Component Procedures: Accessories and Optional Equipment

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Component Procedures: Accessories and Optional Equipment

OnStar (Article 10918)

This OnStar ® system consists of the following components:
- Telematics communication interface control module
- OnStar® three button assembly
- Microphone
- Cellular antenna
- Navigation antenna
- Bluetooth® antenna (If equipped)
- Back up battery (If equipped)

This system also interfaces with the factory installed vehicle audio system .
Figure 1: Onstar Block Diagram
Telematics Communication Interface Control Module
The telematics communication interface control module is a cellular device that allows the user to communicate data and voice signals over the national cellular network. Power is provided by a dedicated, fused B+ circuit. Ground is provided through the vehicle wiring harness attached to the module. The ignition state is determined by the telematics communication interface control module through serial data messaging.
Dedicated circuits are used to connect the telematics communication interface control module to a microphone, the button assembly, and to command the status LED. The telematics communication interface control module communicates with the rest of the vehicle over the serial data bus.
The module houses 2 technology systems, one to process GPS data, and another for cellular information. The cellular system connects the OnStar® system to the cellular carrier's communication system by interacting with the national cellular infrastructure. The module sends and receives all cellular communications over the cellular antenna and cellular antenna coax. GPS satellites orbiting earth are constantly transmitting signals of their current location. The OnStar® system uses the GPS signals to provide location on demand.
The module also has the capability of activating the horn, initiating door lock/unlock, or activating the exterior lamps using the serial data circuits. These functions can be commanded by the OnStar® Call Center per a customer request.
OnStar® Three Button Assembly
Base Mirror
- The OnStar® button assembly may be part of the rearview mirror, or a separate, stand alone unit. The button assembly is comprised of 3 buttons and a status LED. The buttons are defined as follows:
- The answer/end call button, which is black with a white phone icon, allows the user to answer and end calls or initiate speech recognition.
- The blue OnStar® call center button, which displays the OnStar® logo, allows the user to connect to the OnStar® call center.
- The emergency button, which displays a white cross with a red background, sends a high priority emergency call to the OnStar® call center when pressed.

The telematics communication interface control module supplies 10 volts to the OnStar® button assembly on the keypad supply voltage circuit. When pressed, each button completes a circuit across a resistor allowing a specific voltage to be returned to the telematics communication interface control module on the keypad signal circuit. Depending upon the voltage range returned the telematics communication interface control module is able to identify which button has been pressed.
The OnStar® status LED is located with the button assembly. The LED is green when the system is ON and operating normally. When the status LED is green and flashing, it is an indication that a call is in progress. When the LED is red, this indicates a system malfunction is present. In the event there is a system malfunction and the OnStar® system is still able to make a call, the LED will flash red during the call.
If the mirror has the rear vision camera display in the mirror, the LED's are then interior to the mirror and controlled via data communication on the Low Speed GMLAN bus from the Telematics Communication Interface Control Module to the mirror.
If the LED does not illuminate, this may indicate that the customers OnStar® subscription is not active or has expired. Push the blue OnStar button to connect to an advisor who can then verify the account status.
Each LED is controlled by the telematics communication interface control module over dedicated LED signal circuits. Ground for the LED is provided by the wiring harness attached to the button assembly.
Prismatic Mirror (If Equipped)
- The OnStar® button assembly is apart of the rearview mirror. The button assembly is comprised of 3 capacitive touch buttons and a status LED. The buttons are defined as follows:
- The answer/end call button, which is a white driver figure seated with voice signals near it's face, allows the user to answer and end calls or initiate speech recognition.

- The blue OnStar® call center button, which displays the blue OnStar® logo, allows the user to connect to the OnStar® call center.
- The emergency button, which displays red letters “SOS” as an illuminated Indicator, sends a high priority emergency call to the OnStar® call center when pressed.

The telematics communication interface control module supplies 10 volts to the OnStar® button assembly on the keypad supply voltage circuit. When pressed, each button press is processed and completes a circuit across an internal resistor allowing a specific voltage to be returned to the telematics communication interface control module on the keypad signal circuit. Depending upon the voltage range returned the telematics communication interface control module is able to identify which button has been pressed.

