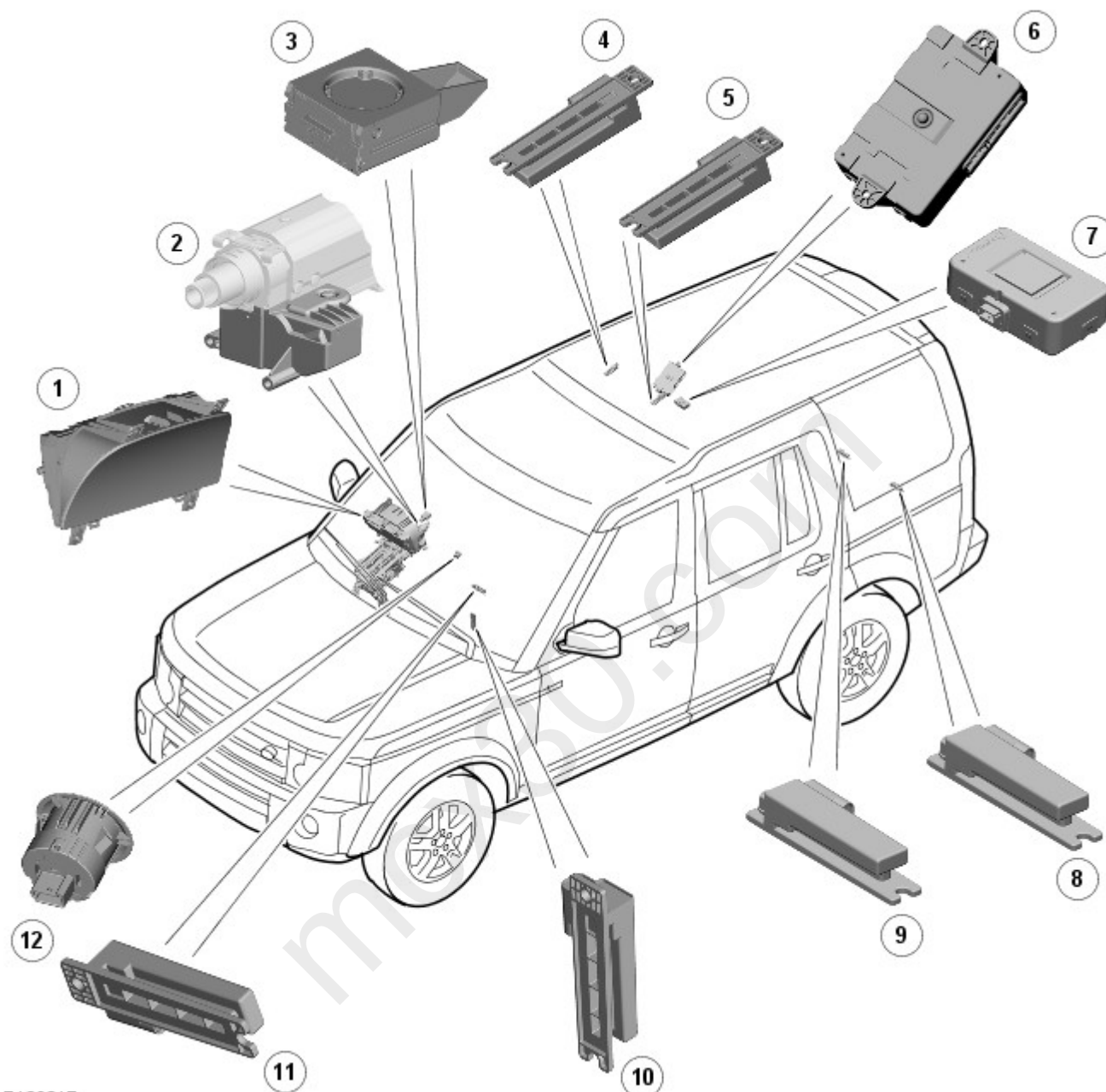


Anti-Theft - Passive - Anti-Theft - Passive

Description and Operation

COMPONENT LOCATION



E129817

Item	Part Number	Description
1	-	Instrument cluster
2	-	Steering column lock
3	-	Immobilizer antenna unit
4	-	Interior Antenna - roof lining
5	-	Interior Antenna - roof lining
6	-	Keyless Vehicle Module
7	-	Radio frequency receiver
8	-	Interior Antenna - luggage compartment
9	-	Interior Antenna - luggage compartment
10	-	Interior Antenna - front compartment
11	-	Interior Antenna - front compartment
12	-	Start/Stop Switch

OVERVIEW

Passive Start

The passive start system relies on the detection of a uniquely coded Smart Key and low frequency antennas strategically

situated within the vehicle. The antennas ensure the Smart Key is always within the active transmission zone of the antennas wherever the Smart Key is placed inside the vehicle. For this reason the orientation and positioning of the antennas is critical to the correct functioning of the system. The Smart Key also operates the passive entry system. For additional information, refer to: [Handles, Locks, Latches and Entry Systems](#) (501-14 Handles, Locks, Latches and Entry Systems, Description and Operation).

