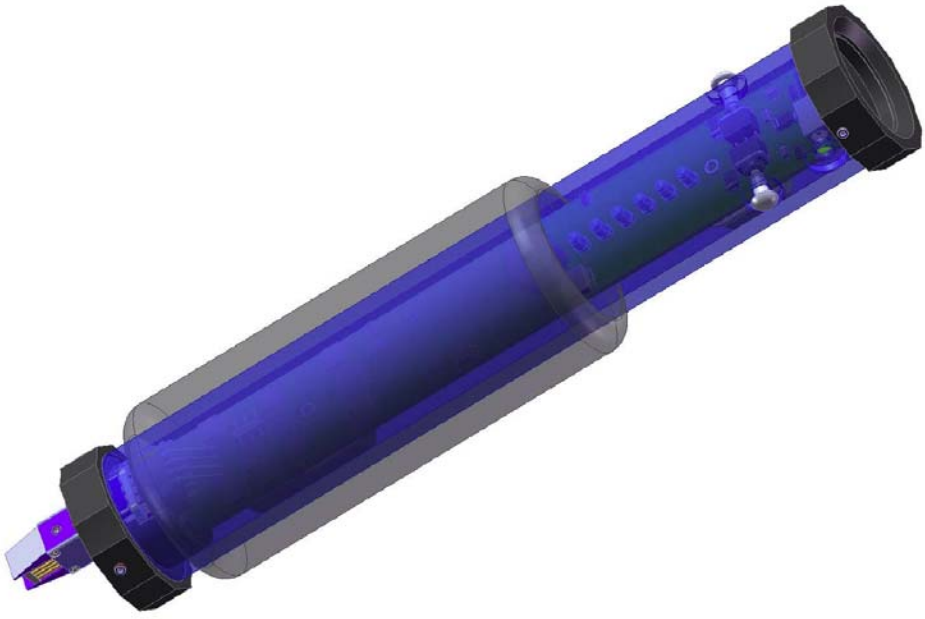
PENLOADERBLUE TOOL

User Manual



The use of this apparatus is limited to legitimate and legal purposes for vehicle maintenance, in compliance with federal and state laws and regulations.

LED Illuminated	File Selected
LED 1	16bit
LED 2	34010
LED 3	47010
LED 4	32bit
LED 5	Honda Red/Black
LED 6	Restore last
LED 6 blinking	Read and save to Restore memory

1 Introduction

The PenloaderBlue unit was designed to provide a tool that can be used to program memory devices installed on circuit boards. The tool is simple to use and requires no external computers, keypad entry devices, adaptor boards or cables.

Features of the tool are:

- Small sized unit for hand held use
- 6 LEDs to display status
- Simple to use
- Programming options selected using a pushbutton switch
- Onboard probes with spring loaded protective cover, for programming 8 pin SOIC packages
- Supports Microwire (93 series) devices
- Powered by external 12V dc supply
- Includes dual LED lamps to illuminate area around device to be programmed
- Audio feedback to user
- 60 second auto power off when not in use
- Software is field updateable using a Windows PC and a serial cable
- Restore operation that can be used to restore contents of last device programmed.

