




## Anti-Theft

### Special Tool(s)

	73III Automotive Meter 105-R0057 or equivalent
	Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool
	Flex Probe Kit 105-R025C or equivalent

### Principles of Operation

#### Anti-Theft Indicator

**NOTE:** Replacement of the passive anti-theft system (PATS) transceiver does not require the PATS keys to be programmed into the PCM again.

**NOTE:** A minimum of 2 PATS keys must be programmed into the PCM before the vehicle will start.

**NOTE:** Make sure any aftermarket remote start systems have been removed from the vehicle before any PATS-related no-start concerns are investigated. If the remote start system is a Power Code® system, make certain it is not the cause of the no-start. Removal of the system may be necessary.

**NOTE:** The smart junction box (SJB) is also known as the generic electronic module (GEM).

PATS uses a visual anti-theft indicator located in the instrument cluster (IC). The indicator proves out for 3 seconds when the ignition key is in the ON or START position under normal operation. If there is a PATS concern, this indicator either flashes rapidly or glows steadily when the ignition key is turned to the ON or START position. PATS also flashes the anti-theft indicator every 2 seconds when the ignition key is in the OFF position to act as a visual theft deterrent.

#### Encoded PATS Keys

PATS uses a special ignition key that is larger than a conventional ignition key because it contains a permanently installed electronic device called a transponder. Each transponder contains a unique encrypted identification code which is one of a very large number of combinations. The addition of this transponder to the key makes it an "encoded" key. The PATS key does not require batteries and should last the lifetime of the vehicle. Each PATS key must be programmed into the PCM before it can be used to start the vehicle. There are special general procedures described in this section that must be carried out if a new PATS key is necessary. Refer to [Key Programming Using Diagnostic Equipment](#) or [Key Programming Using Two Programmed Keys](#) in this section.

#### PATS Transceiver

The PATS transceiver is located under the steering column shroud and communicates with the encoded ignition key. During each vehicle start sequence, the PATS transceiver reads the encoded ignition key identification code and sends data to the PCM. The PCM validates the code, and if it is the correct code, will ground the starter relay solenoid coil and will also allow the fuel injectors to operate. Refer to [Passive Anti-Theft System \(PATS\) Transceiver](#) in this section.

#### PATS Operation

The PATS function is controlled by the PCM. When the ignition key is turned to the ON or START position, the PCM initiates the key interrogation sequence by sending a voltage signal to the PATS transceiver. The transceiver then uses its antenna to communicate with the transponder in the PATS key. This process "reads" the PATS key identification code and sends the key identification code back to the PCM, which interprets it and determines if it matches one of the stored key codes. If it does match one of the stored key codes, the PCM grounds the starter relay solenoid coil and allows fuel injector operation. If it does not match one of the stored key codes, or it is only a partial key read or no key read, the PCM will not ground the starter relay solenoid coil and will not allow fuel injector operation. The anti-theft indicator in the instrument cluster (IC) will flash (or may glow steadily) and the PCM will store one or more DTCs. All elements of PATS must be functional before the vehicle will start. If any of the components are not working correctly, the vehicle will not start. If the PCM must be replaced for any reason (PATS concerns or driveability concerns), the PATS keys must be programmed into the new PCM. Refer to [Key Programming Using Diagnostic Equipment](#) in this section.

PATS is active only for a few seconds when the vehicle is starting. It is not a PATS concern if the vehicle stalls after it has been running for a minimum of 3 seconds. PATS will not disable a running vehicle. The PATS may cause a vehicle no start due to either the fuel injectors not operating or the starter not operating (starter relay does not close) or both. Always check for PATS DTCs from the PCM when a no-crank or no-start condition exists. A low state of charge (SOC) in the vehicle battery may cause the PATS to allow starter operation, but prevent the fuel injectors from operating. If the theft light does not prove out (it may be either flashing or glowing steadily) and one (or both) of the previous conditions (fuel injectors and/or starter inoperative) are present, it may be due to a PATS issue. If the theft light proves out, it may not be a PATS issue. If the theft light does not illuminate at all, it may be an instrument cluster (IC) issue. GO to [Symptom Chart](#) in this section for additional diagnostic direction.

The PATS disables the vehicle from starting if there is:

- a damaged PATS key.
- a non-programmed PATS key.
- a non-PATS key (key has no electronics).
- damaged wiring.
- a damaged transceiver.
- a damaged PCM.

**PATS PIDs**

Monitoring the PATS PIDs can be very useful in determining which diagnostic steps to follow. Viewing the MASTERKEY (master key) PID (with both keys) will determine if the key is a programmed key and will also prove out the transceiver, circuitry and the PCM. A master key is any key that is programmed into the PCM. Viewing the MIN\_KEY (minimum number of keys) PID (this PID does not change) determines the minimum number of keys that must be programmed into the PCM. There must be at least 2 keys programmed into the PCM in this system. Viewing the N\_KEYCODE (number of keys programmed) PID will determine if the minimum number of keys have been programmed into the PCM. If the N\_KEYCODE PID reads 0 or 1, additional key(s) will need to be programmed into the PCM in order to meet the minimum of 2 keys. If the N\_KEYCODE PID reads 0 or 1, and the MASTERKEY PID reads NOTPREST, that particular key must be programmed into the PCM. If the N\_KEYCODE PID reads 1, and the MASTERKEY PID reads PRESNT, that particular key is already programmed into the PCM.

