General Information

The Bulkhead Module (BHM) is the primary module of the vehicle electrical system, and controls the operation of the other multiplex modules in the system and a variety of other vehicle components either directly or indirectly.

The Bulkhead Module is mounted in an opening on the frontwall slightly below and outboard of the steering column. It has four harness connections on the engine compartment side of the frontwall and three harness connections on the cab side. Connections on the engine side are: the forward chassis harness, the engine harness, and two to the frontwall harnesses. Connections on the cab side include up to three dash harness connectors.

For more information about the vehicle electrical system, see **Section 54.00**, Electrical System.

Bulkhead Module Replacement

Replacement

IMPORTANT: It is normally not necessary to replace the Bulkhead Module. Removing and installing the electronic Bulkhead Module controller should be a last resort to solving electrical problems, unless the unit needs replacing due to physical damage. Follow troubleshooting procedures in this section to help solve electrical problems involving this module before replacing either the Bulkhead Module or Chassis Module. If troubleshooting indicates a malfunction of either module, try reflashing the parameters and the software before replacing the module. Check external wiring. Also see **Section 54.00**, Electrical System, for more information about the vehicle electrical system in general.

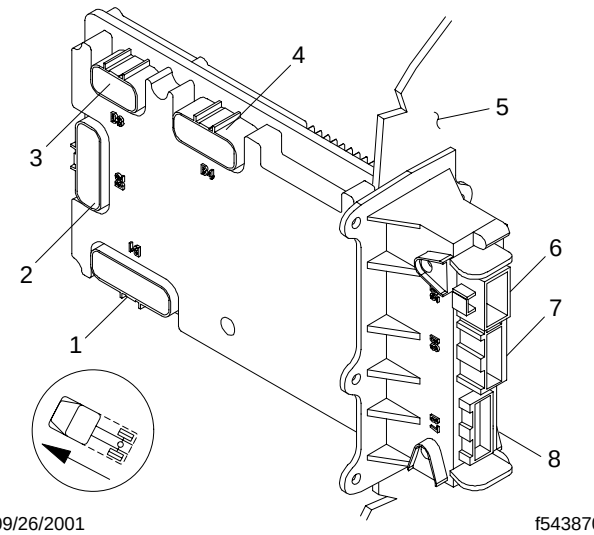
1. Tilt the hood.
2. Disconnect the negative leads from the batteries.

NOTE: The Bulkhead Module is located on the frontwall outboard of the steering column. See **Fig. 1** and **Fig. 2**.

3. Unplug bulkhead harnesses B1–B4 from the engine compartment side of the frontwall.
4. Unplug bulkhead harnesses B5–B7 from the Bulkhead Module on the cab side of the frontwall. See **Fig. 3**.
5. Remove the Torx fasteners securing the Bulkhead Module to the cab side of the frontwall and remove the module by pulling it through the frontwall opening into the cab.

NOTE: Use ServiceLink to flash the Bulkhead Module for loading vehicle specific features.

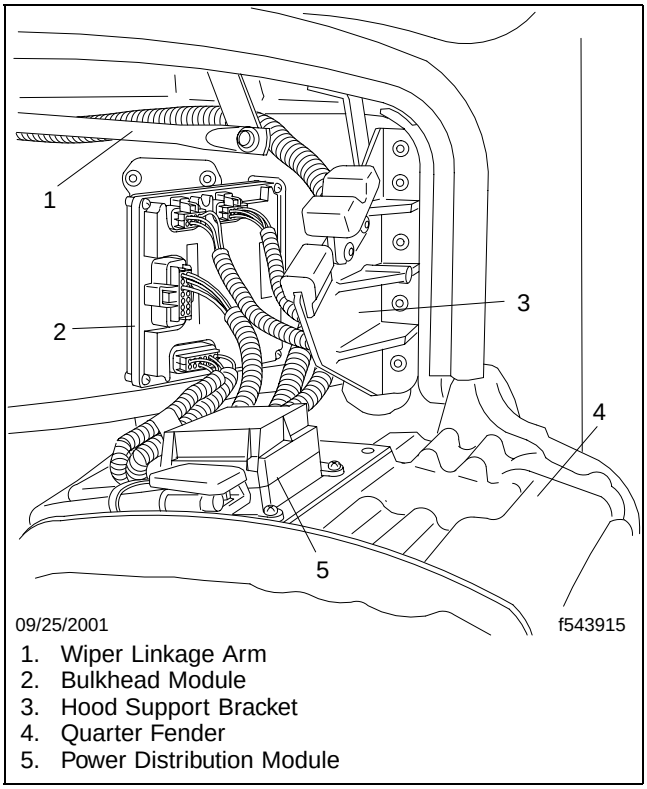
6. Place the Bulkhead Module through the frontwall opening from the cab side, then install and tighten the Torx screws 48 lbf·in (540 N·cm).
7. Plug in bulkhead harnesses B5–B7 to the Bulkhead Module on the cab side of the frontwall.
8. Plug in bulkhead harnesses B1–B4 to the Bulkhead Module on the engine side of the frontwall.
9. Connect the batteries.
10. Verify correct operation of the Bulkhead Module by cycling electrical components.



1. Connection B1, Forward Chassis Harness
2. Connection B2, Engine Harness
3. Connection B3, Frontwall Harness
4. Connection B4, Frontwall Harness
5. Frontwall
6. Connection B5, Dash Harness
7. Connection B6, Dash Harness
8. Connection B7, Dash Harness

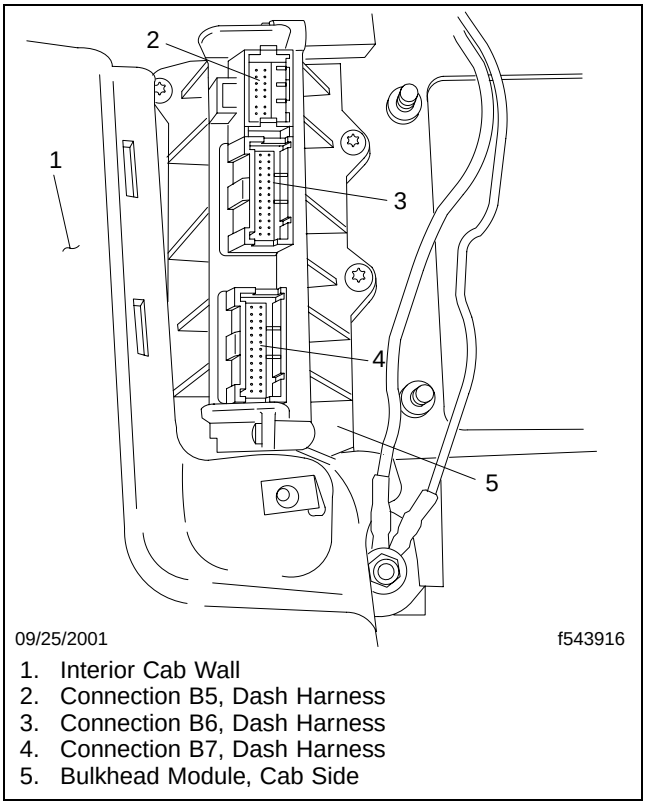
Fig. 1, Bulkhead Module (isometric view)

Bulkhead Module Replacement



1. Wiper Linkage Arm
2. Bulkhead Module
3. Hood Support Bracket
4. Quarter Fender
5. Power Distribution Module

Fig. 2, Bulkhead Module (engine compartment side)



1. Interior Cab Wall
2. Connection B5, Dash Harness
3. Connection B6, Dash Harness
4. Connection B7, Dash Harness
5. Bulkhead Module, Cab Side

Fig. 3, Bulkhead Module (cab side)

Bulkhead Module Troubleshooting

NOTE: The output for the following functions can be controlled by optional software or with the functionality shown in this subject.

When troubleshooting the Bulkhead Module (BHM), use ServiceLink as the diagnostic tool. Verify that the BHM is communicating over both J1708 and J1939 datalinks. Use the instructions below to determine if the BHM is communicating.

1. Park the vehicle, apply the parking brakes, shut down the engine, and chock the front and rear tires.
2. Connect a workshop PC to the diagnostics port on the bus using an approved communication adapter.
3. Open ServiceLink in Online mode.
4. Turn the vehicle ignition switch to the ON position.
5. Click on the Connect button in ServiceLink.
6. Verify that ServiceLink returns the correct vehicle serial number, then click “Continue.”
7. Verify that the BHM appears on the ECU list in ServiceLink. If the BHM is missing or not communicating, it will appear in red on the ServiceLink list. If the BHM is showing up in red, try clicking the “Refresh” button in ServiceLink. If after refreshing ServiceLink the BHM is still missing, check the connections for power, ground, and datalink, and reestablish communication.
8. If the BHM is not communicating (unresponsive) the hazard lights will be flashing, and the head lamps will be turned ON. Thoroughly troubleshoot all power/ground and datalink connections to the BHM. In addition, try disconnecting and reconnecting the batteries.
9. If all connections to the BHM are good, try to flash the BHM using ServiceLink, as follows.
   - 9.1 Click on the BHM icon on the left side screen.
   - 9.2 Click on the "Flashing" tab on the upper portion of the screen.
   - 9.3 Verify that the software version to be flashed is U.r.1.F1.01.00 or higher.
   - 9.4 Click the “Flash Now” button in the dialog box.

     ServiceLink should first return a message saying “The manufacturing block VIN matches the VIN on the host.”

     Click OK.

     ServiceLink will then bring up a message saying “Flashing BHM.”

     Wait until ServiceLink is finished. The next on-screen message should read “Please turn ignition off and on before continuing.” Continue following the prompts from ServiceLink to complete the flash.
10. If ServiceLink cannot flash the BHM due to the bulkhead module being unresponsive, and all wiring checks do not show problems with connections, then the BHM is defective. Replace the bulkhead module.
11. If the BHM is communicating over both J1708 and J1939, then use the descriptions of the C2 features and functions below to determine if the BHM is operating as it should, or to isolate where the problems may exist.

Bulkhead Module Functions

The BHM includes the following functions:

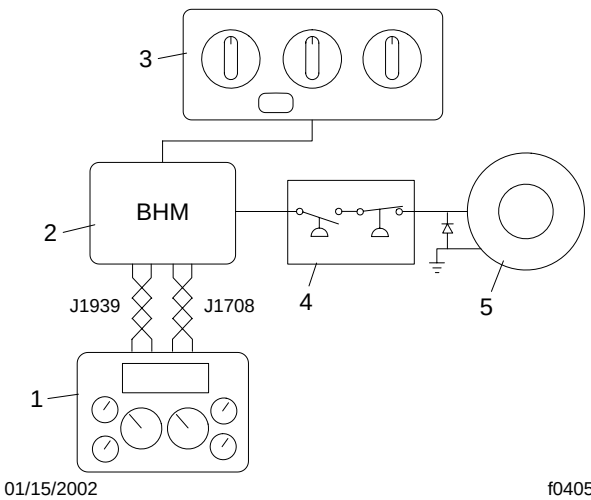
- A/C Clutch Function
- Alternating Charger Function
- Backlighting Function
- Headlight System
- Headlight System — Headlight Switch
- Headlight System — High Beams
- Headlight System — Low Beams
- Horn (Electric)
- Ignition System
- Ignition System — Accessory Power
- Ignition System — Ignition Power Function
- Ignition System — Ignition Switch function
- Starter Relay Signal
- Windshield Wiper/Washer System

- Windshield Wiper/Washer System — Washer Pump Function
- Windshield Wiper/Washer System — Wiper Motor Function

A/C Clutch Function

Description

The HVAC control panel does not directly control the clutch on the A/C compressor. When the driver selects the A/C button and other control conditions are met (see **Group 83** for more information), the control panel sends an A/C clutch request signal to the Bulkhead Module (BHM). Upon receiving this input, the BHM will respond by activating the A/C compressor clutch. See **Fig. 1**. Compressor cycling is handled in the same manner. When the control panel determines that the compressor needs to be cycled, it will send a signal to the BHM. The BHM will react by cycling the compressor. The HVAC control panel contains the logic to prevent the compressor from cycling more than four times per minute.



1. ICU
2. BHM
3. HVAC Control Panel
4. Binary Pressure Switch
5. A/C Compressor Clutch

Fig. 1, A/C Clutch Function

The BHM monitors the A/C compressor clutch wiring and is capable of detecting an open or shorted circuit when the A/C clutch is being driven. Faults discovered by the BHM may be reported on the J1939 and/or J1708 datalinks and may be viewed through ServiceLink.

Input and Output Conditions

Table 1 displays the A/C clutch system inputs to the BHM and how it will react to these inputs.

A/C Clutch Function I/O Conditions		
Inputs to BHM		**Output from BHM**
Ignition Switch	**A/C Clutch Request**	**A/C Clutch**
ON/ACC	ON	Engaged
ON/ACC	OFF	Not Engaged
OFF	ON	Not Engaged

Table 1, A/C Clutch Function I/O Conditions

Fault Conditions

Table 2 displays how the BHM will handle faults that it encounters in the A/C clutch system. The reference parameters that program the BHM determine whether a fault code will be broadcasted. Therefore, even if the BHM detects a fault, a fault code may not be transmitted. If the BHM is programmed to transmit fault codes, they can be viewed through ServiceLink. Fault messages may be transmitted on either or both the J1939 and J1708 datalinks until the ignition switch is OFF.

A/C Clutch Function Fault Conditions	
Description of Fault	**Action Taken by BHM**
Status and or position of the ignition switch is in error	BHM will assume the ignition switch is ON
A/C clutch wiring is shorted or open	BHM may transmit a J1939 and/or a J1708 fault message

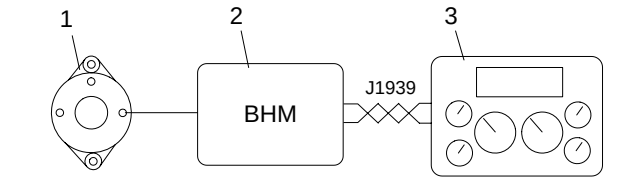
Table 2, A/C Clutch Function Fault Conditions

Alternator Charging Function (optional)

Description

NOTE: Some vehicles will have the alternator "I" terminal hardwired directly to the "No Charge" light on the ICU.

The "No Charge" light on the Instrumentation Control Unit (ICU) is an optional indicator used to alert the operator to the presence of a problem with the alternator. The Bulkhead Module (BHM) will monitor a voltage input from the "I" terminal on the alternator and will send a J1939 message to the ICU to report the status of the alternator. This message is used by the ICU to turn the "No Charge" indicator light on or off. The "No Charge" light on the dash will illuminate if the BHM does not detect voltage at the "I" terminal of the alternator. Once illuminated, the "No Charge" light will remain on until the BHM detects 14 Volts at the alternator "I" terminal. Once off, the "No Charge" light will remain off until the BHM detects 0 Volts at the alternator "I" terminal. See **Fig. 2**.



1. Alternator
2. BHM
3. ICU

Fig. 2, Alternator Charging Function

Input and Output Conditions

Table 3 displays the charging system inputs to the BHM and how it will react to these inputs.

Alternator Charging Function I/O Conditions		
Input to BHM from Alternator "I" Terminal	**Output from BHM via J1939 Message to ICU**	**Output from ICU**
14 Volts	Charge status of J1939 message is HIGH	"No Charge" light is OFF
0 Volts	Charge status of J1939 message is LOW	"No Charge" light is ON

Table 3, Alternator Charging Function I/O Conditions

Backlighting Function

Description

The Backlighting function illuminates the dash display. Backlighting power is provided to the following components: instrument cluster, HVAC control panel, headlight switch, and smart switches.

The backlighting switch is a two-position momentary switch. When the driver pushes the "+" on the top of the switch, a ground path to the Bulkhead Module (BHM) is completed, indicating the driver's desire to increase the panel light backlighting. Upon seeing this ground, the BHM will increase the backlighting voltage to the components. When the driver pushes the "–" on the bottom of the switch, a different pin at the BHM is grounded, indicating the driver's desire to decrease the panel light backlighting. Upon seeing this ground, the BHM will decrease the backlighting voltage to the components. See **Fig. 3**.

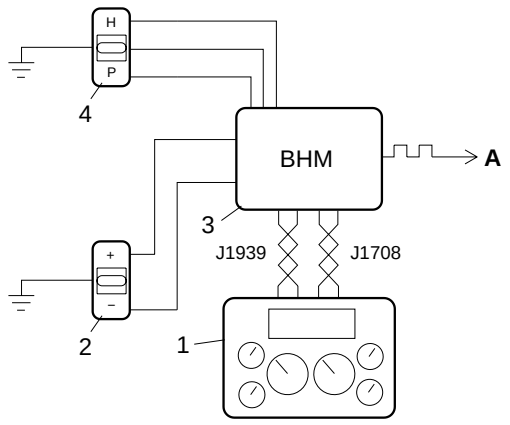
Instead of controlling the level of backlighting illumination with a rheostat, the backlighting functionality in the Saf-T-Liner C2 is controlled by a pulse-width modulated signal (400 Hz) from the BHM. Effective backlighting voltage to the components can be varied between 10% and 90% of battery voltage.

