diagnostics program and initiate the update process to complete the reprogramming.

4. Attach 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

- 1. Verify the vehicle's applicability for recalibration and locate desired calibration file.
 - A. Connect Techstream and establish a vehicle connection.
 - B. Click the "Health Check" button on the "System Select" tab. Figure 2.

	System Select Select desired system Note: An asterisk(*) i	tion Menu m and then press Live D ndicates a system that	lata to access the ECU is unsupported or not re	sponding.			
Health Check	All ECUs Powe Engine and ECT	train Chassis B	ABS/VSC/TRAC	Immobiliser Combination Mater	SRS Airbag	Body	
Customize	These case coost	inear high coor	Davis 0001	Compilation mater	occupant perocutan		
ECU							
Reprogramming							
Bus Check							
1222							-1
A. B. Strand							
							•
1234	This ECU controls to	el injection, ignition tim	ing, knock control, idlin	g engine speed, self-diag	nosis function, and back	up function in	
101035	extraordinary circum	stance etc. Additionally	, it controls automatic tr	ansmission			
NUMBER AND	1.1.1						
1200	1 CONTRACTOR						
	1						-

Operation Procedure (Continued)

C. Choose desired ECU group(s) in the "Health Check" dialog box.

Figure 3.

	System Selection	on Menu and then press Live Dat	a to access the ECU.				
Electric and a	Note: An asterisk(*) indi	icates a system that is	unsupported or not re	sponding			
	All ECUs Powertra	ain Chassis Bod	Electrical				
Health Check	Engine and ECT	Cruise Control	ABS/VSC/TRAC	Immobiliser	SRS Airbag	Body	^
	"Rear Left Door	Rear Right Door	"Back Door	Combination Meter	Occupant Detection		- 11
Setting					1		-30
FOIL		Ifealth	Check (5309-02)	a straw - A	STORES STORES		
Reprogramming		Ple	ase select system ar	as to include in the Heal	Rh		
Canada CAN		Ch	eck. Fewer ECUs red eck to run faster	ice delay and allows Hea	ath		
Bus Check					mile -		- 110
ALC: NO.		ECU	Selection:				
言語によってい			Powertrain(2 ECUs)				
	M		Chassis(2 ECUs))	2. 2		- 18
2. S.			Body(7 ECUs)	/	0.000		- 11
53000 45		Thi	s function may take a	few minutes to complete			-
		Pre	ess Next to continue.			- Martin Land	
Marine Street	This ECU controls fuel	injection, ignitic	Help	Next> Cano	cel ction, and back	up function in	-
17 A. () () () () ()	extraordinary circumst.	ance etc. Additic	5				
S. Carlow S.							
1			$\mathbf{\nabla}$				
The state is an other							

- D. Click "Next".
- E. Click "Continue" to view Health Check results. Figure 4.

Health Check (S309-05)	
Health Check Complete !	
-Health Check does not display live data	
-Changes in vehicle condition will not update automatical	у
-To update Health Check, click the "Refresh Health Check	k" button
Continue	

Operation Procedure (Continued)

F. Available calibration updates are indicated by a <u>Yes</u> link in the "Update" column. Click the <u>Yes</u> link 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 5.

System Select Store	d Data				1					
2012 Rav4 EV	Tire Pressure / Threshold Value [psi(g	jauge)]	0							
001533 mile 2012_Rav4 EV_E	Sensor 1: 35.9 / N/A Sensor 2: Sensor 3: 35.2 / N/A Sensor 4: Sensor 5: N/A / N/A	36.6 / 36.6 /	N/A N/A							
E Health Checl	System	Monitor Status	DTC	Curr	Pend	Hist	Perm	SB	Calibration	Update
Data 2-1/3	EV.								896834201300	No
Data 3-1/3	EV								896854201100	No
	Cruise Control									
	Electric Propulsion Control System			-				_	1.3.37	Yes
	Tire Pressure Monitor		_	-						
	ABS/VSC/TRAC	-		-	-				F 1520	No
	EMPS			-	-					No
	Occupant Detection			-				-		
	SHS Airbag			-	-			-		
	Air Conditioner				-			-	020000046002	Ma
		-	-	-	-			-	838000R15002	NO
		-		-	-			-	838000R15001	No
		-		+	-			-	838000R15001	No
		-		-	-			-	838000R15001	No
		1 1		-				-	838000R15001	No
		1		-				-	838000R15001	No
Sort		1 1	-	-				-	838000R15001	No
				1					838000R15001	No
Expand>>		1 1							838000R15001	No
									838000R15001	No
TIS Search	Combinetion Nation								838000R15001	No
Print Back	1/30/2013 9:16:27 AM Campaign Status:NONE					1	'n	DT	0	0

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

Operation Procedure (Continued)

H. 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.



Figure 6.

