SECTION : 419-07 Satellite Navigation

VEHICLE APPLICATION : 2008.0 Falcon

CONTENTS

SPECIFICATIONS

DESCRIPTION AND OPERATION

DIAGNOSIS AND TESTING

REMOVAL AND INSTALLATION

SPECIFICATIONS

Torque Specifications

Description	Nm
Processor mounting bracket screws	4 ± 1

DESCRIPTION AND OPERATION

Satellite Navigation

How does the system work?

The movement of the vehicle is measured by sensors that are integrated in the navigation computer. The distance driven is recorded by an electronic signal from the speedometer and the rotary movements of bends by the gyroscope (a rotary measurement system). The information from these sensors is, however, not always exact. Measurements could be affected by skidding of the wheels, varying tyre pressure due to changes in temperature, etc. By comparison of these signals with the digitized CD-ROM map it is possible to correct any inaccuracies of the sensors and to determine the position of the vehicle quite precisely. In order to correct the data, a signal from the GPS satellites is required for a period of several minutes.

GPS (Global Positioning System)

The GPS System is based on the reception of navigation signals from a total of 27 GPS satellites orbiting the earth at a height of 21,000 kilometers, once every 12 hours. To determine a 3D position (with longitude, latitude and height), signals from at least 4 satellites must be received. This allows an accuracy of about 30m to 100m which is further improved by other sensors.

Start-up Behaviour – Shutdown Delay Time

Immediately after switching off accessories, navigation guidance stops, but the navigation computer remains active for a period that can be set. This has the advantage that you can continue the directional guidance after a short stop (e.g. at the petrol station), without the navigation computer having to calculate the route again. The shutdown delay time can be set between 1 and 10 minutes. The current planned route remains stored, the navigation computer is immediately ready for use after switching off the ignition without any start-up phase.

Limited GPS Reception

When the vehicle is parked for a long period of time, the satellites move on during this period. Therefore, when the ignition is turned on again it can take a few minutes before the navigation system can pick up enough satellites and evaluate the received signals. The system will operate reliably again once the GPS reception is available in sufficient quality.

Functional disturbance may also occur if GPS reception is interrupted or interference occurs over a distance of several kilometres.

GPS reception may be interrupted or interference could occur:

* In between high buildings
* In multiple story car parks or garages, in tunnels and under bridges
* In forests or tree-lined streets
* During heavy rain showers
* Unfavourable satellite positions in conjunction with the mounting position of the GPS antenna (in this case GPS reception may be obstructed for a longer period of time)
- Unfavourable satellite constellations in conjunction with the mounting position of the GPS antenna (in this case GPS reception may be obstructed for a longer period of time).
- In valleys and in mountainous regions

Sufficient GPS reception should be present about 95% of the driving time. If interference in the reception occurs more frequently contact your Authorised Ford Dealer. However, the navigation system is able to compensate reception problems over a period of a few minutes without functional interference.

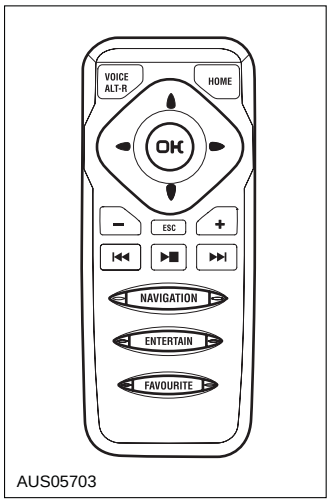
Component Layout

The navigation system comprises of six main components:

* Remote Control
* G.P.S. Antenna
* Processor
* SD Card (Map data)
* Display
* Infra-Red Sensor

Remote Control

The remote control is required for activation/ deactivation of the system and the utilization of the navigation functions. The remote control utilizes an Infra-Red (IR) transmitter with the corresponding IR receiver located in the overhead console.