The system provides a secure interface between the [CJB \(central junction box\)](#) and the [ECM \(engine control module\)](#) to prevent unauthorized starting of the engine. This is achieved by immobilization of the engine crank system and the fuel system, using encoded data exchange between the Smart Key and multiple control modules.

Engine starting is initiated when the encoded data exchange between the Smart Key and the control modules is verified. The engine management system will then allow engine crank and fueling when an authorization data message is received from the [CJB](#).

The engine can be started by pressing the start/stop button and depending on the type of transmission:

- Automatic; when the drive selector is in the 'Park' position and the brake pedal is pressed.
- Manual; when the gear selector is in 'Neutral' and the clutch pedal is pressed.

COMPONENT DESCRIPTION

Immobilizer Antenna Unit

The IAU (immobilizer antenna unit) is used if the keyless vehicle module is unable to authorize the Smart Key. If the keyless vehicle module is unable to identify the Smart Key, for example if the Smart Key battery voltage is low or there is local RF interference, the transponder within the Smart Key can be read in the conventional manner. The driver will be alerted to this by a chime and a message in the instrument cluster message center 'SMART KEY NOT FOUND REFER TO HANDBOOK'.

Refer to Keyless Start Backup section.

Low Frequency Antenna

Six LF (low Frequency) antennas for the passive start system are positioned in specific locations within the vehicle.

The keyless vehicle module transmits an LF signal via the antennas which is received by the Smart Key. The Smart Key then responds by transmitting a RF (radio Frequency) signal which is received by the RF receiver and passed to the KVM (Keyless Vehicle Module) for authorization.

Keyless Vehicle Module

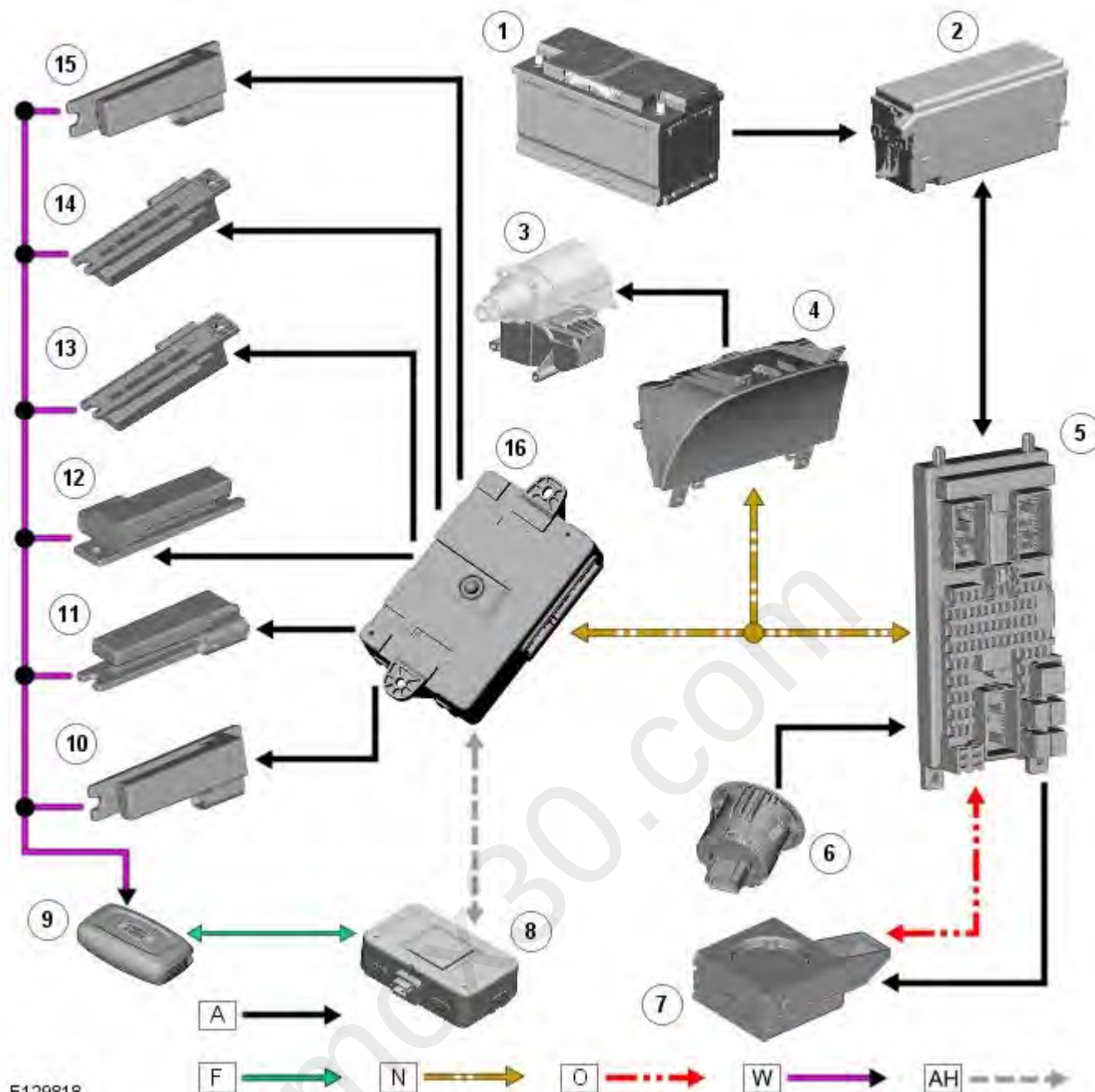
The keyless vehicle module controls signal transmissions to and from the Smart Key and provides authorization to allow the vehicle to be started. The module has a medium-speed [CAN \(controller area network\)](#) connection to the [CJB](#) for authorizing vehicle starting.