2 Product Features

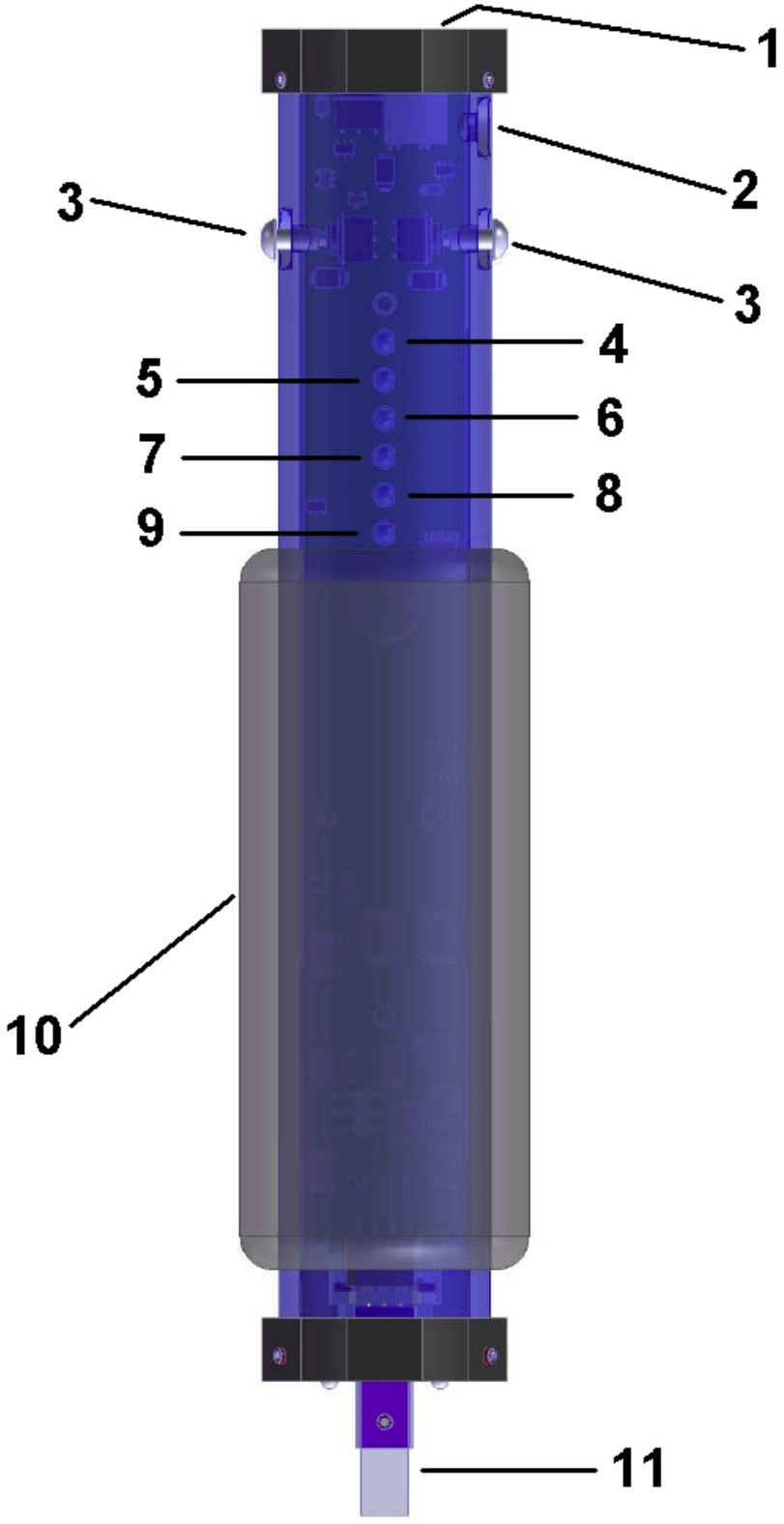


Figure 1 – Penloader Unit

Item	Description
1	On/Off button
2	12V dc input connector
3	START buttons
4	LED 1
5	LED 2
6	LED 3
7	LED 4
8	LED 5
9	LED 6
10	Neoprene grip
11	Spring probes

3 PenloaderBlue Operation

This tool provides a set of programming functions to help the locksmith when programming new transponder keys.

The operation of the PenloaderBlue unit can be split into 2 distinct procedures – operation and program file selection; and the actual performance of the selected operation.

3.1 *File Selection*

On power up, the PenloaderBlue unit will flash LED 6, indicating that the selected option is to read an external device and save to the Restore memory (ref Table 1 below). Pressing the START button will advance the selection 1 position. When LED 6 is illuminated, a further push of the START button will return the file selection to the first position again (16bit).

If the START button is not pressed after power up, the File Selection mode will time out in 5 seconds, and the PenloaderBlue unit will enter the programming mode. If the START button is pressed, the timeout function will be reset to 3 seconds, and each subsequent press of the START button will reset the timeout to 3 seconds. Once the desired programming file has been selected, no further presses of the START button are required, and the file selection mode should be allowed to timeout.

The time out of the file selection mode, and the transition of the unit to the programming mode, is marked by a short illumination (flash) of all LEDs simultaneously, along with a short 2 note audible chirp.

LED Illuminated	File Selected
1	16bit
2	47010
3	34010
4	32bit
5	HonFlash
6	Restore original
6 (blinking)	Special state on power up only - read and save to Restore memory

Table 1 – File selections

3.2 *Programming Operation*

Once in programming mode the PenloaderBlue unit is ready to program an external device using the file selected. Before programming can commence the unit must be positioned over the device to be programmed, ensuring that the spring probes are making good contact with the legs on the memory device. Figure 2 below shows how to locate pin 1 on the 8 pin memory device. It is important that the spring probe identified as “1”, is in contact with Pin 1 on the 8 pin memory device.

To start the programming operation press the START buton once. There will be a short 1 second delay, then the operation will commence. During programming the unit will provide audio and visual cues as described in Table 3.2 below. The operation will either end with success or failure, identified by the audio and visual cues.

The PenloaderBlue unit will remain in programming mode, with the same file selected, until power is cycled. If the programming operation was not successful, it can be tried

again without the need to go through a file selection procedure again.

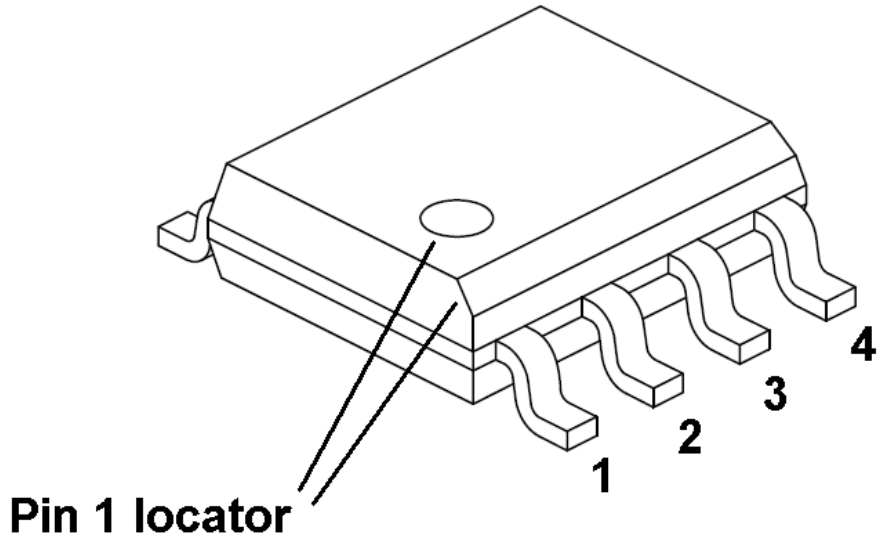


Figure 2 – Locator for Pin 1

3.3 *Step by Step Operation*

Thus, the basic operating procedure for using the PenloaderBlue unit is as follows:

(i) Remove module containing memory device to be programmed, from the vehicle, and disassemble to provide access to the memory device to be programmed.
(ii) Power up the PenloaderBlue unit.
(iii) Use START button to select the desired programming files (as indicated by the lit LED).
(iv) After selecting the desired file, wait for all the LEDs to momentarily illuminate simultaneously with an audible chirp, signifying the end of the programming file selection period.

(v) Position the Penloader over the 8 pin memory device.
(vi) Push the START button.
(vii) Audio and visual cues will be provided during the programming operation.
(viii) Listen for the audio cue identifying success or failure, and also signifying the end of the programming operation.

