H-1939CM507-BP J1939 Translator
2023-2025 Ford Super Duty F250-F600

Introduction

The H-1939CM507-BP translator plugs into the vehicle's Gateway connector and acquires proprietary vehicle data which it translates and transmits over a separate J1939 protocol network. This allows 3rd party J1939 devices to be installed on light duty vehicles which do not support J1939 protocol. By moving 3rd party devices off of the OEM network and onto a separate J1939 network, OEM network bandwidth traffic problems are eliminated as well as conflicts between multiple 3rd party devices.

Installation Instructions

WARNING
Disconnect the battery to prevent setting a check engine light.

Disconnect vehicle battery before proceeding with installation.

IMPORTANT—READ BEFORE INSTALLATION

It is the installer's responsibility to route and secure all wiring harnesses where they cannot be damaged by sharp objects, mechanical moving parts and high heat sources. Failure to do so could result in damage to the system or vehicle and create possible safety concerns for the operator and passengers.

Avoid placing the module where it could encounter strong magnetic fields from high current cabling connected to motors, solenoids, etc. Avoid radio frequency energy from antennas or inverters next to the module. Avoid high voltage spikes in vehicle wiring by always using diode clamped relays when installing upfitter circuits.

H-1939CM507-BP Module

Remove the lower dash panel below the steering column area and find a suitable location to mount the H-1939CM507-BP module. Locate the module in an area away from any external heat sources (engine heat, heater ducts, etc.). Do not actually mount the module until all wire harnesses are routed and secure (last step of the installation is to mount the module).

Data Link Harness Installation

The Ford Super Duty has an OEM Gateway module located on the other side of the SYNC 4 module, which is behind the center console. Follow the steps below to access it:

Installation Instructions (continued)

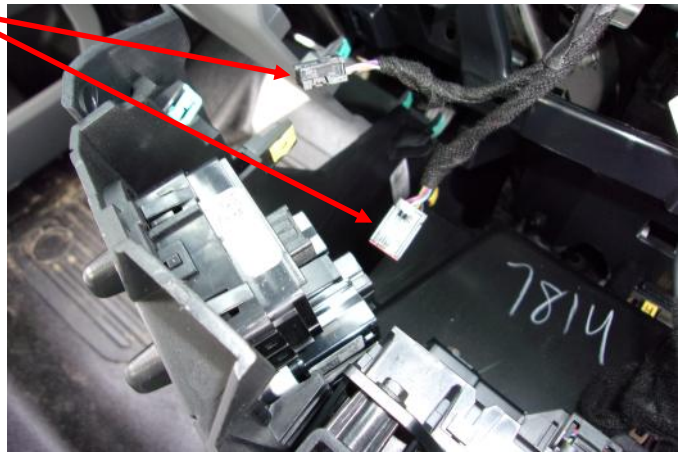
1. Remove the RH instrument panel trim using a trim removal tool. The trim starts at the ignition switch and ends at the silver clip. The glove compartment can be opened to better access the back side of the trim.

2. Using a trim removal tool, pop out the upper right corner of the lower steering column close out panel. Position it away from the center stack.

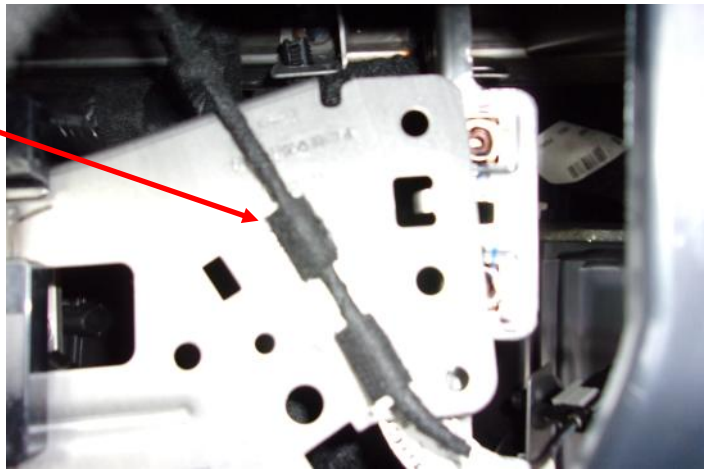
3. Remove the four bolts (Size: 7mm) located at the top of the center stack.

4. Release the clips on both sides of the center stack using a trim removal tool. Position the center stack away from the mounting points.

