

Module Network Input Messages – DSM

Broadcast Message	Originating Module	Message Purpose
Manual mirror override	DDM	Used to abort a memory recall if the exterior mirror control switch is pressed in any direction while a memory recall is taking place.
Memory switch status	DDM	Indicates the status of each memory switch button (pressed or not pressed).

System Operation - Exterior, Power, With Memory

NOTE: If the DDM or PDM detects a mirror motor feedback circuit fault, a timeout strategy disables the memory operations for 30 seconds to prevent system damage. After the 30 second timeout, normal operation resumes.

All functions of the power mirror feature are integrated into one switch module (integral to the LH front door window control switch). The left and right side selection buttons have an LED to indicate which one is active and a directional pad is used for directional control. Neutral is achieved by pressing the lit button to deactivate the left or right exterior mirror, or by allowing the system to time out and reset to neutral.

When the exterior mirror directional pad switch is pressed left, right, up or down with the LH or RH exterior mirror selected, the movement request is sent to the DDM through a LIN circuit. If the LH mirror is selected, the DDM supplies voltage and ground to the appropriate LH exterior mirror motor. If the RH mirror is selected, the DDM sends the passenger mirror command message with the input from the exterior mirror control switch to the PDM. The PDM then supplies voltage and ground to the appropriate RH exterior mirror motor. The DDM and PDM controls the glass movements by reversing polarity of the voltage and ground circuits being supplied to each motor.

When a memory recall or save is initiated, the DSM sends the memory command message to the DDM and PDM through the MS-CAN. Based on this message, the DDM and PDM recall the requested memory preset mirror position from internal memory or save the current mirror position to correspond with the requested preset. During a memory recall, the DDM and PDM supply voltage and ground to the appropriate exterior mirror motors to achieve the desired memory positions that are stored in memory based on feedback from the mirror motor potentiometers. To support the memory function, the DDM supplies a 5 volt reference and ground to the LH mirror motor potentiometers and the PDM supplies a 5 volt reference and ground to the RH mirror motor potentiometers. The DDM monitors the feedback voltage from the horizontal and vertical potentiometers to determine the position of the LH mirror glass and the PDM monitors the feedback voltage from the horizontal and vertical potentiometers to determine the position of the RH mirror glass. If the exterior mirror control switch is activated in any direction during a memory recall, the DDM sends the manual mirror override message to the DSM. After this message is received, the DSM sends the memory command message to abort the memory recall. After the recall is aborted, the DDM or PDM respond to the exterior mirror control switch inputs. A memory recall is also aborted if the driver seat control switch is activated in any direction during a memory recall.

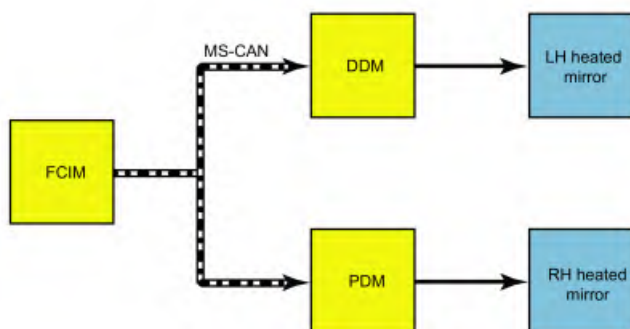
The LH exterior mirror glass position presets are stored in the DDM and the RH exterior mirror glass position presets are stored in the PDM.

A memory save can be initiated by the memory set switch. A memory recall can be initiated by the memory set switch, a RKE transmitter or the keyless entry keypad. For additional information on memory recall or memory save, refer to the Owner's Literature.

For additional information on the memory feature function,

Refer to: Front Seats - System Operation and Component Description (501-10A Front Seats, Description and Operation).

System Diagram - Exterior, Heated



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Item	Description
1	LH heated mirror
2	RH heated mirror
3	FCIM
4	MS-CAN
5	DDM
6	PDM

Network Message Chart

Module Network Input Messages – DDM and PDM

Broadcast Message	Originating Module	Message Purpose
Mirror heat request	FCIM	Used to command the heated exterior mirror glass on and off

System Operation - Exterior, Heated

The rear window defrost system controls the operation of the heated exterior mirror glass and, if equipped, the heated spotter mirror glass. The heated exterior mirror glass and the heated spotter mirror glass only operates when the rear window defrost system is active.

The heated mirrors are heated for a period of 10 minutes when the engine is running and the defrost system is activated.

Based on the mirror heat request message received from the FCIM through the MS-CAN, the DDM controls the operation of the LH heated exterior mirror glass and the PDM controls the operation of the RH heated exterior mirror glass. The LH and RH heated mirror glass do not share the same ground.

