

Safe-T-Net STN401

(harness compatible with GTWY401 and HL201)

2009-2010 Ford E & F Series

2008-2010 Chevy Express, GM Savana



Introduction

The STN401 plugs into a vehicle's OBDII connector and acquires vehicle data which it translates and transmits to a third party device over a CAN network in accordance with the J1979 standard. The STN401 is completely compatible with all Intermotive products. This allows third party devices to be installed on vehicles which already have other Intermotive products and not worry about compatibility issues, while still acquiring necessary data without changes to the third party device. In addition, the STN401 provides a number of proprietary data parameters to third party devices that may not be available in other cases. The STN401 assumes there is a GTWY401 or HL201 wheelchair lift interlock module also installed in the vehicle and provides a harness compatible with this application. See STN405 for applications with GTWY505/506/605, HL510/550/610, or PRPC and STN430 for standalone non-Gateway applications.

Installation Instructions

Be sure the vehicle's battery is disconnected before proceeding with 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 antenna's or inverters next to the module. Finally, avoid high voltage spikes in vehicle wiring by always using diode clamped relays when installing upfitter circuits.

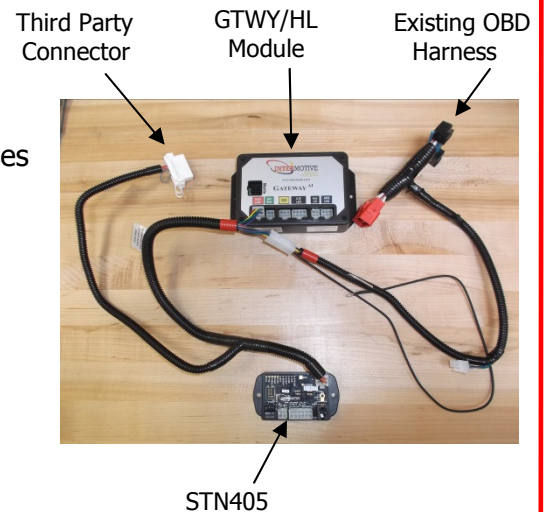
Installation Instructions

Disconnect the vehicle battery before proceeding with installation

The STN is available as either an STN401-B or STN401-C. The only difference between the two is the harness. If the module is going to be installed close to the OEM OBDII connector, the STN401-C should be used. If the installation requires the module to be located away from the OEM OBDII connector, (e.g. the passenger side of the vehicle) the STN401-B should be used.

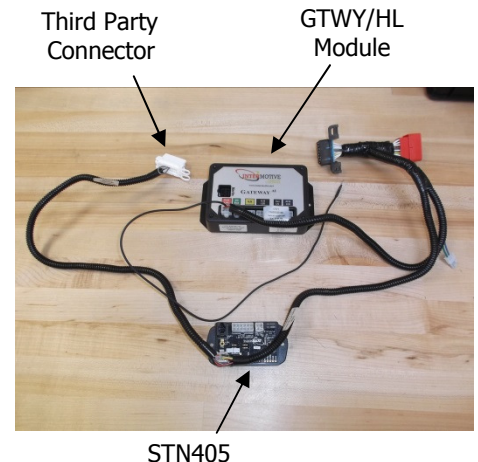
STN401-B

1. Locate the module in an area away from any heat sources. High temperatures can typically be caused by engine heat or hot air from heater ducts. Do not actually mount the module until all wire harnesses are routed and secure (last step on the installation is to mount the module).
2. Plug the male 6-pin connector (note red tape) into the mating 6-pin connector on the GTWY/HL module.
3. Plug the female 6-pin connector into the existing OBD harness.
4. Locate the 6-pin male connector into the 6-pin connector on the STN401 harness.
5. Plug this 6-pin connector into the 6-pin connector on the STN401 module.
6. Plug the third party connector into the third party product.