The OnStar® status LED is located within the mirror near the buttons. The LED is green when the system is ON and operating normally. When the status LED is green and flashing, it is an indication that a call is in progress. When the LED is red, this indicates a system malfunction is present. In the event there is a system malfunction and the OnStar® system is still able to make a call, the LED will flash red during the call.

Electrochromic Mirror (If Equipped)

- The OnStar® button assembly is apart of the rearview mirror. The button assembly is comprised of 3 capacitive touch buttons and an error indicator. The buttons are defined as follows:

The telematics communication interface control module supplies 10 volts to the OnStar® button assembly on the keypad supply voltage circuit. When pressed, each button press is processed and completes a circuit across an internal resistor allowing a specific voltage to be returned to the telematics communication interface control module on the keypad signal circuit. Depending upon the voltage range returned the telematics communication interface control module is able to identify which button has been pressed and illuminate associated indicator above each button.

The OnStar® error indicator is located within the mirror above the buttons between the OnStar® indicator and emergency “SOS” indicator. All three indicators associated with a button press are illuminated when the system is ON and operating normally. When any indicator is illuminated and flashing, it is an indication that a call is in progress. When the OnStar® error indicator is illuminated, this indicates a system malfunction is present. In the event there is a system malfunction and the OnStar® system is still able to make a call, the OnStar® error indicator will remain illuminated during the call.

If the indicators do not illuminate, this may indicate that the customers OnStar® subscription is not active or has expired. Push the blue OnStar button to connect to an advisor who can then verify the account status.

Secondary OnStar® Controls

Some vehicles may have an additional button that when pushed can engage the OnStar® system. The button may be a symbol of a face with sound waves, or may say MUTE, or be a symbol of a radio speaker with a slash through it.

By engaging the OnStar® system with this feature, the user can interact with the system by use of voice commands. A complete list of these commands is supplied in the information provided to the customer. If the information is not available for reference, at any command prompt the user can say "HELP" and the telematics communication interface control module will return an audible list of available commands.

OnStar® Microphone

The OnStar®, or cellular microphone , can be a part of the rearview mirror assembly, or on some vehicle lines, a separate, stand alone unit. In either case, the telematics communication interface control module supplies approximately 10 volts to the microphone on the cellular microphone signal circuit, and voice data from the user is sent back to the telematics communication interface control module over the same circuit. A cellular microphone low reference circuit or a drain wire provides a ground for the microphone.

Cellular and GPS Antenna s

This vehicle will be equipped with one of the following types of antennas:

- A combination cellular and navigation antenna, which brings the functions of both into a single part
- A cellular, GPS, and digital radio receiver antenna, which also incorporates the functionality of the digital radio receiver satellite antenna (XM).
- A cellular, GPS, and digital radio receiver antenna, which also incorporates the AM/FM antenna.

The cellular antenna is the component that allows the OnStar® system to send and receive data over airwaves by means of cellular technology. The antenna is connected at the base to a coax cable that plugs directly into the telematics communication interface control module.

The GPS antenna is used to collect the signals of the orbiting GPS satellites. Within the antenna is housed a low noise amplifier that allows for a more broad and precise reception of this data. The antenna is connected at the base to a coax cable that plugs directly into the telematics communication interface control module. The cable also provides a path for DC current for powering the antenna.

The OnStar® Call Center also has the capability of communicating with the vehicle during an OnStar® call to retrieve the latest GPS location and transmit it to the OnStar® Call Center. A history location of the last recorded position of the vehicle is stored in the module and marked as aged, for as long as the module power

is not removed. Actual GPS location may take up to 10 minutes to register in the event of a loss of power.

