CAM502
Camera Aftermarket Module

2020-2025 Ford Transit (B-)
2021-2026 Ford E-Series (B-)
2020-2023 Ford F53/F59 (B-)
2015-2020 Ford F150 (B-)
2022-2025 Ford Transit w/Sync4 (G-)
2021-2023– Ford F150 (G-)

Introduction

The Camera Aftermarket Module (CAM) is a vehicle camera controller system which will turn on up to eight cameras by providing eight different 12V @ 1/2A signals when the ignition switch is in Run and the appropriate camera conditions are met. CAM supports key-off operation while the vehicle is awake.

All 8 outputs output vehicle voltage when active. Output 1 will float when inactive, Outputs 2-8 will ground when inactive.

Installation Instructions

Disconnect the battery before proceeding with the installation.

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

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.

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

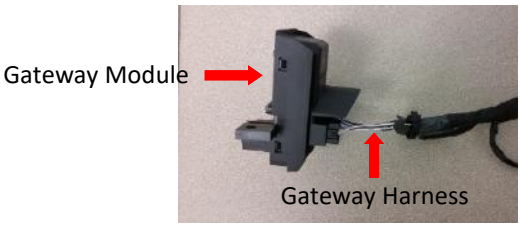
CAM502 Module

Remove the lower dash panel below the steering column and find a suitable location to mount the CAM502 module. Do not mount the module where it will be exposed to excessive heat. Do not mount the module until all wire harnesses are routed and secure. The last step of the installation is to mount the module.

Data Link Harness Installation:

Gateway Plug and Play Harness (B-CAM502)

1. Locate the vehicles Gateway Module (C2431). 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 Gateway 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 Gateway harness.
5. Secure the BOM Gateway harness so that it does not hang below the lower dash panel.

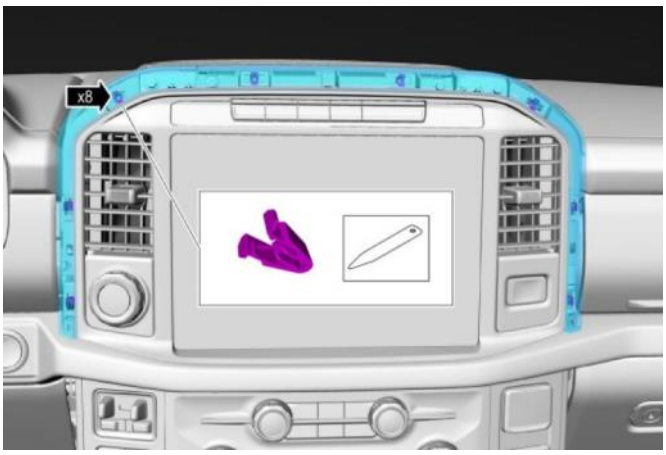


InterMotive Plug and Play Gateway Harness

Data Link Harness (G-CAM502)