The SPAREKEY (spare key) PID is defaulted to ENABLE. With the SPAREKEY PID displaying ENABLE, the PCM will accept more than 2 keys (up to a maximum of 8) being programmed into the PCM. It can be toggled to DISABLE if the customer does not want any more than 2 keys programmed into the PCM using the [Key Programming Using Two Programmed Keys](#) procedure. Refer to [Key Programming Switch State Control](#) in this section to change the state of the SPAREKEY PID.

**Unlimited Key Mode**

This system contains a feature named unlimited key mode (UNL\_KEY\_ID PID). This feature allows a customer to program more than 8 keys to their vehicle if they request it. Each vehicle in unlimited key mode is set up with a special unlimited transponder security key code. This allows all the customer vehicles to share the same keys, but no other keys from outside can be used to operate the vehicle(s). Any randomly selected security key is acceptable. Refer to [Spare Key Programming — Unlimited Key Mode](#) in this section.

**Inspection and Verification**

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

**Visual Inspection Chart**

<b>Mechanical</b>	<b>Electrical</b>
<ul style="list-style-type: none"> <li>• Large metallic objects or electronic devices on the key ring that can be used to purchase gasoline or similar items</li> <li>• Ignition lock cylinder</li> <li>• Passive anti-theft system (PATS) key</li> <li>• Use of a non-PATS key or incorrect PATS key</li> <li>• More than one PATS key on key ring</li> <li>• Remote start system installed</li> </ul>	<ul style="list-style-type: none"> <li>• Bussed electrical center (BEC) fuse 68 (20A)</li> <li>• Smart junction box (SJB)</li> <li>• Wiring, terminals or connectors</li> <li>• Ignition switch</li> <li>• PATS transceiver</li> <li>• PCM</li> </ul>

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

4. **NOTE:** Make sure to use the latest scan tool software release.

If the cause is not visually evident, connect the scan tool to the data link connector (DLC).

5. **NOTE:** The vehicle communication module (VCM) LED prove-out confirms power and ground from the DLC are provided to the VCM.

If the scan tool does not communicate with the VCM:

- Check the VCM connection to the vehicle.
- Check the scan tool connection to the VCM.
- Refer to [Section 418-00](#), No Power To The Scan Tool, to diagnose no communication with the scan tool.

6. If the scan tool does not communicate with the vehicle:

- Verify the ignition key is in the ON position.
- Verify the scan tool operation with a known good vehicle.
- Refer to [Section 418-00](#) to diagnose no response from the PCM.

7. Carry out the network test.

- If the scan tool responds with no communication for one or more modules, refer to [Section 418-00](#).
- If the network test passes, retrieve and record the continuous memory DTCs.

8. Clear the continuous DTCs and carry out the self-test diagnostics for the PCM.

9. If the DTCs retrieved are related to the concern, go to DTC Charts. For all other DTCs, refer to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.

10. If no DTCs related to the concern are retrieved, GO to [Symptom Chart](#).

## DTC Charts

### PCM DTC Chart

DTC	Description	Action
B1213	Anti-Theft Number of Programmed Keys is Below Minimum	If DTCs B1600, B1601, B1602, B1681 or B2103 are present, they must be addressed first. If DTC B1213 is the only DTC present, PROGRAM additional keys. REFER to <a href="#">Key Programming Using Diagnostic Equipment</a> in this section. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test.
B1342	ECU is Faulted	CLEAR the DTCs. REPEAT the self-test. If DTC B1342 is retrieved again, INSTALL a new PCM. REFER to <a href="#">Section 303-14</a> . CYCLE the ignition. REPEAT the self-test.
B1600	PATS Ignition Key Transponder Signal Is Not Received	No PATS key has been read by the PCM. <a href="#">GO to Pinpoint Test B</a> .
B1601	PATS Received Incorrect Key-Code From Ignition Key Transponder	There is an unprogrammed PATS key. <a href="#">GO to Pinpoint Test C</a> .
B1602	PATS Received Invalid Format of Key-Code From Ignition Key Transponder	Only a partial PATS key was read. <a href="#">GO to Pinpoint Test D</a> .
B1681	PATS Transceiver Module Signal Is Not Received	The PCM did not receive the PATS transceiver signal. <a href="#">GO to Pinpoint Test E</a> .
B2103	Antenna Not Connected	There has been a PATS transceiver antenna failure. <a href="#">GO to Pinpoint Test A</a> .
B2431	Transponder Programming Failed	The ignition key was not programmed. PROGRAM the key. REFER to <a href="#">Spare Key Programming — Using Diagnostic Equipment</a> in this section. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test.
P1260	Theft Detected, Vehicle Immobilized	If there are any PATS DTCs present, ADDRESS them first. If DTC P1260 is the only DTC present, there may be a power or ground concern with the PCM. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.
All other DTCs	—	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.

