General Information

The Expansion Module (EXM) is an optional module of the vehicle electrical system, and acts as a slave to the Bulkhead Module. It is functionally equivalent to the Chassis Module (CHM) (see **Section 54.02**). An EXM may be required on a vehicle in order to add non-standard functionality (such as heated mirrors) when all the required pins are already in use on the Chassis Module or on previously installed EXMs. Since it is optional, there may be from zero to five EXMs on a vehicle.

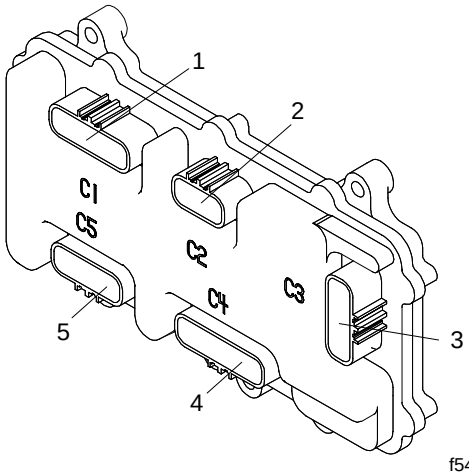
The EXM has five harness connections, though all may not be used. See **Fig. 1**.

NOTE: Since the hardware for the Chassis Module and the Expansion Module is the same, connector designations, such as C1, are the same for both modules.

The EXM comes in three sizes, based on vehicle options and customer specifications: Limited, Standard and Full. The Limited and Standard EXMs use only connectors C1, C3, and C4; connectors C2 and C5 are sealed. All three sizes are supported by a single version of software.

All three EXM sizes use external strapping. External strapping assigns a unique pre-defined J1939 Source Address and J1587 Message ID to the module, viewable in ServiceLink.

External strapping involves connecting two pre-determined pins on the module. The two specific pins that are connected depend on the desired functionality, such as a Chassis Module or the third Expansion Module. To get the desired configuration of size and functionality, connect the two pins according to **Table 1**, upon installation. **Table 1** shows the necessary connections between Address IDs A, B, C and D. These Address IDs correspond to pins located on connector C4. See Table 4 in **Specifications 400**, to match the Address ID to the actual pin.



1. Connection C1
2. Connection C2
3. Connection C3
4. Connection C4
5. Connection C5

Fig. 1, Expansion Module

Module Configurations and External Strapping IDs			
System Definition	**Address ID Connection on Connector C4***	**J1939 Source Address**	**J1708 MID**
CHM	A–C Connection	71–CHM	249
EXM #1	A–D Connection	235	170
EXM #2	B–C Connection	236	187
EXM #3	B–D Connection	237	188

General Information

Module Configurations and External Strapping IDs			
System Definition	**Address ID Connection on Connector C4***	**J1939 Source Address**	**J1708 MID**
EXM #4	C–D Connection	238	178
EXM #5	A–B Connection	239	240

* Pin connections shown are Address IDs.

Table 1, Module Configurations and External Strapping IDs

Expansion Module Removal and Installation

Removal

IMPORTANT: It is normally not necessary to replace the Expansion Module (EXM). Removing and installing an Expansion Module should be a last resort to solving electrical problems, unless a unit needs replacing due to physical damage. Follow procedures in **Section 54.01, Troubleshooting 300**, Bulkhead Module, to help solve electrical problems involving the EXM before replacing either this module, the Bulkhead Module, or the Chassis Module. If troubleshooting indicates a malfunction of any of these modules, try reflashing the parameters and the software on the Bulkhead Module before replacing them. Also check external wiring.

Also see **Section 54.00**, Electrical System, for more information about the vehicle electrical system in general, and **Troubleshooting 300** in that section for help in troubleshooting the entire electrical system.

1. Disconnect the negative leads from the batteries.

NOTE: The EXM may be mounted anywhere on the vehicle. Refer to the configuration tab under the Bulkhead Module icon in ServiceLink to identify the proper circuits and modules involved.

NOTE: The Expansion Module may not have harnesses plugged in to all connectors. Connections without a harness should be plugged. Also remember that Standard and Limited Expansion Modules do not use connectors C2 or C5.