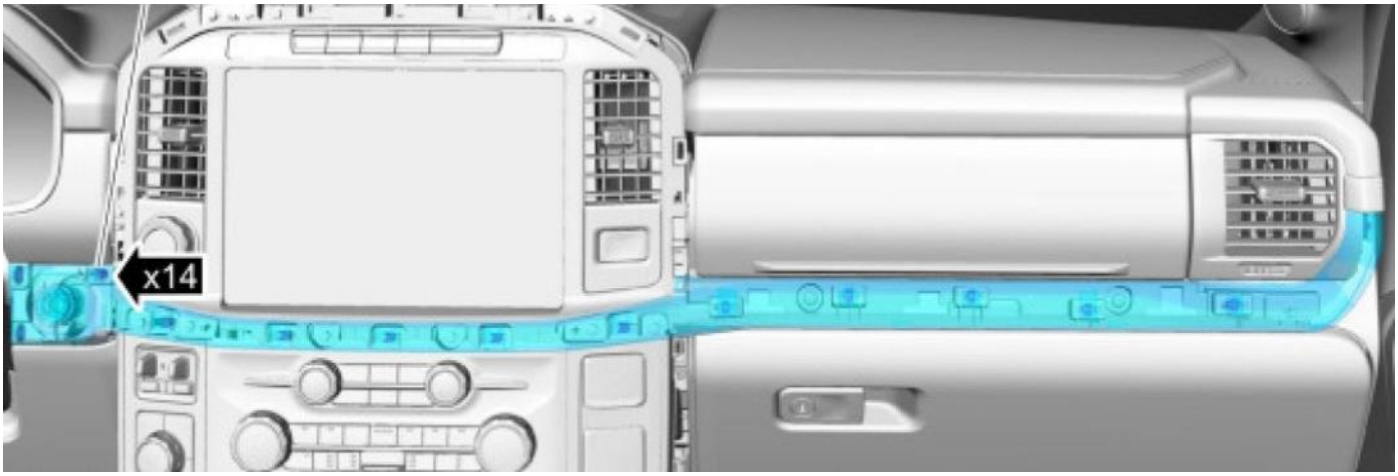
2021-2023 F150

1. Remove the upper centerstack bezel using a plastic trim tool. There are 8 clips securing it to the dash.



Data Link Harness (G-CAM502) continued:

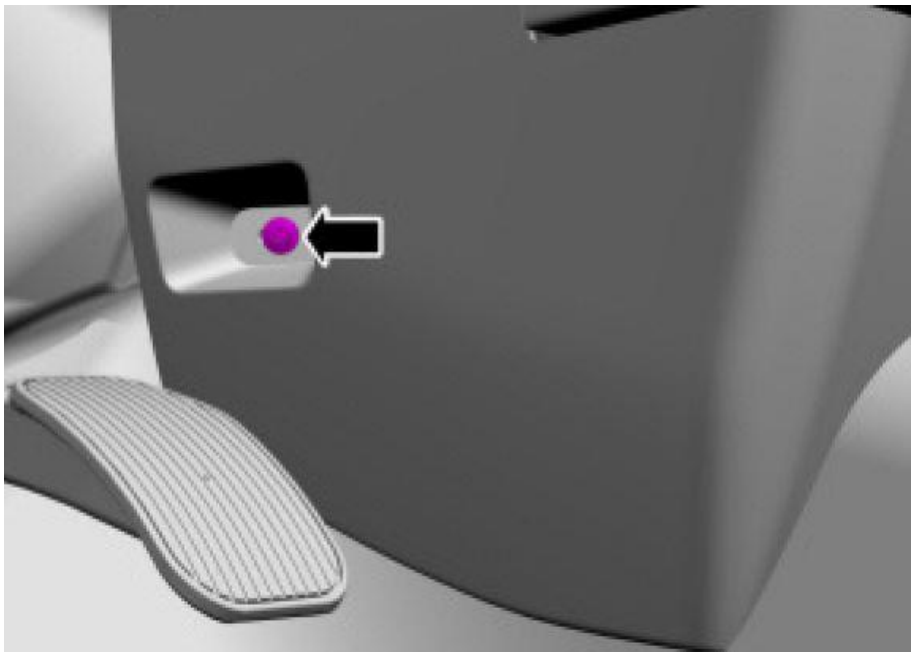
2. Remove the instrument center trim panel using a plastic trim tool. There are 14 clips security it to the dash.



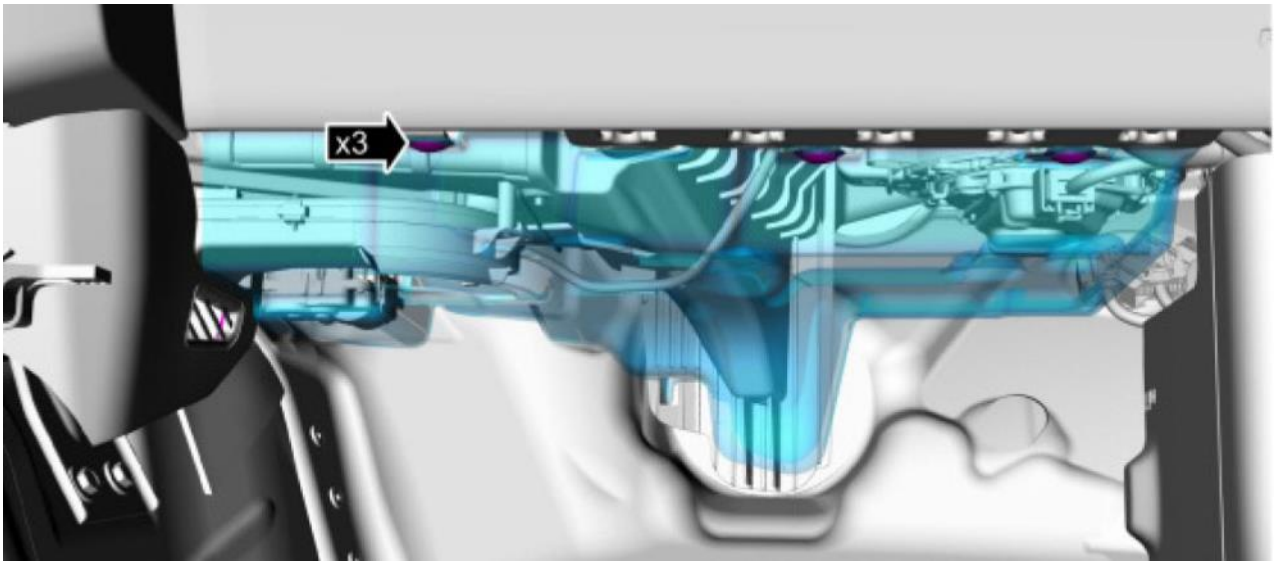
3. Grasp the lower trim panel below the steering column and pull down. Unscrew the (2) 7mm screws and remove them. Remove the remainder of the lower steering column panel using a plastic trim removal tool. There are 7 clips securing it to the dash.