· Library · Diagnostics	• Tech Assistance • Ve	hicle Inquiry	
ScartTool	Calibrations	er Resat Telematic	a Havigation Toola & Equipment
Calibration Search Form			Reference Documents
Choose the criteria you would Choose the criteria you would Choose the criteria you would Choose Cho	Calibration ID Calibration ID III IIII IIIIIIIIIIIIIIIIII	Ovos	Safety Recall A0G - 2003 Secure - Skid Control ECU Update ^{Next} Software application and installation guide Vehicle Reprogramming Tips This guick reference sheet outlines reprogramming best practices. Toryota ECU Hash Reprogramming Bulletin T-SB-0064-10 A complete guide to reprogramming with TIS Techstream and Techstream Lite.
Calibration Search Result	and the second second		
Current New ECU CAL ID ECU CAL ID	Document Title (Release Date)	Year / Model / VDS Mar	ket
1.3.37 1.3.57	ECU Software Update (2013-01-28)	2012 / RAV4 EV / YL4DV 2013 / RAV4 EV /	

Operation Procedure (Continued)

- 2. Connect the GR8 Battery Diagnostic Station.
 - A. Connect the GR8 Battery Diagnostic Station to the vehicle and turn it ON.
 - B. Select Power Supply Mode by following the screen flow below.

NOTICE

- 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, refer to the <u>GR8 Instruction Manual</u> located on TIS, *Diagnostics – Tools & Equipment – Battery Diagnostics.*

Figure 7.



Operation Procedure (Continued)

Perform the RAV4 EV ECU software update using the Tesla Powertrain Service Diagnostics program.

After reviewing the procedures outlined in the selected Service Bulletin, launch the Tesla Powertrain Service Diagnostics program.

NOTE

The vehicle may require special preparation — please review the selected Service Bulletin carefully.

A. Click "Start".

- B. Click "All Programs".
- C. Click "Tesla Powertrain Service Diagnostics RAV4".

Figure 8.



Operation Procedure (Continued)

NOTICE

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

- Battery voltage <u>MUST NOT FALL BELOW 11.4 volts</u> during reprogramming. Confirm battery voltage is higher than 11.4 volts, but be sure voltage <u>DOES NOT RISE ABOVE</u> 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 cable connections between the vehicle and Techstream PC are secure.
- Do NOT disconnect or turn off Techstream PC or vehicle ignition, and do NOT close Tesla Powertrain Diagnostic program during reprogramming.
- · Set parking brake.
- If the battery's state of charge or capacity are in question, test with SST. No. <u>00002-V8150-KIT</u> "Digital Battery Analyzer," and follow Service Bulletin No. <u>PG001-06</u>, "Battery Maintenance for In-Stock Vehicles & Pre-Delivery", or the appropriate "Maintenance for HV & Auxiliary Batteries" Service Bulletin.
- 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, refer to the <u>GR8 Instruction Manual</u> located on TIS, Diagnostics – Tools & Equipment – Battery Diagnostics.

D. Disconnect the Techstream DLC3 connector.

Operation Procedure (Continued)

E. Connect the RAV4 EV Diagnostic Cable (DLC3 No. 2 is located in the rear cargo area).

Figure 9.



Figure 10. Diagnostic Cable Connected



1	To Vehicle
2	DLC3 No. 2
3	CAT 5 Ethernet Cable
4	USB Ethernet Adapter
5	To PC

F. Confirm the communication light is green.

Battery	AlertList	DC-DC Converter	Pump Tool	Thermal Test	Pump Tool Monitor	Charger	Batte

Operation Procedure (Continued)

G. Click on the "Firmware Download" tab.

H. Click the "Play" button.

HINT

File will automatically download and be displayed on this screen. Please ensure PC is connected to dealership wireless network.

Figure 12.