3.4 *Visual and Audio Cues*

When the PenloaderBlue unit is used to program an update into a memory device it will provide both visual and audio cues to the user. The following table defines these cues and their definition.

Visual Cue	Audio Cue	Definition
LED 1 and 2 illuminated.	None	Low supply voltage.
LED 5 and 6 illuminated.	None	Overcurrent when powering up external device to be programmed.
None	Faint ticking sound, with ticks approximately 1 second apart	The Penloader is determining what type and size device it is currently positioned over.
LEDs sequencing from center to outside, and back.	Machine gun type sound	The Penloader is programming the external memory device.
All LEDs illuminated.	Pseudo “charge” tune.	The VRFY operation was successful, and the data in the programmed part matches the data used in the program operation.
No LEDs illuminated.	Low tone held for 2 seconds.	An error occurred, or the Penloader could not determine the type of device.

Table 3.2 – Visual and audio cues

3.5 *Restore Original Contents*

The PenloaderBlue unit contains a reserved “Restore” memory, which is used by the PenloaderBlue unit to save the contents of an external memory device before it overwrites it with new data.

When programming an external memory device, and after the START button is pressed, and the PenloaderBlue unit has identified the external device to be programmed, the unit reads the contents of the external memory device, and saves it to the “Restore” memory.

Should the user desire to restore the original contents of the external memory device after programming, this is made possible through the use of the Restore Original selection (ref Table 1).

It is important to note that the “Restore” memory is overwritten by each subsequent programming of an external device. As a consequence, it is only possible to restore the last contents of the last external memory device programmed.

3.6 *Read and Save Content*

When the PenloaderBlue unit is powered up, it is put into a special state, indicated by LED 6 blinking. In this state it is possible to read the contents of an external 93C/LC series device and save it to the Restore memory.

If the Start button is pressed within the timeout period, LED 1 will illuminate, and the unit will now cycle through the options as defined in Table 1. The only way to renter the read and save state again, once the START button has been pressed, is to power cycle the unit.

The data saved in the Restore memory can subsequently be used to write to other memory devices using the Restore function (LED 6).

4 *Programming File* Selections In Detail

4.1 *General Operation*

The following sections describe the operation of the PenloaderBlue unit.

4.1.1 LED 1

File: 16bit
Flash device identifier: IC900
Type of operation: Programming
Manufacturer(s): Toyota, Lexus – Type 1 ECU (models specified in the following table).

Model	Year	ECU Location
4Runner	1998-2001	Behind glove box
Avalon	1998-2003	Behind glove box
Camry	1998-2000	Behind glove box
Solara	1998-2000	Behind glove box
Highlander	2001-2003	Behind glove box
Landcruiser	1998-2000	Behind glove box
MR2	2001-2003	Behind driver seat
RAV 4	2002-2003	Behind glove box
Sienna	1998-2003	Behind glove box
ES 300	1998-2001	Behind glove box
GS 300	1998-2000	Under hood, driver's side
GS 400	1998-2000	Under hood, driver's side
LS 400	1998-2000	Behind glove box
LX 470	1998-2000	Behind glove box
RX 300	1999-2003	Behind glove box

SC 300	1998-2000	Below glove box, under carpet
SC 400	1998-2000	Below glove box, under carpet

To perform the programming function use the procedure described in section 3. All LEDs must briefly illuminate at the end of the procedure, else the programming operation failed.

After programming is successfully completed, follow the procedure described in Appendix C, section C.1.1 to register keys into the ECU.

Note: If vehicle will only register 1 key after programming - this is an indication that it probably uses a Type 2 ECU, and was programmed with the wrong file. Reflash with the correct file.

4.1.2 LED 2

File: 47010
Flash device identifier: IC
Type of operation: Programming
Manufacturer(s): Toyota (models specified in the following table).

Model	Year	Immo Location
Prius	2001-2003	Under dash board, above steering column. Must drop the column – 10mm bolt to release the bracket located in left corner behind roll bar.

To perform the programming function use the procedure described in section 3. All LEDs must briefly illuminate at

the end of the procedure, else the programming operation failed.

After programming is successfully completed, follow the procedure described in Appendix C, section C.2.1 to register keys into the Immobilizer.

After programming all modules must be resynchronized by performing the following procedure:

4.1.3 LED 3

File: 34010
Flash device identifier: IC2
Type of operation: Programming
Manufacturer(s): Toyota (models specified in the following table).

Model	Year	Immo Location
Sequoia	2003 and newer	Behind cluster. Must be a 4D-67 transponder.

To perform the programming function use the procedure described in section 3. All LEDs must briefly illuminate at the end of the procedure, else the programming operation failed.

Important: Pin 14 of IC1 must be connected to GND before trying to program IC2 (refer to photo in Appendix B).

After programming is successfully completed, follow the procedure described in Appendix C, section C.3.1 to register keys into the Immobilizer.

4.1.4 LED 4

File: 32bit
Flash device identifier: IC900
Type of operation: Programming
Manufacturer(s): Toyota, Lexus – Type 2 ECU (models specified in the following table).

Model	Year	ECU Location
4Runner	2002	Behind glove box
Camry	2001-2009	Behind glove box
Solara	2001-2004	Behind glove box
LandCruiser	2001-2002	Behind glove box
Sequoia	2001-2002	Behind glove box
ES 300	2002-2003	Behind glove box
GS 300	2001-2003	Under hood, driver's side
GS 430	2001-2003	Under hood, driver's side
IS 300	2001-2003	Under hood, driver's side
LX 470	2001-2002	Behind glove box

To perform the programming function use the procedure described in section 3. All LEDs must briefly illuminate at the end of the procedure, else the programming operation failed.

After programming is successfully completed, follow the procedure described in Appendix C, section C.1.1 to register keys into the ECU.

Note: If vehicle will only register 1 key after programming - this is an indication that it probably uses a Type 1 ECU, and was programmed with the wrong file. Reprogram with the correct file.