The BHM monitors the backlighting voltage output and is capable of detecting a short circuit when the backlighting output is being driven. Faults discovered by the BHM may be reported on the J1939 and/or J1708 datalinks and may be viewed through Service-Link.

Input and Output Conditions

Table 4 displays how the backlighting system inputs to the BHM and how it will react to these inputs.

Troubleshooting



A. Pulse-width modulated signal to ICU, HVAC control panel, headlight switch, hazard switch, and smart switches.

1. ICU
2. Dimmer Switch
3. BHM
4. Headlight Switch

Fig. 3, Backlighting Function

Backlighting Function I/O Conditions				
Inputs to BHM		**Outputs from BHM**		
Headlight Switch	**Marker Interrupt Switch**	**Backlight Status**	**Illumination**	**% Battery Voltage Output**
ON/PARK	OFF	On	Dependant on dimmer switch position (range dim to bright)	Dependant on dimmer switch position (range 10–90%)
OFF	ON	On	Bright	100%
ON/PARK	ON	Off	Off	0%
OFF	OFF	Off	Off	0%

Table 4, Backlighting Function I/O Conditions

Fault Conditions

Table 5 displays how the BHM will handle faults that it encounters in the backlighting system. The reference parameters that program the BHM determine whether a fault code will be broadcasted. Therefore, even if the BHM detects a fault, a fault code may not be transmitted. If the BHM is programmed to transmit fault codes, they can be viewed through ServiceLink. Fault messages may be transmitted on either or both the J1939 and J1708 datalinks until both the headlight switch and the marker interrupt switch are turned OFF.

Backlighting Function Fault Conditions		
Failed Component or Circuit	**Description of Fault**	**Action Taken by BHM**
Backlight dimmer switch	BHM sees panel light increase and panel light decrease simultaneously	BHM may transmit a J1939 and/or a J1708 fault message
Headlight switch	Headlight switch is in error	BHM will assume the headlight switch is ON
Marker interrupt switch	Marker interrupt switch is in error	BHM will assume the marker interrupt switch is OFF and may transmit a fault message on the J1939 and/or J1708 datalinks
Backlighting power output	Backlighting power wiring is shorted	BHM may transmit a J1939 and/or a J1708 fault message

Table 5, Backlighting Function Fault Conditions

Headlight System

Description

The headlight system is made up of multiple components. The Bulkhead Module (BHM) takes inputs from the multifunction switch via a J1939 message from the Instrumentation Control Unit (ICU) as well as the combination headlight/parking light switch and uses the information to control the headlights. See **Fig. 4**.

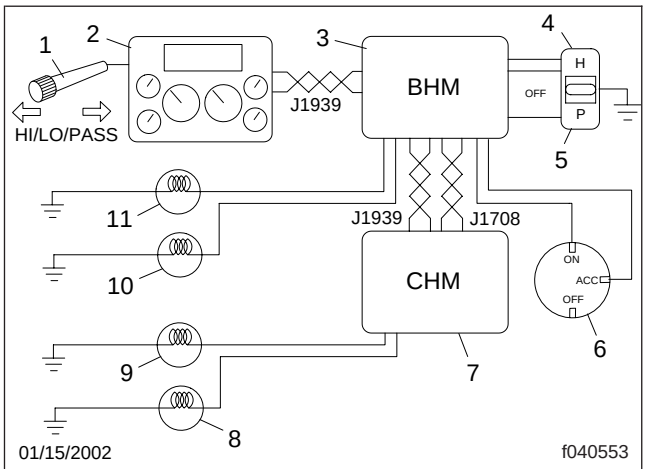
Headlight System, Headlight Switch Function

Description

The headlight switch on the dash has three positions: OFF, PARK (parking lights), and ON (headlights). The Bulkhead Module (BHM) continuously monitors the position of the dash-mounted headlight switch and broadcasts this information on the J1939 datalink.

There are three circuits that run from the headlight switch to the BHM. One is for the parking lights, the other two are for the headlights. Either of the two headlight circuits running from the switch to the BHM can activate the headlights. The double circuits act as a fail-safe and will allow the headlights to work even if one of the two wires is damaged or disconnected. See **Fig. 4**.

The BHM monitors the headlight switch wiring and is capable of detecting error conditions in the headlight switch circuits. Faults discovered by the BHM may be reported on the J1939 and/or J1708 datalinks and may be viewed through ServiceLink.



1. Multifunction Switch
2. ICU
3. BHM
4. Headlight Switch
5. Parking Light Switch
6. Ignition Switch
7. CHM
8. Right-Hand Headlamp, Low Beam
9. Right-Hand Headlamp, High Beam
10. Left-Hand Headlamp, High Beam
11. Left-Hand Headlamp, Low Beam

Fig. 4, Headlight System Function

Input and Output Conditions

Table 6 displays how the BHM will react given the status of the headlight switch.

Headlight (Hdlt) Switch Function I/O Conditions					
Inputs to BHM			Outputs from BHM		
Hdlt Switch Park Circuit	Hdlt Switch On Circuit	Hdlt Switch On 2 Circuit	Hdlt Switch Status	J1939 Hdlt On/Off Message	J1939 Hdlt Park Message
Open	Open	Open	OFF	Off	Off
Closed	Open	Open	PARK	Off	On
Open	Closed	Open	ON	On	On
Open	Open	Closed	ON	On	On
Open	Closed	Closed	ON	On	On
Closed	Open	Closed	ON*	On	On
Closed	Closed	Open	ON*	On	On
Closed	Closed	Closed	ON*	On	On

* These are error conditions. For more information see the Fault Conditions paragraph that follows.

Table 6, Headlight (Hdlt) Switch Function I/O Conditions

Fault Conditions

Table 7 displays headlight switch circuit combinations that will create a fault. In these cases, the BHM assumes the headlight switch status is ON. The reference parameters that program the BHM determine whether a fault code will be broadcasted. Therefore, even if the BHM detects a fault, a fault code may not be transmitted. If the BHM is programmed to transmit fault codes, they can be viewed through ServiceLink. Fault messages may be transmitted on either or both the J1939 and J1708 datalinks until the ignition switch is turned OFF.

Headlight Switch Function Fault Conditions			
Description of Fault			Action Taken by BHM
Headlight Switch Park Circuit	Headlight Switch On Circuit	Headlight Switch On 2 Circuit	
Closed	Closed	Open	BHM may transmit a J1939 and/or a J1708 fault message
Closed	Open	Closed	BHM may transmit a J1939 and/or a J1708 fault message
Closed	Closed	Closed	BHM may transmit a J1939 and/or a J1708 fault message

Table 7, Headlight Switch Function Fault Conditions

Headlight System, High (HI) Beams Function

Description

The Bulkhead Module (BHM) continually monitors the position of the dash-mounted headlight switch and the position of the multifunction switch to determine if the headlights should be on low (LO) beams or high (HI) beams. The Instrumentation Control Unit (ICU) transmits the multifunction switch position information to the BHM via a J1939 message. When the headlight switch is ON, and HI beam or PASS is selected at the multifunction switch, the BHM will activate the left high beam and send a J1939 message to the Chassis Module (CHM) instructing it to activate the right high beam.

The BHM is capable of detecting open and shorted circuits in the left high beam wiring and the right high beam wiring on the CHM. Faults discovered by the BHM may be reported on the J1939 and/or J1708 datalinks and may be viewed through ServiceLink. See **Fig. 4**.

Input and Output Conditions

Table 8 displays the high beam headlight system inputs to the BHM and how it reacts based on these inputs.

Headlight High (HI) Beams Function I/O Conditions				
Inputs to BHM			Outputs from BHM	
Ignition Switch Position	Headlight Switch Position	Multi-function Switch Position	Left HI Beam	Right HI Beam*
ON	ON	HI/PASS	On	On
ON	ON	LO	Off	Off
ON	OFF	HI/PASS	Off	Off
OFF	ON	HI/PASS	Off	Off

* Via J1939 message to the CHM

Table 8, Headlight High (HI) Beams Function I/O Conditions

Fault Conditions

Table 9 displays how the BHM will handle faults it encounters in the high beam headlight system. The reference parameters that program the BHM determine whether a fault code will be broadcasted. Therefore, even if the BHM detects a fault, a fault code may not be transmitted. If the BHM is programmed to transmit fault codes, they can be viewed through ServiceLink. Fault messages may be transmitted on either or both the J1939 and J1708 datalinks until the ignition switch is turned OFF.

Headlight High (HI) Beams Function Fault Conditions	
Description of Fault	**Action Taken by BHM**
Headlight switch is in error	BHM will assume the headlight switch is ON, and may transmit a fault message on the J1939 and/or J1708 datalinks
Position of multifunction switch is unavailable or in error	BHM will assume the multifunction switch position is LO
BHM fails to receive five consecutive J1939 multifunction switch position messages from the ICU	BHM may transmit a J1939 and/or a J1708 fault message
BHM receives a J1939 multifunction switch error message from the ICU	BHM may transmit a J1939 and/or a J1708 fault message
Left HI beam wiring open or shorted	BHM may transmit a J1939 and/or a J1708 fault message
Right HI beam wiring open or shorted	BHM may transmit a J1939 and/or a J1708 fault message

Table 9, Headlight High (HI) Beams Function Fault Conditions

Headlight System, Low (LO) Beams Function

Description

The Bulkhead Module (BHM) continually monitors the position of the dash-mounted headlight switch and the position of the multifunction switch to determine if the headlights should be on low (LO) beams or high (HI) beams. The Instrumentation Control Unit (ICU) transmits the multifunction switch position information to the BHM via a J1939 message. When the headlight switch is ON and LO beam is selected at the multifunction switch, the BHM will activate the left low beam and send a J1939 message to the Chassis Module (CHM) instructing it to activate the right low beam. High beams operate only with the key ON.

NOTE: If the CHM doesn't see J1939 messages from the BHM, the right low beam is activated. If the BHM fails, the left low beam is activated.

The BHM is capable of detecting open and shorted circuits in the left low beam wiring and the right low beam wiring on the CHM. Faults discovered by the BHM may be reported on the J1939 and/or J1708 datalinks and may be viewed through ServiceLink. See **Fig. 4**.

Input and Output Conditions

Table 10 displays the low beam headlight system inputs to the BHM and how it reacts based on these inputs.

Headlight Low (LO) Beams Function I/O Conditions			
Inputs to BHM		**Outputs from BHM**	
Headlamp Switch Position	**Multifunction Switch Position**	**Left LO Beam**	**Right LO BEAM***
ON	LO	On	On
ON	HI/PASS	Off	Off
OFF	HI/PASS	Off	Off

* Via J1939 message to the CHM

Table 10, Headlight Low (LO) Beams Function I/O Conditions

Fault Conditions

Table 11 displays how the BHM will handle faults it encounters in the low beam headlight system. The reference parameters that program the BHM determine whether a fault code will be broadcasted. Therefore, even if the BHM detects a fault, a fault code may not be transmitted. If the BHM is programmed to transmit fault codes, they can be viewed through ServiceLink. Fault messages may be transmitted on either or both the J1939 and J1708 datalinks until the ignition switch is turned OFF.

Headlight Low (LO) Beams Function Fault Conditions	
Description of Fault	**Action Taken by BHM**
Headlight switch is in error	BHM will assume the headlight switch is ON, and may transmit a fault message on the J1939 and/or J1708 datalinks
Position of multifunction switch is unavailable or in error	BHM will assume the multifunction switch position is LO

Headlight Low (LO) Beams Function Fault Conditions	
Description of Fault	**Action Taken by BHM**
BHM fails to receive five consecutive J1939 multifunction switch position messages from the ICU	BHM may transmit a J1939 and/or a J1708 fault message
BHM receives a J1939 multifunction switch error message from the ICU	BHM may transmit a J1939 and/or a J1708 fault message
Left LO beam wiring open or shorted	BHM may transmit a J1939 and/or a J1708 fault message
Right LO beam wiring open or shorted	BHM may transmit a J1939 and/or a J1708 fault message

Table 11, Headlight Low (LO) Beams Function Fault Conditions

Horn (Electric) Function

Description

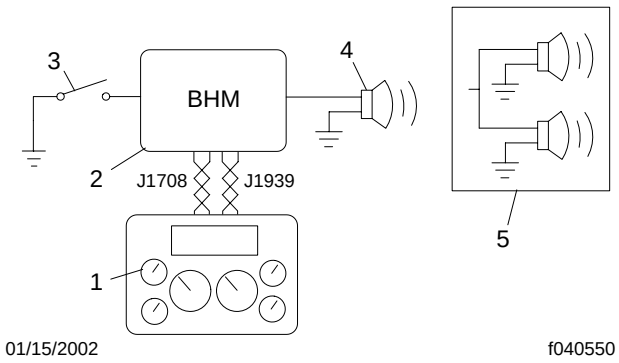
The Bulkhead Module (BHM) controls the horn. A single horn is standard; dual horns are an option. There is no change in functionality between single and dual horns. When the driver activates the horn switch the circuit is completed and grounds the signal line to the BHM. The BHM will activate the horn circuit as long as the signal line is grounded. The BHM is capable of detecting open or short conditions. Faults discovered by the BHM may be reported on the J1939 and/or J1708 datalinks and may be viewed through ServiceLink. See **Fig. 5**.

Input and Output Conditions

Table 12 indicates how the horn should react based on the inputs from the signal line.

Horn (Electric) Function I/O Conditions	
Horn Switch	**Electric Horn**
Pressed	Activate (noise)
Released	Deactivate (silent)

Table 12, Horn (Electric) Function I/O Conditions



1. ICU
2. BHM
3. Horn Switch
4. Horn
5. Dual Horns (optional)

Fig. 5, Horn (Electric) Function

Fault Conditions

Table 13 displays how the BHM will handle faults that it encounters in the electric horn system. The reference parameters that program the BHM determine whether a fault code will be broadcasted. Therefore, even if the BHM detects a fault, a fault code may not be transmitted. If the BHM is programmed to transmit fault codes, they can be viewed through ServiceLink. Fault messages may be transmitted on either or both the J1939 and J1708 datalinks until the horn switch is OFF.

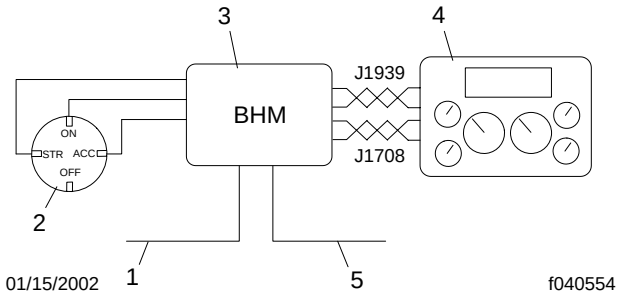
Horn (Electric) Function Fault Conditions	
Description of Fault	**Action Taken by BHM**
Horn output short or open condition	BHM may transmit a J1939 and/or a J1708 fault message

Table 13, Horn (Electric) Function Fault Conditions

Ignition System

Description

The ignition system is made up of multiple components. The Bulkhead Module (BHM) takes input from the ignition switch and uses the information to crank the starter and to supply ignition and accessory power to the vehicle. See **Fig. 6**.



1. Accessory Power (12V+)
2. Ignition Switch
3. BHM
4. ICU
5. Ignition Power (12V+)

Fig. 6, Ignition System Function

Ignition System, Accessory Power Function

Description

The Bulkhead Module (BHM) continuously monitors the position of the ignition switch to determine if the accessory power outputs should be energized. Accessory power is provided to the HVAC control panel and the radio. Separate power feeds are used for each of the accessory outputs.

The BHM is capable of detecting open and shorted circuits in the accessory power outputs. Faults discovered by the BHM will be reported on the J1939 and/or J1708 datalinks and may be viewed through ServiceLink. See **Fig. 6**.

Input and Output Conditions

Table 14 displays the accessory power system inputs to the BHM and how it will react to these inputs.

Accessory Power Function I/O Conditions	
Input to the BHM from the Ignition Switch	**Output from the BHM to the Accessory Power Circuits**
ACC	On
OFF	Off
ON	On
START	Off

Table 14, Accessory Power Function I/O Conditions

Fault Conditions

Table 15 displays how the BHM will handle faults it encounters in the accessory power system. The reference parameters that program the BHM determine whether a fault code will be broadcasted. Therefore, even if the BHM detects a fault, a fault code may not be transmitted. If the BHM is programmed to transmit fault codes, they can be viewed through ServiceLink. Fault messages may be transmitted on either or both the J1939 and J1708 datalinks until the ignition switch is turned OFF.