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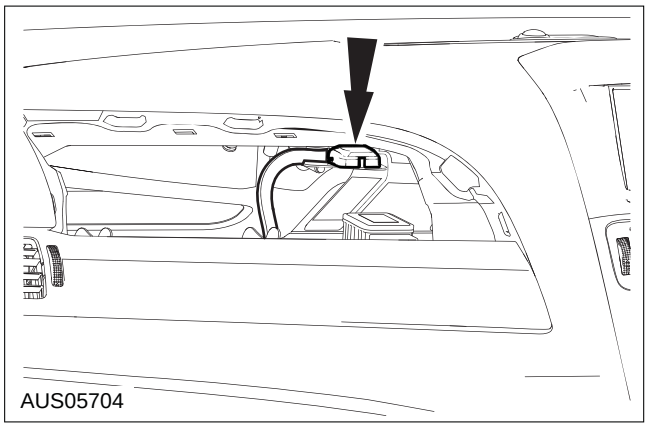
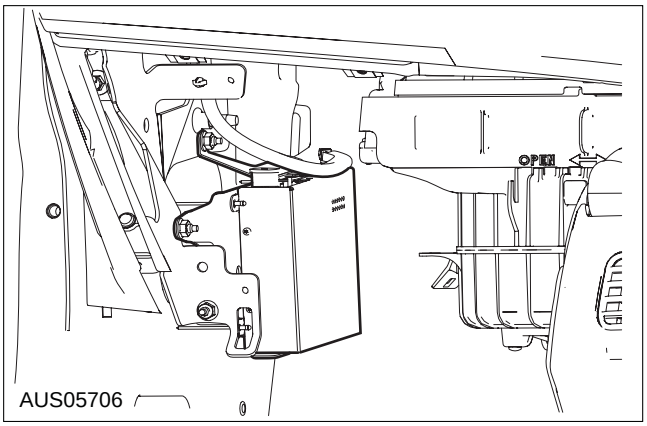
G.P.S Antenna

The GPS antenna (located inside the instrument panel on the passenger side of the ICC, behind the air-bag) is used to receive signals transmitted by GPS satellites. For optimum performance of the navigation system, do not place objects on top of the instrument panel.



Processor

The processor (located inside the left hand side of instrument panel behind the glove box) controls the navigation related functions including screen display output. The processor also houses the SD Card which contains the map data.



SD Card (Map data)

The map data is contained on a Secure Digital (SD) card which is located inside Slot 2 of the navigation processor.

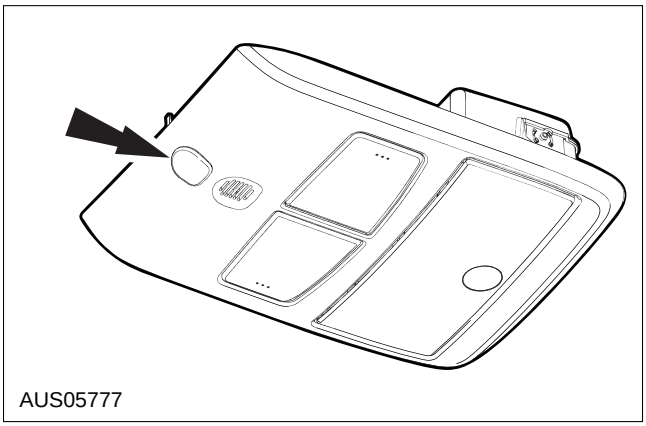
Insert the card into the SD card slot 2 with the label facing up (towards the drivers side of the vehicle) and the slanted corner on the right. Press the card into the slot until it engages.

Display

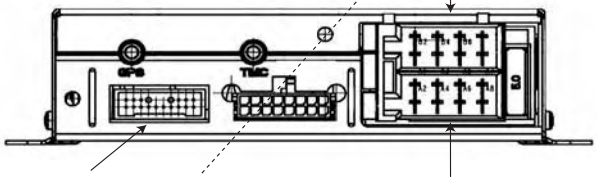
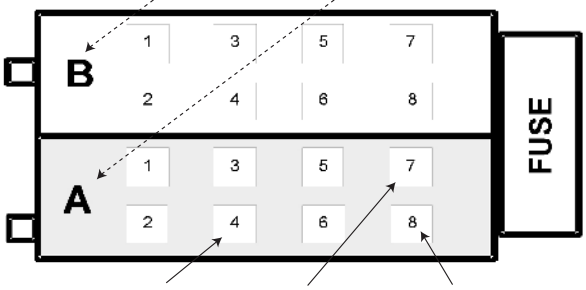
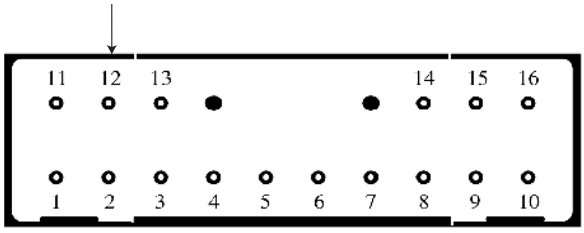
The display (located on the instrument panel) is shared between the GPS, Audio and Climate Control systems.