Testa Powertrain Diagnostics 0.5.23				
File Views Perspectives Help				
Firmware Download	🗗 🗙 Modern Connection Status	8 ×		
C: Users (Techstream)(Tesla \Firmware \firmware release - 1.3.57.tar	Green light indicates a fully functional con Yellow light indicates connection failure, no fault.	fully functional connection. nnection failure, not necessarily a vehicle		
	Modern Connection Status:	0		
	0%	2		
Battery Aler. DC-0 Pump Ther Pump Charger Batt	DTCs Ther. Firm. 1 ()			

Figure 13. I. Verify the information displayed on the warning message before proceeding.

Firmware Download



Operation Procedure (Continued)

J. The ECU Software Update will begin and take approximately 10 – 20 minutes to complete.

Tesla Powertrain Diagnostics 0.5.15		- 6 ×
File Views Perspectives Help Firmware Download		5 ×
Sending In Progress Done. Transferring boot mage to Gateway Sending In Progress Done. Starting Powertrain Update succeeded. Updating manifest succeeded.	Firmware Download	
Dobating UDS Drive Inverter: ProA, $30 \Rightarrow 30^{-3}$ suggers - Updating UDS Drive Inverter: $0.513 \Rightarrow 30(5:151) \Rightarrow 30(5:151)$ subgord - Updating UDS BMS CRAD $60 \Rightarrow 66^{-3}$ sktpring - succeeder Updating UDS BMS $0.45, 13 \Rightarrow 0.65, 13^{-3}$ subgord - succeeder Updating QDS (Dis $0.45, 13 \Rightarrow 0.65, 13^{-3}$ subgord - succeeder Updating QDS Charge CRD, $7 \Rightarrow 5.13^{-3}$ subgord - succeeder Updating QDS Charge CRD, $7 \Rightarrow 5.13^{-3}$ subgord - succeeder Updating QDS Charge CRD, $7 \Rightarrow 0.21, 13^{-3}$ succeeded Updating QDS Charge CRD, $7 \Rightarrow 0.21, 13^{-3}$ succeeded Updating QDS Charge CRD, $17, 1 \Rightarrow 0.12, 13^{-3}$ succeeded Updating QDS Charge CRD, $0.52 \Rightarrow 0.5, 2^{-3}$ succeed Updating QDS THC, $0.52 \Rightarrow 0.5, 2^{-3}$ succeeded Resolution and the succeeded. Rebooting	aucceded.	
Rebooting		

K. Click "OK".

Operation Procedure (Continued)

- L. Disconnect the Tesla Powertrain Diagnostic Cable and close the program.
- M. Connect the Techstream DLC3 cable to the OBDII connector under the dash.
- N. Perform a Health Check to confirm the firmware was installed correctly and to check for DTCs. Figure 15.

2012 Rav4 EV	Tire Pressure / Threshold Value [psi(gauge)]							The second		
EV 001533 mile 2012_Rav4 EV_E File Notes	Sensor 1: 35.9 / N/A Sensor 2: Sensor 3: 35.2 / N/A Sensor 4: Sensor 5: 1//A / N/A Health Check Results	36.6 / 36.6 /	N/A N/A							
B Health Checl	System	Monitor	DTC	Curr	Pend	Hist	Perm	SB	Calibration	Update
Data 2-1/3 Data 3-1/3	EV								896B34201300 896B54201100	No No
Messages	Cruise Control								-	
	Electric Propulsion Control System				+	\square			1.3.57	No
	Tire Pressure Monitor				+			and a	ENCOCADIDA	No
	ABS/VSC/TRAC		+	+	+ +	-			P152042131	No
	Converse Detection				++	<u> </u>	++			140
	SRS Airban				+ +	() ⁽	\mapsto			
	Air Conditioner			-				- 1		
		-		-		_	-	1	838000R15002	No
				-	1	-		1	838000R15001	No
					1				838000R15001	No
								1	838000R15001	No
								1	838000R15001	No
									838000R15001	No
	1								838000R15001	No
Sort									838000R15001	No
Europh		1						1	838000R15001	No
Expand>>								1	838000R15001	No
					-				838000R15001	No
TIS Search	Combination Meter	1.1							838000R15001	No
COMPANY OF A DESCRIPTION OF										

Operation Procedure (Continued)

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

Figure 16.



B. Attach the label under the hood in the location determined by the specific Service Bulletin or Campaign.



C. Test drive the vehicle to confirm proper operation.