Accessory Power Function Fault Conditions	
Description of Fault	**Action Taken by BHM**
Ignition switch is in error	BHM will assume the ignition switch is ON, and will transmit a fault message on the J1939 and/or J1708 datalinks
The accessory power output wiring is open or shorted	BHM may transmit a J1939 and/or a J1708 fault message

Table 15, Accessory Power Function Fault Conditions

Ignition System, Ignition Power Function

Description

The Bulkhead Module (BHM) continuously monitors the position of the ignition switch to determine if the ignition power outputs should be energized. Ignition power is provided to the following components: Antilock Brake System Electronic Control Unit (ABS ECU), Instrumentation Control Unit (ICU), engine ECU, transmission ECU, and the Vehicle Control Unit (VCU) if applicable. Separate power feeds are used for each of the ignition outputs.

The BHM is capable of detecting open and shorted circuits in the ignition power outputs. Faults discovered by the BHM may be reported on the J1939 and/or J1708 datalinks and may be viewed through ServiceLink. See **Fig. 6**.

Input and Output Conditions

Table 16 displays the ignition power system inputs to the BHM and how it will react to these inputs.

Ignition Power Function I/O Conditions	
Input to the BHM from the Ignition Switch	**Output from the BHM to the Ignition Power Circuits**
OFF	Off
ACC	Off
ON	On
START	On

Table 16, Ignition Power Function I/O Conditions

Fault Conditions

Table 17 displays how the BHM will handle faults it encounters in the ignition power system. The reference parameters that program the BHM determine whether a fault code will be broadcasted. Therefore, even if the BHM detects a fault, a fault code may not be transmitted. If the BHM is programmed to transmit fault codes, they can be viewed through ServiceLink. Fault messages may be transmitted on either or both the J1939 and J1708 datalinks until the ignition switch is turned OFF.

Ignition Power Function Fault Conditions	
Description of Fault	**Action Taken by BHM**
Ignition switch is in error	BHM will assume the ignition switch is ON, and may transmit a fault message on the J1939 and/or J1708 datalinks
The ignition power output wiring is open or shorted	BHM may transmit a J1939 and/or a J1708 fault message

Table 17, Ignition Power Function Fault Conditions

Ignition System, Ignition Switch Function

Description

The ignition switch has four positions: OFF, ACC, ON, and START. The Bulkhead Module (BHM) continuously monitors the position of the ignition switch and broadcasts this information on the J1939 datalink. There are three circuits that run from the ignition switch to the BHM. One is for the accessory (ACC) position, one is for the ON position, and one is for the START position.

The BHM monitors the ignition switch wiring and is capable of detecting error conditions in the ignition switch circuits. Faults discovered by the BHM may be reported on the J1939 and/or J1708 datalinks and may be viewed through ServiceLink.

Input and Output Conditions

Table 18 displays how the BHM will react given the status of the ignition switch.

Ignition Switch Function I/O Conditions			
Inputs to BHM			**Output from BHM**
Ignition Switch Accessory Circuit	**Ignition Switch On Circuit**	**Ignition Switch Crank Circuit**	**J1939 Ignition Switch Position Message**
Open	Open	Open	OFF
Closed	Open	Open	ACC
Closed	Closed	Open	ON
Open	Closed	Closed	START
Open	Open	Closed	ON*
Closed	Open	Closed	ON*
Open	Closed	Open	ON*

* These are error conditions. For more information see the Fault Conditions paragraph that follows.

Table 18, Ignition Switch Function I/O Conditions

Fault Conditions

Table 19 displays ignition switch circuit conditions that will create a fault. The reference parameters that program the BHM determine whether a fault code will be broadcasted. Therefore, even if the BHM detects a fault, a fault code may not be transmitted. If the BHM is programmed to transmit fault codes, they can be viewed through ServiceLink. Fault messages may be transmitted on either or both the J1939 and J1708 datalinks until a valid ignition switch status is detected.

Ignition Switch Function Fault Conditions			
Description of Fault			Action Taken by BHM
Ignition Switch Accessory Circuit	Ignition Switch On Circuit	Ignition Switch Crank Circuit	
Open	Open	Closed	BHM will transmit a J1939 and/or a J1708 fault message
Closed	Open	Closed	BHM will transmit a J1939 and/or a J1708 fault message
Open	Closed	Open	BHM will transmit a J1939 and/or a J1708 fault message

Table 19, Ignition Switch Function Fault Conditions

Windshield Wiper/Washer System

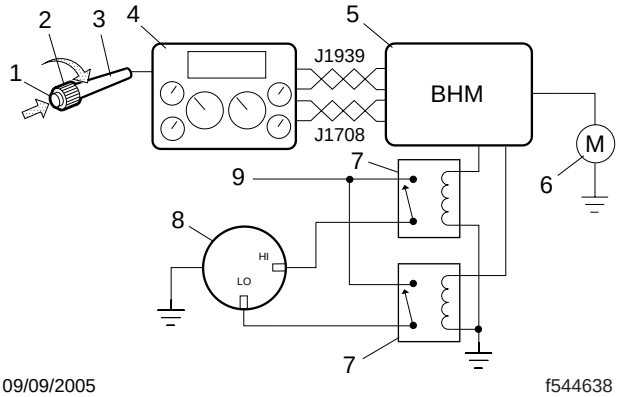
Description

The Windshield Wiper/Washer System is made up of multiple components. The Instrumentation Control Unit (ICU) monitors input information regarding windshield wiper and washer switch positions from the multifunction switch and sends this information via J1939 messages to the Bulkhead Module (BHM). The BHM takes these messages from the ICU and uses the information to control the windshield wiper motor and the washer pump motor. See **Fig. 7**.

Windshield Wiper/Washer System, Washer Pump Function

Description

The Instrumentation Control Unit (ICU) constantly monitors input information from the multifunction switch regarding windshield washer switch position and sends this information via J1939 messages to



1. Washer Switch
2. Wiper Switch
3. Multifunction Switch
4. ICU
5. BHM
6. Washer Pump Motor
7. Relay
8. Wiper Motor
9. Battery

Fig. 7, Windshield Wiper/Washer System Function

the Bulkhead Module (BHM). The BHM takes these messages from the ICU and uses the information to control the windshield washer pump motor. Under normal operating conditions, when the washer pump is activated the ICU also sends a wiper low command.

The BHM monitors the washer pump motor wiring and is capable of detecting open or shorted circuits. Faults discovered by the BHM may be reported on the J1939 and/or J1708 datalinks and may be viewed through ServiceLink. See **Fig. 7**.

Fault Conditions

Table 20 displays how the BHM will handle faults that it encounters in the washer pump system. The reference parameters that program the BHM determine whether a fault code will be broadcasted. Therefore, even if the BHM detects a fault, a fault code may not be transmitted. If the BHM is programmed to transmit fault codes, they can be viewed through ServiceLink. Fault messages may be transmitted on either or both the J1939 and J1708 datalinks until the ignition switch is turned OFF.

Windshield Wiper/Washer System, Washer Pump Function Fault Conditions	
Description of Fault	**Action Taken by BHM**
J1939 washer pump message from the ICU is unavailable or in error	BHM assumes J1939 washer pump message is OFF
ICU sends an error indicator in the J1939 washer pump message to the BHM	BHM may transmit a J1939 and/or a J1708 fault message
BHM fails to receive five consecutive J1939 washer pump messages from the ICU	BHM may transmit a J1939 and/or a J1708 fault message
Washer pump motor wiring shorted or open	BHM may transmit a J1939 and/or a J1708 fault message

Table 20, Windshield Wiper/Washer System, Washer Pump Function Fault Conditions

Windshield Wiper/Washer System, Wiper Motor Function

Description

The Instrumentation Control Unit (ICU) constantly monitors input information from the multifunction switch regarding windshield wiper switch position and sends this information via J1939 messages to the Bulkhead Module (BHM). The BHM takes these messages from the ICU and uses the information to control the windshield wiper motor.

The BHM monitors the wiper motor wiring and is capable of detecting open or shorted circuits. Faults discovered by the BHM may be reported on the J1939 and/or J1708 datalinks and may be viewed through ServiceLink. See **Fig. 7**.

Input and Output Conditions

The wiper motor has a low speed, a high speed, and five intermittent speeds. The BHM controls the wiper motor speed by monitoring three J1939 messages that it receives from the ICU and acting accordingly. The three messages are: J1939 wiper on/off message, J1939 wiper low message, and J1939 wiper high message. When one of the intermittent speeds is selected at the multifunction switch, the ICU controls the timing of the wipers by pulsing the J1939 wiper on/off and J1939 wiper low messages.

Table 21 displays the multifunction switch inputs to the ICU and the J1939 message outputs.

Table 22 displays the wiper motor system inputs to the BHM and how it will react to these inputs.

Windshield Wiper/Washer System, Multifunction Switch I/O Conditions				
Inputs to ICU		**Outputs from ICU**		
Multifunction Switch Position	**Wiper Operation Timing**	**J1939 Wiper On/Off Message**	**J1939 Wiper Low Message**	**J1939 Wiper High Message**
OFF	Wiper Off	Off	Off	Off
Intermittent 1	Wipe every 17 seconds	Pulsed on	Pulsed on	Off
Intermittent 2	Wipe every 12 seconds	Pulsed on	Pulsed on	Off
Intermittent 3	Wipe every 8 seconds	Pulsed on	Pulsed on	Off
Intermittent 4	Wipe every 5 seconds	Pulsed on	Pulsed on	Off
Intermittent 5	Wipe every 3 seconds	Pulsed on	Pulsed on	Off
LOW	Wiper low speed	On	On	Off
HIGH	Wiper high speed	On	Off	On

Table 21, Windshield Wiper/Washer System, Multifunction Switch I/O Conditions

Windshield Wiper/Washer System, Wiper Motor System I/O Conditions				
Inputs to BHM				Output from BHM
Ignition Switch Position	J1939 Wiper On/Off Message	J1939 Wiper Low Message	J1939 Wiper High Message	Wiper Motor Speed
START/OFF	On/Off	On/Off	On/Off	Off
ON/ACC	Off	Off	Off	Off
ON/ACC	On	On	Off	Low
ON/ACC	Off	On	Off	Low*
ON/ACC	On	Off	Off	Low*
ON/ACC	On	Off	On	High
ON/ACC	On	On	On	High*
ON/ACC	Off	On	On	High*
ON/ACC	Off	Off	On	High*

* This is an error condition. See the Fault Conditions paragraph for more information.

Table 22, Windshield Wiper/Washer System, Wiper Motor System I/O Conditions

Fault Conditions

Table 23 displays multifunction switch combinations that will create a fault. The reference parameters that program the BHM determine whether a fault code will be broadcasted. Therefore, even if the BHM detects a fault, a fault code may not be transmitted. If the BHM is programmed to transmit fault codes, they can be viewed through ServiceLink. Fault messages may be transmitted on either or both the J1939 and J1708 datalinks.

Table 24 displays how the BHM will handle any other faults that it encounters in the wiper motor system. The reference parameters that program the BHM determine whether a fault code will be broadcasted. Therefore, even if the BHM detects a fault, a fault code may not be transmitted. If the BHM is programmed to transmit fault codes, they can be viewed through ServiceLink. Fault messages may be transmitted on either or both the J1939 and J1708 datalinks.

Windshield Wiper/Washer System, Wiper Motor System Multifunction Switch Fault Conditions			
Description of Multifunction Switch Fault			Action Taken by BHM
J1939 Wiper On/Off Message	J1939 Wiper Low Message	J1939 Wiper High Message	
Off	On	Off	BHM may transmit a J1939 and/or a J1708 fault message
On	Off	Off	BHM may transmit a J1939 and/or a J1708 fault message
On	On	On	BHM may transmit a J1939 and/or a J1708 fault message
Off	On	On	BHM may transmit a J1939 and/or a J1708 fault message
Off	Off	On	BHM may transmit a J1939 and/or a J1708 fault message

Table 23, Windshield Wiper/Washer System, Wiper Motor System Multifunction Switch Fault Conditions

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Windshield Wiper/Washer System, Other Wiper Motor Fault Conditions	
Description of Fault	**Action Taken by BHM**
Ignition switch is in error	BHM will assume the ignition switch is ON, and may transmit a fault message on the J1939 and/or J1708 datalinks
Wiper commutator switch is unavailable or in error	BHM will assume the wiper commutator switch is in PARK
J1939 wiper on/off message from the ICU is unavailable or in error	BHM may transmit a J1939 and/or a J1708 fault message
J1939 wiper low message from the ICU is unavailable or in error	BHM may transmit a J1939 and/or a J1708 fault message
J1939 wiper high message from the ICU is unavailable or in error	BHM may transmit a J1939 and/or a J1708 fault message
Contradictory J1939 messaging between the ICU and BHM	BHM may transmit a J1939 and/or a J1708 fault message
ICU sends an error indicator in any of the J1939 wiper messages to the BHM	BHM may transmit a J1939 and/or a J1708 fault message
BHM fails to receive any five consecutive J1939 wiper messages from the ICU	BHM may transmit a J1939 and/or a J1708 fault message
Wiper motor wiring open or shorted	BHM may transmit a J1939 and/or a J1708 fault message

Table 24, Windshield Wiper/Washer System, Other Wiper Motor Fault Conditions

Features and Options

The outputs for the following features can be controlled by software parameters, sensory inputs, manually controlled switch, or a combination of these. Read the descriptions for the various features and options below to help determine if a system is operating correctly.

- Air Horn
- Back-Up Alarm
- Body Taillights
- Crossing Arm Deactivation
- Daytime Running Lights
- Defroster Fans
- Destination Sign
- Directional/Hazard Lights
- Driver's Dome
- Escape Hatch
- Heaters
- Heated Mirrors
- Heater Booster Pump
- ID/Marker Lights
- Left-Side Emergency Door
- Light Monitor
- Noise Suppression
- Passenger A/C System
- Passenger Dome Light
- Reading Lights
- Rear Emergency Door
- Reverse Lights
- Right-Side Electric Entrance Door
- Service Brake
- Speakers
- Step Tread Heated Mat
- Stepwell Lights
- Storage Compartment
- Switch Panel Backlighting
- Vandalock
- Video Camera
- Warning System (four lights)
- Warning System (eight lights)

- Warning System Emergency Switch
- Wheelchair Lift System
- Window Sash Warning

Air Horn

The air horn(s) is used to supplement the standard vehicle horn, and is enabled whenever the key switch is in the RUN or ACC (accessory) position. The air horn(s) is activated by a momentary rocker switch (off/momentary) located in the switch panel. The air horn output can be controlled by optional software in addition to the functionality described here. See **Table 25** for air horn inputs, and **Table 26** for air horn outputs.

Back-Up Alarm

Activation of the backup lights/alarm is different depending on the transmission type. A manual transmission uses a standard switch to tell the BHM when the transmission is in reverse. Automatic transmissions will send a J1939 message to the BHM when they are placed into reverse gear. Described below is the standard automatic transmission.

The back-up alarm enables whenever the ignition switch is in the ON position and activates when the transmission selector is in reverse.

The back-up alarm produces an intermittent beeping sound until the transmission selector is no longer in reverse or there is no ignition power. See **Table 27** for back-up alarm inputs, and **Table 28** for back-up alarm outputs.

Body Taillights

The body taillights output is activated when the park/headlamp switch is in the park lamp or headlamp position. See **Table 29** for body taillight inputs, and **Table 30** for body taillight outputs.

Crossing Arm Deactivation

The crossing arm deactivation function is used in conjunction with any existing four or eight light warning system. The momentary crossing arm deactivation switch (off/momentary) deactivates the crossing arm, and the crossing arm is suspended until the red warning lights are deactivated. The crossing arm is not capable of being reactivated until the next warning light sequence. See **Table 31** for crossing arm deactivation inputs, and **Table 32** for crossing arm deactivation outputs.

NOTE: The SSID for this function is 293.

