An ISO 9001:2015 Registered Company

1939CM506-AP J1939 Translator
2011-2016 F250-F550 (A-1939CM506-AP)
2017-2021 Ford F250-F600 (B-1939CM506-AP)
2020 - 2022 Ford Transit (B-1939CM506-AP) *
2021 Ford F650/750 (B-1939CM506-AP)

* For vehicles with the OEM gateway connector located below the lower left dash panel (with a Black OBDII connector). For vehicles with the gateway connector located behind the glovebox (White OBDII connector), use the G-1939CM506-AP.

Introduction

The 1939CM506-AP translator plugs into a vehicle's OBDII or 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 OBDII network and onto a separate J1939 network, OEM network bandwidth traffic problems are eliminated as well as conflicts between multiple 3rd party devices.

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

Installation Instructions

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.

J1939CM506 Module

Remove the lower dash panel below the steering column area and find a suitable location to mount the 1939CM506-AP 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

Data Link Harness (2011-2016 F250-F550)

1. Locate the vehicle OBDII Data Link Connector. It will be mounted below the lower left dash panel.
2. Remove the mounting screws for the OBDII connector. Plug the red connector from the Data Link Harness into the vehicle's OBDII connector. Ensure the connection is fully seated and secured with the supplied wire tie.
3. Mount the black connector from the Data Link Harness in the former location of the vehicle's OBDII connector.
4. Leave the 6-pin "Data Link" connector unplugged from the 6-pin connector on the 1939CM506-AP module.

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Installation Instructions (Continued)

1939CM506 Translator Connection Output

The 1939CM506-AP Data Link Harness has a 4-Pin White connector that provides J1939 CAN 1 High and CAN 1 Low signals for connecting to a 3rd party device.

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

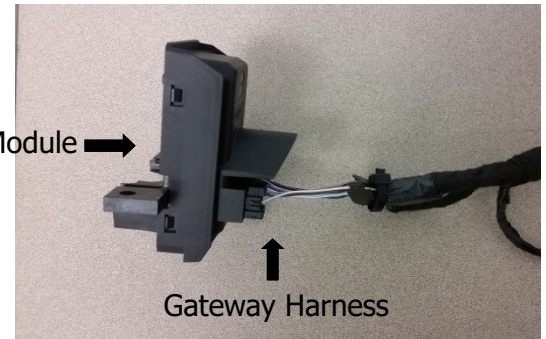Pin 3 Blue Wire - J1939 CAN 1 Low   Pin 4 Gray Wire - Ground
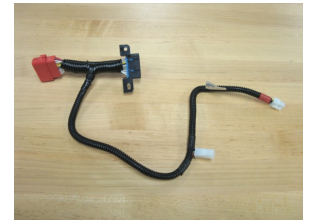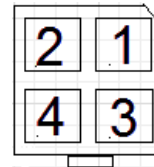
Mating connectors: Molex 39012040   Termination: 39000038 18-24 awg   39000077 16 awg

Ford 24-pin Data Link Harness
(2017 to 2021 Ford F250-F550)
(2020 to 2022 Ford Transit)
(2021 Ford F650/750)

Gateway Module
Gateway Harness

1. Locate the vehicles Gateway Module. It will be mounted below the lower left dash panel.
2. Remove the harness behind the Gateway module by pressing the locking tab and pulling outward.
3. Plug the Female side of the Intermotive 1939CM506 Harness into the back of the Gateway module. Ensure the connection is fully seated and secured by the locking tab.
4. Plug the Male side of the Intermotive Data Link Harness into the Gateway harness.
5. Secure the Gateway harness so that it does not hang below the lower dash panel.
6. Plug the 6-pin Molex connector into the 1939CM506-A module.
7. Plug the 3rd party J1939 device into either the 2 or 4-pin connectors from the S-H142AX harness.

To OEM Gateway Module
To 3rd Party Device
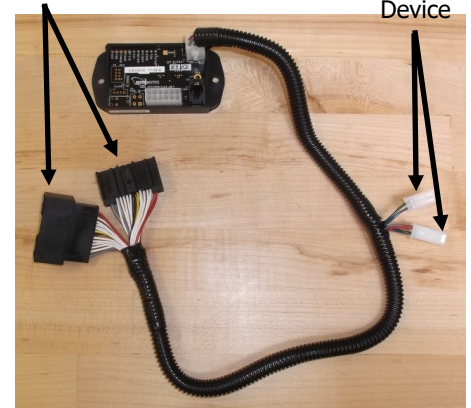
1939CM506-AP-A Translator Connection Output

The 1939CM506-AP harness provides a 4 pin connector for interfacing to 3rd party J1939 devices. There is also an optional stub harness which provides the more common J1939 type of barrel connector if desired.