**Symptom Chart**

**Symptom Chart**

Condition	Possible Sources	Action
<ul style="list-style-type: none"> <li>No communication with the PCM</li> </ul>	<ul style="list-style-type: none"> <li>Fuse</li> <li>Wiring, terminals or connectors</li> <li>PCM</li> </ul>	<ul style="list-style-type: none"> <li>REFER to <a href="#">Section 418-00</a>.</li> </ul>
<ul style="list-style-type: none"> <li>The anti-theft indicator is always/never on</li> </ul>	<ul style="list-style-type: none"> <li>Instrument cluster (IC)</li> <li>PCM</li> </ul>	<ul style="list-style-type: none"> <li>REFER to <a href="#">Section 413-01</a>.</li> </ul>
<ul style="list-style-type: none"> <li>The vehicle does not start</li> </ul>	<ul style="list-style-type: none"> <li>Wiring, terminals or connectors</li> <li>Starter relay</li> <li>PCM</li> </ul>	<ul style="list-style-type: none"> <li>CYCLE the ignition. CARRY OUT the PCM self-test. If PATS DTCs are present, GO to DTC Charts in this section. If no PATS DTCs are present, REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.</li> </ul>

**Pinpoint Tests**

**Pinpoint Test A: DTC B2103 — Antenna Not Connected**

**Normal Operation**

The passive anti-theft system (PATS) transceiver reads the PATS key when the key is turned to the START or ON position.

DTC B2103 (Antenna Not Connected) — sets when the PCM detects a PATS transceiver antenna failure. The PATS transceiver may need to be replaced.

**This pinpoint test is intended to diagnose the following:**

- PATS transceiver
- PCM

**PINPOINT TEST A : DTC B2103 — ANTENNA NOT CONNECTED**

<p><b>A1 INSPECT THE PATS TRANSCEIVER FOR CORRECT INSTALLATION</b></p>	
<p><b>NOTE:</b> Replacement of the PATS transceiver does not require the PATS keys to be programmed into the PCM again.</p> <ul style="list-style-type: none"> <li>Ignition OFF.</li> <li>Verify the PATS transceiver is correctly installed. Refer to <a href="#">Passive Anti-Theft System (PATS) Transceiver</a> in this section.</li> <li>Ignition ON.</li> <li>Clear the PCM DTCs.</li> <li>Ignition OFF.</li> <li>Ignition ON.</li> <li>Retrieve the PCM DTCs.</li> </ul> <p><b>Is DTC B2103 retrieved?</b></p>	
<p><b>Yes</b></p>	<p>INSTALL a new PATS transceiver. REFER to <a href="#">Passive Anti-Theft System (PATS) Transceiver</a> in this section. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test. If the concern is still present, GO to <a href="#">A2</a> .</p>
<p><b>No</b></p>	<p>The system is OK.</p>

**A2 CHECK FOR CORRECT PCM OPERATION**

**NOTE:** When a new PCM is installed, the PATS keys must be programmed into the PCM.

- Disconnect all the PCM connectors.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins

- Connect all the PCM connectors and make sure they seat correctly.
- Operate the system and verify the concern is still present.

**Is the concern still present?**

<b>Yes</b>	INSTALL a new PCM. REFER to <a href="#">Section 303-14</a> . PROGRAM the PATS keys into the PCM. REFER to <a href="#">Key Programming Using Diagnostic Equipment</a> in this section. REPEAT the self-test.
<b>No</b>	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test.

**Pinpoint Test B: DTC B1600 — PATS Ignition Key Transponder Signal Is Not Received**

**Normal Operation**

During each vehicle start sequence, the passive anti-theft system (PATS) transceiver reads the PATS key identification code and sends the data to the PCM.

DTC B1600 (PATS Ignition Key Transponder Signal Is Not Received) — sets when no PATS key has been read by the PCM.

**This pinpoint test is intended to diagnose the following:**

- PATS key
- PATS transceiver
- PCM

**PINPOINT TEST B : DTC B1600 — PATS IGNITION KEY TRANSPONDER SIGNAL IS NOT RECEIVED**

**NOTE:** Large metallic objects, electronic devices on the key ring that can be used to purchase gasoline or similar items, or a second key on the same key ring as the PATS key may cause a vehicle starting concern and record DTCs under certain conditions. If a fault cannot be identified, examine the customer key ring for such objects or devices. If present, inform the customer that they need to keep these objects from touching the PATS key while starting the engine. These objects and devices cannot damage the PATS key, but can cause a momentary concern if they are too close to the key during engine start. If a concern occurs, turn the key off and restart the engine with all other objects on the key ring held away from the ignition key. Check to make sure the PATS key used by the customer is an approved Ford PATS key. (PATS keys from Ford, Rotunda, Strattec, or HUF are approved Ford PATS keys.)