Data Link Harness (G-CAM502) continued:

4. Remove the 7 mm screw from the instrument panel lower trim panel.

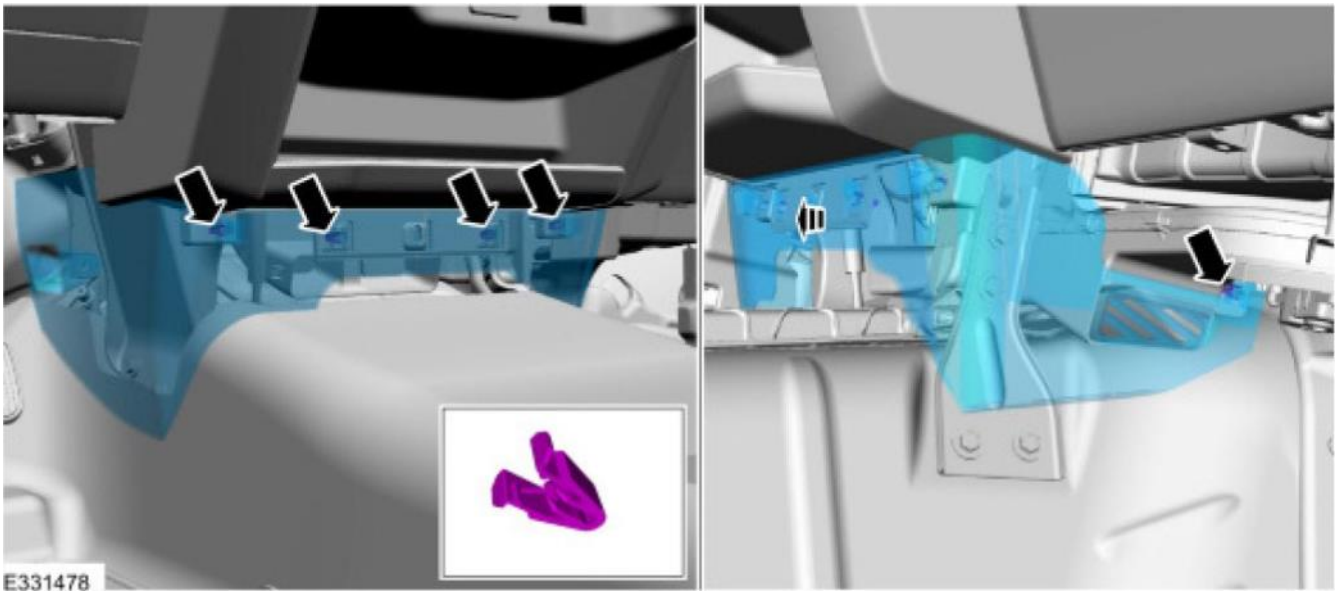


5. Remove the (3) pin-type retainers from the fabric trim panel located below the glovebox and remove the trim panel.



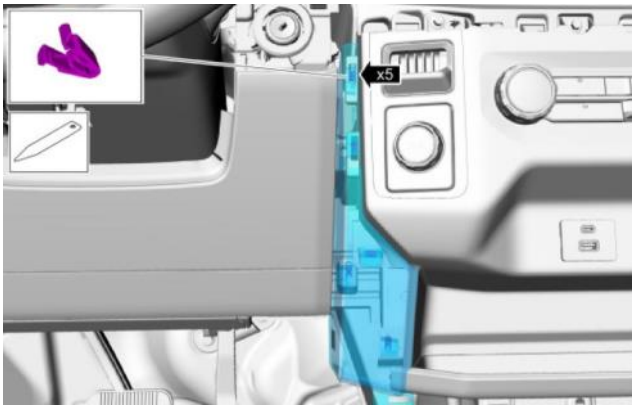
Data Link Harness (G-CAM502) continued:

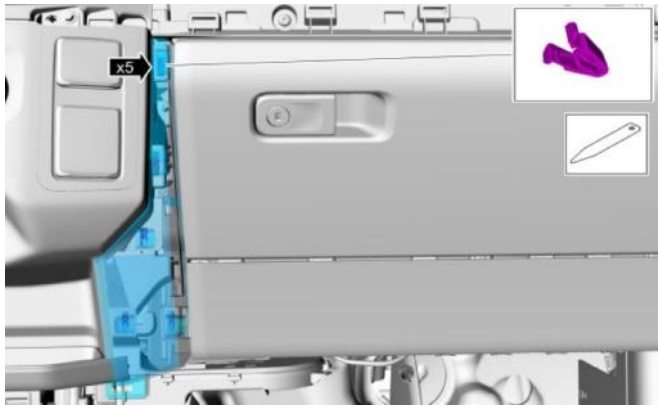
6. Remove the instrument panel lower trim panel using a plastic trim removal tool. There are 6 clips securing it to the dash.



Data Link Harness (G-CAM502) continued:

7. Remove the left and right lower centerstack trim panels. They each have 5 clips securing it to the dash.





8. Remove the (4) 7 mm screws from the lower centerstack trim panel.

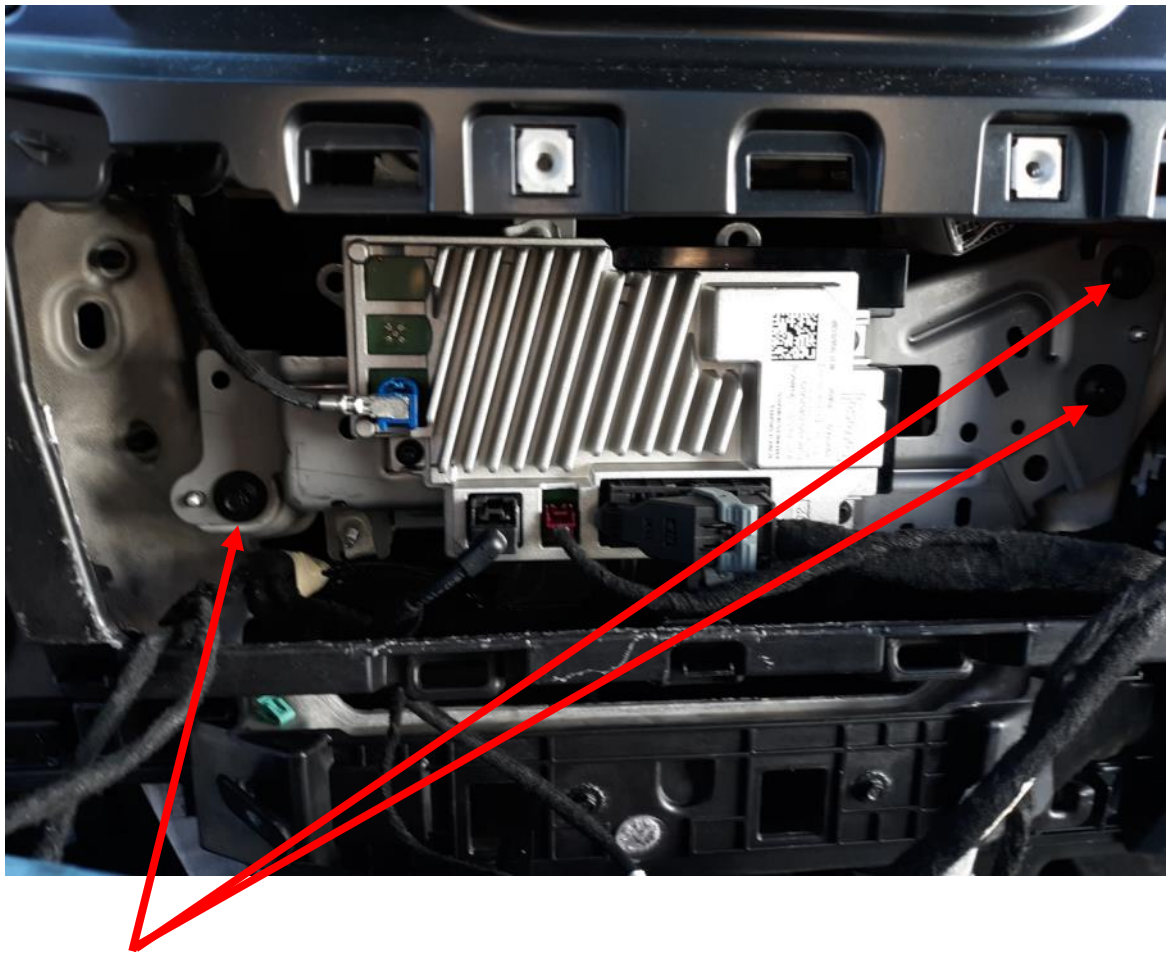
Data Link Harness (G-CAM502) continued:

9. Remove the (2) 10 mm screws from the left and the right sides of the centerstack trim panel.

10. Grab the centerstack trim panel and set it on the floor. There is no reason to disconnect any of the connectors.

Data Link Harness (G-CAM502) continued:

11. Locate the module below the radio and remove the connectors from the module.



12. Remove the (3) 8 mm screws from the module located below the radio.

Data Link Harness (G-CAM502) continued:

13. Locate the 26-pin connector and disconnect it from the Gateway Module. Plug the 26-pin connector into the mating connector on the Intermotive harness. Plug the Male connector from the Intermotive harness into the mating connector at the OEM Gateway module.

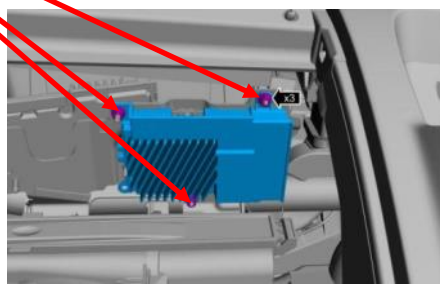
14. Reverse the instructions to reassemble the vehicle.

15. Plug the free end of the Data Link harness into the mating 6-pin connector on the G-CAM502 module.

Data Link Harness (G-CAM502):

2022-2024 Transit

1. Locate the vehicles Gateway Module. It will be mounted behind the glove compartment.
2. Press the tabs inward on the sides of the glove compartment and fully lower it.
3. Remove the 3 nuts securing the Gateway module to the vehicle.
4. Remove the 26-pin connector from the side of the Gateway module and plug into the mating connector on the G-CAM502 harness.
5. Plug the male 26-pin connector from the G-CAM502 harness into the Gateway module.
6. Reinstall the Gateway module and the glove compartment.
7. Plug the free end of the Data Link harness into the mating 6-pin connector on the G-CAM502 module.

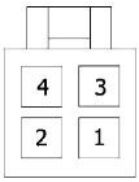


4-Pin Input Connector (S-H65AX) Definition

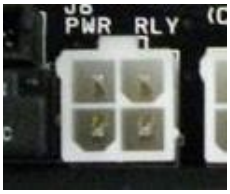
This 4 pin connector contains the CAM's 2 discrete wire inputs. These are both active low inputs which means external devices must pull these inputs to ground. These inputs have their own internal pull up resistors so they can be left floating when not used or not active. These inputs can be used as part of the programmable logic to configure the output pins.

- Pin #1 - (Blue/White stripe) Input 1, Active low
- Pin #2 - Not Used
- Pin #3 - (Green/White stripe) Input 2, Active low
- Pin #4 - Not Used

Connect inputs as needed. Tape up unused input wires.