Radio Frequency Receiver

The RF (radio frequency) receiver transmission is received from the Smart Key to enable key identification.

CONTROL DIAGRAM

- NOTE: **A** = Hardwired connection; **F** = RF Transmission; **N** = Medium speed CAN bus; **O** LIN bus; **W** = LF Transmission; **AH** = Serial Communications Link



Item	Part Number	Description
1	-	Battery
2	-	EJB (engine junction box)
3	-	Steering column lock
4	-	Instrument cluster
5	-	CJB
6	-	Start/Stop Switch
7	-	Immobilizer antenna unit
8	-	Radio frequency receiver
9	-	Smart Key
10	-	Interior Antenna - roof lining
11	-	Interior Antenna - roof lining
12	-	Interior Antenna - luggage compartment
13	-	Interior Antenna - luggage compartment
14	-	Interior Antenna - front compartment
15	-	Interior Antenna - front compartment
16	-	KVM (Keyless Vehicle Module)

PRINCIPLES OF OPERATION

Passive Start

At the request of the CJB the KVM (Keyless Vehicle Module) prompts each of the internal low-frequency antennas to output a signal. When the Smart Key is in the vehicle cabin, it detects the low-frequency signals and responds with a RF radio frequency data-identification signal back to the KVM via the RF receiver.

If the data received matches that stored in the KVM it continues the passive start process by communicating a 'Smart Key valid' signal to the [CJB](#) via the medium-speed [CAN](#) bus.

Once the [CJB](#) receives the authorization and confirms the response with an internal calculation, it passes coded data to the [ECM](#) on the high-speed [CAN](#) bus. Upon confirmation from the [ECM](#) the ignition is enabled.

Before [CJB](#) sends a mobilization signal to the [ECM](#) it will exchange encrypted data with the electric steering lock mechanism to authorize unlocking of the steering column. The instrument cluster only provides a ground for the steering lock motor.

The [CJB](#) will enable the fuel pump relay which, on diesel vehicles operates the fuel pump and on gasoline vehicles sends a battery voltage supply to the fuel pump driver module to operate the fuel pump in conjunction with the [ECM](#).