**B1 RETRIEVE THE DTCS**

- Ignition ON.
- Clear the PCM DTCs.
- Ignition OFF.
- Ignition ON.
- Retrieve the PCM DTCs.

**Is DTC B1600 retrieved?**

<b>Yes</b>	GO to <a href="#">B2</a> .
<b>No</b>	If DTCs other than PATS PCM DTCs are retrieved, REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. If no PATS DTCs are retrieved, the system is OK. The concern may have been caused by interference from another object.

**B2 CHECK BOTH PATS KEYS**

**NOTE:** Check to make sure the new PATS keys are approved Ford encoded PATS keys. Unapproved PATS keys do not always operate correctly over various temperature ranges. (PATS keys from Ford, Rotunda, Strattec, or HUF are approved Ford PATS keys.)

- Obtain both PATS keys from the customer and follow the procedure using one PATS key, then the other. If the customer only has one PATS key, it will be necessary to cut a new PATS key.
- If it is necessary to cut a new PATS key, program the new PATS key. Refer to [Key Programming Using Diagnostic Equipment](#) in this section.

- Ignition ON.
- Clear the PCM DTCs.
- Ignition OFF.
- Ignition ON.
- Retrieve the PCM DTCs.

**Using either existing key or the new key, is DTC B1600 present?**

<b>Yes</b>	If DTC B1600 was present for both existing keys and the new key, GO to <a href="#">B3</a> . If DTC B1600 was not present with the new key, the original key may be damaged and should be replaced. CUT a new key to replace the damaged key. PROGRAM the new PATS key. REFER to <a href="#">Key Programming Using Diagnostic Equipment</a> in this section. CLEAR the DTCs. REPEAT the self-test.
<b>No</b>	If DTCs other than PATS PCM DTCs are retrieved, REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. If no PATS DTCs are retrieved, the system is OK. The concern may have been caused by interference from another object.

### **B3 INSTALL A NEW PATS TRANSCEIVER**

**NOTE:** Replacement of the PATS transceiver does not require the PATS keys to be programmed into the PCM again.

**NOTE:** Do not use the PATS key that may have been programmed in Step B2.

- Ignition OFF.
- Install a new PATS transceiver. Refer to [Passive Anti-Theft System \(PATS\) Transceiver](#) in this section.
- Ignition ON.
- Clear the PCM DTCs.
- Ignition OFF.
- Ignition ON.
- Retrieve the PCM DTCs.

**Is DTC B1600 retrieved?**

<b>Yes</b>	GO to <a href="#">B4</a> .
<b>No</b>	The system is OK.

### **B4 CHECK FOR CORRECT PCM OPERATION**

**NOTE:** When a new PCM is installed, the PATS keys must be programmed into the PCM.

- Disconnect all the PCM connectors.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect all the PCM connectors and make sure they seat correctly.
- Operate the system and verify the concern is still present.

**Is the concern still present?**

<b>Yes</b>	INSTALL a new PCM. REFER to <a href="#">Section 303-14</a> . PROGRAM the PATS keys into the PCM. REFER to <a href="#">Key Programming Using Diagnostic Equipment</a> in this section. REPEAT the self-test.
<b>No</b>	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test.

## **Pinpoint Test C: DTC B1601 — PATS Received Incorrect Key-Code From Ignition Key Transponder**

### **Normal Operation**



During each vehicle start sequence, the passive anti-theft system (PATS) transceiver reads the PATS key identification code and sends the data to the PCM.

DTC B1601 (PATS Received Incorrect Key-Code From Ignition Key Transponder) — sets when there is an unprogrammed PATS key. There is no issue with the PATS key itself, but the key must be programmed into the PATS memory (unless the maximum number of keys are already programmed).

**This pinpoint test is intended to diagnose the following:**

- PATS key
- PCM

**PINPOINT TEST C : DTC B1601 — PATS RECEIVED INCORRECT KEY-CODE FROM IGNITION KEY TRANSPONDER**

**NOTE:** Large metallic objects, electronic devices on the key ring that can be used to purchase gasoline or similar items, or a second key on the same key ring as the PATS key may cause a vehicle starting concern and record DTCs under certain conditions. If a fault cannot be identified, examine the customer key ring for such objects or devices. If present, inform the customer that they need to keep these objects from touching the PATS key while starting the engine. These objects and devices cannot damage the PATS key, but can cause a momentary concern if they are too close to the key during engine start. If a concern occurs, turn the ignition switch off and restart the engine with all other objects on the key ring held away from the ignition key. Check to make sure the PATS key used by the customer is an approved Ford PATS key. (PATS keys from Ford, Rotunda, Strattec, or HUF are approved Ford PATS keys.)

**NOTE:** Only 8 PATS keys can be programmed into the PCM using the Key Programming Using Diagnostic Equipment procedure unless the unlimited key mode is active. If the N\_KEYCODE (number of keys programmed) PID reads more than 2, the concern may be the PATS key being used is an unprogrammed key. Verify this by also viewing the MASTERKEY (master key) PID. It must read PRESNT for the key to be valid.