5. Disconnect the two connectors behind the center stack.



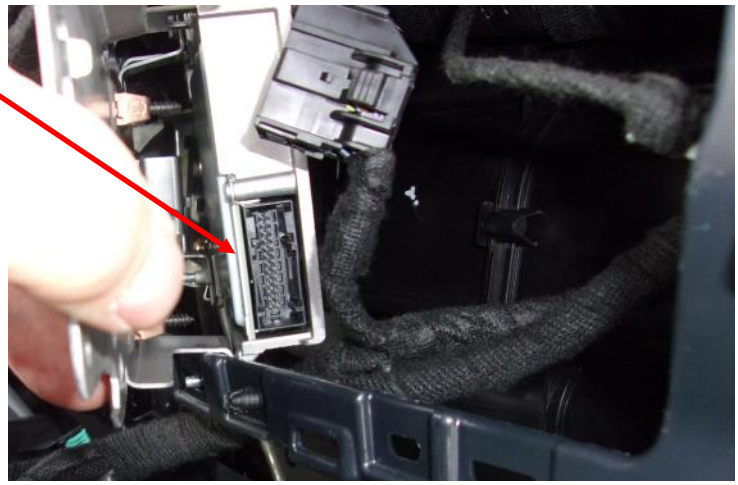
6. Detach the push-mount cable tie from the bracket and position the cable out of the way.



Installation Instructions (continued)

7. Remove the 4 bolts (Size: 7mm) and position the bracket away from the mounting points to access the Gateway Module. The Gateway Module is located behind the bracket.

8. Disconnect the Gateway Connector by pressing down on the tab and pulling the connector away from the module.



9. Install the Data Link Harness between the Gateway Module and the disconnected Gateway Connector.

10. Run the 6-pin connector of the Data Link Harness to the mounting location of the H-1939CM507-BP module.

11. After the Data Link Harness is installed, reverse the installation procedure to reassemble.

Installation Instructions (Continued)

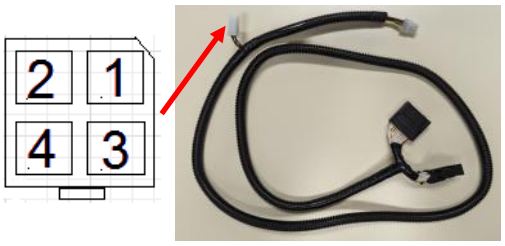
H-1939CM507-BP Translator Connection Output

The H-1939CM507-BP Data Link Harness has a 4-Pin white connector that provides J1939 CAN 2 High and CAN 2 Low signals for connecting to a 3rd party device.

Pin 1 Dark Green Wire - J1939 CAN 2 High Pin 2 Red Wire - Battery Voltage

Pin 3 Brown Wire - J1939 CAN 2 Low Pin 4 Gray Wire - Ground

Mating connectors: Molex 39012040 Termination: 39000038 18-24 AWG 39000077 16 AWG



Initial Installation:

1. With vehicle in PARK, Park Brake ON, key in RUN, plug the 6-pin connector of the Data Link Harness into the H-1939CM507-BP module.
2. On this first boot-up, the module sends a request to see what optional PGNs are available on the vehicle. The module stores this information internally and uses it on subsequent boot-up sequences.
3. To verify a successful initial power-up sequence, observe the module LEDs. There should be no LEDs ON. If LEDs 1-4 are scrolling, this indicates two possible things:
    i. The module is trying to acquire the VIN
    ii. The module acquired the VIN and deemed it to be invalid.

In the first case, repeat Step 1 to make sure the ignition is in the right state for the vehicle to provide VIN to the module.

In the second case, one LED will remain on after the scrolling pattern has completed. See "Error Mode" on the next page for details.

If errors persist, contact InterMotive Technical Support.

Module Configurations:

Starting with Firmware version 4.07, the 1939CM507 allows for four different configuration options. The options allow for baud rates of 250kbps or 500kbps and for active data to be enabled or disabled.

The configurations are defined as the following:

- **CM507-02P** has a J1939 baud rate of 250kbps and active data disabled. This is the default configuration.
- **CM507-02A** has a J1939 baud rate of 250kbps and active data enabled.
- **CM507-05P** has a J1939 baud rate of 500kbps and active data disabled.
- **CM507-05A** has a J1939 baud rate of 500kbps and active data enabled.