OnStar® RemoteLink

OnStar® RemoteLink is a mobile app to link mobile devices to a vehicle for limited diagnostics and feature controls. After downloading the app and registering the device, vehicle owners with an eligible vehicle can use their mobile devices to access real-time data from their vehicle and perform specific commands remotely. All communication between the app and the vehicle is powered by OnStar's® advanced connected vehicle technology. An active OnStar® account as well as a valid OnStar® username and password are required to use the app. The remote commands must be enabled by logging into the user's OnStar® account prior to using the app.

Vehicle Control Features

- Lock/Unlock doors
- Start vehicle remotely
- Activate your Horn & Lights
- Contact an OnStar Advisor, Roadside Assistance or your Preferred Dealer

Available Vehicle Data:

- Real-time fuel information, including fuel range, fuel remaining, and lifetime MPG
- Lifetime mileage
- Remaining oil life
- Current tire pressure information
- OnStar® account information

Compass Heading

The telematics communication interface module has a compass feature to calculate vehicle direction which is displayed via the instrument panel cluster or designated display. The compass heading is determined by dead reckoning until the GPS 3d fix is established. The dead reckoning is accomplished by using the yaw rate sensors and wheel ticks to determine heading changes from a GPS known heading. The GPS 3d fix heading is determined by the deferential of two locations.

Bluetooth® (If Equipped)

Bluetooth® wireless technology is a short-range communications technology intended to replace the cables connecting portable and/or fixed devices while maintaining high levels of security. Only vehicles with steering wheel controls will have Bluetooth® functionality. In order to utilize the vehicle's Bluetooth® system, a Bluetooth® equipped cellular phone is required.

The Bluetooth® antenna is a small fixed antenna connected directly to the telematics communication interface control module and is used to send and receive signals from a Bluetooth® enabled cellular phone. The antenna utilizes no cabling and is not external to the vehicle. The available features and functions are determined by the software within the device being used and the telematics communication interface control module. The operating range of the signal from the vehicle is approximately 30 feet. Note that the operating range is dependent upon the cellular phone being used and battery level of the phone.

With Bluetooth® technology customers can experience hands-free calling as their Bluetooth® capable cellular phones are wirelessly connected to the vehicle. It will allow customers to place and receive calls using the steering wheel controls and voice recognition. The vehicle audio system will allow you to listen to your call through the vehicle speakers and adjust volume through steering wheel or radio control s.

Not all Bluetooth® cellular phones are guaranteed to work with the vehicle's Bluetooth® system. Based on the cellular phone's service provider and the manufacturer's implementation of Bluetooth®, not all phones support all available Bluetooth® functionality. Bluetooth® enabled cellular phones will be tested for vehicle compatibility and a feature compatibility list will be provided via the GM Bluetooth® website: http://www.gm.com/vc/bluetooth/

Bluetooth® Features Supported

The following is a list of features supported by the Bluetooth® system. Note that not all devices will support all of the listed functions.

- Automatic reconnection – highest priority phone will automatically be connected to vehicle when vehicle ignition is on
- Hands-free dialing- via digits, redial, name tags (phone number saved to a nametag via voice recognition)
- Answering a call
- Ending a call
- Mute a Call
- Rejecting a call – ignore an incoming call
- Call Waiting
- Three-way Calling – initiated from hands-free system
- Send Number During a Call – this is used when calling a menu-driven phone system
- Transfer a Call – transfer call from vehicle to cellular phone and visa versa
- Voice Pass-Thru – allow access to the voice recognition commands on the cellular phone

Pairing a Bluetooth® Cellular Phone to the Vehicle

In order to use hands-free calling, the cellular phone must be paired to the vehicle. Up to five devices can be paired to the vehicle at one time, but only one can be connected at any given time. To pair a phone, the customer must know how to operate the Bluetooth® functionality of their phone. The pairing process must only be done one time for each phone, unless that phone's information is deleted. For safety reasons, the pairing process is disabled while the vehicle is moving.

Once the Bluetooth® cellular phone has been paired with vehicle, it will automatically connect to the vehicle when the ignition is on and the device is on. When more than one paired phone is in the vehicle, the phone with the highest priority will be connected. If the cellular phone is in use while getting into the vehicle, the phone can be switched to hands-free mode with the press of a button. In addition, a call in progress can be transferred from the vehicle hands-free mode to the phone to continue the call as the customer exits the vehicle.