4.1.5 LED 5

File: Red/Black Keys
Type of operation: Programming
Manufacturer(s): Honda (models specified in the following table).

Model	Year	Immo Location
NSX	1997 - 2004	Attached to steering column.
Prelude	1997 - 2002	
RL	1996 - 2004	

To perform the programming function use the procedure described in section 3. All LEDs must briefly illuminate at the end of the procedure, else the programming operation failed.

The Red Key, and one Black Key, are as follows:

Red Key = 89E9 1ECC 9721 FE03

Black Key = 8971 8F20 A574 FE03

Use a T Code Pro, SDD or CodeSeeker programmer to initialize a Black Key.

4.1.6 LED 6

File: Data from “Restore” memory.
Flash device identifier: Depends on manufacturer
Type of operation: Programming
Manufacturer(s): Any

This setting is used to restore the contents of a memory device to its value prior to programming.

Anytime the PenloaderBlue unit is used to program a device, it reads the device and saves the contents into a “Restore” memory (contained in the PenloaderBlue unit)

prior to overwriting the device with new data. If there is a desire to restore the original contents of the device after programming, this can be achieved using this file selection.

It is important to note that the contents of the “Restore” memory are overwritten with each subsequent programming operation

To perform the programming function use the procedure described in section 3. All LEDs must briefly illuminate at the end of the procedure, else the restore operation failed.

4.1.7 LED 6 Blinking

File: None.
Flash device identifier: Depends on manufacturer
Type of operation: Read and save data
Manufacturer(s): Any

This setting is used to read data from an external device, and save the data to the Restore memory. When selected, and once the selection period has timed out, follow the procedure presented in section 3.3, though in this case no data will be written to the external device.

This operation is only presented as an option on first power up of the unit. Once the START button has been pressed to advance to the next possible operation, this read and save option is excluded from being selected again, until the next power cycle offers it again.

Data read and saved using this operation, can be programmed into another device using the LED 6 selection as described in section 4.1.6.

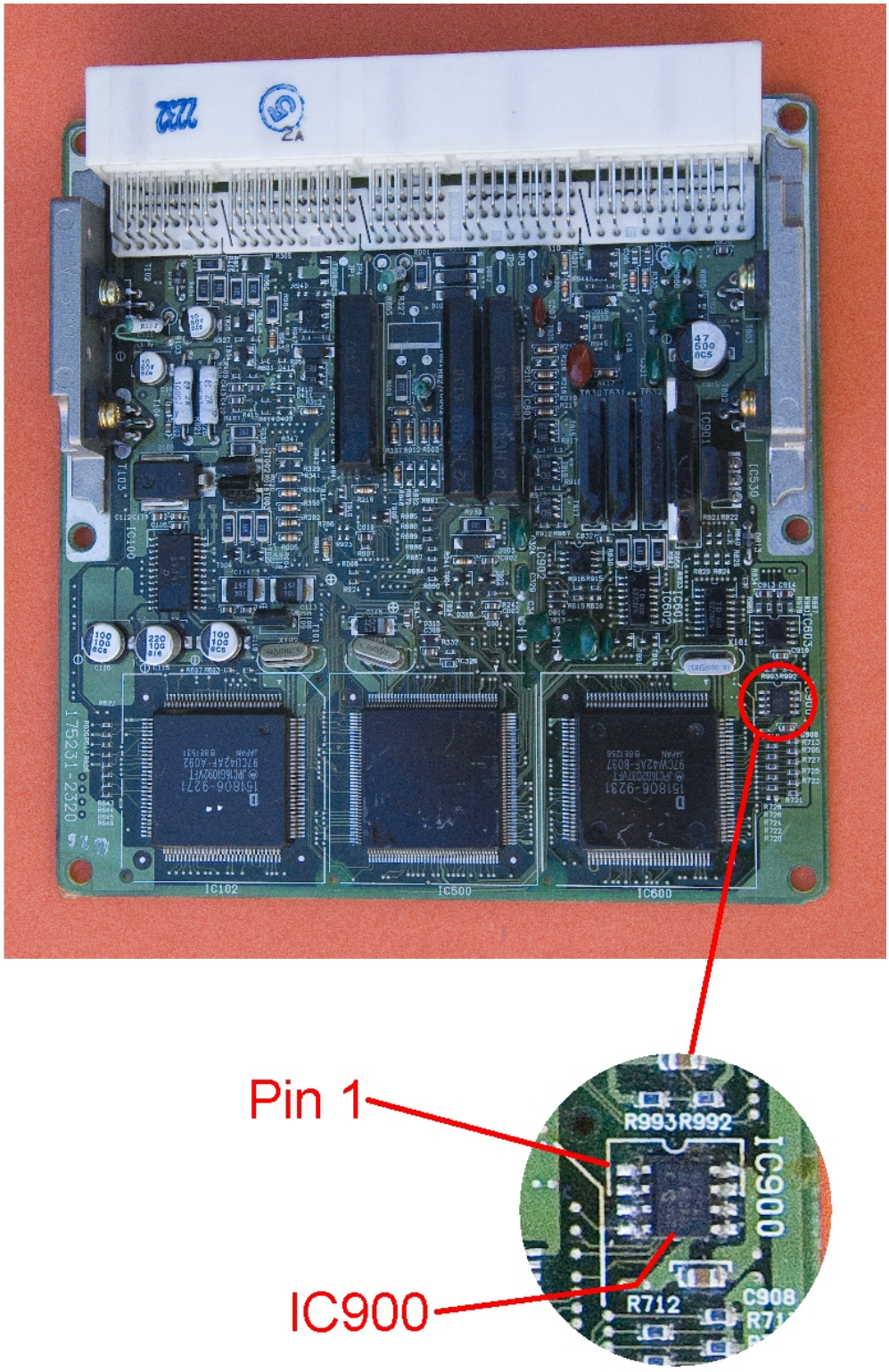
Note that the data saved in the Restore memory will be overwritten by the next file write operation, LED 1 through LED 5.