Operational Instructions

Optional PGN Enable

Some vehicles support additional network data (PGNs/SPNs) which may be required by the 3rd party device that will be connected to the H-1939CM507-BP. The module comes from the factory with this optional data disabled. If the 3rd party device requires this data, perform the following sequence to enable this additional data:

1. Ensure the vehicle is in PARK, the Park Brake ON, and the key in RUN. Be ready to apply the Service Brake. It will need to be applied several times right after pressing the Test button on the module. Press the Test button once to start the procedure.
2. Apply and release the Service Brake four times within five seconds and then observe the module LEDs. The module recognizes this sequence and enables acquisition of the optional data. As a visual feedback that this occurred, the module will scroll the LEDs twice. If this did not occur, wait five seconds and try again. **NOTE**: The optional PGNs/SPNs can be disabled again by executing the same procedure.
3. Once the optional data has been enabled, press the Test button to put the module into the "PGNcheck" diagnostic mode and observe which PGNs are active. See next page for details.

Normal Operation

Once power is applied to the module or it wakes up on CAN traffic, there is a period of two seconds before the module starts transmitting data on the J1939 port. If there is no connection on the J1939 port, the module will sense this and stop transmitting until proper equipment (terminated with 120 ohms) is attached.

Inactive Operation

When the key is turned off and the vehicle's CAN traffic stops, the module ceases operation after 15 seconds and goes into a low-power state. It will remain in this state until it detects CAN traffic again, at which point it will wake up and begin transmitting data. If optional PGNs are enabled, the module will not request this data until the key is in the RUN position.

Diagnostic Modes

The H-1939CM507-BP module has three diagnostic modes spanning five diagnostic pages that utilize its LEDs. This can be helpful in troubleshooting or determining what vehicle data is available. The first press of the Test button will cause the module to enter Page 1, and each subsequent press will enter the next diagnostic page. The "ST" LED on the module will blink out the number of the page that is currently active (e.g. blink once on Page 1, blink twice on Page 2, etc.).

Page 1 is called "TestDiag" mode. Pages 2, 3, and 4 are called "PGNcheck" mode. Finally, Page 5 is a Baud rate mode for the J1939 output. In this mode with the appropriate vehicle conditions, the J1939 Baud rate can be toggled between 250kbps and 500kbps if necessary. Without the appropriate conditions, the module will flash LEDs to indicate the current Baud rate. The module will automatically exit these diagnostic modes and shut off the LEDs. The module continues to operate normally in all modes. Each diagnostic mode and its LED definition start below and continue on the next page.

TestDiag Mode

The LEDs defined below will blink depending on certain actions performed by the module.

ST LED – Indicates current diagnostic page

Page 1

LED1 – Unused
LED2 – Toggles when vehicle CAN messages are being received
LED3 – Toggles when data is being received over laptop connection
LED4 – Toggles when data is being transmitted from the J1939 port (normal)

Operational Instructions (continued)

PGNcheck Mode

Three diagnostic pages indicate optional PGN data that is being acquired. Each LED will indicate that the particular data shown below was received. All LEDs are turned OFF together every 2 seconds in this mode. Note that not all PGN data is available on all vehicles.

Page 2

LED1 – MAF Mass Air Flow
LED2 – AAT Ambient Air Temperature
LED3 – EOT Engine Oil Temperature
LED4 – BP Barometric Pressure

Page 3

LED1 – IMP Intake Manifold Pressure
LED2 – IAT Intake Air Temperature
LED3 – ELD Engine Load
LED4 – EFR Engine Fuel Rate

Page 4

LED1 – TP Throttle Position
LED2 – N/A Unused
LED3 – DTC Number of Ford Diagnostic Trouble Codes (Emissions Related DTCs)

BAUDdiag Mode

Page 5

This page will either show the current J1939 Baud rate or toggle it depending on certain conditions of the vehicle. If the Transmission is **NOT** in PARK and the Service Brake is **APPLIED** while entering this mode, the LEDs will blink according to the following:

LED1 only – Changing Baud rate to 250kbps
LED1 & LED2 – Changing Baud rate to 500kbps

If the conditions above are not satisfied, the LEDs will blink according to the following:

LED1 only – Baud rate is currently 250kbps
LED1 & LED2 – Baud rate is currently 500kbps

Error Mode

Some events can lead to an error condition which halts translator operation. These error states are indicated by certain patterns displayed by the LEDs. Error Modes are defined as follows:

- Failed to check all available PGNs: LEDs 1 - 4 scrolling in ascending order
- Invalid VIN Errors:
  - No VIN received: All LEDs scroll back and forth three times
  - Invalid manufacturer: All LEDs scroll back and forth three times and **LED1** stays on
  - Invalid model: All LEDs scroll back and forth three times and **LED2** stays on
  - Invalid engine type: All LEDs scroll back and forth three times and **LED3** stays on
  - Invalid model year: All LEDs scroll back and forth three times and **LED4** stays on

Module mounting

Ensure the Data Link harness is properly connected and routed and not hanging below the dash area. Mount the module as described on Page 1 and secure using supplied screws or double sided tape.