Complete pairing instructions are provided in the Vehicle Owners Manual.

Phantom Phone Calls

A customer may report that the OnStar® system is attempting and/or completing phone calls which the operator of the vehicle did not initiate.

It is important to know which type of reported phantom phone call the operator is reporting. Some phone calls of this nature are considered normal and cannot be addressed other than through education, while others may require some remedial action to resolve. When attempting resolve, it is very important to determine under which circumstances the reported Phantom Phone call resulted.

The following are different scenarios:

- The vehicle may receive an incoming call just like any other phone. Typically the customer will hear the phone ringing in the vehicle. This scenario also includes incoming Bluetooth calls.
- Because the button assembly and associated wiring feeds voltage back to the OnStar® system based on the amount of voltage drop through each of the buttons, should the return line be partially shorted to voltage the system could interpret this voltage as a key press. If one of the buttons voltage is simulated, such as the Blue button. The system will make a phone call just as if the button had been pressed by the operator of the vehicle. Refer to the OnStar Button Malfunction document for diagnostics.
- Internal module fault. Some customers may report a condition where ″Phone Unavailable″ message is heard after the vehicle door is opened or key is cycled. The technician may find a DTC stored in the Telematics module (example: U1500 or B1000). Refer to diagnostics for the DTC making sure to follow any applicable Bulletins or PIs.
- Unwanted Hands free calling activation. A customer may report that the ″Ready!″ or ″OnStar® Ready!″ message is heard while driving. The customer may also advise that this seems to happen mostly while making a turn. In some cases it has been found that the customer is inadvertently pressing the ″push to talk″ button on the steering wheel controls. On rare occasions, other issues in the steering column or Steering Wheel Control system may induce this event.

The majority of reported Phantom Phone Calls can be attributed to accidental button presses or customer induced concern. In some cases an incoming call may be mistaken as a phantom call concern. It is important to verify all aspects of the customer concern in order to properly duplicate and diagnose the condition. If the concern points to normal operation and customer induced concern, please communicate to the customer this condition is a normal operating characteristic of their vehicle.

Back-up Battery (If Equipped)

Certain OnStar® equipped vehicles may also be equipped with a back-up battery. The back-up battery is a non-rechargeable, lithium battery intended to provide an auxiliary power source for the telematics communication interface control module in the event where power from the main vehicle battery is lost.

The back-up battery is intended to have a limited life span of approximately 4 years and is designed to maintain an open circuit voltage between 16 V and 9 V throughout this period. This allows the battery to power the basic functions of the telematics communication interface control module for least one 200 second (5 minute) call at the end of the 4 year span, should the main vehicle battery be lost. In the case of a vehicle losing vehicle battery power, OnStar will switch over to the backup battery based on an internal algorithm. It will look for an air-bag deploy, or near-deploy, messages from the SDM. If there are no messages the OnStar module will stay wake for a few minutes longer and monitor the buttons in the mirror. If not pressed, the modules will power down and shut off completely.

The back-up battery is connected to the telematics communication interface control module through the back-up battery positive voltage circuit and back-up battery ground circuit and is protected from a short circuit by means of an internal fuse. In the event the back-up battery, battery positive voltage circuit is shorted to the back-up battery ground circuit or chassis ground, the fuse will open and render the back-up battery permanently inoperable. The status of the back-up battery and its associated wiring is monitored by the telematics communication interface control module.

Audio System Interface

When the OnStar® requires audio output, a serial data message is sent to the audio system to mute all radio functions and transmit OnStar® originated audio. The OnStar® audio is transmitted to the vehicle audio system by a dedicated signal circuit and a low reference circuit.

The audio system will mute and an audible ring will be heard though the speakers if the vehicle receives a call with the radio ON.