APPENDIX A

User Manual – *Circuit Board Photos*

Base PenloaderBlue kit

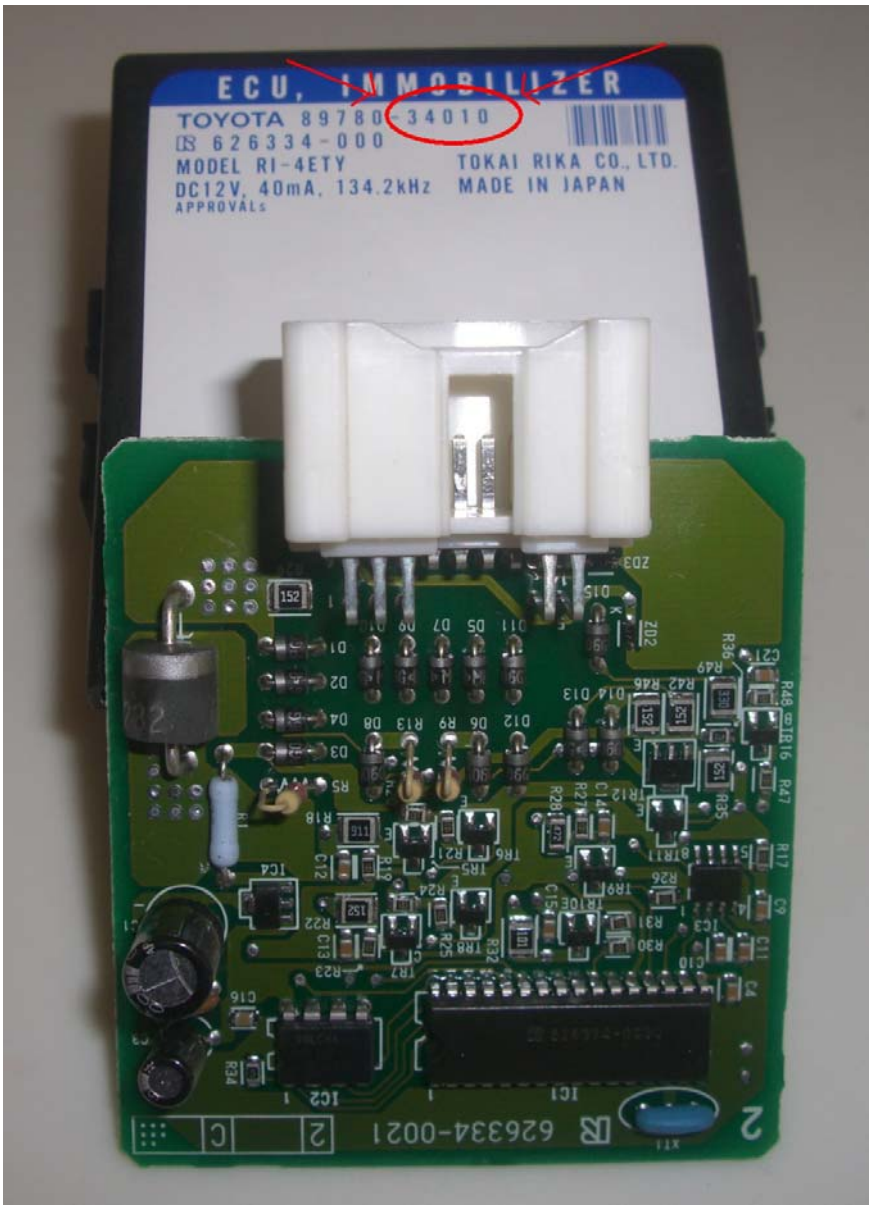
PenloaderBlue shown with available options