Air Horn Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Air Horn Switch	Rocker smart switch	Activates the air horn circuit	N/A	N/A	N/A
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
IGN	Vehicle ignition switch in the RUN position	Notifies the controller that the ignition switch is in the RUN position	BHM	B6	A3

Table 25, Air Horn Inputs

Air Horn Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Air Horn	Activates the air horn solenoid	CHM/EXM	Floats	—

Table 26, Air Horn Outputs

Troubleshooting

Back-Up Alarm Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Transmission in Reverse	Parameter on datalink: Vehicle transmission in reverse gear	Parameter used to notify the controller that the vehicle transmission is in reverse gear	—	—	—
Ignition	Vehicle ignition switch	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 27, Back-Up Alarm Inputs

Back-Up Alarm Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Backup Alarm	Body backup alarm output	CHM	C5	J

Table 28, Back-Up Alarm Outputs

Body Taillights Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Park Lamps	Parameter on datalink: Vehicle park lamps	Parameter used to notify the controller that the park lamp circuit is active	BHM	B6	B9
Headlamps	Parameter on datalink: Vehicle headlamps	Parameter used to notify the controller that the headlamp circuit is active	BHM	B6	B10

Table 29, Body Taillights Inputs

Body Taillights Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Lower Left Tail Lamp	Body lower left tail lamp outputs	SHM	J2	E
Upper Left Tail Lamp	Body upper left tail lamp outputs	SHM	J3	F
Lower Right Tail Lamp	Body lower right tail lamp outputs	SHM	J2	F
Upper Right Tail Lamp	Body upper right tail lamp outputs	SHM	J3	K

Table 30, Body Taillights Outputs

Crossing Arm Deactivation Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Crossing Arm Switch	Rocker smart switch	Deactivates the crossing arm relay	N/A	N/A	N/A

Crossing Arm Deactivation Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Red Warning Lights	Parameter on datalink	Parameter that signals the controller that the red warning light flash sequence is currently engaged	N/A	N/A	N/A

Table 31, Crossing Arm Deactivation Inputs

Crossing Arm Deactivation Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Crossing Arm Relay	Crossing arm output	CHM	C5	M
Crossing Arm Indicator Switch	Crossing arm indicator on smart switch	SHM/8SB/SEM	Floats	N/A

Table 32, Crossing Arm Deactivation Outputs

Daytime Running Lights

The daytime running lights (DRL) are enabled when the ignition switch is in the RUN position, the headlamps are turned OFF, and the park brake is disengaged. See **Table 33** for daytime running light inputs, and **Table 34** for daytime running light outputs.

NOTE: Daytime running lights may have many different configurations.

Defroster Fans

Windshield Defroster Fan

The windshield defroster fan is located along the windshield header. It is a 2-speed fan, and is enabled whenever the ignition switch is in the RUN or ACC position. The windshield defroster rocker switch is a smart switch that activates and controls the fan motor speed, either low or high. See **Table 35** for windshield defroster fan inputs, and **Table 36** for windshield defroster fan outputs.

NOTE: The SSID for this function is 279.

Left Side Defroster Fan

The left side defroster fan is located along the driver's window header. It is also a 2-speed fan, and is enabled whenever the ignition switch is in the RUN or ACC position. The left side defroster rocker switch is a smart switch that activates and controls the fan motor speed, either low or high. See **Table 37** for left side defroster fan inputs, and **Table 38** for left side defroster fan outputs.

NOTE: Use the Expansion Module Configuration screens in ServiceLink for the most accurate vehicle specific circuit information. Multiple expansion modules are possible on the Saf-T-Liner C2, and these circuits may vary depending on vehicle specific configurations.

The SSID for this function is 328.

Destination Sign

The destination sign is located on the front and/or the rear hood of the bus body, and is enabled whenever the key switch is in the RUN or ACC position. The destination sign switch (off/on) activates both sign locations. The destination sign output can be controlled by optional software in addition to the functionality described here. See **Table 39** for destination sign inputs, and **Table 40** for destination sign outputs.

NOTE: The SSID for this function is 282.

Directional/Hazard Lights

Hazard lights are enabled regardless of the ignition switch position, and activate with the hazard switch located on the stalk switch. The rear and side hazard

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lights flash in sequence with the front and fender hazard lights.

The directional signals are enabled whenever the ignition switch is in the RUN or ACC position, and activate with the stalk (turn signal) switch. See **Table 41** for directional/hazard lights inputs, and **Table 42** for directional/hazard lights outputs.

Daytime Running Light Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3
Headlamp Switch	Standard switch	Controls the headlamp operation	BHM	B6	B9 B10 B11
Park Brake	Standard pin switch	Notifies the controller if the park brake is set	CHM	C3	F

Table 33, Daytime Running Light Inputs

Daytime Running Light Outputs				
Outputs	**Function**	**Module**	**Connector**	**Pin**
Headlights — Left Low Beam	Front left low beams output	BHM	B1	R
Headlights — Right Low Beam	Front right low beams output	CHM	C3	L

Table 34, Daytime Running Light Outputs

Windshield Defroster Fan Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Windshield Defroster Fan Switch	Rocker smart switch	Activates the 2-speed windshield defroster fan	N/A	N/A	N/A
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 35, Windshield Defroster Fan Inputs

Windshield Defroster Fan Outputs				
Outputs	**Function**	**Module**	**Connector**	**Pin**
Fan Low	Provide power to the windshield defroster fan low circuit relay	CHM	C5	L

Windshield Defroster Fan Outputs				
Outputs	**Function**	**Module**	**Connector**	**Pin**
Fan High	Provide power to the windshield defroster fan high circuit relay	CHM	C2	A

Table 36, Windshield Defroster Fan Outputs

Left Side Defroster Fan Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Left Side Defroster Fan Switch	Rocker smart switch	Activates the 2-speed left side defroster fan	N/A	N/A	N/A
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 37, Left Side Defroster Fan Inputs

Left Side Defroster Fan Outputs				
Outputs	**Function**	**Module**	**Connector**	**Pin**
Fan Low	Provide power to the left side defroster fan low circuit	EXM	C2	A
Fan High	Provide power to the left side defroster fan high circuit	EXM	C1, C2, C3	P, E, R

Table 38, Left Side Defroster Fan Outputs

Destination Sign Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Destination Sign Switch	Rocker smart switch	Activates front/rear destination signs	N/A	N/A	N/A
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 39, Destination Sign Inputs

Destination Sign Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Destination Sign	Illuminate the front/rear destination signs smart switch	EXM	C3	C, D

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Destination Sign Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Destination Indicator Switch	Smart switch destination sign indicator	SHM/8SB/SEM	Floats	N/A

Table 40, Destination Sign Outputs

Directional/Hazard Lights Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Stalk Switch Left Turn Signal	Turn signal switch	Operates the left turn signal	N/A	N/A	N/A
Stalk Switch Right Turn Signal	Turn signal switch	Operates the right turn signal	N/A	N/A	N/A
Stalk Switch Hazard Signal	2-Position hazard signal switch	Operates the hazard signal	BHM	B6	B8
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 41, Directional/Hazard Lights Inputs

Directional/Hazard Lights Outputs				
Outputs	**Function**	**Module**	**Connector**	**Pin**
Left Side Turn Lights	Body left side turn light output	CHM	C1, C2, C3	G, H, N
Right Side Turn Lights	Body right side turn light output	CHM	C1, C2, C3	P, E, R
Left Rear Turn Lights	Body left rear turn light output	BHM	B5	E
Right Rear Turn Lights	Body right rear turn light output	BHM	B5	G
Left Front Turn	Body left front turn light output	CHM	C4	F
Right Front Turn	Body right front turn light output	CHM	C3	K

Table 42, Directional/Hazard Lights Outputs

Driver's Dome

The driver's dome lamp is enabled whenever the ignition switch is in the RUN or ACC position, and is activated when the driver's dome light rocker switch (smart switch) is turned to RUN. See **Table 43** for driver's dome inputs, and **Table 44** for driver's dome outputs.

NOTE: The SSID for this function is 275.

Emergency Warning Switch

The momentary emergency warning switch will manually activate the red or outboard warning lights, and activates the step lights and crossing arm. The emergency warning operation is deactivated once the momentary switch is released. The emergency warning operation is battery enabled and functions independently of the installed warning system. See **Table 45** for emergency warning switch inputs, and **Table 46** for emergency warning switch outputs.

NOTE: The SSID for this function is 306.

Escape Hatch

The escape hatch is enabled whenever the ignition switch is in the RUN or ACC position, and the panel buzzer will activate when the emergency escape hatch is opened. See **Table 47** for emergency escape hatch buzzer inputs, and **Table 48** for emergency escape hatch buzzer outputs.

Heated Mirrors

The heated mirrors are enabled whenever the ignition switch is in the RUN or ACC position, and is activated by the heated mirror smart switch. See **Table 49** for heated mirror inputs, and **Table 50** for heated mirror outputs.

NOTE: The SSID for this function is 289.

Driver's Dome Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Driver's Dome Light Switch	Rocker smart switch	Activates/Deactivates the driver's dome lamp circuit	N/A	N/A	N/A
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the RUN position	Notifies the controller that the ignition switch is in the RUN position	BHM	B6	A3

Table 43, Driver's Dome Inputs

Driver's Dome Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Driver's Dome Light	Driver's dome lamp circuit	BHM	B5	B

Table 44, Driver's Dome Outputs

Emergency Warning Switch Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Emergency Warning Switch	Rocker smart switch (off/ momentary)	Activates red warning light sequence	N/A	N/A	N/A

Table 45, Emergency Warning Switch Inputs

Troubleshooting

Emergency Warning Switch Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Left Front Red Warning Light	1. Conditional operation based on warning system input parameters defined in individual warning light system software documents 2. Adjustable flash rate (constant on or flashing from 0.5 to 10 Hz in incremental steps of 0.5 Hz, variable duty cycle) 3. Alternately flashes with right front red warning light at 1 to 2 Hz 4. Must be configured to flash simultaneously with right rear red warning light	SHM	P2	M
Left Rear Red Warning Light	1. Conditional operation based on warning system input parameters 2. Adjustable flash rate (constant on or flashing from 0.5 to 10 Hz in incremental steps of 0.5 Hz, variable duty cycle) 3. Alternately flashes with right rear red warning light at 1 to 2 Hz 4. Must be configured to flash simultaneously with right front red warning light	SHM	P2	K
Right Front Red Warning Light	1. Conditional operation based on warning system input parameters 2. Adjustable flash rate (constant on or flashing from 0.5 to 10 Hz in incremental steps of 0.5 Hz, variable duty cycle) 3. Alternately flashes with left front red warning light at 1 to 2 Hz 4. Must be configured to flash simultaneously with left rear red warning light	SHM	P1	M

Emergency Warning Switch Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Right Rear Red Warning Light	1. Conditional operation based on warning system input parameters 2. Adjustable flash rate (constant on or flashing from 0.5 to 10 Hz in incremental steps of 0.5 Hz, variable duty cycle) 3. Alternately flashes with left rear red warning light at 1 to 2 Hz 4. Must be configured to flash simultaneously with left front red warning light	SHM	P1	L
Emergency Indicator Switch	Smart switch SW emergency warning indicator circuit	SHM/8SB/SEM	Floats	N/A

Table 46, Emergency Warning Switch Outputs

Emergency Escape Hatch Buzzer Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Body Switch	Body momentary switch located on the emergency escape hatch assembly	Switch passes the GND signal to electronic components when closed	SHM	P2	G
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 47, Emergency Escape Hatch Buzzer Inputs

Emergency Escape Hatch Buzzer Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Panel Buzzer	Switch panel buzzer 1 output	SHM	P1	D

Table 48, Emergency Escape Hatch Buzzer Outputs

Heated Mirror Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Heated Mirror Switch	Rocker smart switch	Activates/Deactivates the heated mirror circuit	N/A	N/A	N/A
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1

Heated Mirror Inputs					
Input	Type	Function	Mux Device	Connector	Pin
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 49, Heated Mirror Inputs

Heated Mirror Outputs				
Output	Function	Module	Connector	Pin
Heated Mirror	Provide power to the mirror heater	EXM	C3	A
Heated Mirror Switch Indicator	Smart switch indicator circuit	N/A	Floats	N/A

Table 50, Heated Mirror Outputs

Heater Booster Pump

The heater booster pump provides a more efficient circulation of engine coolant to the rear of buses with passenger heater systems. It is enabled whenever the ignition switch is in the RUN or ACC position. The heater pump switch activates the heater booster pump. See **Table 51** for heater booster pump inputs, and **Table 52** for heater booster pump outputs.

NOTE: The SSID for this function is 284.

Heaters

Stepwell Heater

The stepwell heater fan is a 2-speed fan located in the heater assembly. It is enabled whenever the ignition switch is in the RUN or ACC position. The stepwell heater fan switch activates and controls the speed of the stepwell heater fan. See **Table 53** for stepwell heater fan inputs, and **Table 54** for stepwell heater fan outputs.

NOTE: The SSID for this function is 325.

Rear Heater Fan

The rear heater fan is a 2-speed fan located in the heater assembly. It is enabled whenever the ignition switch is in the RUN or ACC position, and is controlled by the rear heater smart switch. See **Table 55** for rear heater fan inputs, and **Table 56** for rear heater fan outputs.

NOTE: The SSID for this function is 292.

Left Side Aft Heater Fan

The left side aft heater is a 2-speed fan located in the heater assembly. It is enabled whenever the ignition switch is in the RUN or ACC position, and is activated by the aft heater switch. See **Table 57** for left side aft heater fan inputs, and **Table 58** for left side aft heater fan outputs.

NOTE: The SSID for this function is 291.

Left Side Forward Heater Fan

The left side forward heater fan is a 2-speed fan located in the heater assembly. It is enabled whenever the ignition switch is in the RUN or ACC position, and is activated and controlled by the left side forward heater fan switch. See **Table 59** for left side forward heater fan inputs, and **Table 60** for left side forward heater fan outputs.

NOTE: The SSID for this function is 290.

ID/Marker Lights

The ID and marker lights activate with the vehicle park lamp circuit. See **Table 61** for ID/marker lights inputs, and **Table 62** for ID/marker lights outputs.

Heater Booster Pump Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Heater Booster Pump Switch	Rocker smart switch	Activates/Deactivates the heater booster pump circuit	N/A	N/A	N/A
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 51, Heater Booster Pump Inputs

Heater Booster Pump Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Heater Booster	Heater booster pump circuit	BHM	C1C	K
Switch Indicator Light	Smart switch indicator light circuit	N/A	Floats	N/A

Table 52, Heater Booster Pump Outputs

Stepwell Heater Fan Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Step Well Heater Fan Switch	Rocker smart switch	Activates/Deactivates the step fan (High/Low)	N/A	N/A	N/A
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 53, Stepwell Heater Fan Inputs

Stepwell Heater Fan Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Stepwell Heater Fan Low	Provides power to the stepwell heater fan low speed relay circuit	EXM	C5	H
Stepwell Heater Fan High	Provides power to the stepwell heater fan high speed relay circuit	EXM	C5	J

Table 54, Stepwell Heater Fan Outputs

Troubleshooting

Rear Heater Fan Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Rear Heater Fan	Rocker smart switch	Activates/Deactivates the rear fan (High/Low)	N/A	N/A	N/A
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 55, Rear Heater Fan Inputs

Rear Heater Fan Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Rear Heater Fan Low	Provides power to the rear heater fan low relay circuit	EXM	C5	L
Rear Heater Fan High	Provides power to the rear heater fan high relay circuit	EXM	C5	M

Table 56, Rear Heater Fan Outputs

Left Side Aft Heater Fan Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Left Side Aft Heater Switch	Rocker smart switch	Activates/Deactivates the aft heater fan (High/Low)	N/A	N/A	N/A
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 57, Left Side Aft Heater Fan Inputs

Left Side Aft Heater Fan Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Left Aft Heater Low	Provides power to the left side aft heater fan low relay circuit	SHM	P3	D
Left Aft Heater High	Provides power to the left side aft heater fan high relay circuit	SHM	P3	L

Table 58, Left Side Aft Heater Fan Outputs

Left Side Forward Heater Fan Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Left Forward Heater Fan Switch	Rocker smart switch	Activates/Deactivates the left forward heater fan (High/Low)	N/A	N/A	N/A
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 59, Left Side Forward Heater Fan Inputs

Left Side Forward Heater Fan Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Left Forward Heater Low	Provides power to the left side forward heater fan low relay circuit	SHM	P2	A
Left Forward Heater High	Provides power to the left side forward heater fan high relay circuit	SHM	P2	B

Table 60, Left Side Forward Heater Fan Outputs

ID/Marker Lights Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Park Lamps	Parameter on datalink: Vehicle park lamps	Parameter used to notify the controller that the park lamp circuit is active	BHM	B6	B9
Headlamps	Parameter on datalink: Vehicle headlamps	Parameter used to notify the controller that the headlamp circuit is active	BHM	B6	B10

Table 61, ID/Marker Lights Inputs

ID/Marker Lights Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
ID Lights	Body ID light output	EXM	C1	A, H, J
ID/Marker Lights	Body marker light output	BHM	B5	F

Table 62, ID/Marker Lights Outputs

Left-Side Emergency Door

The left-side emergency door is enabled whenever the key switch is in the RUN or ACC positions. There are several configurations of this feature, depending on what parameters the bulkhead module is programmed to use. The panel buzzer and the left-side door buzzer will sound when the system is enabled, and the left-side door latch is opened. The panel buzzer and the left-side door buzzer will deactivate when the left-side door latch is closed. See **Table 63** for left-side emergency door inputs, and **Table 64** for left-side emergency door outputs.