On some vehicles, the HVAC blower speed may be reduced when the OnStar® system is active to aid in reducing interior noise. When the system is no longer active, the blower speed will return to its previous setting.

OnStar® Sleep Cycle

The OnStar® system uses a unique sleep cycle to allow the system to receive cellular calls while the ignition is in the OFF position and retained accessory power mode has ended. This cycle enables the telematics communication interface control module to perform remote functions, such as door unlock, as commanded over the air by the OnStar® Call Center, and to continue to maintain an acceptable level of battery electrical drain.

The OnStar® system uses 4 states of readiness, depending upon the type of cellular market the vehicle is in when the ignition is put into the OFF state:

- High power
- Low power
- Sleep
- Digital standby

The high power state is in effect whenever the ignition is in the ON or RUN position, or retained accessory power is enabled, and the OnStar® system is sending or receiving calls or when the system is performing a remote function.

The low power state is in effect when the OnStar® system is idle with the ignition in the ON or RUN position, or with retained accessory power enabled.

The sleep state is entered after the vehicle has been shut off and the retained accessory power has timed out while in an analog cellular area. At a predetermined time recorded within the telematics communication interface control module, the system re-enters the low power state to listen for a call from the OnStar® Call Center for 1 minute. After this interval, the system will again return to the sleep state for 9 minutes. If a call is sent during the 1 minute interval, the OnStar® system will receive the call and immediately go into the high power mode to perform any requested functions. If no call is received during the 1 minute interval, the system will go back into the sleep mode for another 9 minutes. This process will continue for up to 48 hours, after which the OnStar® system will turn off until the ignition is turned to the ON or RUN position.

The digital standby power state is entered after the vehicle has been shut off and the retained accessory power has timed out while in a digital cellular area. When in digital standby mode, the OnStar® module is able to perform all remote functions as commanded by an OnStar® advisor at any time, for a continuous 120 hours. After 120 hours, the OnStar® module will go into sleep mode until a wake up signal from the vehicle is seen by the telematics communication interface control module. If the OnStar module loses the digital cellular signal it will revert to analog mode and follow the standard sleep state (9 minutes OFF, 1 minute standby) based on the time of the GPS signals, this will continue until a digital cellular signal is again received.

If the OnStar® system loses battery power while the system is in a standby or sleep mode, the system will remain OFF until battery power is restored and the ignition is turned to the ON or RUN position.

Features

OnStar® Personal Calling

The hands free, OnStar® personal calling cellular phone feature is an additional feature of the OnStar® system. This feature is embedded within the telematics communication interface control module; however it must be activated by an OnStar® advisor. OnStar® personal calling operates similar to most hand held cellular phones in that the availability for its usage is based on minutes or units. The customer must have a current OnStar® subscription, as this feature cannot be utilized without it. To use OnStar® personal calling, the customer must also purchase units (minutes) as outlined in the owners guide provided with the OnStar® system. Units begin to deplete, 1 unit is equal to 1 minute, as the customer makes outbound phone calls, answers inbound phone calls, or while connected to the OnStar® virtual advisor. In addition, units may also have an expiration date, depending upon the type of units purchased.

Customers have the ability to store telephone numbers within the module, referenced by a nametag for the convenience of frequently dialed numbers. After storing a nametag, the user can dial this number by initiating the OnStar® personal calling feature, speaking the word "call," and repeating the nametag assigned.

Turn by Turn Navigation

Turn by Turn Navigation allows the driver to contact OnStar® to obtain directions for driving from a current location to a desired location. The Turn by Turn Navigation system stores your planned route and continually checks your position along that route, when you deviate from the planned route, the system will recognize this and prompt the driver with verbal prompts for how to proceed. The driver then responds verbally to direct the

system to continue the current routing or to recalculate the route because of a missed turn.

Advisor Record Feature

The Advisor Record Feature allows the user to store any information given during a call with an OnStar® Advisor. Recording is activated by pressing the blue OnStar button during a call; pressing the button a second time stops the recording. The stored information can be played back by pressing the phone button on the three button assembly and using the voice command “Advisor Playback”.