On vehicles equipped with a LH exterior auto-dimming mirror, the LH exterior mirror glass takes longer to defrost than the RH exterior mirror glass due to differences in the mirror glass thickness.

If equipped, the rear window defrost can also be commanded on and off using voice commands or by touching the rear window defrost button located on the touchscreen interface (FDIM). For additional information on voice or touchscreen commanded features, refer to the Owner's Literature.

For additional information on the rear window defrost system,

Refer to: Glass, Frames and Mechanisms - System Operation and Component Description (501-11 Glass, Frames and Mechanisms, Description and Operation).

System Operation - Exterior Auto-Dimming

The LH exterior mirror is equipped with an auto-dimming feature. This feature automatically reduces the glare caused by bright light behind the vehicle during nighttime conditions. The interior auto-dimming mirror supplies voltage and ground to electronically darken the LH exterior mirror glass. The reflectance level of the mirror glass is variable and depends on the amount of rear glare in relation to ambient light conditions in front of the interior mirror.

To provide increased visibility when backing up, the interior auto-dimming mirror glass and LH exterior mirror glass automatically returns to a high reflectance mode whenever the vehicle is in REVERSE, regardless of exterior lighting conditions.

System Operation- Interior Manual-Dimming

The manual interior rear view mirror can be adjusted from a day position to a night position to reduce unwanted glare caused by headlamps from behind the vehicle. Adjusting the interior mirror is accomplished by using the day/night tab, located on the bottom of the interior mirror. Pulling the tab rearward, towards the driver, adjusts the mirror to the night position. Pushing the tab forward, away from the driver, adjusts the mirror to the day position.

System Operation- Interior Auto-Dimming

The auto-dimming feature is active any time the ignition is ON. The interior auto-dimming mirror uses 2 integral photoelectric sensors to detect exterior lighting conditions. When the forward facing sensor detects daytime conditions, the rearward facing sensor is inactive and the mirror glass stays in a high reflectance mode. When the forward facing sensor detects nighttime conditions, the rearward facing sensor is active. When bright lights (glare) are detected by the rearward facing sensor, the mirror glass is electronically darkened. To provide increased visibility when backing up, the interior rear view mirror automatically returns to a high reflectance mode any time reverse gear is selected, regardless of exterior lighting conditions.

Component Description

Exterior Mirror Control Switch

The exterior mirror control switch is a momentary contact switch that is integral to the LH front door window control switch, which is connected to the DDM through a LIN circuit. The LED on each exterior mirror selection button illuminates to indicate which exterior mirror is selected for adjustment.

Exterior Mirror

Each exterior mirror has 2 bi-directional motors that are used to control the position of the exterior mirror glass. Adjusting the exterior mirror control switch to the LH or RH position determines which exterior mirror motor to control.

If equipped with heated exterior mirrors, heated exterior mirrors use heating elements that are integral to the exterior mirror glass.

If equipped with the LH exterior auto-dimming mirror, the LH exterior auto-dimming mirror glass electronically darkens when bright light is detected from behind the vehicle during nighttime conditions.

If equipped with memory mirrors, each exterior mirror motor is equipped with an integral potentiometer that is monitored by the DDM (LH mirror) or PDM (RH mirror) to determine the position of the exterior mirror glass. The DDM and PDM are capable of setting Diagnostic Trouble Codes (DTCs) for the mirror circuits.

The exterior mirrors use a jumper harness between the vehicle wiring harness and the exterior mirror motors and the heated mirror glass. The exterior mirror jumper harness is integral to the exterior mirror. Before replacing an exterior mirror or motor, inspect the jumper harness for opens, shorted circuits or damaged and pushed-out pins. If a concern with the exterior mirror jumper harness exists, attempt to repair the jumper harness.

The exterior mirrors may include turn signals indicators. For additional information on the mirror-mounted turn signals indicators, Refer to: Turn Signal and Hazard Lamps (417-01 Exterior Lighting, Diagnosis and Testing).

The exterior mirrors may include puddle lamps. For additional information on the mirror-mounted puddle lamps, Refer to: Interior Lighting - System Operation and Component Description (417-02 Interior Lighting, Description and Operation).

The exterior mirrors may include BLIS® Light Emitting Diodes (LEDs). For additional information on the mirror-mounted BLIS®, Refer to: Blind Spot Information System - System Operation and Component Description (419-04 Side and Rear Vision, Description and Operation).

DDM

For the exterior power functions, the DDM receives mirror movement requests through the LIN circuit from the LH front door window control switch. When the LH exterior mirror is selected, the DDM provides voltage and ground to the appropriate LH exterior mirror motor to drive the mirror glass in the desired direction. The DDM sends RH exterior mirror movement requests to the PDM through the MS-CAN.