Back of Connector



4 Pin I/O

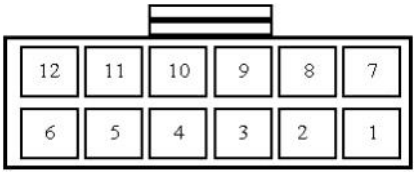
12 pin connector (S-H64AX) **pin-out definition**

This connector contains the CAM's 8 output pins. Each output is rated at 1/2A and is intended to drive relay coils or other low current loads. **Note: when driving relays, a diode-protected type must be used. InterMotive recommends DigiKey #PB682-ND Relay.**

The 8 outputs are defined as follows:

- Pin #1 (Purple wire) Engine Running, Active High
- Pin #2 (Green wire) Right Turn Signal On, Active High
- Pin #3 (White wire) Left Turn Signal On, Active High
- Pin #4 (Gray Wire) TR = Reverse, Active High
- Pins #5-6 are no-connects
- Pin #7 (Red Wire) fixed jumper to pin 12
- Pin #8 (Brown Wire) DRLs On, Active High
- Pin #9 (Orange Wire) Service Brake Pressed, Active High
- Pin #10 (Blue Wire) Ignition On, Active High
- Pin #11 (Yellow Wire) Hazard Lights On, Active High
- Pin #12 (Red Wire) fixed jumper to pin 7

12 Pin IO



Back of Connector

Extend these output wires and connect to vehicle equipment as needed. Tape unused leads. When connecting to relays, use relays with appropriate kick-back suppression, such as Digikey #PB682-ND. Unsuppressed relays will induce very high voltage spikes throughout modern vehicle's sensitive computer electronics and should not be used, per Ford, GM, SAE, etc.

Reconnect the vehicle battery

Initial Installation Power-Up:

The following sequence must be performed prior to mounting the CAM502 module. The initial installation is completed as follows:

1. Ensure the 6 pin connector is NOT yet connected to the CAM502 module.
2. Turn the vehicle key on, engine off.
3. If the VIN is captured and recognized, no LEDs on the module will light up.
4. If the VIN is not present or not received, the LEDs will scroll from low to high.
5. If the VIN is received but not recognized, the LEDs will scroll from high to low.
6. LEDs scrolling from the center outward indicates an invalid configuration is loaded on the module.

CAM502 Module Mounting

Ensure all the harnesses are properly connected and routed, and are not hanging below the dash area. Locate the CAM502 module in an area away from any external heat sources (engine heat, heater ducts, etc.). Mount the module using two screws, Velcro, or double backed tape.

CAM Post Installation Testing

1. Turn the ignition ON to wake up and initialize the CAM502 module.
2. With the conditions met, ensure that the specific output has the desired output.

The CAM502 is properly installed only if it passes the above tests. If any irregular operational issues persist, recheck the data configuration.
Contact InterMotive at 530-823-1048 for technical assistance.

Diagnostics

To enter diagnostic mode, momentarily press the Red "Test" button on the module with the ignition on. There are six 'pages' of diagnostic data. Each time the Red "Test" button is momentarily pressed the module will advance to the next 'page'. The Status LED will flash the page number (e.g. the Status LED will flash 5 times when in 'page' 5).

Page 1

The on-board LED's will light when a corresponding load is active:

LED1 = Output #1
LED2 = Output #2
LED3 = Output #3
LED4 = Output #4
LED5 = Output #5
LED6 = Output #6
LED7 = Output #7
LED8 = Output #8
LED9 = Input #1
LED10 = Input #2

Page 2

The on-board LED's will light when corresponding vehicle data is detected:

LED1 = Transmission
LED2 = RPM
LED3 = VSS (vehicle speed sensor)
LED4 = Park Brake
LED5 = Service Brake
LED6 = APP (accelerator pedal position)
LED7 = Key Position
LED8 = TFT (transmission fluid temperature)
LED9 = ECT (engine coolant temperature)
LED10 = AAT (ambient air temperature)

Diagnostics (Continued)

Page 3

The on-board LED's will light when corresponding vehicle data is detected:

LED1 = FL (fuel level)
LED2 = MIL (malfunction indicator lamp)
LED3 = ABS
LED4 = AC
LED5 = Rear Door
LED6 = Driver Front Door
LED7 = Passenger Front Door
LED8 = Driver Rear Door
LED9 = Passenger Rear Door
LED10 = Turn Signal

Page 4

The on-board LED's will light when corresponding vehicle data is detected:

LED1 = ParkLamp
LED2 = LowBeam
LED3 = HiBeam
LED4 = DRL
LED5 = All Lock
LED6 = All Unlock
LED7 = Driver Door Unlock
LED8 = Driver Seat
LED9 = Passenger Seat
LED10 = Driver Belt

Page 5

The on-board LED's will light when corresponding vehicle data is detected:

LED1 = Passenger Belt
LED2 = EOP (engine oil pressure)
LED3 = Mute
LED4 = Hazard
LED5 = Light
LED6 = Brake Torque
LED7 = Engine Torque
LED8 = Odometer
LED9 = Not Used
LED10 = VIN PnR Active

Page 6

Output Trouble Codes

If there is an issue with one of the CAM outputs, the status LED will flash a two digit code while in diagnostic mode, page 6. A 1-1 code means everything is working properly. The first digit flashed will correspond to the output number and the second digit will indicate the specific problem. The second digit can be:

- 2 - Output fault (overcurrent or overvoltage)
- 3 - Invalid data (The data associated with the output is invalid)
- 4 - Data timed out (The data associated with the output has timed out)
- 5 - Unsupported data (The data associated with the output is not supported on the current vehicle)

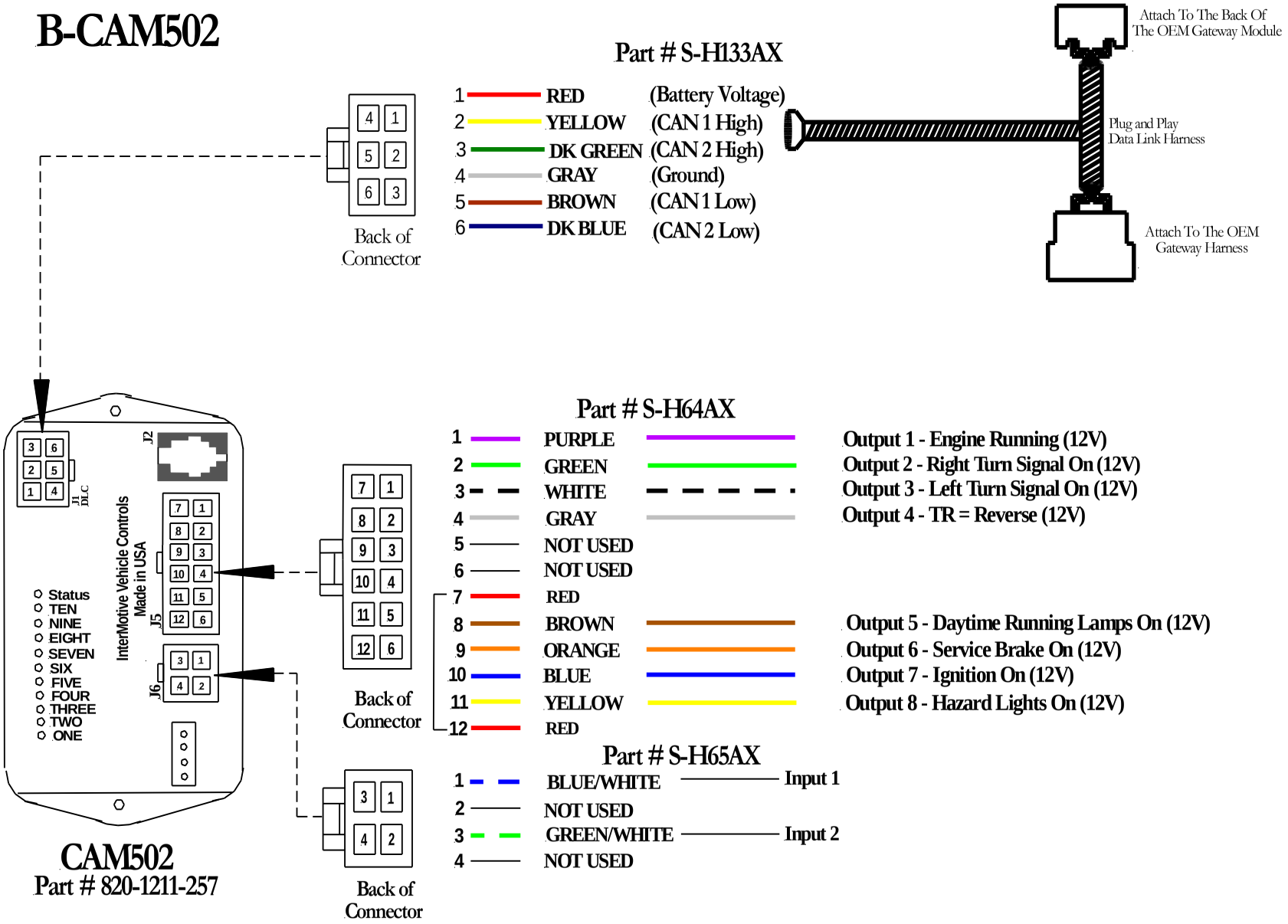
Scrolling LED's may indicate one of the following errors:

- LED's scrolling sequentially one at a time indicates that an invalid or incomplete VIN was captured.
- LED's scrolling from the middle outward indicates a configuration error. This can be the result of configuring the CAM for one chassis, but installing it in a different chassis.