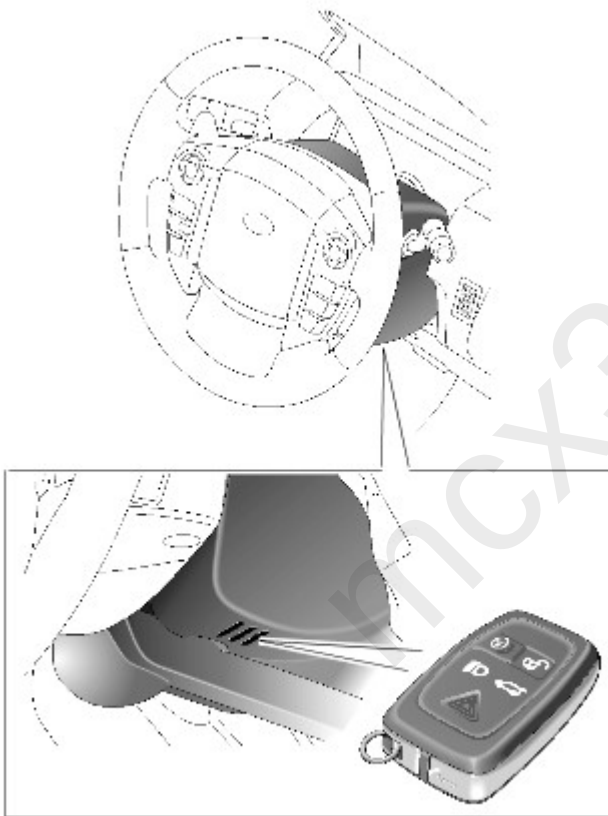
• **NOTE:** If the KVM fails to locate the Smart Key, a message 'SMART KEY NOT FOUND REFER TO HANDBOOK' will appear in the instrument cluster message center and the keyless start back-up process will have to be used to mobilize and start the vehicle.

Keyless Start Backup

If the vehicle has been unlocked using the emergency key blade or the Smart Key is not detected by the vehicle, it will be necessary to use the keyless start backup to disarm the alarm and start the engine. The following process must be followed in this event:

- Position the Smart Key against the underside of the fascia, on the outboard side of the steering column, with the buttons facing downwards. This is the location of the IAU (immobilizer antenna unit).
- Holding the Smart Key in position and the brake / clutch pedal depressed, press the start/stop button to start the engine.

Smart Key positioned next to immobilizer antenna unit



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This process bypasses the data exchange between the KVM and the [CJB](#); this is an inductive process and will operate if the battery in the Smart Key is discharged. A transponder within the Smart Key is detected by the IAU. The IAU confirms the code output from the transponder and communicates this code confirmation with the [CJB](#) via a LIN (local interconnect network) bus connection. The [CJB](#) then initiates the vehicle start process in the normal manner.

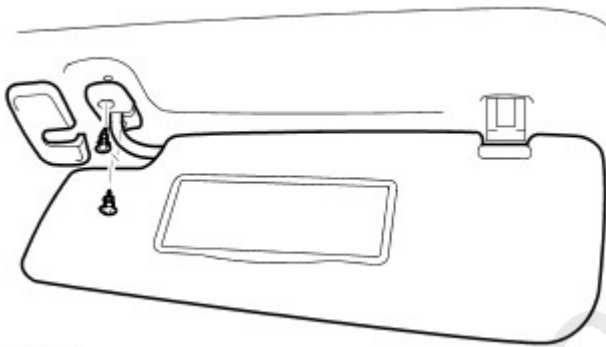
Anti-Theft - Passive - Passive Anti-Theft System (PATS) Module

Removal and Installation

Removal

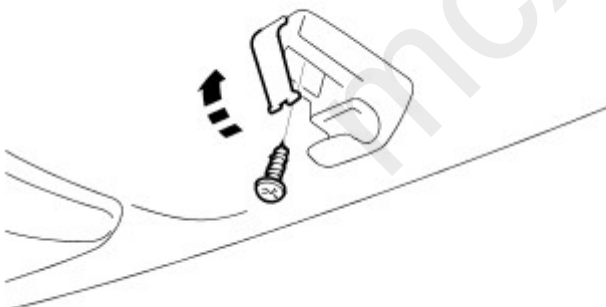
• NOTE: If the PATS module is to be replaced then T4 must be connected and the correct procedures adhered to, prior to the battery disconnection.

1. Disconnect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).
2. Remove the RH A-pillar upper trim panel.
For additional information, refer to: [A-Pillar Trim Panel](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).
3. Remove the RH B-pillar upper trim panel.
For additional information, refer to: [B-Pillar Upper Trim Panel](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).
4. Remove the RH C-pillar upper trim panel.
For additional information, refer to: [C-Pillar Upper Trim Panel](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).
5. Remove the RH sun visor.
 - Remove the screw covers.
 - Remove the 2 screws.