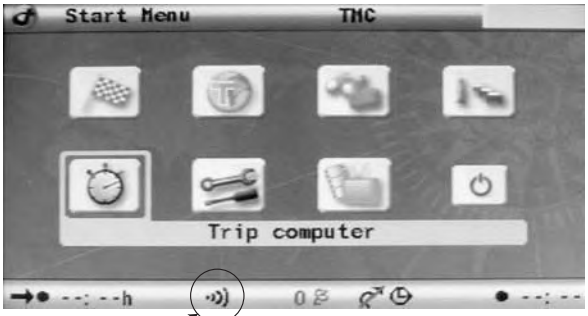
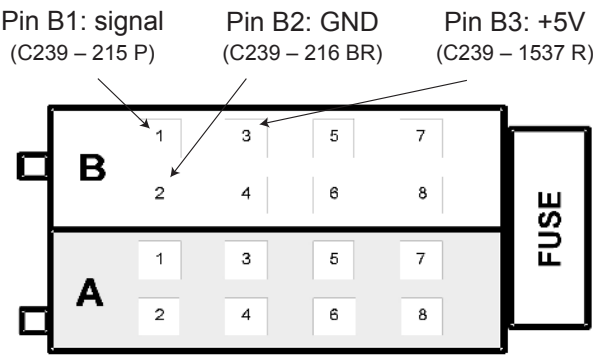
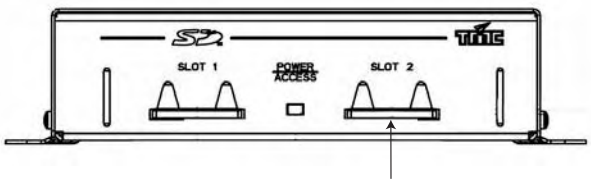
Infra-Red (IR) Sensor

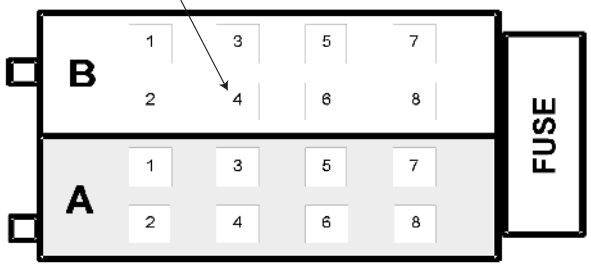
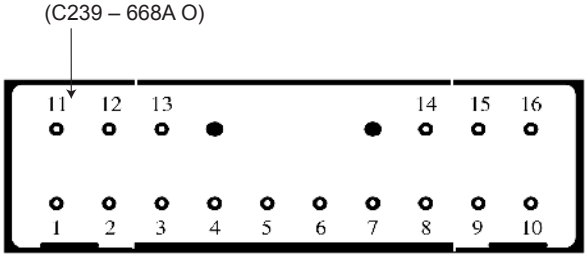
The Infra-Red (IR) sensor is located in the overhead console. Refer to Section “501-05: Interior Trim and Ornamentation” for details of installation and removal.