CAM Operation

Turning the vehicle ignition ON will wake up and initialize the CAM module. Outputs are controlled based on the module's configuration. When the key is turned OFF, the CAM module will go into a low power sleep mode and it's outputs will shut off. This may take up to five minutes, and the Diagnostic LED's (if active) on the module will go out once in sleep mode. Other vehicle activity such as opening doors, inserting key in the ignition, etc. may delay sleep mode.

B-CAM502

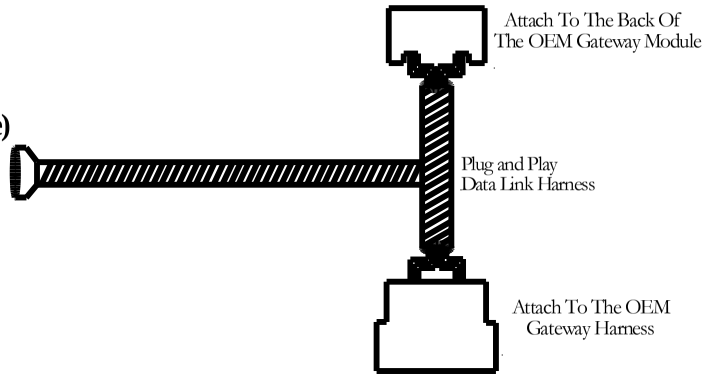


Submit product registration at www.intermotive.net

If the CAM fails any step in the Post Installation Test, review the installation instructions and the loaded configuration by running the Graphical User Interface application. If necessary, call **InterMotive technical support @ (530) 823-1048.**

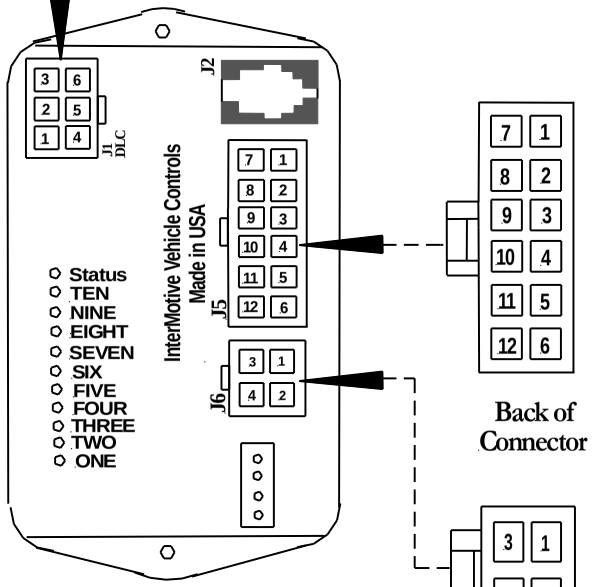
G-CAM502

Part # 840-00201



1	RED	(Battery Voltage)
2	DK BLUE	(CAN 1 High)
3	DK GREEN	(CAN 2 High)
4	GRAY	(Ground)
5	WHITE	(CAN 1 Low)
6	BROWN	(CAN 2 Low)

Back of Connector



CAM502
Part # 820-1211-257

Part # S-H64AX

1	PURPLE	Output 1 - Engine Running (12V)
2	GREEN	Output 2 - Right Turn Signal On (12V)
3	WHITE	Output 3 - Left Turn Signal On (12V)
4	GRAY	Output 4 - TR = Reverse (12V)
5	NOT USED	
6	NOT USED	
7	RED	
8	BROWN	Output 5 - Daytime Running Lamps On (12V)
9	ORANGE	Output 6 - Service Brake On (12V)
10	BLUE	Output 7 - Ignition On (12V)
11	YELLOW	Output 8 - Hazard Lights On (12V)
12	RED	

Back of Connector

Part # S-H65AX

1	BLUE/WHITE	Input 1
2	NOT USED	
3	GREEN/WHITE	Input 2
4	NOT USED	

Back of Connector

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