**C1 RETRIEVE THE DTCS**

- **NOTE:** Follow this procedure using both PATS keys (using one at a time).  
If only one key is available, cut a new key and program the keys. Refer to [Key Programming Using Diagnostic Equipment](#) in this section.
- If both keys are available, program the keys. Refer to [Key Programming Using Diagnostic Equipment](#) in this section.
- Ignition ON.
- Clear the PCM DTCs.
- Ignition OFF.
- Ignition ON.
- Retrieve the PCM DTCs.

**Is DTC B1601 retrieved for one or both PATS keys?**

<b>Yes</b>	If DTC B1601 is retrieved for one PATS key, REPLACE that key and PROGRAM all the keys. REFER to <a href="#">Key Programming Using Diagnostic Equipment</a> in this section. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test. If DTC B1601 is retrieved for both PATS keys, GO to <a href="#">C2</a> .
<b>No</b>	The system is OK. CHECK all the customer PATS keys by attempting to start the vehicle with each key to VERIFY all the other PATS keys are programmed.

**C2 CHECK FOR CORRECT PCM OPERATION**

**NOTE:** When a new PCM is installed, the PATS keys must be programmed into the PCM.

- Disconnect all the PCM connectors.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect all the PCM connectors and make sure they seat correctly.
- Operate the system and verify the concern is still present.

**Is the concern still present?**

<b>Yes</b>	INSTALL a new PCM. REFER to <a href="#">Section 303-14</a> . PROGRAM the PATS keys into the PCM. REFER to <a href="#">Key Programming Using Diagnostic Equipment</a> in this section. REPEAT the self-test.
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<b>No</b>	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test.
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## Pinpoint Test D: DTC B1602 — PATS Received Invalid Format Of Key-Code From Ignition Key Transponder

### Normal Operation

During each vehicle start sequence, the passive anti-theft system (PATS) transceiver reads the PATS key identification code and sends the data to the PCM.

DTC B1602 (PATS Received Invalid Format of Key-Code From Ignition Key Transponder) — sets when only a partial PATS key was read. Remote starter equipment can also cause this DTC.

**This pinpoint test is intended to diagnose the following:**

- PATS key
- PATS transceiver
- PCM

### PINPOINT TEST D : DTC B1602 — PATS RECEIVED INVALID FORMAT OF KEY-CODE FROM IGNITION KEY TRANSPONDER

**NOTE:** Large metallic objects, electronic devices on the key ring that can be used to purchase gasoline or similar items, or a second key on the same key ring as the PATS key may cause a vehicle starting concern and record DTC under certain conditions. If a fault cannot be identified, examine the customer key ring for such objects or devices. If present, inform the customer that they need to keep these objects from touching the PATS key while starting the engine. These objects and devices cannot damage the PATS key, but can cause a momentary concern if they are too close to the key during engine start. If a concern occurs, turn the ignition off and restart the engine with all other objects on the key ring held away from the ignition key. Check to make sure the PATS key used by the customer is an approved Ford PATS key. (PATS keys from Ford, Rotunda, Strattec, or HUF are approved Ford PATS keys.)

**NOTE:** Only 8 PATS keys can be programmed into the PCM using the Key Programming Using Diagnostic Equipment procedure unless the unlimited key mode is active. If the N\_KEYCODE (number of keys programmed) PID reads more than 2, the concern may be the PATS key being used is an unprogrammed key. Verify this by also viewing the MASTERKEY (master key) PID. It must read PRESNT for the key to be valid.

#### D1 RETRIEVE THE DTCS

- **NOTE:** Follow this procedure using both PATS keys (using one at a time).

If only one key is available, cut a new key and program the keys. Refer to [Key Programming Using Diagnostic Equipment](#) in this section.

- Ignition ON.
- Clear the PCM DTCs.
- Ignition OFF.
- Ignition ON.
- Retrieve the PCM DTCs.

**Is DTC B1602 retrieved for one or both PATS keys?**

<b>Yes</b>	If DTC B1602 is retrieved for one key, REPLACE that key and PROGRAM the new key. REFER to <a href="#">Spare Key Programming — Using Diagnostic Equipment</a> in this section. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test. If DTC B1602 is retrieved for both PATS keys, GO to <a href="#">D2</a> .
<b>No</b>	The system is OK. CHECK all the customer PATS keys by attempting to start the vehicle with each key to VERIFY all the other PATS keys are programmed. The concern may have been caused by interference from another object.

#### D2 INSTALL A NEW PATS TRANSCEIVER

**NOTE:** Replacement of the PATS transceiver does not require the PATS keys to be programmed into the PCM again.

- Ignition OFF.
- Install a new PATS transceiver. Refer to [Passive Anti-Theft System \(PATS\) Transceiver](#) in this section.



- Ignition ON.
- Clear the PCM DTCs.
- Ignition OFF.
- Ignition ON.
- Retrieve the PCM DTCs.

**Are any PATS DTCs retrieved?**

<b>Yes</b>	GO to <a href="#">D3</a> .
<b>No</b>	The system is OK. CHECK all the customer PATS keys by attempting to start the vehicle with each key to VERIFY all the other PATS keys are programmed.