STN401-C

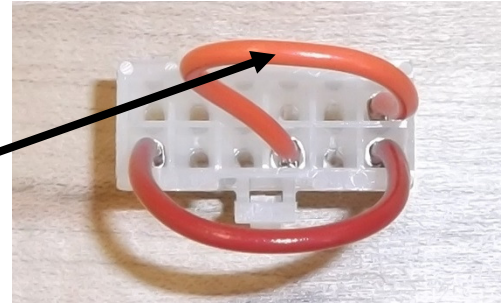
1. Locate the module in an area away from any heat sources. High temperatures can typically be caused by engine heat or hot air from heater ducts. Do not actually mount the module until all wire harnesses are routed and secure (last step of the installation is to mount the module).
2. Plug the male 6-pin connector (labeled "GTWY") into the mating 6-pin connector on the GTWY/HL module.
3. Plug the male 6-pin connector (labeled "STN401") into the mating 6-pin STN401 module.
4. Plug the third party connector into the third party product.
5. Plug the OBDII connector into the vehicle's OEM OBDII connector.



STN401-A Translator Connection Output

Operation:

- **Active Mode:** By default the STN401 is passive, which means that it does not transmit on the vehicle network via the OBDII interface. However, unique data that is not available passively may be required by some third party devices. In these cases, the STN401 must be put into active mode. Active mode is entered by cutting the "Active Messaging Jumper" **Orange** wire installed on the 12-pin connector. **Tape or heat shrink both sides of the cut wire.** See the attached harness drawing for more jumper details. While in active mode, the STN401 will pass through certain requests to the vehicle network. See Table 4 for a description of data available in active and passive modes.



Active Mode Limitations

The STN401 is intended to be compatible with all Intermotive products. To accomplish this, it limits both the type and frequency of active messages transmitted on the vehicle network. This means that while in active mode not all messages will pass through to the vehicle network, and the rate at which they're passed through is limited. **The maximum rate at which active messages are transmitted on the vehicle network is 40ms. Note that the STN401 will reply immediately to any active request if it has available data, but the data parameters will not update faster than 40ms. See Table below for list of supported services in active mode.**

Inputs

The STN401 provides two general purpose, active high inputs. These inputs are read by the STN401 and their status is transmitted upon request. See the wiring diagram for input details.

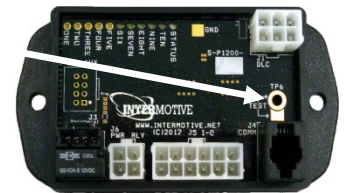
Diagnostics

During VIN acquisition: Scrolling LED's indicate an error occurred while acquiring the VIN.

- LEDs scrolling in ascending order (LED1, LED2, LED3...) indicate an **invalid VIN** was captured. Verify that the chassis is supported by this product. If work was recently performed on this chassis, the VIN may have been cleared in the PCM.
- LEDs scrolling in descending order (LED10, LED9, LED8...) indicate **no VIN** was captured. Verify that the ignition is On, the Data Link Harness is not damaged, and that no other devices are installed on the OBDII port that might interfere with the STN401.

Diagnostic Mode: During normal operation, momentarily grounding the module's Test Pad puts the module into diagnostic mode. Momentarily grounding the pad again exits diagnostic mode. While in diagnostic mode, the LEDs illuminate in the following manner:

- LED1: Passive vehicle data received
- LED2: Active response received from vehicle
- LED3: Active request sent to vehicle
- LED4: Request received from third party device
- LED5: Message sent to third party device
- LED6: Reserved
- LED7: Reserved
- LED8: Active Mode status
- LED9: Input 1 status
- LED10: Input 2 status
- Status: Heartbeat



J1979 Service \$01 - Request Current Powertrain Diagnostic Data

The description below refers to constructs used in the SAEJ1979 FEB2012 standard. Refer to this standard for further details. Service \$01 allows a third party device to request vehicle data. Table 4 lists the PID's available in Passive Mode. All other service \$01 PID's are available only in Active Mode. A number of PID's unique to the STN401 are available via service \$01. These are listed in Table 4.