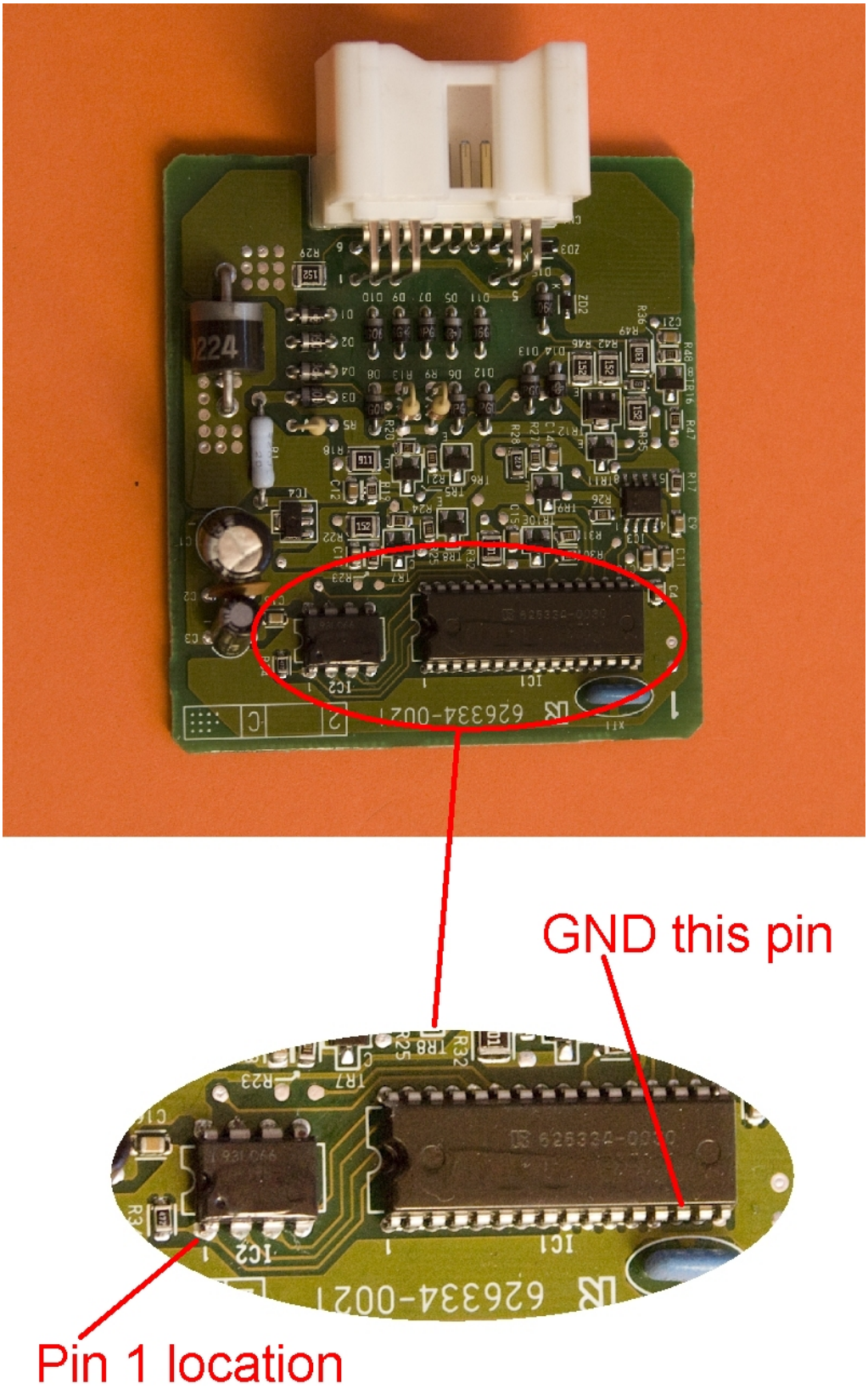
Toyota-Lexus 16bit ECU circuit board

Penloader installed on Toyota-Lexus 16bit ECU circuit board

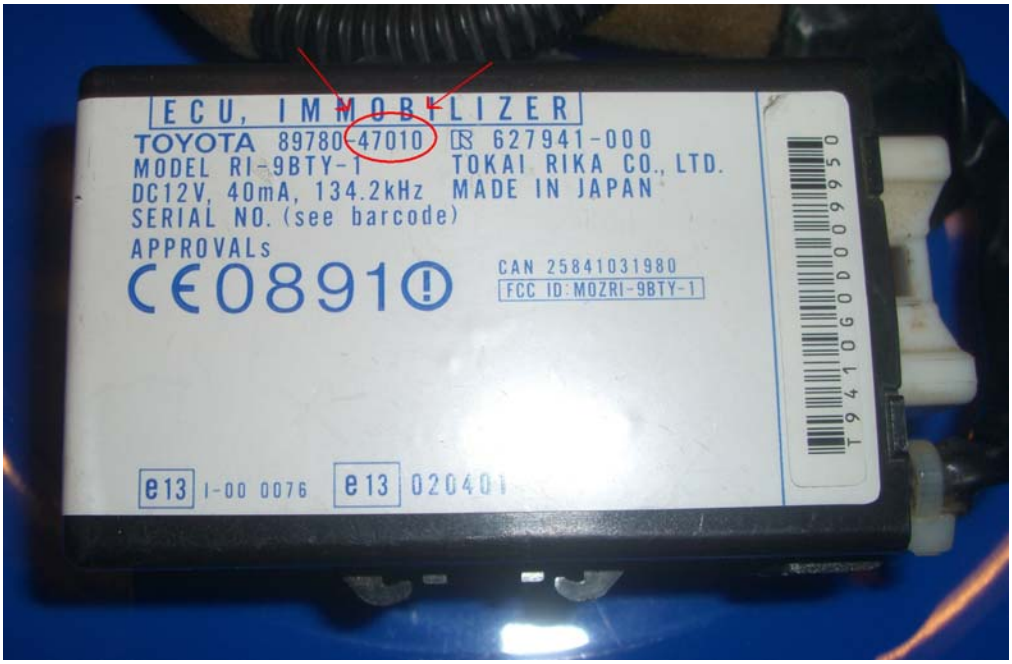
2003 and later Sequoia (34010) immobilizer location behind instrument cluster.