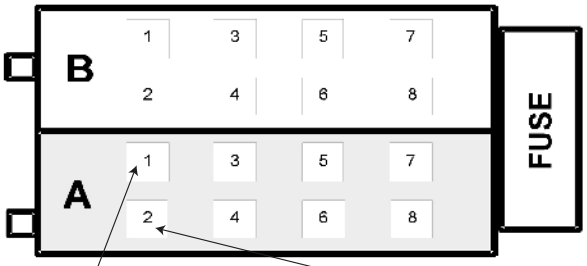
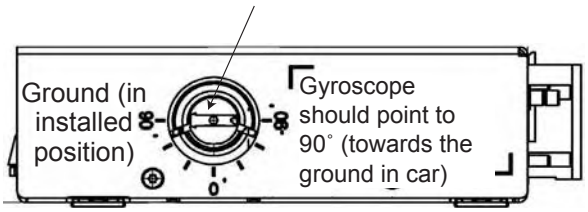


DIAGNOSIS AND TESTING

No.	Condition	Test Step	Result/Action to Take
1	ICC screen does not show any image. The green light on the navigation computer IS NOT LIT when the accessories is ON.	1.Check system power (pin A4 & A7) and ground supplies (pin A8) at rear of computer. *Refer wiring schematic 419-07-00-1 & Connector C-239* ISO connector B (C239 – NAVIGATION2)  Mitsumi connector M (C239 – NAVI (MITSUMI) ISO connector A (C239 – NAVIGATION3)  Pin A4: 12V (C239 – 38LN B-O) Pin A7: ACC (C239 – 294 G) Pin A8: GND (C239 – 57TB B) 2. Check fuse in rear of computer.	If 1 - 2 are correct, check vehicle fuse and power harness. If OK remove and replace Navigation computer.
2	ICC screen does not show any image, the green light on the navigation computer IS LIT when accessories is ON.	1.Press the NAVIGATION button on the remote control to restore image. 2.Check Mode Select pin M12 is active (Ground). Pin M12 Mode Select (C239 – 1538 Y-R)  3.Push the “OK” button on the ICC screen for at least 3 seconds.	If 1 - 3 are correct, check signals at ICC system, check ICC fuse and harness. If OK, then remove and replace Navigation computer.

3	Remote control does not work.	1.Check battery condition and polarity. 2.Ensure switch in Remote control battery compartment is set to '1'. 3.Point remote to IR sensor (in overhead console). 4.Check the screen shows an image of the remote signal indicator flashing when a button is pressed.  IR sensor indicator 5.If the battery symbol appears in the status line, the batteries of the remote control must be changed. 6.Check power and ground feeds to IR sensor (Pin B2 and B3). 7.Remove IR sensor connector from Navigation Computer and check continuity with IR sensor signal pin (Pin B1). 	If 1 - 7 are correct, remove and replace Navigation computer.
4	Navigation and Address book icons are not highlighted	1.Check Map SD card is inserted in SLOT 2 of navigation computer correctly.  Slot 2 for map SD card	If 1 is OK, remove and replace with new SD card. If not OK then remove and replace Navigation computer.

5	No guidance voice can be heard; screen shows guidance direction 'Pictograms'.	1.Press + and – buttons on remote & confirm audible voice 'Softer' & 'Louder' are heard. 2.Check Mix / Mute input is Grounded immediately after + and – buttons pressed. Pin B4: Navi mix / mute (C239 – 213 L-Y)  3.Check continuity of Navigation Audio output line to ACM. Pin M11: Navi Audio out (C239 – 668A O) 	If 1-3 are correct, check Radio System. Check mix/mute and audio wiring continuity between Nav and Radio. If OK, then remove and replace Navigation Computer.