Light Monitor

The light monitor is a visual “bulb-out” detection device, and is enabled whenever the ignition switch is in the RUN, ACC, or START position. See **Fig. 8**. The bulb display light emitting diodes (LEDs) illuminate whenever corresponding outputs are active, but will not illuminate if the corresponding monitored outputs are in fault condition. In other words, if the lights being monitored are not working correctly, the light monitor will show that the corresponding lights on the display are also not working.

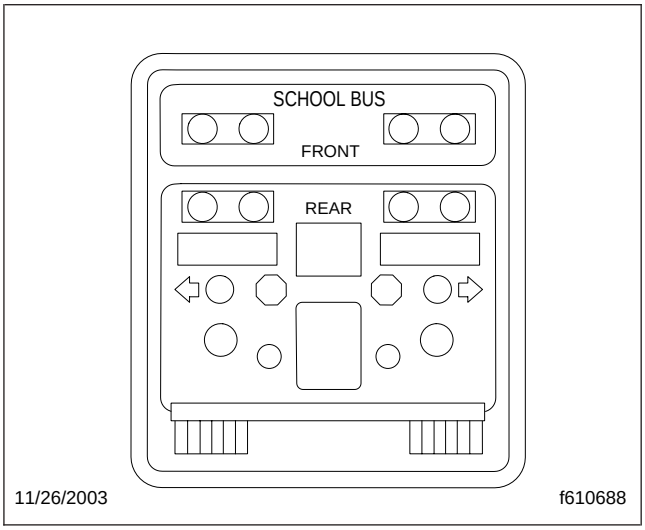


Fig. 8, Light Monitor

Any display head LED indictor representing two lamps (i.e. upper and lower BRAKE, TAIL, and REVERSE) should flash at approximately 2 Hz, with 50 percent duty cycle if either of the two lamps monitored is considered in fault condition. If both lamps are considered in FAULT, the corresponding LED will not operate.

The LED indicator circuit will only operate (either flashing or steady burn) if the monitored circuit is active. See **Table 65** for light monitor inputs, and **Table 66** for light monitor outputs.

Noise Suppression

The noise suppression feature is a single feature that deactivates all noise producing equipment in the vehicle body. It enables whenever the key switch is in the RUN or ACC position.

There are two types of smart switches used for this feature; momentary noise suppression switch and (off/on) noise suppression switch. Both functions are the same but are mutually exclusive and only one switch is required. See **Table 67** for noise suppression inputs, and **Table 68** for noise suppression outputs.

NOTE: The SSID for this function is 294.

Passenger A/C System

The passenger A/C system is enabled whenever the key switch is in the RUN or ACC position. The passenger A/C system is controlled by two rocker switches located in the switch panel. The A/C compressor switch (off/on/on) controls whether the system is in "vent" mode or "A/C" mode. The A/C fan switch (on/on/on) controls the fan speed output (low/medium/high). Both switches work together to produce low/medium/high vent, or low/medium/high air conditioning. See **Table 69** for passenger A/C system inputs, and **Table 70** for passenger A/C system outputs.

NOTE: The SSID for the A/C switch function is 326 and the A/C fan switch function is 322.

Left-Side Emergency Door Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Left Side Latch Switch	Body momentary switch located on the left-side emergency door latch assembly	Switch rests with an open circuit and passes ground signal to C2 electronic components when the latch is opened	CHM	C5	A
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1

Left-Side Emergency Door Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 63, Left-Side Emergency Door Inputs

Left-Side Emergency Door Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Panel Buzzer	Switch panel buzzer	SHM	P1	D
Left-Side Door Buzzer	Left-side door latch buzzer	EXM	C1	N

Table 64, Left-Side Emergency Door Outputs

Light Monitor Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 65, Light Monitor Inputs

Light Monitor Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Left Front Red	Left front red warning light	SHM	J4	18
Left Rear Red	Left rear red warning light	SHM	J4	14
Right Front Red	Right front red warning light	SHM	J4	17
Right Rear Red	Right rear red warning light	SHM	J4	13
Left Front Amber	Left front amber warning light	SHM	J4	20
Left Rear Amber	Left rear amber warning light	SHM	J4	16
Right Front Amber	Right front amber warning light	SHM	J4	19
Right Rear Amber	Right rear amber warning light	SHM	J4	15
Left Rear Turn	Left rear turn signal	SHM	J4	6
Right Rear Turn	Right rear turn signal	SHM	J4	5
Right Rear Upper Brake	Right rear upper brake light	SHM	J4	7
Right Rear Lower Brake	Right rear lower brake light			
Left Rear Upper Brake	Left rear upper brake light	SHM	J4	8
Left Rear Lower Brake	Left rear lower brake light			

Troubleshooting

Light Monitor Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Right Rear Upper Reverse	Right rear upper reverse light	SHM	J4	1
Right Rear Lower Reverse	Right rear lower reverse light			
Left Rear Upper Reverse	Left rear upper reverse light	SHM	J4	2
Left Rear Lower Reverse	Left rear lower reverse light			
Right Rear Upper Tail	Right rear upper taillight	SHM	J4	3
Right Rear Lower Tail	Right rear lower taillight			
Left Rear Upper Tail	Left rear upper taillight	SHM	J4	4
Left Rear Lower Tail	Left rear lower taillight			

Table 66, Light Monitor Outputs

Noise Suppression Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Noise Suppression Switch	OFF/MOM or OFF/ON	Activates noise suppression by deactivating noise producing components	N/A	N/A	N/A
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 67, Noise Suppression Inputs

Noise Suppression Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Left Side Forward Heater Low	Provide power to the left side forward heater fan low relay circuit	SHM	P2	A
Left Side Forward Heater High	Provide power to the left side forward heater fan high relay circuit	SHM	P2	B
Left Side Aft Heater Low	Provide power to the left side aft heater fan low relay circuit	SHM	P3	D
Left Side Aft Heater High	Provide power to the left side aft heater fan high relay circuit	SHM	P3	L
Rear Heater Low	Provide power to the rear heater fan low relay circuit	EXM	Floats	N/A
Rear Heater High	Provide power to the rear heater fan high relay circuit	EXM	Floats	N/A
Hatch Fan	Provide power to the hatch fan circuit	EXM	Floats	N/A
A/C Fan Low	A/C low speed fan relay signal	EXM	C1	A
A/C Fan Medium	A/C medium speed fan relay signal	EXM	Floats	N/A

Noise Suppression Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
A/C Fan High	A/C high speed fan relay signal	EXM	Floats	N/A
Step Heater Low	Provide power to the stepwell heater fan low relay circuit	EXM	Floats	N/A
Step Heater High	Provide power to the stepwell heater fan high relay circuit	EXM	Floats	N/A
Left-Side Fan Low	Provide power to the left-side defroster fan low circuit	EXM	C2	A
Left-Side Fan High	Provide power to the left-side defroster fan high circuit	EXM	C1, C2, C3	P, E, R
Windshield Fan Low	Provide power to the windshield defroster fan low circuit	CHM	C5	L
Windshield Fan High	Provide power to the windshield defroster fan high circuit	CHM	C2	A
Chassis Radio	Provide power to the chassis radio circuit	BHM	B6	A10
Chassis HVAC	Provide power to the chassis HVAC circuit	BHM	B6	A9

Table 68, Noise Suppression Outputs

Passenger A/C System Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
A/C Compressor Switch	Rocker switch (off/on/on)	Activates A/C compressor (low/ medium/high)	N/A	N/A	N/A
A/C Fan Switch	Rocker switch (on/on/on)	Activates the A/C fan (high/medium/ low)	N/A	N/A	N/A
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 69, Passenger A/C System Inputs

Passenger A/C System Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
A/C Fan Low	A/C low speed fan relay signal	EXM	Floats	N/A
A/C Fan Medium	A/C medium speed fan relay signal	EXM	Floats	N/A
A/C Fan High	A/C high speed fan relay signal	EXM	Floats	N/A
A/C Condenser	A/C compressor relay signal	EXM	Floats	N/A
A/C Control	A/C fan ignition signal	EXM	Floats	N/A

Passenger A/C System Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Indicator Switch	SW A/C compressor indicator circuit	SHM/8SB/SEM	Floats	N/A

Table 70, Passenger A/C System Outputs

Passenger Dome Light

The passenger dome light system is driven by two separate circuits, one for the front and one for the rear. There are four different switch configurations: single on/off, single on/off/dimmer, dual front and rear on/off, and dual on/off dimmer. See **Table 71** for passenger dome light inputs, and **Table 72** for passenger dome light outputs.

The system is enabled whenever the ignition switch is in the ON or the ACC position.

The on/off dome switch activates both circuits.

NOTE: The SSID for this function is 274.

Reading Lights

The reading lights feature is enabled whenever the key switch is in the RUN or ACC positions. The master reading light switch (off/on) enables the reading lights. Individual reading light operation is locally controlled at the light. See **Table 73** for reading lights inputs, and **Table 74** for reading lights outputs.

NOTE: The SSID for this function is 329.

Rear Emergency Door

The rear emergency door is enabled whenever the ignition switch is in the ignition position or the ACC position.

The panel buzzer and the rear door buzzer sound when the rear door latch is opened.

The panel buzzer and the rear door buzzer turn off when the rear door latch is closed.

See **Table 75** for rear emergency door inputs, and **Table 76** for rear emergency door outputs.

Reverse Lights

The reverse light (backup light) functions when the driver engages the transmission in the reverse gear, and is enabled whenever the ignition switch is in the RUN position only. When the transmission is in reverse, the standard upper left and right reverse lights and the optional lower left and right reverse lights illuminate. See **Table 77** for reverse lights inputs, and **Table 78** for reverse lights outputs.

Right-Side Electric Entrance Door

The electric entrance door is operated by a linear actuator controlled by a momentary paddle switch (momentary/off/momentary).

The right side electric entrance door enables whenever the ignition switch is in the ON or ACC position.

See **Table 79** for right-side electric entrance door inputs, and **Table 80** for right-side electric entrance door outputs.

NOTE: The SSID for this function is 283.

Service Brake

The service brake circuit is enabled regardless of the ignition switch position.

Pressing the service brake pedal activates the brake pilot light and the rear brake lights. See **Table 81** for service brake inputs, and **Table 82** for service brake outputs.

Speakers

The exterior speaker horn is located on the body or chassis of the vehicle, and is enabled when the key switch is in the RUN or ACC position.

Normal operation routes all radio/PA output to the interior speakers within the bus body. The speaker rocker switch (internal/external), when in the external position, routes all radio/PA out to the exterior speaker horn(s). The speaker rocker switch (internal/external), when in the internal position, routes all

radio/PA out to the interior speakers. See **Table 83** for speaker inputs, and **Table 84** for speaker outputs.

NOTE: The SSID for this function is 295.

Passenger Dome Light Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Dome Light Switch	Rocker switch: Off/On switch rests in the OFF position	ID 3–Activates the front and rear dome light circuits ID 1–Turns off front and rear interior light circuits	—	—	—
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 71, Passenger Dome Light Inputs

Passenger Dome Light Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Front Dome Light	Front passenger interior light circuit	SHM	J3	G
Rear Dome Light	Rear passenger interior light circuit	SHM	J3	M

Table 72, Passenger Dome Light Outputs

Reading Lights Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Reading Lights Switch	Rocker smart switch (off/on)	Activates reading light circuit	N/A	N/A	N/A
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 73, Reading Lights Inputs

Reading Lights Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Reading Lights	Reading light circuit	EXM	Floats	N/A

Table 74, Reading Lights Outputs

Troubleshooting

Rear Emergency Door Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Rear Latch Switch (latch closed)	Body momentary switch located on the rear emergency door latch assembly	Switch rests open and passes GND to C2 electronic components when the latch is opened	BHM	B6	A7
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 75, Rear Emergency Door Inputs

Rear Emergency Door Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Panel Buzzer	Switch panel buzzer 1	SHM	J1	D
Rear Door Buzzer	Rear door latch buzzer	BHM	B5	A

Table 76, Rear Emergency Door Outputs

Reverse Lights Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Trans In Reverse	Parameter on datalink: transmission in reverse	Parameter used to notify the controller that the vehicle transmission is in reverse gear	N/A	N/A	N/A
RUN	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A3

Table 77, Reverse Lights Inputs

Reverse Lights Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Lower Left Reverse Lamp	Body lower left reverse lamp output	SHM	P3	E
Upper Left Reverse Lamp	Body upper left reverse lamp output	CHM	C3	C, D
Lower Right Reverse Lamp	Body lower right reverse lamp output	SHM	P3	C
Upper Right Reverse Lamp	Body upper right reverse lamp output	CHM	C1	A, H, J

Table 78, Reverse Lights Outputs

Right-Side Electric Entrance Door Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Entrance Door Switch	Rocker switch: Momentary switch rests in OFF position	ID 3–Activates electric door OPEN circuit (up) ID 2–OFF (rest) ID 1–Activates electric door CLOSE circuit (down)	—	—	—
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 79, Right-Side Electric Entrance Door Inputs

Right-Side Electric Entrance Door Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Door Open	Front entrance door open circuit controlled by the rocker switch located on the switch panel	SHM	J1	A
Door Close	Front entrance door close circuit controlled by the rocker switch located on the switch panel	SHM	J1	E

Table 80, Right-Side Electric Entrance Door Outputs

Step Tread Heated Mat

The step tread heated mat is located on the first step in the stepwell of the bus. This feature is enabled when the key switch is in the RUN or ACC position, and is activated by a rocker switch (off/on). See **Table 85** for step tread heated mat inputs, and **Table 86** for step tread heated mat outputs.

NOTE: The SSID for this function is 332.

An optional momentary switch incorporates a 15 minute delay.

Stepwell Lights

The stepwell lights are enabled whenever the ignition switch is in the ON or the ACC position.

The stepwell lights activate with any passenger dome light switch.

The entrance door lights operate in unison with the stepwell lights.

See **Table 87** for stepwell lights inputs, and **Table 88** for stepwell lights outputs.

Storage Compartment

The storage compartment feature is enabled when the key switch is in the RUN or ACC position. The panel buzzer and starter interlock are activated when the pin switch in the storage hatch is engaged indicating that the compartment latch is locked. The panel buzzer and starter interlock will deactivate when the storage compartment latch is unlocked. See **Table 89** for storage compartment inputs, and **Table 90** for storage compartment outputs.

Switch Panel Backlighting

The switch panel backlighting feature controls the backlighting intensity of all rocker switches installed

in both the SHM/8SB and SEM, and is enabled while the park/head lamp circuit is active. The momentary dimmer switch (momentary/off/momentary) will increase or decrease the intensity in a loop pattern. Current intensity level is retained when the park/headlamp circuit is deactivated and restored when the park/headlamp circuit is reactivated. See **Table 91** for switch panel backlighting inputs, and **Table 92** for switch panel backlighting outputs.

NOTE: The SSID for this function is 308.

Service Brake Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Service Brake Switch	Switch located on the vehicle service brake pedal mechanism	Notifies the system that the vehicle service brake has been pressed	SHM	J1	R

Table 81, Service Brake Inputs

Service Brake Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Lower Left Brake Lamps	Body lower left brake lamp output	SHM	J3	H
Upper Left Brake Lamps	Body upper left brake lamp output	CHM	C1	N
Lower Right Brake Lamps	Body lower right brake lamp output	SHM	J2	R
Upper Right Brake Lamps	Body upper right brake lamp output	CHM	C1	L

Table 82, Service Brake Outputs

Speaker Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Exterior Speaker Switch	Rocker smart switch (off/on)	Activates external speaker horn relay bypass	N/A	N/A	N/A
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 83, Speaker Inputs

Speaker Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Exterior Speaker Indicator Switch	Smart switch exterior speaker indicator circuit	SHM/8SB/SEM	Floats	N/A
Exterior Speaker Relay	Activates/deactivates external speaker horn relay bypass	EXM	Floats	N/A

Table 84, Speaker Outputs

Step Tread Heated Mat Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Step Tread Heated Mat Switch	Rocker smart switch (off/on)	Activates step tread heated mat	N/A	N/A	N/A
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 85, Step Tread Heated Mat Inputs

Step Tread Heated Mat Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Step Tread Heated Mat	Provide power to the step tread heater	EXM	C2, C4	F, C, L, M, D
Tread Indicator Switch	Smart switch step tread heater indicator circuit	SHM/8SB/SEM	Floats	N/A

Table 86, Step Tread Heated Mat Outputs

Stepwell Lights Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Entrance Door Switch	Pin switch	Provides GND signal when the entrance door is open Open circuit when the entrance door is closed.	SHM	P2	C
Park Lamps	Parameter on datalink: vehicle park lamps	Notifies the controller that the park lamp circuit is active	BHM	B6	B9
Head Lamps	Parameter on datalink: vehicle head lamps	Notifies the controller that the head lamp circuit is active	BHM	B6	B10

Table 87, Stepwell Lights Inputs

Stepwell Lights Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Stepwell Light	Front entrance stepwell light circuit	BHM	B4	E, F
Entrance Door Light	Front entrance door light circuit	EXM	Floats	N/A

Table 88, Stepwell Lights Outputs

Troubleshooting

Storage Compartment Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Storage Compartment Switch	Body momentary switch located in the storage compartment	Switch passes ground signal to C2 electronic components when the hatch is locked	PDM	J11	F
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 89, Storage Compartment Inputs

Storage Compartment Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Panel Buzzer	Switch panel buzzer output	SHM	J1	D
Starter Relay	Output signal to starter relay	BHM	C4	B

Table 90, Storage Compartment Outputs

Switch Panel Backlighting Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Panel Dim Switch	Rocker smart switch (momentary/off/momentary)	Increases SHM and SEM switch backlighting intensity	Floats	Floats	N/A
Park Lamps	Network parameter vehicle park lamps	Parameter used to notify the controller that the park lamp circuit is active	N/A	N/A	N/A

Table 91, Switch Panel Backlighting Inputs

Switch Panel Backlighting Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Increase Backlight	Increases backlight intensity	N/A	N/A	N/A
Decrease Backlight	Decreases backlight intensity	N/A	N/A	N/A

Table 92, Switch Panel Backlighting Outputs

Vandalock

The Vandalock, and Vandalock pilot light is enabled whenever the ignition switch is in the RUN or ACC position.