Pin#1 Green - J1939 CAN High   Pin#2 Red—Battery Voltage (2A max)
Pin#3 Blue - J1939 CAN Low   Pin#4 Gray - Ground
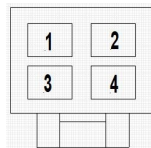
Reconnect vehicle battery

Optional Stub Harness

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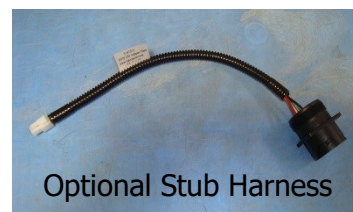
Initial Installation:

1. With vehicle in PARK, Park Brake ON, Ignition ON, Engine OFF, and 1939CM506-AP module **<u>unplugged</u>** from the 6-pin connector, press the 1939CM506-AP modules Test button.

2. Plug in the 6-pin 1939CM506-AP connector while holding the Test button for at least a second, then the button may be released.

3. The module recognizes this as a special power up sequence and requests the vehicle VIN as well as checks to see what Optional PGNs are available on the vehicle. The module stores this information internally and uses it on subsequent boot-up sequences.

4. To verify a successful initial power-up sequence, observe the module LEDs; there should be no LEDs ON. If "scrolling" LEDs (1-4) are seen, another LED will also be ON solid – this indicates a problem occurred while powering up (see Error Mode below).   In this case, try repeating the special power up sequence again. If errors persist, contact Intermotive Technical Support.

Operation

Optional PGN Enable: Some vehicles support additional network data (PGN/SPN's) which may be required by the 3rd party device that will be connected to the 1939CM506-AP. 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. With vehicle in PARK, Park Brake ON, and Ignition ON, Engine OFF, put the module into the "TestDiag" mode by pressing the Test button on the module (does NOT require disconnecting 6 pin connector—see below) .

2. Observe the module LEDs as you engage and disengage the Service Brake 4 times within 5 sec. 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. NOTE: the optional PGN/SPN's can be disabled again by executing the same sequence of events (i.e. it's a toggle operation).

3. Once the optional data has been enabled, put the module into the PGN check diag mode and observe which PGNs are active (see below).

Normal Operation: Once power is applied to the module or it wakes up on CAN traffic, there is a period of 2 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 CAN traffic stops, the module ceases operation after 20 sec. 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.

Operation (continued)

Diagnostic Mode: The 1939CM506-AP module has 2 diagnostic modes that enable it's LEDs. This can be helpful in troubleshooting or determining what vehicle data is available. Pressing the Test button on the module will cause it to enter the "TestDiag" mode. A second press enables "PGNcheck" mode. A third press will exit these diagnostic modes and shut off the LEDs. The module continues to operate normally in all modes. The LED's are defined as follows:

TestDiag Mode (first Test button press)

LED1 – toggles at a 1 sec. rate to indicate TestDiag Mode
LED2 – toggles when vehicle HSCAN data is being received
LED3 – toggles when data is being *received* on the J1939 port (rare)
LED4 – toggles when data is being received over laptop connection
LED8 – toggles when data is being transmitted out the J1939 port (normal)

PGNcheck Mode – Each LED (by turning ON) will indicate that particular Optional PGN data has been acquired. All LED's are turned OFF together every 2 sec. in this mode. Note that not all PGN data is available on all vehicles.

LED1 – MAF   Mass Air Flow
LED2 – AAT   Ambient Air Temperature
LED3 – EOT   Engine Oil Temperature
LED4 – BP   Barometric Pressure
LED5 – IMP   Intake Manifold Pressure
LED6 – IAT   Intake Air Temperature
LED7 – ELD   Engine Load
LED8 – EFR   Engine Fuel Rate
LED9 – TP   Throttle Position
LED10 – DTC   Diagnostic Trouble Codes are present (Emissions Related DTC's)

Error Mode – certain events can lead to a condition which halts translator operation. This can be observed by LEDs 1 – 4 scrolling and one of three (6, 7, or 8) LEDs being constantly ON. While there can be several causes for the three errors listed below, the most common fault is poor or no connection to the OBDII connector. Error Modes are defined as follows:

LED6 – Module failed to receive all information about which optional PGNs are available.
LED7 – Invalid VIN received. Module may be installed in currently unsupported vehicle.
LED8 – Module timed out (about 8 sec) waiting for a VIN to be received during installation.

The following page defines the J1939 PGN/SPN's 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.

Module mounting

Ensure all harness are properly connected and routed, and are not hanging below the dash are. Mount the module as described on page one and secure using supplied screws or double sided tape.

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Function	SPN	PGN	Dflt / Opt
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
EOP On/Off - Engine Oil Pressure		PGN61452	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 - Eng Fuel Rate	SPN183	PGN65266	Optional
BP - Barometric Pressure	SPN108	PGN65269	Optional
EOT - Engine Oil Temp	SPN175	PGN65262	Optional
ELD - Engine Load	SPN92	PGN61443	Optional
AAT - Ambient Air Temperature	SPN171	PGN65269	Optional
VIN - Vehicle Identification Number		PGN59904	Requested

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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 SPN's 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
Hi 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
UNDEFINED	Bytes 6 & 7

PGN 61450 Format:

MAF (2 bytes)	Bytes 0&1
Turn Signals (3 bits)	Byte 4 bits 0-2

	001 – Right
	010 – Left
	011 – Hazard (both)
	111 – Data invalid

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) and the resolution is 10m for Ford vehicles.