The STN401 only allows one PID per service \$01 request.

Table 1 - Message Format

Size (Bits)	11	8	8	8	8	8	8	8	8
Field	ID	Data #0	Data #1	Data #2	Data #3	Data #4	Data #5	Data #6	Data #7

Table 2 - Service \$01 Request Format

Data Byte	Parameter Name	Hex Value
#1	Request Powertrain Data Request Service ID	01
#2	PID (See table below, and/or J1979DA)	XX
PID value should be supported by this chassis.		

Table 3 - Service \$01 Request Response Format

Data Byte	Parameter Name	Hex Value
#1	Request Powertrain Data Response Service ID	41
	Data Record of PID:	
#2	PID	XX
#3	Data A	XX
#4	Data B	XX
#5	Data C	XX
#6	Data D	XX
Data B-D depend on selected PID value.		

Table 4 - Service \$01 PID's available in Passive Mode

PID	Description	Conversion
0x05	Engine Coolant Temperature (ECT)	A-40, Degrees C
0x0C	Engine Speed (RPM)	$((A*256)+B)/4$
0x0D	Vehicle Speed (VSS)	1 bit = 1 kph
0x11	Throttle Position (TP)	$A*100/255, \%$
0x2F	Fuel Level (FLI)	$A*100/255, \%$
0xE1	Park Brake (PB), Service Brake (SB), A/C (AC), ABS Event (ABS), Engine Oil Pressure Lamp (EOP), Malfunction Indicator Lamp (MIL), General Purpose Inputs (IN1/IN2)	Data A: PB - On=\$1x, Off=\$0x, Unknown=\$3x SB - On=\$x1, Off=\$x0, Unknown=\$x3 Data B: AC - On=\$1x, Off=\$0x, Unknown=\$3x ABS - On=\$x1, Off=\$x0, Unknown=\$x3 Data C: MIL - On=\$1x, Off=\$0x, Unknown=\$3x EOP - On=\$x1, Off=\$x0, Unknown=\$x3 Data D: IN1 - Active=\$1x, Inactive=\$0x, Unknown=\$3x IN2 - Active=\$x1, Inactive=\$x0, Unknown=\$x3
0xE2	Transmission Range (TR), Key Position (KEY), Headlights (LIGHTS)	Data A: TR - 0=Park, 1=Reverse, 2=Neutral, 3=Drive, 7=Unknown Data B: KEY - 0 = Off, 1=Accessory, 2=On, 3=Crank, 7=Unknown Data C: LIGHTS - DRL On=\$1x, DRL Off=\$0x, DRL Unknown=\$3x Park Lamps On=\$x1, Park Lamps Off=\$x0, Park Lamps Unknown=\$x3 Data D: LIGHTS - Low Beams On=\$1x, Low Beams Off=\$0x, Low Beams Unknown=\$3x High Beams On=\$x1, Hi Beams Off=\$x0, High Beams Unknown=\$x3
0xE3	Transmission Fluid Temperature (TFT)	A-40, Degrees C; \$FF = Unknown
0xE4	Ambient Air Temperature (AAT)	A-40, Degrees C; \$FF = Unknown

Table 4 - Service \$01 PID's available in Passive Mode (Continued)