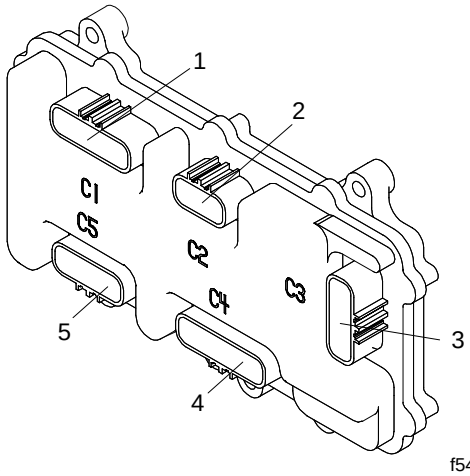
2. Unplug harnesses C1 through C5 from the expansion module. See **Fig. 1**.
3. Remove the three mounting bolts securing the Expansion Module and remove the module.

Installation

1. Make sure the negative leads from the batteries are disconnected.
2. Properly orient the Expansion Module. Install the module with the three mounting bolts and nuts.

NOTE: The Expansion Module may not have harnesses for all connectors. (Reminder: Standard and Limited Expansion Modules do not use connectors C2 or C5). Connections without a harness should be plugged.

3. Plug wiring harnesses into connectors C1 through C5. See **Fig. 1**.
4. Make sure all connectors, cavity plugs, and wire seals are fully seated.
5. Connect the batteries.
6. Check to make sure electrical components work.



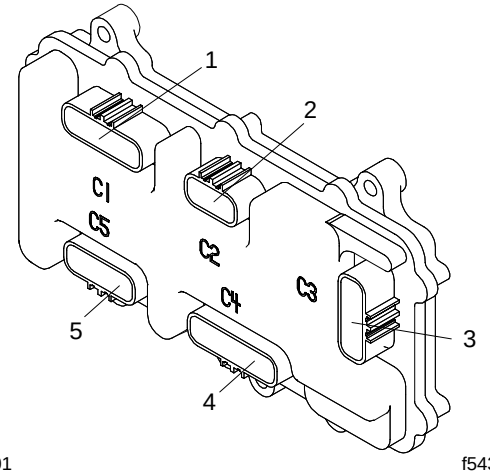
1. Connection C1
2. Connection C2
3. Connection C3
4. Connection C4
5. Connection C5

Fig. 1, Expansion Module

General Specifications

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

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



1. Connection C1
2. Connection C2
3. Connection C3
4. Connection C4
5. Connection C5

Fig. 1, Expansion Module (isometric view)

Expansion Module Connector Specifications

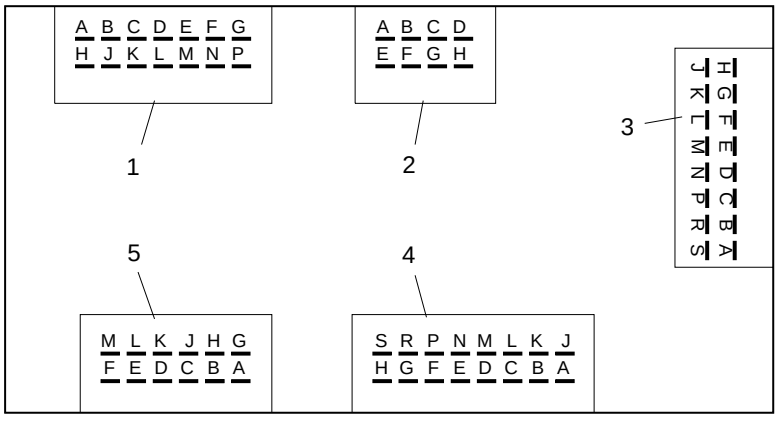
For harness pinouts at connector C1, see **Table 1**.

For harness pinouts at connector C2, see **Table 2**.

For harness pinouts at connector C3, see **Table 3**.

For harness pinouts at connector C4, see **Table 4**.

For harness pinouts at connector C5, see **Table 5**.



1. Connection C1
2. Connection C2
3. Connection C3
4. Connection C4
5. Connection C5

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

Specifications

Pinouts at Connector C1					
Connector Pin	Signal Type	Maximum Current: Amps	Normal Current: Amps		
			Full	Standard	Limited
C1-A	Digital Output	7.45	2.5	2.5	—
C1-B	—	—	—	—	—
C1-C	—	—	—	—	—
C1-D	Pass-Through	N/A	0.7	0.7	—
C1-E	Pass-Through	N/A	0.7	0.7	—
C1-F	Pass-Through	N/A	0.7	0.7	—
C1-G	Digital Output	7.45	2.5	2.5	—
C1-H	Digital Output	7.45	0.5	0.5	—
C1-J	Digital Output	7.45	2.5	2.5	—
C1-K	—	—	—	—	—
C1-L	Digital Output	7.45	2.7	2.7	6.7
C1-M	—	—	—	—	—
C1-N	Digital Output	7.45	2.7	2.7	6.7
C1-P	Digital Output	7.45	2.5	2.5	—