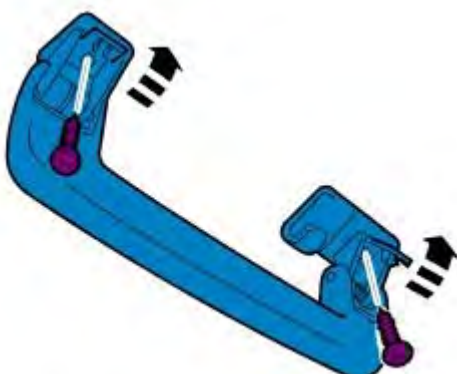
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6. Remove the sun visor retaining clip.
 - Release the screw cover.
 - Remove the screw.

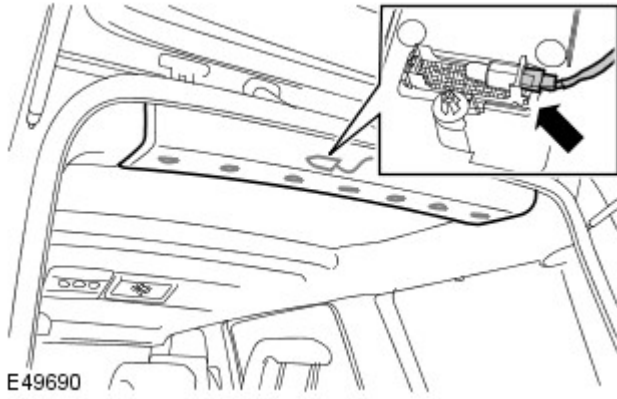


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7. Remove the RH passenger assist handles.
 - Carefully release the 4 screw covers.
 - Remove the 4 screws.

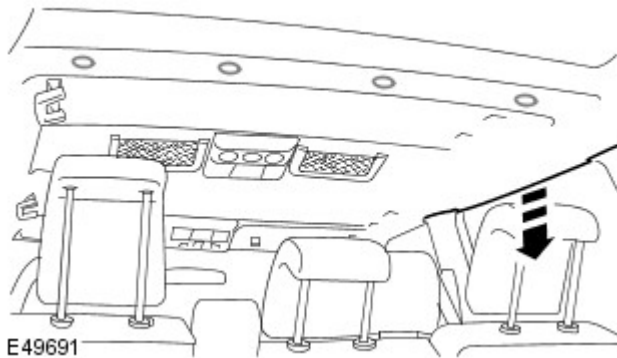


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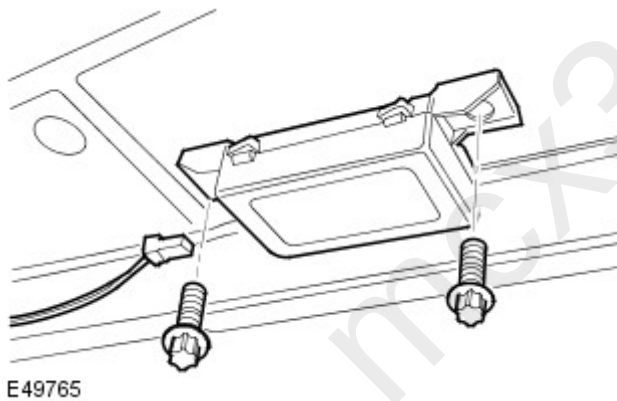
8. Remove the rear headliner trim panel.

- Release the 7 clips.



9. Release the RH side of the headliner.

- Carefully release the 4 clips.



10. Remove the PATS module.

- Disconnect the electrical connector.
- Remove the 2 bolts.

Installation

1. Install the PATS module.

- Connect the electrical connector.
- Tighten the bolts to 10 Nm (7 lb.ft).

2. Secure the RH side of the headliner.

- Carefully secure the clips.

3. Install the rear headliner trim panel.

- Secure the clips.

4. Install the RH passenger assist handles.

- Install the screws.
- Install the screw covers.

5. Install the sun visor retaining clip.

- Install the screw.
 - Install the screw cover.
6. Install the RH sun visor.
- Install the screws.
 - Install the screw covers.
7. Install the RH C-pillar upper trim panel.
For additional information, refer to: [C-Pillar Upper Trim Panel](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).
8. Install the RH B-pillar upper trim panel.
For additional information, refer to: [B-Pillar Upper Trim Panel](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).
9. Install the LH A-pillar upper trim panel.
For additional information, refer to: [A-Pillar Trim Panel](#) (501-05 Interior Trim and Ornamentation, Removal and Installation).
10. Connect the battery ground cable.
For additional information, refer to: [Specifications](#) (414-00 Battery and Charging System - General Information, Specifications).
11. Initiate a new PATS module using T4.