0xE5	Door Switch Status (DOORS), Door Lock Status (LOCKS), Turn Signal Status (TSIG)	Data A: DOORS - Front Driver Open=\$1x, Front Driver Closed=\$0x, Front Driver Unknown=\$3x Front Passenger Open=\$x1, Front Passenger Closed=\$x0, Front Passenger Unknown=\$x3 Data B: DOORS - Rear Driver Open=\$1x, Rear Driver Closed=\$0x, Rear Driver Unknown=\$3x Rear Passenger Open=\$x4, Rear Passenger Open=\$x0, Rear Passenger Unknown=\$xC Rear Open=\$x1, Rear Closed=\$x0, Rear Unknown=\$x3 Data C: LOCKS - All Locked=\$x1, All Unlocked=\$x2, Driver Unlocked=\$x4, Unknown=\$x7 Data D: TSIG - Left On=\$1x, Left Off=\$0x, Left Unknown=\$3x Right On=\$4x, Right Off=\$0x, Right Unknown=\$Cx Hazards On=\$x1, Hazards Off=\$x0, Hazards Unknown=\$x3
0xE6	Seat Switch Status (SEATS), Seat Belt Status (BELTS), Audio Mute Status (MUTE)	Data A: SEAT - Driver Occupied=\$1x, Driver Unoccupied=\$0x, Driver Unknown=\$3x Passenger Occupied=\$x1, Passenger Unoccupied=\$x0, Passenger Unknown=\$x3 Data B: BELT - Driver Buckled=\$1x, Driver Unbuckled=\$0x, Driver Unknown=\$3x Passenger Buckled=\$x1, Passenger Unbuckled=\$x0, Passenger Unknown=\$x3 Data C: MUTE - Mute On=\$x1, Mute Off=\$x0, Mute Unknown=\$x3
0xE7	Odometer (ODO)*	1 km per bit. 32-bit value, A is MSB, D is LSB

* Only available in Passive mode in some applications.

J1979 Service \$03 - Request Emission-Related Diagnostic Trouble Codes

The description below refers to constructs used in the SAEJ1979 FEB2012 Standard. Refer to this standard for further details. Service \$03 allows a third party device to request Diagnostic Trouble Codes from all modules on a vehicle. **This service is only available in Active Messaging Mode.**

When the STN401 receives a Service \$03 request, it passes it through to the vehicle network. Any responses from vehicle modules are passed back through to the third party device as they are received.

The third party device should use the message described in Table 5 to request trouble codes.

Table 5 - Service \$03 Request Trouble Codes (refer to Table 1 for message format)

Data Byte	Parameter Name	Hex Value
#1	Request Powertrain Data Request Service ID	03

J1979 Service \$09 - Request Vehicle Information

The description below refers to constructs used in the SAE J1979 FEB2012 and ISO 15765 standards. Refer to these for further details. Service \$09 allows a third party device to request vehicle-specific vehicle information. **The SNT401 only supports a VIN request, described below. This works in both Passive and Active Modes.** The VIN request using service \$09 makes use of multiple frame communication, as described in ISO 15765. The message flow is outlined below, but refer to ISO 15765 for further details regarding multiple frame communications

Table 6 - Service \$09 Request VIN

Data Byte	Parameter Name	Hex Value
#1	Request Vehicle Information Request Service ID	09
#2	Info Type - VIN	02

Table 7 - Service \$09 Response 1 from STN401

Data Byte	Parameter Name	Hex Value
#0	Multiple Message Communication: First Frame	10
#1	Data Length	14
#2	Request Vehicle Information Response Service ID	49
#3	Info Type - VIN	02
#4	Number of Data Items	01
#5	VIN Character 1	XX
#6	VIN Character 2	XX
#7	VIN Character 3	XX

Table 8 - Service \$09 Response 2 from STN401

Data Byte	Parameter Name	Hex Value
#0	Consecutive Frame: Sequence Number 1	21
#1	VIN Character 4	XX
#2	VIN Character 5	XX
#3	VIN Character 6	XX
#4	VIN Character 7	XX
#5	VIN Character 8	XX
#6	VIN Character 9	XX
#7	VIN Character 10	XX