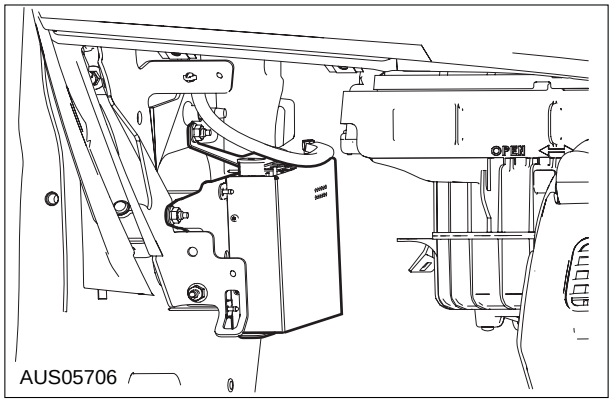
6	Guidance is imprecise and map mode shows 'jerky' movement of the map and vehicle position symbol.	1.Select Menu "Settings" → "System Information" → "Diagnosis" → Enter CODE 6330 → section 'READ I/O DATA' and confirm that the 'SPEED PULSES' are 0 at rest. Drive vehicle at 20km/h and note speed pulse value. Drive at 40km/h and note speed pulse value. Compare speed pulse values - Must be a linear increase with speed. 2.Enter diagnostic mode (CODE 6330) section 'READ I/O DATA' and confirm that the 'DIRECTION' is reading 'FWD' when the car is driving forward and REV when vehicle is moving in reverse. 3.Check continuity of SPEED input. 4.Check Reverse Input is 12V when in reverse.  Pin A1: speed signal (C239 – 565 B-W) Pin A2: Reverse (12V) (C239 – 140 R-B) 5.Check orientation of gyroscope.  6.Check GPS reception via the diagnostic mode; view READ GPS DATA. >4 Satellites should be available 95% of driving time. 7.Check GPS antenna is plugged into GPS connector. 8.Check GPS antenna cable for damage. 9.Check No metallic window tint on windscreen or object placed on instrument panel.	If 1 - 9 are OK, check PCM system speed output, check reverse signal wiring, and if OK, then remove and replace GPS antenna. If OK then remove and replace Navigation Computer.

REMOVAL AND INSTALLATION

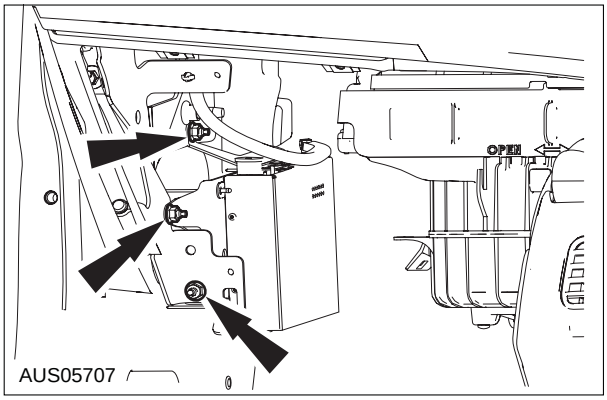
Navigation System Module

Removal

1. The navigation processor is located behind the glove box assembly.



2. Remove glove box lid.
3. Remove 9 screws around glove box lower.
4. Remove glove box lower.
5. Disconnect glove box switch.
6. Disconnect foot lamp.
7. Remove 3 nuts around navigation processor mounting bracket.



8. Remove navigation processor & bracket.
9. Disconnect navigation processor from vehicle harness.

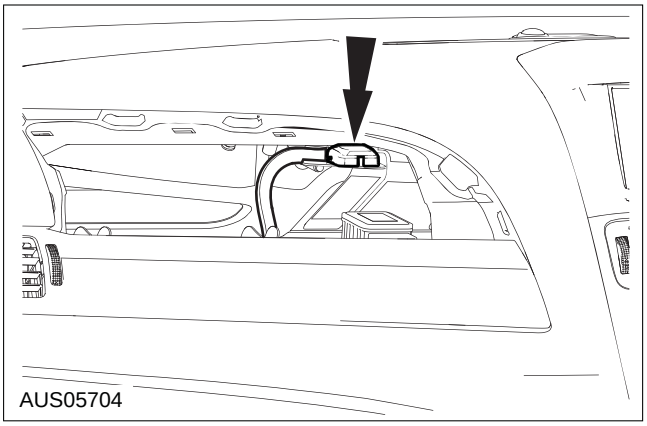
Installation

1. Installation is the reverse of the removal procedure.

Navigation System Antenna

Removal

1. Refer to section 501-12 “Instrument Panel and Console”, for instructions on removing the instrument panel.
   NOTE: View is shown with air bag removed for clarity. Access is with the instrument panel removed.
2. Remove G.P.S. antenna from bracket.
3. Disconnect antenna from navigation processor and remove.



Installation

1. Installation is the reverse of the removal procedure.

Navigation System Display Module

Removal and Installation

Refer to Section 413-08 for instructions.