**D3 CHECK FOR CORRECT PCM OPERATION**

**NOTE:** When a new PCM is installed, the PATS keys must be programmed into the PCM.

- Disconnect all the PCM connectors.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect all the PCM connectors and make sure they seat correctly.
- Operate the system and verify the concern is still present.

**Is the concern still present?**

<b>Yes</b>	INSTALL a new PCM. REFER to <a href="#">Section 303-14</a> . PROGRAM the PATS keys into the PCM. REFER to <a href="#">Key Programming Using Diagnostic Equipment</a> in this section. REPEAT the self-test.
<b>No</b>	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test.

**Pinpoint Test E: DTC B1681 — PATS Transceiver Module Signal Is Not Received**

Refer to Wiring Diagrams Cell [112](#), Passive Anti-Theft System for schematic and connector information.

**Normal Operation**

The passive anti-theft system (PATS) transceiver receives voltage from the smart junction box (SJB) fuse 19 (5A) on circuit 1266 (RD/YE) and is grounded on circuit 1205 (BK). The PATS transceiver and the PCM communicate on circuits 1215 (WH/LG) and 1216 (GY/OG). The PCM compares the key code stored in memory and enables the starter if the key code is correct.

DTC B1681 (PATS Transceiver Module Signal Is Not Received) — sets when the PATS transceiver signal is not received by the PCM. This DTC can be caused by circuits to the PATS transceiver, circuits between the PATS transceiver and the PCM, the PATS transceiver or the PCM. This can also be caused by using the incorrect PATS transceiver part number.

**This pinpoint test is intended to diagnose the following:**

- Fuse
- Wiring, terminals or connectors
- PATS transceiver
- PCM

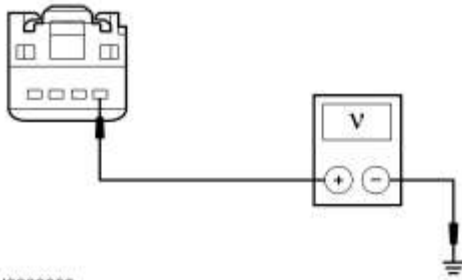
**PINPOINT TEST E : DTC B1681— PATS TRANSCIVER MODULE SIGNAL IS NOT RECEIVED**

**NOTICE:** Use the correct probe adapter(s) when making measurements. Failure to use the correct probe adapter(s) may damage the connector.

**E1 CHECK THE PATS TRANSCIVER POWER CIRCUIT 1266 (RD/YE) FOR VOLTAGE**

- Ignition OFF.
- Disconnect: PATS Transceiver [C2007](#) .

- Ignition ON.
- Measure the voltage between the PATS transceiver [C2007](#) Pin 1, circuit 1266 (RD/YE), harness side and ground.



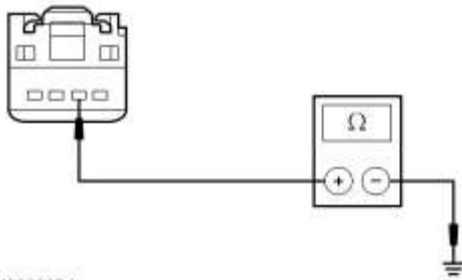
N0002393

**Is the voltage greater than 10 volts?**

<b>Yes</b>	GO to <a href="#">E2</a> .
<b>No</b>	VERIFY the SJB fuse 19 (5A) is OK. If OK, REPAIR the circuit. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test.

### **E2 CHECK THE PATS TRANSCEIVER GROUND CIRCUIT 1205 (BK) FOR AN OPEN**

- Ignition OFF.
- Measure the resistance between the PATS transceiver [C2007](#) Pin 2, circuit 1205 (BK), harness side and ground.



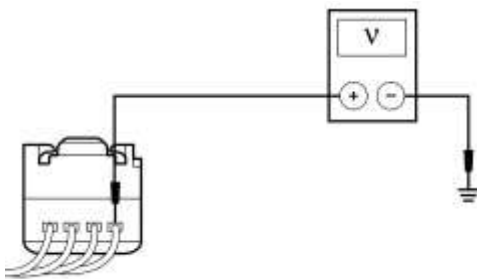
N0002394

**Is the resistance less than 5 ohms?**

<b>Yes</b>	GO to <a href="#">E3</a> .
<b>No</b>	REPAIR the circuit. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test.

### **E3 CHECK THE PATS TRANSCEIVER RECEIVE CIRCUIT 1216 (GY/OG) FOR VOLTAGE**

- Connect: PATS Transceiver [C2007](#) .
- Ignition ON.
- Measure the voltage by backprobing between the PATS transceiver [C2007](#) Pin 4, circuit 1216 (GY/OG), harness side and ground.