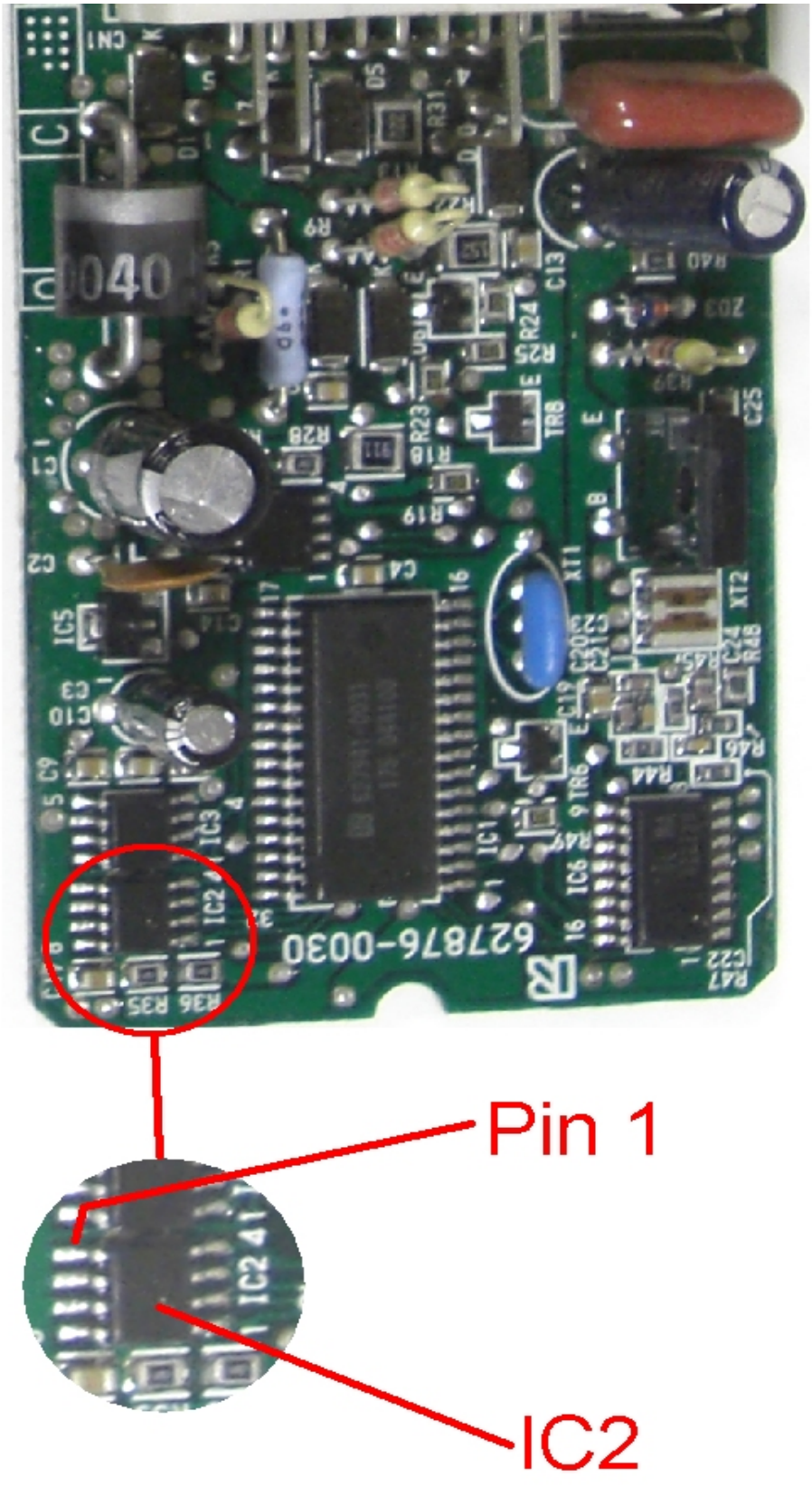
34010 module



Circuit Board from 34010 module

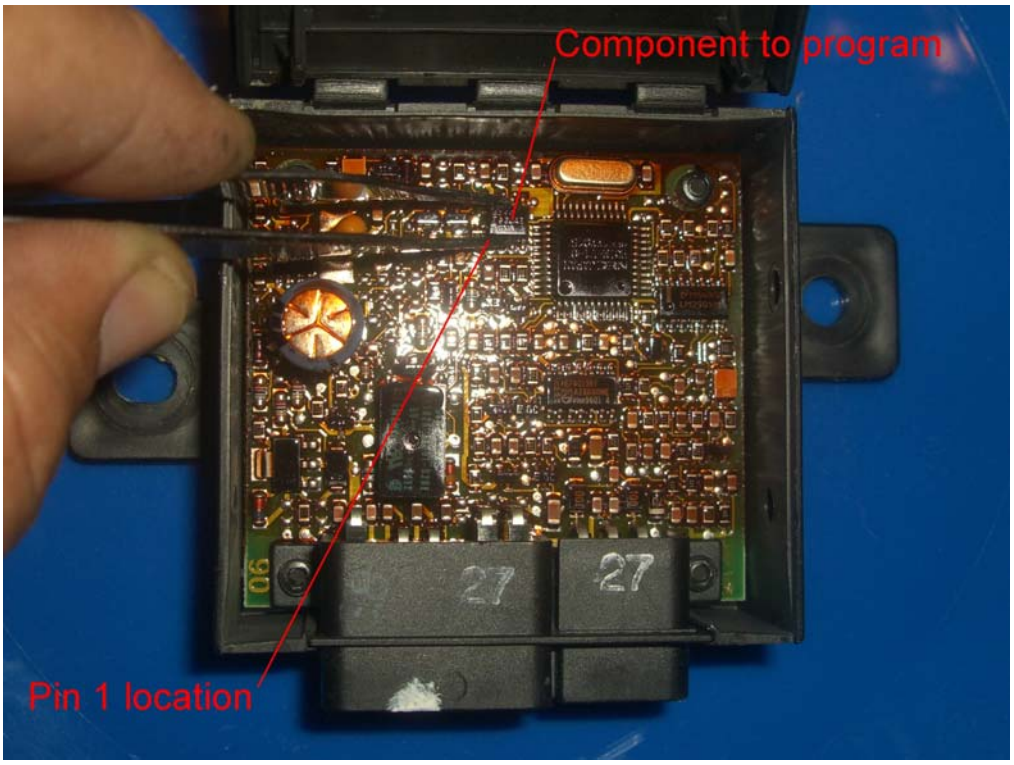


47010 module



Circuit Board from 47010 module

Honda immobilizer module



Honda module circuit board

APPENDIX C

Toyota/Lexus Post Programming Procedures

C.1 Procedures to be followed for the following vehicles:

Make	Model	Year	Remark
Toyota	4Runner	1999-2002	
	Avalon	1998-2003	
	Camry	1998-2002	
		2001-2003	4 cylinder engine
	Highlander	2001-2003	
	LandCruiser	1998-2002	
	MR2	2000-2003	
	RAV4	2000-2003	
	Sequoia	2001-2002	
	Sienna	1998-2003	
	Solara	1999-2003	
Lexus	ES300	1998-2003	
	GS300	1998-2003	
	GS400	1998-2000	
	GS430	2001-2003	
	IS300	2001-2003	
	LS400	1998-2000	
	LX470	1998-2002	
	RX300	1999-2003	
	SC300	1998-2000	
	SC400	1998-2000	

C.1.1 To register Keys in a new ECU:

a. ECU is in Automatic Registration mode, and the Security light should be blinking.
b. Insert a key into the ignition switch (do not turn ignition on). The Security light should now be on (not blinking).
c. The key is now registered.
d. Remove key from the ignition switch.
e. Repeat steps b through e if more keys are to be registered.
f. Once all keys are registered, remove last key from the ignition switch, then depress and release the brake pedal once.
g. Programming mode completes after 10 seconds.