Deactivated OnStar® Accounts

In the event a customer has not renewed their OnStar® account after expiration or the account was never activated, OnStar® will make a discrete cellular call to the vehicle to deactivate the OnStar® system. Before taking this action, customers are notified that the OnStar® system in their vehicle will be deactivated unless they elect to renew the account. After the OnStar® account has been deactivated, customers will experience the following:

- The OnStar® status LED will not illuminate.
- The OnStar® system will NOT attempt to connect to the OnStar® Call Center in the event of a collision or if the vehicle's front air bags deploy for any other reason.
- An emergency button press will play a demo message indicating the service has been deactivated.
- An OnStar® Call Center button press will connect the customer with a dedicated sales team who can sell an OnStar® subscription and reactivate the vehicle. Depending on the type of OnStar® hardware in the vehicle, the customer may first hear a demonstration message stating there is no current OnStar® subscription for the vehicle, and directing the customer what to do to activate services.
- OnStar® personal calling will not be available, as this feature requires the customer to have a current OnStar® account. Attempts to use this feature may result in cellular connection failure messages and the inability to connect to the number dialed.

Certain vehicles that have never had an active OnStar® account, or that have been deactivated, may be unable to establish a connection with the OnStar® Call Center. When normal published diagnostic procedures do not indicate a possible cause for the no connect concern, the vehicle may have been deactivated. For deactivated vehicles, a no connect response should be considered normal operation. Further diagnosis and subsequent repair is only necessary should the customer elect to become an active OnStar® subscriber or renew the account subscription.

OnStar® Cellular, GPS, and Diagnostic Limitations

The proper operation of the OnStar® System is dependent on several elements outside the components integrated into the vehicle. These include the National Cellular Network Infrastructure, the cellular telephone carriers within the network, and the GPS.

The cellular operation of the OnStar® system may be inhibited by factors such as the users range from an analog or digital cellular tower, the state of the cellular carrier’s equipment, and the location where the call is placed. Making an OnStar® key press in areas that lack sufficient cellular coverage or have a temporary equipment failure will result in either the inability of a call to complete with a data transfer or the complete inability to connect to the OnStar® Call Center. The OnStar® system may also experience connection issues if the identification numbers for the module, station identification number, electronic serial number or manufacturers electronic ID, are not recognized by the cellular carriers local signal receiving towers.

The satellites that orbit earth providing the OnStar system with GPS data have almost no failures associated with them. In the event of a no GPS concern, the failure will likely lie with the inability of the system to gain GPS signals because of its location, i.e. in a parking structure, hardware failure, or being mistaken with an OnStar® call which has reached the Call Center without vehicle data.

During diagnostic testing of the OnStar® system, the technician should ensure the vehicle is located in an area that has a clear unobstructed view of the open sky, and preferably, an area where analog or digital cellular calls have been successfully placed. These areas can be found by successfully making an OnStar® keypress in a known good OnStar® equipped vehicle and confirming success with the OnStar® Call Center advisor. Such places can be used as a permanent reference for future OnStar® testing.

Mobile Identification Number and Mobile Directory Number

The telematics communication interface control module utilizes 2 numbers for cellular device identification, call routing and connection, a mobile identification number and a mobile directory number. The mobile identification number represents the number used by the cellular carrier for call routing purposes while the mobile directory number represents the number dialed to reach the cellular device.

Operation of the OnStar® Speech Recognition Systems

OnStar® users communicate with 2 speech recognition systems. Speech recognition allows the user to speak to one computer in the vehicle, and one reached over a phone line. The computer tries to understand the users command, and responds by speaking back, or by taking the appropriate action, e.g. dialing the phone.

- Personal Calling uses a speech recognition system that resides in the vehicle. When the user presses the

phone button, the system states, Ready, and listens for the user's command. The user can speak commands to control the hands-free phone.
- Virtual advisor is a remote speech recognition system that the caller can access by making a phone call. The user connects to virtual advisor by requesting it during personal calling use. The user is then transferred to the virtual advisor server and talks to it via a cellular connection.