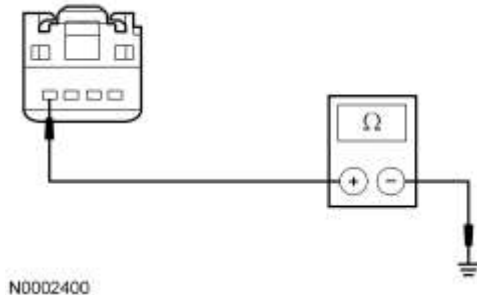
N0002396

**Is the voltage greater than 8 volts?**

<b>Yes</b>	GO to <a href="#">E6</a> .
<b>No</b>	GO to <a href="#">E4</a> .

#### E4 CHECK THE PATS TRANSCEIVER RECEIVE CIRCUIT 1216 (GY/OG) FOR A SHORT TO GROUND

- Ignition OFF.
- Disconnect: PCM [C175B](#) .
- Disconnect: PATS Transceiver [C2007](#) .
- Measure the resistance between the PATS transceiver [C2007](#) Pin 4, circuit 1216 (GY/OG), harness side and ground.

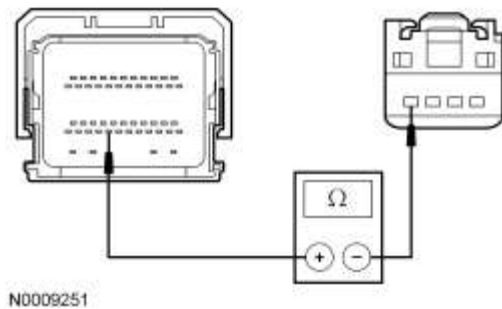


**Is the resistance greater than 10,000 ohms?**

<b>Yes</b>	GO to <a href="#">E5</a> .
<b>No</b>	REPAIR the circuit. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test. If DTC B1681 is retrieved again, GO to <a href="#">E12</a> .

#### E5 CHECK THE PATS TRANSCEIVER RECEIVE CIRCUIT 1216 (GY/OG) FOR AN OPEN

- Measure the resistance between the PCM [C175B](#) Pin 42, circuit 1216 (GY/OG), harness side, and the PATS transceiver [C2007](#) Pin 4, circuit 1216 (GY/OG), harness side.



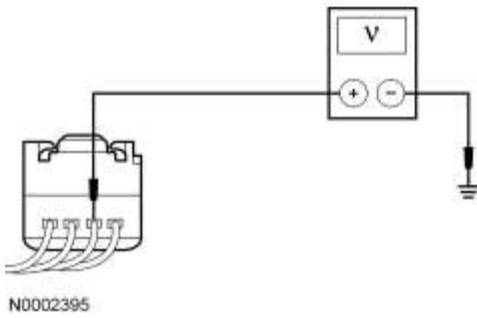
**Is the resistance less than 5 ohms?**

<b>Yes</b>	GO to <a href="#">E12</a> .
<b>No</b>	REPAIR the circuit. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test.

#### E6 CHECK THE PATS TRANSCEIVER TRANSMIT CIRCUIT 1215 (WH/LG) FOR VOLTAGE

**NOTE:** Replacement of the PATS transceiver does not require the PATS keys to be programmed into the PCM again.

- Measure the voltage by backprobing between the PATS transceiver [C2007](#) Pin 3, circuit 1215 (WH/LG), harness side and ground.

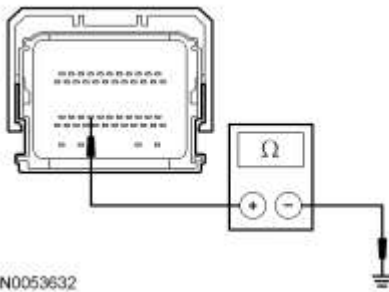


Is the voltage greater than 8 volts?

<b>Yes</b>	INSTALL a new PATS transceiver. REFER to <a href="#">Passive Anti-Theft System (PATS) Transceiver</a> in this section. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test. If DTC B1681 is retrieved again, GO to <a href="#">E12</a> .
<b>No</b>	GO to <a href="#">E7</a> .

### E7 CHECK THE PATS TRANSCIEVER TRANSMIT CIRCUIT 1215 (WH/LG) FOR A SHORT TO GROUND WITH THE PATS TRANSCIEVER CONNECTED

- Ignition OFF.
- Disconnect: PCM [C175B](#) .
- Measure the resistance between the PCM [C175B](#) Pin 31, circuit 1215 (WH/LG), harness side and ground.



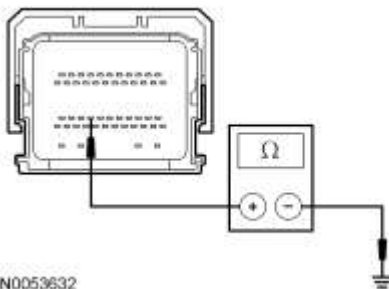
Is the resistance greater than 10,000 ohms?

<b>Yes</b>	GO to <a href="#">E9</a> .
<b>No</b>	GO to <a href="#">E8</a> .