Note: The first key registered will be the new Master Key. The last key registered will be the Valet key. If only 1 key is to be registered, cycle the single key through the registration process 4 or 5 times.

C.1.2 To register an additional Master Key:

a. Insert a registered Master key into the ignition switch (do not turn ignition on).
b. Depress and release the gas pedal 5 times.
c. Depress and release the brake pedal 6 times.
d. Remove the Master key from the ignition switch.
e. Insert new key to be registered into the ignition switch (do not turn ignition on).
f. Depress the gas pedal once.
g. Wait approximately 1 minute until the security light stops blinking.
h. Remove the key.
i. Depress and release the brake pedal once.
j. Programming mode completes after 10 seconds.

C.1.3 To register an additional Valet Key:

a. Insert a registered Master key into the ignition switch (do not turn ignition on).
b. Depress and release the gas pedal 4 times.
c. Depress and release the brake pedal 5 times.
d. Remove the Master key from the ignition switch.
e. Insert new key to be registered into the ignition switch (do not turn ignition on).
f. Depress the gas pedal once.
g. Wait approximately 1 minute until the security light stops blinking.
h. Remove the key.
i. Depress and release the brake pedal once.
j. Programming mode completes after 10 seconds.

C.1.4 To delete all other existing keys:

a. Insert a registered Master key into the ignition switch (do not turn ignition on).
b. Depress and release the gas pedal 6 times.
c. Depress and release the brake pedal 7 times.

d. Remove the Master key from the ignition switch.
e. Insert new key to be registered into the ignition switch (do not turn ignition on).
f. Depress the gas pedal once.
g. Wait approximately 1 minute until the security light stops blinking.
h. Remove the key.
i. Depress and release the brake pedal once.
j. Programming mode completes after 10 seconds.

C.2 Procedure to be followed for the following vehicles:

Make	Model	Year	Remark
Toyota	Prius	2001-2003	

C.2.1 To register Keys in a new ECU:

a. Ensure there is no key in the ignition.
b. While sitting in drivers seat, close all vehicle doors, but do not lock them.
c. Insert first new Master key into the ignition switch.
d. Wait 5 seconds, then remove key from ignition switch.
e. Insert second new Master key into the ignition switch.
f. Wait 5 seconds, then remove key from ignition switch.
g. Insert new Valet key into the ignition switch.
h. Wait 5 seconds, then remove key from ignition switch.
i. All 3 keys should now trun off the theft light, but will no start the vehicle.
j. Insert a Master Key into the ignition switch, and turn turn ignition switch on.
a. Short OBD2 connector terminal 4 to terminal 13 using a wire or paper clip.
a. Wait 30 minutes, then turn ignition switch off and remove shorting wire from OBD2. Programming mode is complete. Vehicle should now start with any of the 3 keys.

C.2.2 To register an additional Master or Valet Key:

a. Ensure there is no key in the ignition.
b. While sitting in drivers seat, close all vehicle doors, but do not lock them.
c. Insert a registered Master key into the ignition switch.
d. Quickly turn ignition switch ON then OFF 5 times.
e. Quickly open, then close, the driver's door 6 times.
f. Remove the Master key from the ignition switch.
g. Insert new key to be registered into the ignition switch (do not turn ignition on). This must be completed within 10 seconds of removing the Master key.
h. Leave key in the ignition switch for a minimum of 60 seconds, until the Theft light goes out.
i. Remove the key from the ignition switch.
j. Key is now registered in ECU.

C.3 Procedure to be followed for the following vehicles:

Make	Model	Year	Remark
Toyota	Sequoia	2003	
Toyota	Camry	2001 - 2004	
Toyota	Solara	2003 - 2004	
Lexus	LS430	2004	
Lexus	ES330	2004	
Lexus	RX330	2004	VIN starts with J or 2

C.3.1 To register 3 Keys (2 Master, 1 Valet) in a new Immobilizer:

a. Ensure there is no key in the ignition.
b. While sitting in drivers seat, close all vehicle doors, but do not lock them.
c. Insert first Master key into the ignition switch and wait 5 seconds.
d. Remove key and insert second Master key into the ignition switch and wait 5 seconds.

e. Remove key and insert Valet key into the ignition switch and wait 5 seconds.
f. Remove key.
a. The Immobilizer must be resynchronized with the ECU, else vehicle will not start. Insert a Master Key into the ignition switch, and turn ignition switch on (do not try to start the vehicle).
b. Short OBD2 connector terminal 4 to terminal 13 using a wire or paper clip.
c. Wait for 30 minutes.
d. Remove shorting wire from OBD2 connector.
e. Turn ignition switch off and remove key.
f. Reinsert key and verify that vehicle can now be started.

To register less than 3 Keys in a new Immobilizer:

a. Ensure there is no key in the ignition.
b. While sitting in drivers seat, close all vehicle doors, but do not lock them.
c. Insert first Master key into the ignition switch and wait 5 seconds.
d. Remove key. If required, insert a second key into the ignition switch, wait 5 seconds then remove key.
e. Insert first Master key into the ignition switch.
f. Quickly turn ignition switch ON then OFF 5 times.
g. Remove key.
h. The Immobilizer must be resynchronized with the ECU, else vehicle will not start. Insert a Master Key into the ignition switch, and turn ignition switch on (do not try to start the vehicle).
i. Short OBD2 connector terminal 4 to terminal 13 using a wire or paper clip.
j. Wait for 30 minutes.
k. Remove shorting wire from OBD2 connector.
l. Turn ignition switch off and remove key.
m. Reinsert key and verify that vehicle can now be started.