The OnStar® speech recognition systems use speech technology that is designed to understand a wide range of American English speakers. Although there is no one right way to speak English, the system will work best when users try to modify their pronunciation should they encounter difficulty. Users who do not obtain good results are advised to try the tips and workarounds found in this section.

Concern Tip for Better Result

Noise Noise may confuse the speech recognition system. You usually get better performance from the system in quieter conditions: The HVAC fan creates noise. Turn it down or OFF for better speech system performance. Driving at high speeds creates louder engine noise and wind noise. You may get better results at lower speeds. An open window or an open sunroof allows more noise to enter the vehicle. Close all windows for better results. Noisy rainstorms can also reduce performance. If passengers are talking while you use the speech system, it may be confused by their speech. You will get better results if all occupants of the vehicle are quiet while the system is listening for commands.
- The HVAC fan creates noise. Turn it down or OFF for better speech system performance.
- Driving at high speeds creates louder engine noise and wind noise. You may get better results at lower speeds.
- An open window or an open sunroof allows more noise to enter the vehicle. Close all windows for better results.
- Noisy rainstorms can also reduce performance.
- If passengers are talking while you use the speech system, it may be confused by their speech. You will get better results if all occupants of the vehicle are quiet while the system is listening for commands.

When to Speak In Personal Calling, the system is only listening after it prompts you to speak with a beep. When the system prompts you to speak, you have about 5 seconds to respond. If the system does not hear a response, it will prompt you again, or cancel the transaction. If you begin to speak too soon, try pausing for a half second before speaking after the beep. In the Virtual Advisor, the system is always listening for commands, even while it is speaking.
- When the system prompts you to speak, you have about 5 seconds to respond. If the system does not hear a response, it will prompt you again, or cancel the transaction.
- If you begin to speak too soon, try pausing for a half second before speaking after the beep.
- In the Virtual Advisor, the system is always listening for commands, even while it is speaking.

How to Speak Speak forcefully, and clearly. The noisier the environment, the louder you need to speak. If you are in the driver seat, speak facing the front of the car. If you are a passenger, speak facing the rearview mirror. Speak calmly, and naturally. The system may sometimes fail your repeated attempts to give a command. If your speech is distorted by shouting or frustration, this may cause more errors. People with high-pitched voices may have better results by speaking in a deeper, lower-pitched voice. However, do not lower the volume of the voice. Avoid speaking with a rising intonation, like asking a question. Use a flat or falling intonation, like giving an answer.
- The noisier the environment, the louder you need to speak. If you are in the driver seat, speak facing the front of the car. If you are a passenger, speak facing the rearview mirror.
- Speak calmly, and naturally. The system may sometimes fail your repeated attempts to give a command. If your speech is distorted by shouting or frustration, this may cause more errors.
- People with high-pitched voices may have better results by speaking in a deeper, lower-pitched voice. However, do not lower the volume of the voice.
- Avoid speaking with a rising intonation, like asking a question. Use a flat or falling intonation, like giving an answer.

What to Say Personal Calling: One-word commands The Personal Calling system listens for only one word at a time. There are some exceptions, 2-word phrases that are spoken and understood as a single word, e.g. “virtual advisor”, “voice feedback”, and “my number”. You can enter phone numbers only one digit at a time, and the system repeats each digit as it hears it. Say "Help" at the Ready prompt to hear the list of Personal Calling commands. Virtual Advisor can understand sentences with more than one word. It also expects to hear a 4-digit number all at once when it asks for your PIN. Say, "What are my choices?" to hear a list of commands that the Virtual Advisor understands.
- The Personal Calling system listens for only one word at a time. There are some exceptions, 2-word phrases that are spoken and understood as a single word, e.g. “virtual advisor”, “voice feedback”, and “my number”. You can enter phone numbers only one digit at a time, and the system repeats each digit as it hears it.
- Say "Help" at the Ready prompt to hear the list of Personal Calling commands.