### E8 CHECK THE PATS TRANSCIEVER TRANSMIT CIRCUIT 1215 (WH/LG) FOR A SHORT TO GROUND WITH THE PATS TRANSCIEVER DISCONNECTED

**NOTE:** Replacement of the PATS transceiver does not require the PATS keys to be programmed into the PCM again.

- Disconnect: PATS Transceiver [C2007](#) .
- Measure the resistance between the PCM [C175B](#) Pin 31, circuit 1215 (WH/LG), harness side and ground.

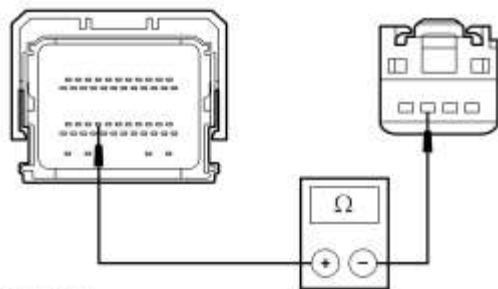


**Is the resistance greater than 10,000 ohms?**

<b>Yes</b>	INSTALL a new PATS transceiver. REFER to <a href="#">Passive Anti-Theft System (PATS) Transceiver</a> in this section. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test.
<b>No</b>	REPAIR the circuit. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test.

**E9 CHECK THE PATS TRANSCEIVER TRANSMIT CIRCUIT 1215 (WH/LG) FOR AN OPEN**

- Disconnect: PATS Transceiver [C2007](#) .
- Measure the resistance between the PCM [C175B](#) Pin 31, circuit 1215 (WH/LG), harness side and the PATS transceiver [C2007](#) Pin 3, circuit 1215 (WH/LG), harness side.



N0002397

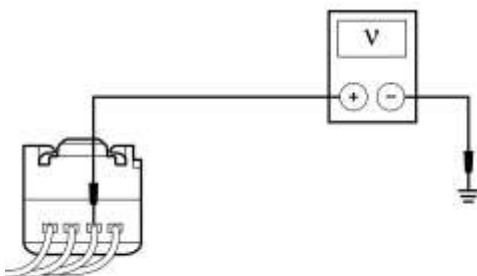
**Is the resistance less than 5 ohms?**

<b>Yes</b>	GO to <a href="#">E10</a> .
<b>No</b>	REPAIR the circuit. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test.

**E10 CHECK THE PATS TRANSCEIVER TRANSMIT CIRCUIT 1215 (WH/LG) FOR VOLTAGE**

**NOTE:** Replacement of the PATS transceiver does not require the PATS keys to be programmed into the PCM again.

- Connect: PATS Transceiver [C2007](#) .
- Connect: PCM [C175B](#) .
- Ignition ON.
- Enter the following diagnostic mode on the scan tool: PCM DataLogger.
- Trigger the active command TRANSMIT to ON.
- Measure the voltage by backprobing between the PATS transceiver [C2007](#) Pin 3, circuit 1215 (WH/LG), harness side and ground.



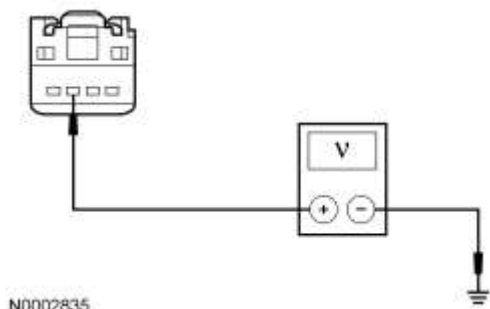
N0002395

**Is the voltage less than 5 volts?**

<b>Yes</b>	INSTALL a new PATS transceiver module. REFER to <a href="#">Passive Anti-Theft System (PATS) Transceiver</a> in this section. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test.
<b>No</b>	GO to <a href="#">E11</a> .

**E11 CHECK THE PATS TRANSCEIVER TRANSMIT CIRCUIT 1215 (WH/LG) FOR A SHORT TO VOLTAGE**

- Ignition OFF.
- Disconnect: PCM [C175B](#) .
- Disconnect: PATS Transceiver [C2007](#) .
- Ignition ON.
- Measure the voltage between the PATS transceiver [C2007](#) Pin 3, circuit 1215 (WH/LG), harness side and ground.



**Is any voltage indicated?**

<b>Yes</b>	REPAIR the circuit. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test.
<b>No</b>	GO to <a href="#">E12</a> .

## **E12 CHECK FOR CORRECT PCM OPERATION**

**NOTE:** When a new PCM is installed, the PATS keys must be programmed into the PCM.

- Disconnect all the PCM connectors.
- Check for:
  - corrosion
  - damaged pins
  - pushed-out pins
- Connect all the PCM connectors and make sure they seat correctly.
- Operate the system and verify the concern is still present.

**Is the concern still present?**

<b>Yes</b>	INSTALL a new PCM. REFER to <a href="#">Section 303-14</a> . PROGRAM the PATS keys into the PCM. REFER to <a href="#">Key Programming Using Diagnostic Equipment</a> in this section. REPEAT the self-test.
<b>No</b>	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. CYCLE the ignition. REPEAT the self-test.