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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1939CM506-AP
Part # S-M1211-95

InterMotive Vehicle Controls
Made in USA

Status
TEN
NINE
EIGHT
SEVEN
SIX
FIVE
FOUR
THREE
TWO
ONE

Back of Connector

1 —— RED —— (Battery Voltage)
2 —— GREEN —— (J1939 CAN 1 High)
3 —— YELLOW —— (J2284 CAN 2 High)
4 —— GRAY —— (Ground)
5 —— BLUE —— (J1939 CAN 1 Low)
6 —— BROWN —— (J2284 CAN 2 Low)

1 —— GREEN (J1939 CAN 1 High)
2 —— RED (12V)
3 —— BLUE (J1939 CAN 1 Low)
4 —— GRAY (Ground)

Part # S-H42BX

Attach To OEM OBDII Connector
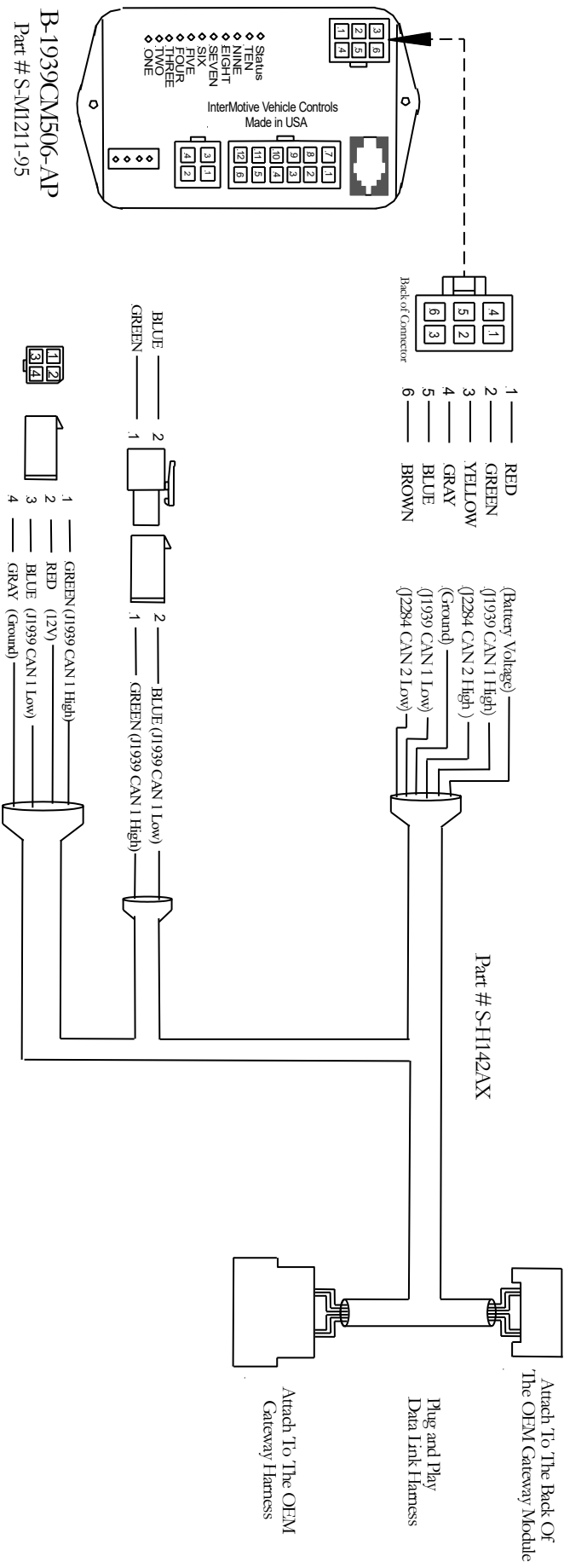
Plug and Play Data Link Harness

Pass Through OBDII Connector

Submit product registration at www.intermotive.net

If the 1939CM506-AP-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.

B-1939CM506-AP
Part # S-M1211-95

InterMotive Vehicle Controls
Made in USA

Status
TEN
NINE
EIGHT
SEVEN
SIX
FIVE
FOUR
THREE
TWO
ONE

Back of Connector

1 ——— RED ——— (Battery Voltage)
2 ——— GREEN ——— (J1939 CAN 1 High)
3 ——— YELLOW ——— (J2284 CAN 2 High)
4 ——— GRAY ——— (Ground)
5 ——— BLUE ——— (J1939 CAN 1 Low)
6 ——— BROWN ——— (J2284 CAN 2 Low)

Part # S-H142AX

BLUE ——— 2 ——— BLUE (J1939 CAN 1 Low)
GREEN ——— 1 ——— GREEN (J1939 CAN 1 High)

2 ——— GREEN (J1939 CAN 1 High)
1 ——— BLUE (J1939 CAN 1 Low)

1 ——— GREEN (J1939 CAN 1 High)
2 ——— RED (12V)
3 ——— BLUE (J1939 CAN 1 Low)
4 ——— GRAY (Ground)

Attach To The Back Of
The OEM Gateway Module

Plug and Play
Data Link Harness

Attach To The OEM
Gateway Harness

If the 1939CM506-AP-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.

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