When any given emergency door is locked, the panel buzzer and corresponding door buzzer(s) will sound, the starter circuit will interrupt, and the optional Vandalock pilot light will flash. See **Table 93** for Vandalock inputs, and **Table 94** for Vandalock outputs.

Video Camera

The video camera is enabled when the key switch is in the RUN or ACC position. The video camera switch (off/on) activates the video camera LED in the

front bulkhead. See **Table 95** for video camera inputs, and **Table 96** for video camera outputs.

Warning System (4 Lights)

The four warning lights are enabled whenever the ignition switch is in the RUN, ACC, or START position, and the master switch is in the ON position. The warning lights are switched on when the activation (ON/OFF) switch is turned to the ON position.

The red warning lights are deactivated by setting the master switch or activation switch to OFF. There is also a red pilot light that indicates the warning lights are operating. See **Table 97** for warning systems (4 lights) inputs, and **Table 98** for warning systems (4 lights) outputs.

Warning System (8 Lights)

The eight warning lights consist of four red and four amber warning lights. This warning system is sequential, meaning the amber lights need to be engaged prior to the red warning lights turning on. This configuration is active regardless of the ignition switch position.

A momentary activation switch (OFF/MOM) turns the amber lights on. The red warning lights automatically turn on, and the amber warning lights automatically turn off when the entrance door is open.

There will also be both red and amber pilot lights indicating the system is operating. See **Table 99** for warning system (8 lights) inputs, and **Table 100** for warning system (8 lights) outputs.

Wheelchair Lift System

The wheelchair lift system feature activates the wheelchair lift and interlocks, and is enabled whenever the key switch is in the RUN or ACC position. The lift switch (off/on) activates the wheelchair lift and locks out the transmission, throttle, and brakes. See **Table 101** for wheelchair lift system inputs, and **Table 102** for wheelchair lift system outputs.

NOTE: The SSID for this function is 312.

Window Sash Warning

The window sash warning is enabled when the key switch is in the RUN or ACC position. The panel buzzer sounds when either the left or right window sashes are opened. See **Table 103** for window sash warning inputs, and **Table 104** for window sash warning outputs.

Vandalock Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Rear Emergency Door Latch Switch	Vandalock switch, located on the rear emergency door latch assembly	Passes the GND to the vehicle electronics when the door is locked	CHM	C5	B
Left Side Exit Door Latch Switch	Vandalock switch, located on the left side exit door latch assembly	Passes GND to the vehicle electronics when the door is locked	EXM	Floats	N/A
Right Side Exit Door Latch Switch	Vandalock switch, located on the right side exit door latch assembly	Passes GND to the vehicle electronics when the door is locked	CHM	Floats	N/A
Front Exit Door Latch Switch	Vandalock switch, located on the front exit door latch assembly	Passes GND to the vehicle electronics when the door is locked	EXM	Floats	N/A
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	B4

Troubleshooting

Vandalock Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	C5

Table 93, Vandalock Inputs

Vandalock Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Starter Interrupt	Inhibits controller start command	N/A	N/A	N/A
Panel Buzzer	Audible buzzer when engaged	SHM	P1	D
Left Side Door Buzzer	Left side door latch buzzer	EXM	Floats	N/A
Right Side Door Buzzer	Right side door latch buzzer	EXM	Floats	N/A
Rear Door Buzzer	Rear door latch buzzer	BHM	B5	A
Vandalock Pilot Light	Flashes when any emergency door is locked	SHM/8SB/SEM	Floats	N/A

Table 94, Vandalock Outputs

Video Camera Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Video Switch	Rocker smart switch (off/on)	Activates video camera LED and switch indicator	N/A	N/A	N/A
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 95, Video Camera Inputs

Video Camera Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Video Camera LED	Provide power to the video camera LED located in the front bulkhead	SHM	P2	N
Video Indicator Switch	Smart switch video camera indicator circuit	SHM/8SB/SEM	Floats	N/A

Table 96, Video Camera Outputs

Four Warning Lights Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Master Warning Switch	Rocker smart switch	Enables warning system	N/A	N/A	N/A
Activation Switch	Rocker smart switch	Activates the red light flash sequence	N/A	N/A	N/A
ACC	Vehicle ignition switch	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch	Notifies the controller that the ignition switch is in the RUN position	BHM	B6	A3
START	Vehicle ignition switch	Notifies the controller that the ignition switch is in the START position	BHM	B6	A5

Table 97, Four Warning Lights Inputs

Four Warning Lights Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Left Front Red Warning Light	Warning light	SHM	P2	M
Left Rear Red Warning Light	Warning light	SHM	P2	K
Right Front Red Warning Light	Warning light	SHM	P1	M
Right Rear Red Warning Light	Warning light	SHM	P1	L

Table 98, Four Warning Lights Outputs

Eight Warning Lights Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Amber Warning Switch	Rocker smart switch	Initiates the amber warning light flash sequence	N/A	N/A	N/A
Entrance Door Switch	Pin switch	Provides a GND signal when the entrance door is open	SHM	P2	C

Table 99, Eight Warning Lights Inputs

Eight Warning Lights Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Left Front Amber Warning Light	Warning light	SHM	P3	A

Troubleshooting

Eight Warning Lights Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Left Rear Amber Warning Light	Warning light	SHM	P2	P
Right Front Amber Warning Light	Warning light	SHM	P1	H
Right Rear Amber Warning Light	Warning light	SHM	P1	P
Left Front Red Warning Light	Warning light	SHM	P2	M
Left Rear Red Warning Light	Warning light	SHM	P2	K
Right Front Red Warning Light	Warning light	SHM	P1	M
Right Rear Red Warning Light	Warning light	SHM	P1	L
Warning Switch Indicator	Smart switch amber warning indicator circuit	SHM/8SB/SEM	Floats	N/A
Stop Arm	Warning system stop arm relay	CHM	C5	H
Crossing Arm	Warning system crossing arm relay	CHM	C5	M
Amber Pilot Light	Monitors amber warning light status	SHM/8SB/SEM	Floats	N/A
Red Pilot Light	Monitors red warning light status	SHM/8SB/SEM	Floats	N/A

Table 100, Eight Warning Lights Outputs

Wheelchair Lift System Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Lift Switch	Rocker smart switch	Activates lift hydraulic pump if interlocks are set	N/A	N/A	N/A
ACC	Vehicle ignition switch is in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch is in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3
Park Brake	Vehicle park brake	Notifies the controller that the park brake is set (engaged)	CHM	C3	F
Vehicle Speed Sensor	Vehicle speed sensor	Provides control with vehicle speed information	N/A	N/A	N/A
Neutral	Transmission in neutral	Notifies the controller that the transmission is in neutral	BHM	C2	G
Service Brake	Vehicle service brake	Notifies the controller that the service brake is applied	CHM	C3	G
Lift Latch Position	Lift door latch position	Provides ground signal to control when the the latch is ajar	EXM	Floats	N/A

Wheelchair Lift System Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Lift Door Position	Lift door open/close position	Provides ground signal to control when the lift door is not closed	EXM	Floats	N/A

Table 101, Wheelchair Lift System Inputs

Wheelchair Lift System Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Lift Pump	Hydraulic lift pump solenoid output	EXM	Floats	N/A
Lift Door Light	Lift door light(s) output	EXM	Floats	N/A
Remote PTO	Engine remote PTO output	EXM	Floats	N/A
Park Set	Automatic park brake set output smart switch	SHM	P2	S
Lift Indicator Switch	Smart switch lift indicator circuit	SHM/8SB/SEM	Floats	N/A
Panel Buzzer	Switch panel buzzer 1 tone A. Continuous output when engaged.	SHM	P1	D
Lift Door Buzzer	Right side door latch buzzer, indicates lift pump status	EXM	Floats	N/A
Lift Pilot	Pilot light should be illuminated steady if lift pump is active. System level failure default state is OFF.	SHM/8SB/SEM	Floats	N/A

Table 102, Wheelchair Lift System Outputs

Window Sash Warning Inputs					
Input	**Type**	**Function**	**Mux Device**	**Connector**	**Pin**
Right Side Sash Switch	Pin switch located on the right side window sash	Notifies the system that the window sash push out window is open	SHM	P2	L
Left Side Sash Switch	Pin switch located on the left side window sash	Notifies the system that the window sash push out window is open	BHM	C6	B2
ACC	Vehicle ignition switch in the ACC position	Notifies the controller that the ignition switch is in the ACC position	BHM	B6	A1
RUN	Vehicle ignition switch in the ON position	Notifies the controller that the ignition switch is in the ON position	BHM	B6	A3

Table 103, Window Sash Warning Inputs

Window Sash Warning Outputs				
Output	**Function**	**Module**	**Connector**	**Pin**
Panel Buzzer	Switch panel buzzer output	SHM	P1	D

Table 104, Window Sash Warning Outputs

Fault Code Information

The information below contains all proprietary Bulkhead Module (BHM) fault codes for J1587 and J1939 data bus protocols, how to view these codes, and what they mean. The fault codes can be seen on the instrument cluster. The mode/reset switch is used to scroll through the displays on the message display screen. For more information on the mode/reset switch see **Chapter 3** of the *Saf-T-Liner C2 School Bus Driver's Manual*. Each fault code contains three distinct pieces of information, as described below.

J1587 fault codes consist of the following, in this order:

In ServiceLink, J1587 fault codes are shown under J1708. J1587 and J1708 are essentially the same data bus protocol.

- Module Identifier (MID)–Identifies which Electronic Control Unit (ECU) the fault is coming from. The J1587 MID identifying all Bulkhead Information Module faults is 164.
- Subsystem Identifier (SID)–Indicates what function on the ECU has failed. All J1587 SIDs for the BHM are listed in **Table 1**.
- Failure Mode Indicator (FMI)–Indicates in what way the function failed.

References such as BHM B1.A, beginning with SID 050 in **Table 1**, indicate that the fault is sensed to be coming from the Bulkhead Module, connector B1, pin A. Similarly, CHM indicates the Chassis Module, and EXM1-5 indicates the first through fifth Expansion Module on a vehicle.

J1939 faults consist of the following, in this order:

NOTE: As the SAE J1939 subcommittee approves new SPNs for use in J1939 messaging on a continual basis, J1939 SPNs used for diagnostic messages could change when the Bulkhead Module part changes.

- Source Address (SA)–Identifies which ECU the fault is coming from. The J1939 SA identifying all Bulkhead Module faults is 33.
- Suspect Parameter Number (SPN)–Indicates what function on the ECU has failed. All J1939 SPNs for the BHM are listed in **Table 2**.
- Failure Mode Indicator (FMI)–Indicates in what way the function failed.

Also included is a reference table of all FMIs for both data bus protocols. See **Table 3**.

J1587 SIDs for Bulkhead Module (BHM) MID 164

SID	Description	Possible FMI
000	Backlighting Dimmer Switch Fault	7
001	Clutch Switch Fault	7
002	Reserved for Future Use	—
003	Headlamp Switch Disagreement - Both Park and On Inputs are CLOSED	7
004	Stalk Switch High Beam Input Fault	2
005	Ignition Switch Fault	7
006	Marker Interrupt Switch Fault	7
007	Stalk Switch Disagreement - Both Wiper High and Wiper Low Inputs are ON	2
008	Stalk Switch Disagreement - Wiper On/Off Input is OFF and Wiper High or Low Input is ON	2
009	Wiper Park Input Fault	7
010	ICU3-M2 Hazard Switch CAN Feedback Error	2

Fault Code Information

J1587 SIDs for Bulkhead Module (BHM) MID 164		
SID	**Description**	**Possible FMI**
011	Stalk Switch Left Turn Signal Input Fault	2
012	Stalk Switch Right Turn Signal Input Fault	2
013	Stalk Switch Washer Switch Input Fault	2
014	Stalk Switch Wiper On/Off Input Fault	2
015	Stalk Switch Wiper Low Input Fault	2
016	Stalk Switch Wiper High Input Fault	2
017	Wheel Based Vehicle Speed CAN Message Error	2
018	Wake up Hardware Fault (modules are kept awake)	7
019	Unknown Keep Awake Fault (modules are kept awake)	7
020	Extra Smart Switch	7
021	Duplicate Smart Switch	7
022	Missing Smart Switch	7
023	Fifth Wheel Solenoid Unexpected Pressure Feedback	7
024	Fifth Wheel Solenoid No Pressure Feedback	7
025	End of Frame Air Unexpected Pressure Feedback	7
026	End of Frame Air No Pressure Feedback	7
027	Axle Lift Unexpected Pressure Feedback	7
028	Axle Lift No Pressure Feedback	7
029	Suspension Dump Unexpected Pressure Feedback	7
030	Suspension Dump No Pressure Feedback	7
031	Suspension Proportioning Unexpected Pressure Feedback	7
032	Suspension Proportioning No Pressure Feedback	7
033	Cigar Lighter Output Fault	7
034	BHM / ICU3-M2 Ignition Mismatch	7
035	BHM / ICU3-M2 Hazard Switch Mismatch	2
036	BHM / ICU3-M2 Wiper Park Mismatch	2
037	Missing Transmission CAN Message	9
038	Missing Chassis Module CAN Message	9
039	Remote Bucket Switch Stuck Fault	7
040	Axle Lift 2 Feedback Fault	7
041	Axle Lift 2 No Feedback Fault	7
042	PTO 1 Feedback Fault	7
043	PTO 1 No Feedback Fault	7
044	PTO 2 Feedback Fault	7
045	PTO 2 No Feedback Fault	7

J1587 SIDs for Bulkhead Module (BHM) MID 164		
SID	**Description**	**Possible FMI**
046-049	Reserved for Future Use	—
050	BHM B1.A	3,4
051	BHM B1.F, B1.P, B2.K, B2.L, B6.A8	5,6
052	BHM B1.J	3,4
053	BHM B1.K, B5.C	5,6
054	BHM B1.L	5,6
055	BHM B1.N	3,4
056	BHM B1.R	5,6
057	BHM B2.M	5,6
058	BHM B3.D	3,4
059	BHM B3.E	3,4,5,6
060	BHM B3.F	5,6
061	BHM B3.G	5,6
062	BHM B3.H	5,6
063	BHM B4.B	5,6
064	BHM B4.E, B4.F	3,4,5,6
065	BHM B4.G	3,4
066	BHM B4.K	3,4
067	BHM B4.M, B5.E	3,4,5,6
068	BHM B5.A, B7.A12	5,6
069	BHM B6.A9, B6.A10	5,6
070	BHM B5.B	5,6
071	BHM B5.D	5,6
072	BHM B5.F	3,4,5,6
073	BHM B5.G	3,4,5,6
074	BHM B5.H, B7.A1	3,4,5,6
075	CHM C1.A, C1.H, C1.J	5,6
076	CHM C1.G, C2.H, C3.N	5,6
077	CHM C1.L	5,6
078	CHM C1.N	5,6
079	CHM C1.P, C2.E, C3.R	5,6
080	CHM C2.A	3,4
081	CHM C2.F, C4.C, C4.D, C4.L, C4.M	3,4,5,6
082	CHM C3.A	3,4,5,6
083	CHM C3.C, C3.D	5,6