J1939 PGN and SPN Definition

The table below defines the J1939 PGNs/SPNs that are available. The PGNs labeled "Default" are automatically enabled and available, whereas the optional PGNs need to be "Turned ON" if required by the 3rd party device connected to the J1939 connector.

Function	SPN	PGN	Availability
VSS - Vehicle Speed	SPN84	PGN65265	Default
RPM - Engine Revs per Minute	SPN190	PGN61444	Default
ECT - Engine Coolant Temp	SPN110	PGN65262	Default
TFT - Trans Fluid Temp	SPN177	PGN65272	Default
FL - Fuel Tank Level	SPN96	PGN65276	Default
APP - Accelerator Pedal Position	SPN91	PGN61443	Default
PB - Park Brake	SPN619	PGN65274	Default
SB - Service Brake	SPN597	PGN65265	Default
ABS - Anti Lock Brake System Event	SPN563	PGN61441	Default
TR - Transmission Range	SPN163	PGN61445	Default
ODO - Odometer	SPN917	PGN65217	Default
AAT - Ambient Air Temperature	SPN171	PGN65269	Default
ENG RUN - RPM > 400		PGN61452	Default
MIL - Malfunction indicator Lamp		PGN61452	Default
AC Clutch - Air Conditioner Clutch On		PGN61452	Default
Key Position		PGN61452	Default
DFDR - Driver Side Front Door		PGN61452	Default
DRDR - Driver Side Rear Door		PGN61452	Default
PFDR - Passenger Side Front Door		PGN61452	Default
PRDR - Passenger Side Rear Door		PGN61452	Default
RDR - Rear Door		PGN61452	Default
Park Lamp		PGN61452	Default
Low Beam		PGN61452	Default
High Beam		PGN61452	Default
DRL - Daytime Running Lights		PGN61452	Default
Turn Signal		PGN61452	Default
DRLKS - Door Locks		PGN61452	Default
DTC Count - Diag Trbl Codes (Emissions)		PGN61452	Optional
EFR - Engine Fuel Rate	SPN183	PGN65266	Optional
BP - Barometric Pressure	SPN108	PGN65269	Optional
IAT - Intake Air Temperature	SPN105	PGN65270	Optional
ELD - Engine Load	SPN92	PGN61443	Optional
VIN - Vehicle Identification Number		PGN59904	Requested

All PGNs having an SPN designation will be formatted and transmitted as stated in the SAE J1939-71 (Rev. AUG2002) standards document. Some of the PGNs on the previous chart do not have SPNs specified. These are custom-defined and have chassis data in the locations described below. **NOTE:** For any of the 2-bit definitions below, a value of "01" indicates a TRUE condition (as defined), a "00" indicates a FALSE condition, and if both bits are HIGH, data is to be considered invalid.

PGN 61452 Format:

Key Position (4 bits)	Byte 0, bits 0 - 3
	1 = OFF (0001)
	2 = ACC (0010)
	4 = Run (0100)
	8 = Crank (1000)
	F = Data invalid (1111)
Doors Open/Closed (2 bits)	Driver Front – Byte 0, bits 6 & 7
	Passenger Front – Byte 1, bits 0 & 1
	Driver Rear – Byte 1, bits 2 & 3
	Passenger Rear – Byte 1, bits 4 & 5
	Rear – Byte 1, bits 6 & 7
Engine Run (2 bits)	Byte 2, bits 0 & 1
MIL (2 bits)	Byte 2, bits 2 & 3
DRL (2 bits)	Byte 2, bits 4 & 5
AC Clutch (2 bits)	Byte 2, bits 6 & 7
Park Lamp (2 bits)	Byte 3, bits 0 & 1
Low Beam (2 bits)	Byte 3, bits 2 & 3
High Beam (2 bits)	Byte 3, bits 4 & 5
Door Locks (3 bits)	Byte 4, bits 0 - 2
	001 – All doors locked
	010 – All doors unlocked
	011 – Driver door unlocked
	111 – Data invalid
EOP On (2 bits)	Byte 4, bits 4 & 5
DTC Count (7 bits)	Byte 5, bits 0 - 6
12V Battery Voltage (2 bytes)	Bytes 6 & 7