Table 9 - Service \$09 Response 3 from STN401

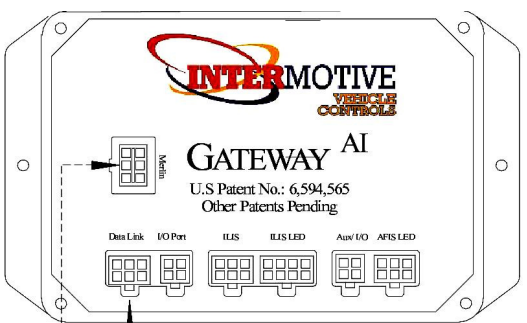
Data Byte	Parameter Name	Hex Value
#0	Consecutive Frame: Sequence Number 2	22
#1	VIN Character 11	XX
#2	VIN Character 12	XX
#3	VIN Character 13	XX
#4	VIN Character 14	XX
#5	VIN Character 15	XX
#6	VIN Character 16	XX
#7	VIN Character 17	XX

Proprietary Service \$22 - Read Parameter by identifier

Some vehicles support service \$22, which is used to request proprietary vehicle data. **This service is only available in Active Messaging Mode.**

When the STN401 receives a service \$22 request addressed to a module ID greater than \$700, it passes it through to the vehicle network. Any responses from vehicle modules are passed back through to the third party device as they are received.

STN401-B

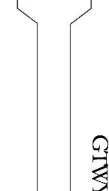
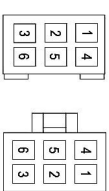


Gateway 401/501
or HL201

- 1 — OPEN
- 2 — OPEN
- 3 — GREEN
- 4 — OPEN
- 5 — OPEN
- 6 — BLUE

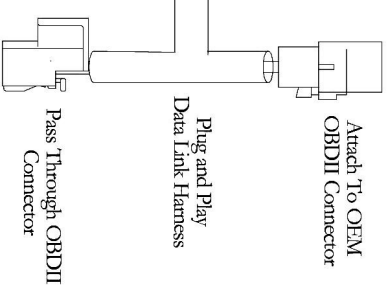


- 1 — RED
- 2 — BLACK
- 3 — YELLOW
- 4 — GRAY
- 5 — OPEN
- 6 — BROWN

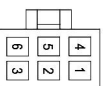


GTWY/HL Supplied Harness

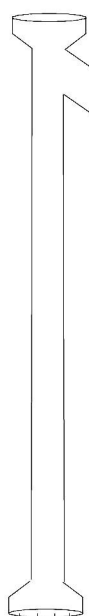
Only Used with Interlock
Kit ILIS501-H5



- 1 — RED
- 2 — YELLOW
- 3 — PINK
- 4 — GRAY
- 5 — BROWN
- 6 — ORANGE



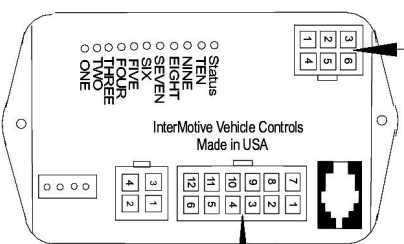
Back of
Connector



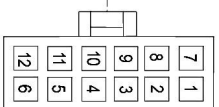
Pin



Front of
Connector



STN401
Part# S-M1211-128



Back of
Connector

- 1 — N/C
- 2 — N/C
- 3 — N/C (Input 1 - Installer Supplied)
- 4 — N/C (Input 2 - Installer Supplied)
- 5 — N/C
- 6 — ORANGE
- 7 — RED
- 8 — N/C
- 9 — N/C
- 10 — ORANGE
- 11 — N/C
- 12 — RED

Part # S-K07GX

Active Messaging Mode Jumper -
Cut to Enable Active Messaging Mode

Submit product registration at www.intermotive.net

If the STN401 fails any step in the Post Installation Test, review the installation instructions and check all connections.
If necessary, call

InterMotive technical support @ (530) 823-1048.

STN401-031519-CAD

(External Ground)



If the STN401 fails any step in the Post Installation Test, review the installation instructions and check all connections.

STN401-031519-CAD