Fault Code Information

J1587 SIDs for Bulkhead Module (BHM) MID 164		
SID	**Description**	**Possible FMI**
084	CHM C3.E	3,4
085	CHM C3.F	3,4
086	CHM C3.J	3,4
087	CHM C3.K	5,6
088	CHM C3.L	5,6
089	CHM C4.F	5,6
090	CHM C4.J	3,4
091	CHM C4.K	5,6
092	CHM C4.P	3,4
093	CHM C5.A	3,4
094	CHM C5.B	3,4
095	CHM C5.F	3,4
096	CHM C5.G	3,4
097	CHM C5.H	3,4
098	CHM C5.J	3,4
099	CHM C5.L	3,4
100	CHM C5.M	3,4
101	EXM1 C1.A, C1.H, C1.C	5,6
101	EXM1 C4.K	5,6
101	EXM1 C3.L	5,6
101	EXM1 C2.F, C4.C, C4.D, C4.L, C4.M	3,4,5,6
101	EXM1 C1.N	5,6
101	EXM1 C1.L	5,6
101	EXM1 C1P, C2.E, C3.R	5,6
101	EXM1 C1.G, C2.H, C3.N	5,6
101	EXM1 C2.A	3,4
101	EXM1 C3.A	3,4,5,6
101	EXM1 C3.C, C3.D	5,6
101	EXM1 C3.K	5,6
101	EXM1 C4.F	5,6
101	EXM1 C5.H	3,4
101	EXM1 C5.C	3,4
101	EXM1 C5.L	3,4
101	EXM1 C5.M	3,4
101	EXM1 C3.E	3,4

J1587 SIDs for Bulkhead Module (BHM) MID 164		
SID	**Description**	**Possible FMI**
101	EXM1 C3.F	3,4
101	EXM1 C3.C	3,4
101	EXM1 C4.C	3,4
101	EXM1 C4.P	3,4
101	EXM1 C5.A	3,4
101	EXM1 C5.B	3,4
101	EXM1 C5.F	3,4
101	EXM1 C5.G	3,4
102	EXM2 C1.A, C1.H, C1.C	5,6
102	EXM2 C4.K	5,6
102	EXM2 C3.L	5,6
102	EXM2 C2.F, C4.C, C4.D, C4.L, C4.M	3,4,5,6
102	EXM2 C1.N	5,6
102	EXM2 C1.L	5,6
102	EXM2 C1P, C2.E, C3.R	5,6
102	EXM2 C1.G, C2.H, C3.N	5,6
102	EXM2 C2.A	3,4
102	EXM2 C3.A	3,4,5,6
102	EXM2 C3.C, C3.D	5,6
102	EXM2 C3.K	5,6
102	EXM2 C4.F	5,6
102	EXM2 C5.H	3,4
102	EXM2 C5.C	3,4
102	EXM2 C5.L	3,4
102	EXM2 C5.M	3,4
102	EXM2 C3.E	3,4
102	EXM2 C3.F	3,4
102	EXM2 C3.C	3,4
102	EXM2 C4.C	3,4
102	EXM2 C4.P	3,4
102	EXM2 C5.A	3,4
102	EXM2 C5.B	3,4
102	EXM2 C5.F	3,4
102	EXM2 C5.G	3,4
103	EXM3 C1.A, C1.H, C1.C	5,6

Fault Code Information

J1587 SIDs for Bulkhead Module (BHM) MID 164		
SID	**Description**	**Possible FMI**
103	EXM3 C4.K	5,6
103	EXM3 C3.L	5,6
103	EXM3 C2.F, C4.C, C4.D, C4.L, C4.M	3,4,5,6
103	EXM3 C1.N	5,6
103	EXM3 C1.L	5,6
103	EXM3 C1P, C2.E, C3.R	5,6
103	EXM3 C1.G, C2.H, C3.N	5,6
103	EXM3 C2.A	3,4
103	EXM3 C3.A	3,4,5,6
103	EXM3 C3.C, C3.D	5,6
103	EXM3 C3.K	5,6
103	EXM3 C4.F	5,6
103	EXM3 C5.H	3,4
103	EXM3 C5.C	3,4
103	EXM3 C5.L	3,4
103	EXM3 C5.M	3,4
103	EXM3 C3.E	3,4
103	EXM3 C3.F	3,4
103	EXM3 C3.C	3,4
103	EXM3 C4.C	3,4
103	EXM3 C4.P	3,4
103	EXM3 C5.A	3,4
103	EXM3 C5.B	3,4
103	EXM3 C5.F	3,4
103	EXM3 C5.G	3,4
104	EXM4 C1.A, C1.H, C1.C	5,6
104	EXM4 C4.K	5,6
104	EXM4 C3.L	5,6
104	EXM4 C2.F, C4.C, C4.D, C4.L, C4.M	3,4,5,6
104	EXM4 C1.N	5,6
104	EXM4 C1.L	5,6
104	EXM4 C1P, C2.E, C3.R	5,6
104	EXM4 C1.G, C2.H, C3.N	5,6
104	EXM4 C2.A	3,4
104	EXM4 C3.A	3,4,5,6

J1587 SIDs for Bulkhead Module (BHM) MID 164		
SID	**Description**	**Possible FMI**
104	EXM4 C3.C, C3.D	5,6
104	EXM4 C3.K	5,6
104	EXM4 C4.F	5,6
104	EXM4 C5.H	3,4
104	EXM4 C5.C	3,4
104	EXM4 C5.L	3,4
104	EXM4 C5.M	3,4
104	EXM4 C3.E	3,4
104	EXM4 C3.F	3,4
104	EXM4 C3.C	3,4
104	EXM4 C4.C	3,4
104	EXM4 C4.P	3,4
104	EXM4 C5.A	3,4
104	EXM4 C5.B	3,4
104	EXM4 C5.F	3,4
104	EXM4 C5.G	3,4
105	EXM5 C1.A, C1.H, C1.C	5,6
105	EXM5 C4.K	5,6
105	EXM5 C3.L	5,6
105	EXM5 C2.F, C4.C, C4.D, C4.L, C4.M	3,4,5,6
105	EXM5 C1.N	5,6
105	EXM5 C1.L	5,6
105	EXM5 C1P, C2.E, C3.R	5,6
105	EXM5 C1.G, C2.H, C3.N	5,6
105	EXM5 C2.A	3,4
105	EXM5 C3.A	3,4,5,6
105	EXM5 C3.C, C3.D	5,6
105	EXM5 C3.K	5,6
105	EXM5 C4.F	5,6
105	EXM5 C5.H	3,4
105	EXM5 C5.C	3,4
105	EXM5 C5.L	3,4
105	EXM5 C5.M	3,4
105	EXM5 C3.E	3,4
105	EXM5 C3.F	3,4

Fault Code Information

J1587 SIDs for Bulkhead Module (BHM) MID 164		
SID	**Description**	**Possible FMI**
105	EXM5 C3.C	3,4
105	EXM5 C4.C	3,4
105	EXM5 C4.P	3,4
105	EXM5 C5.A	3,4
105	EXM5 C5.B	3,4
105	EXM5 C5.F	3,4
105	EXM5 C5.G	3,4
106	Reserved for Future Use	—
107	SHM J1.A, J1.E	6
108	SHM J3.G (PWM)	6
109	SHM J3.M (PWM)	6
110	SHM J3.F	5,6
111	SHM J3.K	5,6

Table 1, J1587 SIDs for Bulkhead Module (BHM) MID 164

J1939 SPNs for Bulkhead Module (BHM) SA 33		
SPN	**Description**	**Possible FMI**
70	Parking Brake Switch	2
80	Washer Fluid Level	2
84	Wheel Based Vehicle Speed	19
96	Fuel Level	19
97	Water In Fuel Indicator	19
163	Transmission Current Range	12,19
177	Transmission Oil Temperature Sensor	3,4
523	Transmission Current Gear	12,19
524	Transmission Selected Gear	12,19
597	ABS Service Brake Switch	2
598	Clutch Switch	7
879	Front Left Turn Signals Output Fault	5,6
880	Trailer Stop Lamp Relay Output Fault	4
881	Front Right Turn Signals Output Fault	5,6
882	Park / Marker Lights Output Fault	4,5,6
973	Engine Retarder Selection	19
1487	Backlighting Dimmer Switch Fault	7
1550	A/C Clutch Output Fault	5,6

J1939 SPNs for Bulkhead Module (BHM) SA 33		
SPN	**Description**	**Possible FMI**
2003	Missing Transmission CAN Message	9
2071	Missing Chassis Module CAN Message	9
6891	ID/Marker/Clearance Lamps - HW Override Output Fault	5,6
6892	Upper Right Tail Lamp Output Fault	5,6
6893	Upper Left Tail Lamp Output Fault	5,6
6894	Rear Passenger Dome Lamp Output Fault	6
6895	Front Passenger Dome Lamp Output Fault	6
6896	Right Side Air/Electric Entrance Door - Close - Output Fault	6
6897	Right Side Air/Electric Entrance Door - Open - Output Fault	6
6898	Right Side Turn Signal Output Fault	5,6
6900	Left Side Turn Signal Output Fault	5,6
6901	Stepwell Lights Output Fault	5,6
6902	Left Upper Backup Lamp Output Fault	5,6
6903	Right Upper Backup Lamp Output Fault	5,6
6904	Rear Right Turn Signal Output Fault	5,6
6905	Rear Left Turn Signal Output Fault	5,6
6906	PTO 2 No Feedback Fault	7
6907	PTO 2 Feedback Fault	7
6908	PTO 1 No Feedback Fault	7
6909	PTO 1 Feedback Fault	7
6910	Axle Lift 2 No Feedback Fault	7
6911	Axle Lift 2 Feedback Fault	7
6912	Remote Bucket Switch Stuck Fault	7
6915	Lamp and Gauge Ignition Output Fault	4,5,6
6916	BHM / ICU3-M2 Wiper Park CAN Message Mismatch	2
6917	BHM / ICU3-M2 Hazard Switch CAN Message Mismatch	2
6918	Missing Smart Switch	7
6919	Duplicate Smart Switch	7
6920	Extra Smart Switch	7
6921	Unknown Keep Awake Fault (modules are kept awake)	7
6922	Wake up Hardware Fault (modules are kept awake)	7
6923	Wiper Parked Input Fault	7
6924	Stalk Switch Disagreement - Wiper On/Off Input is OFF and Wiper High or Low Input is ON	2
6925	Stalk Switch Disagreement - Both Wiper High and Wiper Low Inputs are ON	2

Fault Code Information

J1939 SPNs for Bulkhead Module (BHM) SA 33		
SPN	**Description**	**Possible FMI**
6926	Marker Interrupt Switch Fault	7
6927	Utility Lamp Output Fault	3,4,5,6
6928	Suspension Proportioning No AMU Pressure Feedback	7
6929	Suspension Proportioning Unexpected AMU Pressure Feedback	7
6930	Suspension Proportioning Solenoid Output Fault	3,4,5,6
6931	Suspension Dump No AMU Pressure Feedback	7
6932	Suspension Dump Unexpected AMU Pressure Feedback	7
6933	Suspension Dump Solenoid Output Fault	3,4,5,6
6934	Spotlights Output Fault	3,4,5,6
6935	Snow Plow Relay Output Fault	3,4,5,6
6936	Rear 2 Differential Lock AMU Pressure Feedback Fault	7
6937	Rear 2 Differential Lock Solenoid Output Fault	3,4,5,6
6938	Rear 1 Differential Lock AMU Pressure Feedback Fault	7
6939	Rear 1 Differential Lock Solenoid Output Fault	3,4,5,6
6940	Optional Feature Output Fault	3,4,5,6
6941	Heated Mirrors Output Fault	3,4,5,6
6942	Interaxle AMU Pressure Feedback Fault	7
6943	Interaxle Solenoid Output Fault	3,4,5,6
6944	Fuel Water Separator Heater Output Fault	4,5,6
6945	Front Differential Lock AMU Pressure Feedback Fault	7
6946	Front Differential Lock Solenoid Output Fault	3,4,5,6
6947	Fog Lamp Output Fault	5,6
6953	5th Wheel Slide Solenoid Output Fault	3,4,5,6
6954	End of Frame Air No AMU Pressure Feedback	7
6955	End of Frame Air Unexpected AMU Pressure Feedback	7
6956	End of Frame Air Solenoid Output Fault	3,4,5,6
6957	Daytime Running Lights (DRL) Output Fault	5,6
6958	Brake Line Air Dryer Output Fault	3,4,5,6
6959	Axle Shift AMU Pressure Feedback Fault	7
6960	Axle Shift Solenoid Output Fault	3,4,5,6
6961	Axle Lift No AMU Pressure Feedback	7
6962	Axle Lift Unexpected AMU Pressure Feedback	7
6963	Axle Lift Solenoid Output Fault	3,4,5,6
6964	Air Horn Solenoid Output Fault	5,6
6965	BHM VBAT 5 Input Fault	3,4

J1939 SPNs for Bulkhead Module (BHM) SA 33		
SPN	**Description**	**Possible FMI**
6966	BHM VBAT 4 Input Fault	3,4
6967	BHM VBAT 3 Input Fault	3,4
6968	BHM VBAT 2 Input Fault	3,4
6969	BHM VBAT 1 Input Fault	3,4
6970	Wiper High Output Fault	5,6
6971	Wiper Low Output Fault	5,6
6972	Stalk Switch Wiper High Input Fault	2
6973	Stalk Switch Wiper Low Input Fault	2
6974	Stalk Switch Wiper On/Off Input Fault	2
6975	ICU3-M2 Wiper Park CAN FeedbackError	2
6976	Washer Pump Output Fault	5,6
6977	Stalk Switch Washer Switch Input Fault	2
6978	Stalk Switch Right Turn Signal Input Fault	2
6979	Stalk Switch Left Turn Signal Input Fault	2
6980	Right Stop Lamp Output Fault	5,6
6981	Left Stop Lamp Output Fault	5,6
6982	Wake up Hardware Fault	5,6
6983	Starter Relay (Mag Switch) Output Fault	5,6
6984	Ignition System, Accessory Power Outputs Fault	5,6
6985	Ignition System, Ignition Power Outputs Fault	2,5,6
6986	Ignition Switch Fault	7
6987	Tail / Clearance / License Plate Lights Output Fault	5,6
6988	Left Low Beam Output Fault	5,6
6989	Right Low Beam Output Fault	5,6
6990	Left High Beam Output Fault	5,6
6991	Right High Beam Output Fault	5,6
6992	Stalk Switch High Beam Input Fault	2
6993	Headlamp Switch Disagreement - Both Park and On Inputs are CLOSED	7
6994	ICU3-M2 Hazard Switch CAN Feedback Error	19
6995	Horn Output Fault	3,4,5,6
6996	Dome Lamps Switched Power Output Fault	5,6
6997	Cigar Lighter Output Fault	3,4,5,6
6998	Dome Lamps Battery Power Output Fault	5,6
6999	Backup Lamps / Alarm Output Fault	5,6

Fault Code Information

J1939 SPNs for Bulkhead Module (BHM) SA 33		
SPN	**Description**	**Possible FMI**
7000	Panel Lamp Backlighting PWM Output Fault	3,4,5,6

Table 2, J1939 SPNs for Bulkhead Module (BHM) SA 33

Failure Mode Identifiers		
FMI	**J1939 Description**	**J1587 Description**
00	Data valid but above normal operational range - Most severe level	Data valid but above normal operational range (engine overheating)
01	Data valid but below normal operational range - Most severe level	Data valid but below normal operational range (engine oil pressure too low)
02	Data erratic, intermittent, or incorrect	Data erratic, intermittent, or incorrect
03	Voltage above normal or shorted high	Voltage above normal or shorted high
04	Voltage below normal or shorted low	Voltage below normal or shorted low
05	Current below normal or open circuit	Current below normal or open circuit
06	Current above normal or grounded circuit	Current above normal or grounded circuit
07	Mechanical system not responding or out of adjustment	Mechanical system not responding properly
08	Abnormal frequency, pulse width, or period	Abnormal frequency, pulse width, or period
09	Abnormal update rate	Abnormal update rate
10	Abnormal rate of change	Abnormal rate of change
11	Root cause not known	Failure mode not identifiable
12	Bad intelligent device or component	Bad intelligent device or component
13	Out of Calibration	Out of Calibration
14	Special Instructions	Special Instructions
15	Data valid but above normal operational range - Least severe level	Reserved for future assignment by the SAE Subcommittee
16	Data valid but above normal operational range - Moderately severe level	—
17	Data valid but below normal operational range - Least severe level	—
18	Data valid but below normal operational range - Moderately severe level	—
19	Received network data in error	—
20	Reserved for SAE Assignment	—
21	Reserved for SAE Assignment	—
22	Reserved for SAE Assignment	—
23	Reserved for SAE Assignment	—
24	Reserved for SAE Assignment	—
25	Reserved for SAE Assignment	—

Failure Mode Identifiers		
FMI	**J1939 Description**	**J1587 Description**
26	Reserved for SAE Assignment	—
27	Reserved for SAE Assignment	—
28	Reserved for SAE Assignment	—
29	Reserved for SAE Assignment	—
30	Reserved for SAE Assignment	—
31	Not available or condition exists	—

Table 3, Failure Mode Identifiers

Specifications

For an isometric view of the Bulkhead Module, see **Fig. 1**.