PGN 61450 Format:

Turn Signals (3 bits)	Byte 4, bits 0-2
	001 – Right
	010 – Left
	011 – Hazard (both)
	111 – Data invalid
J1939 Output Protocol Version (1 byte)	Byte 5
1939CM507 Firmware Version (2 bytes)	Bytes 6 & 7

NOTES on certain PGN data:
DTC count is defined to be only for Emissions-related DTCs at present.
ODO is read in meters (as defined)
VIN must be requested - J1939 REQ PGN 59904 using destination address 65260. VIN will then be transmitted in a multi-frame packet to this address (65260).

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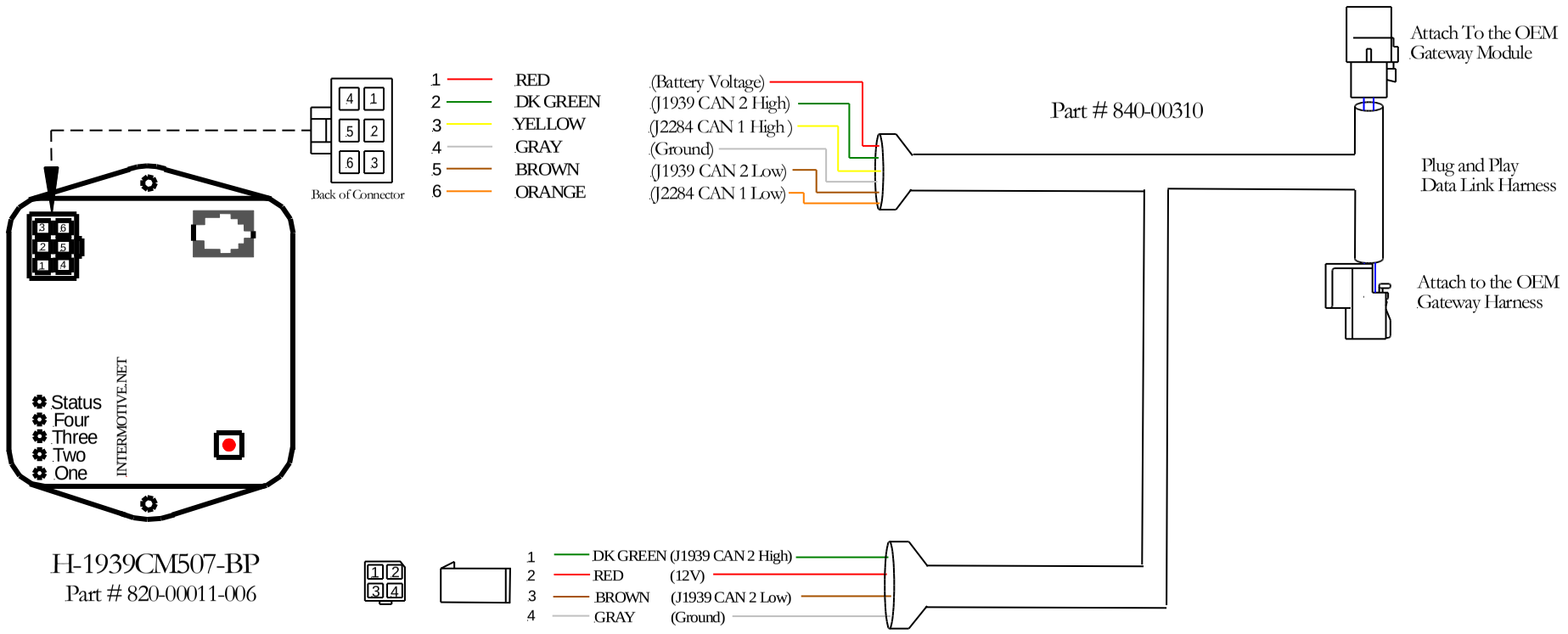

Submit product registration at www.intermotive.net

If the 1939CM507-BP-A fails any step in the Post Installation Test, review the installation instructions and check all connections. If necessary, call InterMotive Technical Support at (530) 823-1048.