Table 1, Pinouts at Connector C1

Pinouts at Connector C2					
Connector Pin	Signal Type	Maximum Current: Amps	Normal Current: Amps		
			Full	Standard	Limited
C2-A	Digital Output	1	0.2	—	—
C2-B	—	—	—	—	—
C2-C	Module Ground	0.2	0.2	—	—
C2-D	Pass-Through	N/A	0.2	—	—
C2-E	Digital Output	7.45	0.2	—	—
C2-F	Digital Output	15	0.2	—	—
C2-G	Pass-Through	N/A	0.2	—	—
C2-H	Digital Output	7.45	0.2	—	—

Table 2, Pinouts at Connector C2

Pinouts at Connector C3					
Connector Pin	Signal Type	Maximum Current: Amps	Normal Current: Amps		
			Full	Standard	Limited
C3-A	Digital Output	20	20	—	—

Pinouts at Connector C3					
Connector Pin	Signal Type	Maximum Current: Amps	Normal Current: Amps		
			Full	Standard	Limited
C3-B	Data Bus Connection (J1708–)	—	—	—	—
C3-C	Digital Output	7.45	3.35	—	—
C3-D	Digital Output	7.45	3.35	—	—
C3-E	Digital (Active Low)/Analog Input	—	—	—	—
C3-F	Digital (Active Low)/Analog Input	—	—	—	—
C3-G	Digital (Active Low) Input	—	—	—	—
C3-H	Module Ground	—	—	—	—
C3-J	Module Power	30	30	30	—
C3-K	Digital Output	7.45	4.0	—	—
C3-L	Digital Output	7.45	4.8	4.8	6.7
C3-M	Digital Input (Active High)	—	—	—	—
C3-N	Digital Output	7.45	2.85	2.85	—
C3-P	Pass-Through	N/A	2.3	2.3	—
C3-R	Digital Output	7.45	2.85	2.85	6.7
C3-S	Data Bus Connection (J1708+)	—	—	—	—

Table 3, Pinouts at Connector C3

Pinouts at Connector C4					
Connector Pin	Signal Type	Maximum Current: Amps	Normal Current: Amps		
			Full	Standard	Limited
C4-A	Module Wake-up (Digital Input)	—	—	—	—
C4-B	Address ID A (Analog Input)	—	—	—	—
C4-C	Digital Output	15	0.7	0.7	—
C4-D	Digital Output	15	0.7	0.7	—
C4-E	Address ID C (Analog Input)	—	—	—	—
C4-F	Digital Output	7.45	4.0	—	—

Specifications

Pinouts at Connector C4					
Connector Pin	Signal Type	Maximum Current: Amps	Normal Current: Amps		
			Full	Standard	Limited
C4-G	Data Bus Connection (J1939+)	—	—	—	—
C4-H	Address ID D (Signal Ground)	—	—	—	—
C4-J	Module Power	30	30	—	—
C4-K	Digital Output	7.45	5.6	5.6	—
C4-L	Digital Output	15	0.7	0.7	—
C4-M	Digital Output	15	0.7	0.7	—
C4-N	Address ID B (Analog Input)	—	—	—	—
C4-P	Module Power	30	30	30	30
C4-R	Data Bus Connection (J1939–)	—	—	—	—
C4-S	Module Ground	—	—	—	—

Table 4, Pinouts at Connector C4

Pinouts at Connector C5					
Connector Pin	Signal Type	Maximum Current: Amps	Normal Current: Amps		
			Full	Standard	Limited
C5-A	Analog Input	—	—	—	—
C5-B	Analog Input	—	—	—	—
C5-C	Signal Ground	—	—	—	—
C5-D	—	—	—	—	—
C5-E	—	—	—	—	—
C5-F	Analog Input	—	—	—	—
C5-G	Analog Input	—	—	—	—
C5-H	Digital Output	0.85	0.7	—	—
C5-J	Digital Output	0.85	0.7	—	—
C5-K	—	—	—	—	—
C5-L	Digital Output	0.85	0.7	—	—
C5-M	Digital Output	0.85	0.7	—	—

Table 5, Pinouts at Connector C5