For a side view of the Bulkhead Module with pinout assignments, see **Fig. 2**.

For connector B1 forward chassis harness pinouts, see **Table 1**.

For connector B2 engine harness pinouts, see **Table 2**.

For connector B3 frontwall harness pinouts, see **Table 3**.

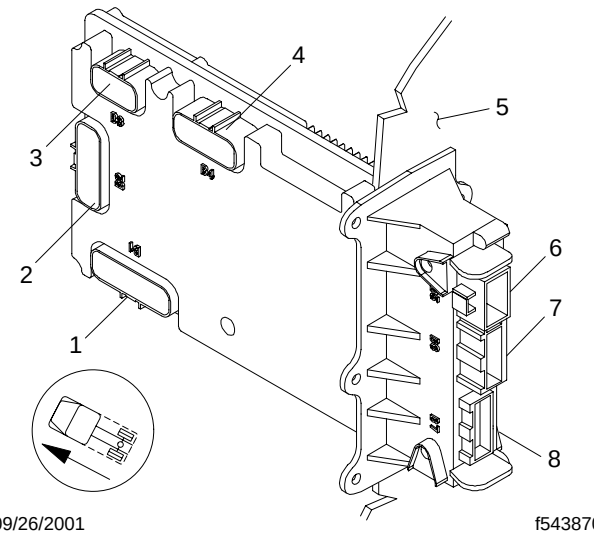
For connector B4 frontwall harness pinouts, see **Table 4**.

For connector B5 dash harness pinouts, see **Table 5**.

For connector B6 dash harness pinouts, see **Table 6**.

For connector B7 dash harness pinouts, see **Table 7**.

For power supply fuses and associated outputs for the Bulkhead Module, see **Table 8**.

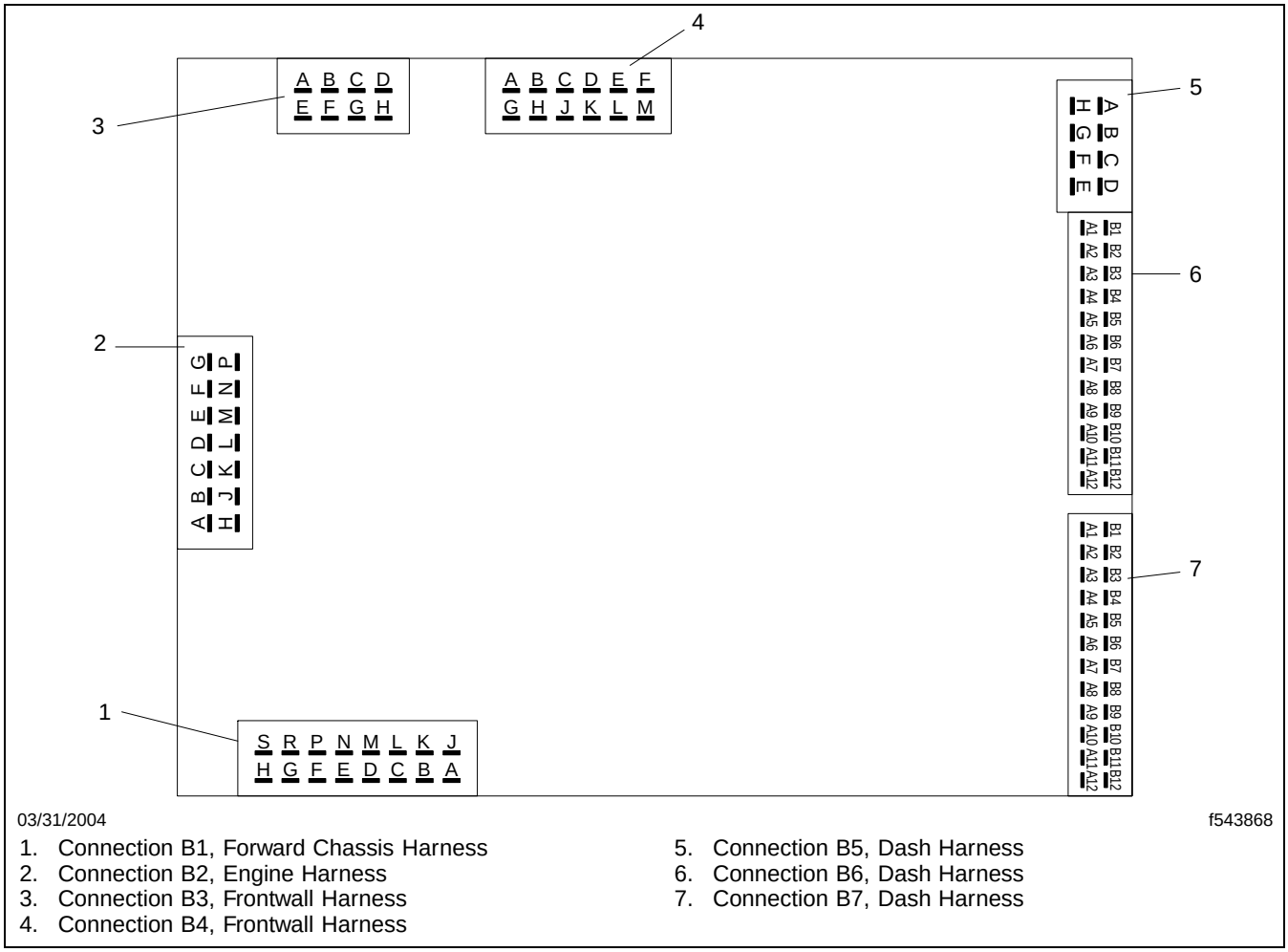


1. Connection B1, Forward Chassis Harness
2. Connection B2, Engine Harness
3. Connection B3, Frontwall Harness
4. Connection B4, Frontwall Harness
5. Frontwall
6. Connection B5, Dash Harness
7. Connection B6, Dash Harness
8. Connection B7, Dash Harness

Fig. 1, Bulkhead Module (isometric view)

Connector B1 Forward Chassis Harness Pinouts		
Connector Pin	**Signal Name**	**Signal Type**
B1-A	Fuel Level Sensor Input	Analog Input
B1-B	Module Wake-up Signal	Digital Input/Output
B1-C	Driver's Side Window Sash Input	Digital Input
B1-D	—	—
B1-E	Ground	Power Ground
B1-F	Fuel/Water Sensor Ignition Power	Digital Output
B1-G	Fuel Level Sensor Ground	Signal Ground
B1-H	J1587+ Data Bus	Data Bus
B1-J	Battery Power (VBAT5)	Power
B1-K	Heater Booster Pump	Digital Output
B1-L	Left High Beam	Digital Output
B1-M	Fuel/Water Separator (Spare Digital Input 5)	Digital Input
B1-N	Battery Power (VBAT3)	Power

Specifications



1. Connection B1, Forward Chassis Harness
2. Connection B2, Engine Harness
3. Connection B3, Frontwall Harness
4. Connection B4, Frontwall Harness
5. Connection B5, Dash Harness
6. Connection B6, Dash Harness
7. Connection B7, Dash Harness

Fig. 2, Bulkhead Module (side view) With Pinout Assignments

Connector B1 Forward Chassis Harness Pinouts		
Connector Pin	**Signal Name**	**Signal Type**
B1-P	ABS Ignition Power	Digital Output
B1-R	Left Low Beam	Digital Output
B1-S	J1587– Data Bus	Data Bus

Table 1, Connector B1 Forward Chassis Harness Pinouts

Connector B2 Engine Harness Pinouts		
Connector Pin	**Signal Name**	**Signal Type**
B2-A	J1587+ Data Bus	Data Bus
B2-B	J1939+ Data Bus	Data Bus
B2-C	J1587+ Data Bus	Data Bus

Connector B2 Engine Harness Pinouts		
Connector Pin	**Signal Name**	**Signal Type**
B2-D	J1587– Data Bus	Data Bus
B2-E	—	—
B2-F	—	—
B2-G	Neutral Signal from Transmission	Digital Input
B2-H	J1587– Data Bus	Data Bus
B2-J	J1939– Data Bus	Data Bus
B2-K	Engine ECU Ignition Power	Digital Output
B2-L	Transmission ECU Ignition Power	Digital Output
B2-M	A/C Clutch	Digital Output
B2-N	—	—
B2-P	Alternator Charging	Digital Input

Table 2, Connector B2 Engine Harness Pinouts

Connector B3 Frontwall Harness Pinouts		
Connector Pin	**Signal Name**	**Signal Type**
B3-A	J1939– Data Bus	Data Bus
B3-B	J1939+ Data Bus	Data Bus
B3-C	Wiper Parked Position	Digital Input
B3-D	Main Battery Power (VBAT1)	Power
B3-E	Horn	Digital Output
B3-F	Wiper Motor High Speed	Digital Output
B3-G	Washer Pump	Digital Output
B3-H	Wiper Motor Low Speed	Digital Output

Table 3, Connector B3 Frontwall Harness Pinouts

Connector B4 Frontwall Harness Pinouts		
Connector Pin	**Signal Name**	**Signal Type**
B4-A	Air Filter Restriction/Spare Digital Input 9	Digital Input
B4-B	Starter Relay	Digital Output
B4-C	Ground	Ground
B4-D	Hydraulic Brake Lamp Signal	Digital Input
B4-E	Stepwell Light, Front Entrance Door	Digital Output
B4-F	—	—
B4-G	Main Battery Power (VBAT2)	Power
B4-H	Module Wake-up Signal	Digital Input/Output

Specifications

Connector B4 Frontwall Harness Pinouts		
Connector Pin	**Signal Name**	**Signal Type**
B4-J	—	—
B4-K	Main Battery Power (VBAT4)	Power
B4-L	Washer Fluid Level (Spare Digital Input 8)	Digital Input
B4-M	—	—

Table 4, Connector B4 Frontwall Harness Pinouts

Connector B5 Dash Harness Pinouts		
Connector Pin	**Signal Name**	**Signal Type**
B5-A	Buzzer, Rear Emergency Door	Digital Output
B5-B	Dome Lamps (PWM)	Digital Output
B5-C	—	—
B5-D	Instrument Cluster Wake-up	Digital Input/Output
B5-E	Left Rear Turn Lamp	Digital Output
B5-F	ID/Marker Lights	Digital Output
B5-G	Right Rear Turn Lamp	Digital Output
B5-H	Panel Lamp Backlighting (PWM)	Digital Output

Table 5, Connector B5 Dash Harness Pinouts

Connector B6 Dash Harness Pinouts		
Connector Pin	**Signal Name**	**Signal Type**
B6-A1	Ignition Switch ACCESSORY Position	Digital Input
B6-A2	Module Wake-up Signal	Digital Input/Output
B6-A3	Ignition Switch ON	Digital Input
B6-A4	—	—
B6-A5	Ignition Switch CRANK	Digital Input
B6-A6	Warning System Activation	Digital Input
B6-A7	Rear Emergency Door Latch	Digital Input
B6-A8	VCU Ignition Power	Digital Output
B6-A9	HVAC/Radio Accessory Power	Digital Output
B6-A10	Radio Accessory Power	Digital Output
B6-A11	J1587– Data Bus	Data Bus
B6-A12	J1587+ Data Bus	Data Bus
B6-B1	Horn Switch	Digital Input
B6-B2	Top of Clutch Switch (Spare Digital Input 7)	Digital Input

Connector B6 Dash Harness Pinouts		
Connector Pin	**Signal Name**	**Signal Type**
B6-B3	Bottom of Clutch Switch (Spare Digital Input 6)	Digital Input
B6-B4	—	—
B6-B5	Panel Lamps Increase	Digital Input
B6-B6	Panel Lamps Decrease	Digital Input
B6-B7	A/C Clutch Request	Digital Input
B6-B8	Hazard Switch	Digital Input
B6-B9	Headlamp Switch PARK Position	Digital Input
B6-B10	Headlamp Switch ON Position	Digital Input
B6-B11	Headlamp Switch ON 2 Position	Digital Input
B6-B12	—	—

Table 6, Connector B6 Dash Harness Pinouts

Connector B7 Dash Harness Pinouts		
Connector Pin	**Signal Name**	**Signal Type**
B7-A1	Panel Lamps (Smart Switch)	Digital Output
B7-A2	Smart Switch 3 ID 1	Analog Input
B7-A3	Smart Switch 3 ID 2	Analog Input
B7-A4	Smart Switch 3 Input	Analog Input
B7-A5	Smart Switch 3 Indicator	Digital Output
B7-A6	Smart Switch 4 ID 1	Analog Input
B7-A7	Smart Switch 4 ID 2	Analog Input
B7-A8	Smart Switch 4 Input	Analog Input
B7-A9	Smart Switch 4 Indicator	Digital Output
B7-A10	Smart Switch 5 ID 1	Analog Input
B7-A11	Smart Switch 5 ID 2	Analog Input
B7-A12	—	—
B7-B1	Smart Switch 1 ID 1	Analog Input
B7-B2	Smart Switch 1 ID 2	Analog Input
B7-B3	Smart Switch 1 Input	Analog Input
B7-B4	Smart Switch 1 Indicator	Digital Output
B7-B5	Smart Switch 2 ID 1	Analog Input
B7-B6	Smart Switch 2 ID 2	Analog Input
B7-B7	Smart Switch 2 Input	Analog Input
B7-B8	Smart Switch 2 Indicator	Digital Output
B7-B9	Ground	Signal Ground

Specifications

Connector B7 Dash Harness Pinouts		
Connector Pin	**Signal Name**	**Signal Type**
B7-B10	Smart Switch 5 Indicator	Digital Output
B7-B11	Smart Switch 5 Input	Analog Input
B7-B12	—	—

Table 7, Connector B7 Dash Harness Pinouts

Power Supply Fuses and Associated Outputs for the Bulkhead Module				
BHM Power Input	**BHM Power Input Pin**	**Fuse Supplying BHM Power Input**	**BHM Outputs Supplied**	**BHM Output Pin**
Power In			**Power Out**	
VBAT1	B3.D	Fuse 22 (30A)	Buzzer for Emergency Doors	B5.A
			Battery (Smart Switches)	B7.A12
			Ignition (VCU)	B6.A8
			Ignition (Engine)	B2.K
			Ignition (ABS)	B1.P
			Ignition (Trans)	B2.L
			Fuel Water Sensor Power	B1.F
			Dome Lamps Switched	B5.B
			Left Low Beam	B1.R
			A/C Clutch	B2.M
			Smart Switch 1 Indicator	B7.B4
			Smart Switch 2 Indicator	B7.B8
			Smart Switch 3 Indicator	B7.A5
			Smart Switch 4 Indicator	B7.A9
			Smart Switch 5 Indicator	B7.B10
VBAT2	B4.G	Fuse 20 (30A)	Accessory (HVAC)	B6.A9
			Accessory (Radio)	B6.A10
			Wake-up (Instrument Cluster)	B5.D
			Left High Beam	B1.L
			Wiper High	B3.F
			Horn	B3.E
VBAT3	B1.N	Fuse 18 (30A)	Wiper Low	B3.H
			Right Rear Turn Lamp	B5.G
			Panel Lamps	B5.H
			Panel Lamps (Smart Switch)	B7.A1

Specifications

Power Supply Fuses and Associated Outputs for the Bulkhead Module				
BHM Power Input	**BHM Power Input Pin**	**Fuse Supplying BHM Power Input**	**BHM Outputs Supplied**	**BHM Output Pin**
Power In			**Power Out**	
VBAT4	B4.K	Fuse 15 (30A)	Clearance Lamps	B5.C
			Heater Booster Pump	B1.K*
			Washer Pump	B3.G
			ID/Marker/Clearance Lights	B5.F
VBAT5	B1.J	Fuse 7 (30A)	Left Rear Turn Lamp	B5.E / B4.M
			Stepwell Light, Front Entrance Door	B4.F
			Stepwell Light, Front Entrance Door	B4.E

* This output supplies power to the Chassis Module pass-through for the tail lamps, license plate lamp, and trailer tail lamp relay.

Table 8, Power Supply Fuses and Associated Outputs for the Bulkhead Module