If the vehicle is equipped with memory mirrors, the DDM monitors the potentiometers in the LH exterior mirror to determine the position of the

exterior mirror glass. Preset memory positions for the LH exterior mirror glass are stored in the DDM.

If the vehicle is equipped with heated exterior mirrors without memory mirrors, based on the mirror heat request message received from the FCIM, the DDM controls the operation of the LH heated exterior mirror glass.

When a concern exists, the DDM is capable of setting and storing Diagnostic Trouble Codes (DTCs) for the LH exterior mirror motor drive circuits, position sensor circuits (if equipped), folding mirror motor circuits (if equipped) and mirror heater circuit (if equipped).

PDM

For the exterior power functions, when the RH exterior mirror is selected, the PDM supplies voltage and ground to the appropriate RH exterior mirror motor to drive the mirror glass in the desired direction based on messages received from the DDM through the MS-CAN.

If the vehicle is equipped with memory mirrors the PDM monitors the potentiometers in the RH exterior mirror to determine the position of the exterior mirror glass. Preset memory positions for the RH exterior mirror glass are stored in the PDM.

If the vehicle is equipped with heated exterior mirrors and without memory mirrors, based on the mirror heat request message received from the FCIM, the PDM controls the operation of the RH heated exterior mirror glass.

When a concern exists, the PDM is capable of setting and storing Diagnostic Trouble Codes (DTCs) for the RH exterior mirror motor drive circuits, position sensor circuits (if equipped), folding mirror motor circuits (if equipped) and mirror heater circuit (if equipped).

Interior Rear View Mirror - Manual-Dimming

The manual dimming interior rear view mirror has a lever at the back of the mirror that must be pulled forward or pushed rearward by the driver to activate the manual dimming function. Manual dimming is completely controlled by the driver.

Interior Rear View Mirror - Auto-Dimming

The auto-dimming rear view mirror has 2 photoelectric sensors, one on the front of the mirror (facing the windshield) and one on the rear of the mirror (at the top of the mirror glass). Based on inputs from these sensors, the automatic dimming feature adjusts the reflectance level of the interior rear view mirror glass to eliminate unwanted glare. The reflectance level of the mirror glass is variable and depends on the amount of rear glare in relation to ambient light conditions in front of the interior mirror.

Diagnosis and Testing

Rear View Mirrors

DTC Chart: DDM

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.
REFER to: Diagnostic Methods (100-00 General Information, Description and Operation).

DTC	Description	Action <i>New: hover over Pinpoint Test links to show title</i>
B11F6:11	Driver Folding Mirror Motor: Circuit Short To Ground	GO to Pinpoint Test E
B11F6:15	Driver Folding Mirror Motor: Circuit Short To Battery or Open	GO to Pinpoint Test E
B1163:11	Left Mirror Heater Output: Circuit Short To Ground	GO to Pinpoint Test D
B1163:15	Left Mirror Heater Output: Circuit Short To Battery Or Open	GO to Pinpoint Test D
B1C09:11	Driver Left/Right Mirror Motor: Circuit Short To Ground	GO to Pinpoint Test B
B1C09:15	Driver Left/Right Mirror Motor: Circuit Short To Battery Or Open	GO to Pinpoint Test B
B1C10:11	Driver Up/Down Mirror Motor: Circuit Short To Ground	GO to Pinpoint Test B
B1C10:15	Driver Up/Down Mirror Motor: Circuit Short To Battery Or Open	GO to Pinpoint Test B
B1C13:11	Driver Up/Down Mirror Motor Feedback: Circuit Short To Ground	GO to Pinpoint Test C
B1C13:15	Driver Up/Down Mirror Motor Feedback: Circuit Short To Battery Or Open	GO to Pinpoint Test C
B1C14:11	Driver Left/Right Mirror Motor Feedback: Circuit Short To Ground	GO to Pinpoint Test C
B1C14:15	Driver Left/Right Mirror Motor Feedback: Circuit Short To Battery Or Open	GO to Pinpoint Test C
C1B15:11	Sensor Supply Voltage B: Circuit Short To Ground	GO to Pinpoint Test C
C1B15:15	Sensor Supply Voltage B: Circuit Short To Battery or Open	GO to Pinpoint Test C
All other DDM Diagnostic Trouble Codes (DTCs)	-	REFER to: Locks, Latches and Entry Systems (501-14 Handles, Locks, Latches and Entry Systems, Diagnosis and Testing).

DTC Chart: PDM

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.
REFER to: Diagnostic Methods (100-00 General Information, Description and Operation).