- Virtual Advisor can understand sentences with more than one word. It also expects to hear a 4-digit number all at once when it asks for your PIN.
- Say, "What are my choices?" to hear a list of commands that the Virtual Advisor understands.
Entering a phone number If you have trouble getting numbers correctly into the system, store your frequently-called number in the directory, so the system will remember them. After you have stored a number with a nametag, then you simply say “call” and the nametag in order to call the number. If the system cannot understand your numbers, ask another person to help you enter your frequently-called numbers. This person can speak the numbers, then you can speak the nametag.
- If you have trouble getting numbers correctly into the system, store your frequently-called number in the directory, so the system will remember them. After you have stored a number with a nametag, then you simply say “call” and the nametag in order to call the number.
- If the system cannot understand your numbers, ask another person to help you enter your frequently-called numbers. This person can speak the numbers, then you can speak the nametag.
Storing or dialing a number When you have finished speaking your phone number, you do not need to say “store” or “dial” to indicate that you are done. If you pause and say nothing, the system will ask you if you want to store or dial. Say “yes”.
Creating nametags Short nametags that are similar may be easily confused by the system. You may get better recognition of your nametags if you make them longer, for example “George Washington” without pause, instead of “George” only. If you want to use nametags while driving, it is best to store the nametag with some vehicle noise in the background. If you are in park while you are storing nametags, you can turn the fan on low or open windows in order to create some background noise.
- Short nametags that are similar may be easily confused by the system. You may get better recognition of your nametags if you make them longer, for example “George Washington” without pause, instead of “George” only.
- If you want to use nametags while driving, it is best to store the nametag with some vehicle noise in the background. If you are in park while you are storing nametags, you can turn the fan on low or open windows in order to create some background noise.
Virtual Advisor 4-digit PIN Say the 4 digits in a natural way, without pausing between digits.
Interrupting When the Virtual Advisor is speaking, you can interrupt it with another command. The first word in your command helps to get its attention. If the Virtual Advisor has trouble understanding your commands when you interrupt, try speaking the first word loudly and clearly, then pause for an instant, then continue with the rest of the command. For example: "Get ... my weather" or "Lookup... a quote for General Motors".
- When the Virtual Advisor is speaking, you can interrupt it with another command. The first word in your command helps to get its attention.
- If the Virtual Advisor has trouble understanding your commands when you interrupt, try speaking the first word loudly and clearly, then pause for an instant, then continue with the rest of the command. For example: "Get ... my weather" or "Lookup... a quote for General Motors".

Steering Wheel Secondary/Configurable Control Schematics (Article 11061)

Figure 1: Steering Wheel

Radio/Navigation System Schematics (Article 11002)

Figure 1: Power, Ground, Antennas, and Subsystem References
Figure 2: Amplifier (UQA)
Figure 3: Speakers (Coupe with UQA)
Figure 4: Speakers (F67 with UQA)
Figure 5: Speakers (UQ3)
Figure 6: Radio/HVAC Controls (without UDY)
Figure 7: Radio/HVAC Controls (with UDY)
Figure 8: Auxiliary Audio Input (without USR)
Figure 9: Auxiliary Audio Input (USR)

OnStar/Telematics Schematics (Article 11001)

Figure 1: OnStar (1 of 2)
Figure 2: OnStar (2 of 2)

Cellular Telephone Schematics (Article 11000)

Figure 1: Module Power, Ground, Serial Data, and Antenna (UPH)
Figure 2: Microphone (without UE1)

Cellular, Entertainment, and Navigation - Fastener Specifications (Article 11005)

Application Specification
Metric English
Communication Interface Module Bracket Bolt Screw 10 Nm 89 lb in
Front Floor Console Bolt 2.5 Nm 22 lb in
Radio Antenna Base Fastener -Convertible 9 Nm 80 lb in
Radio Antenna Base Fastener -Coupe 10 Nm 89 lb in
Radio Antenna Module Bolt 9 Nm 80 lb in
Radio Antenna Module Coil Bolt 10 Nm 89 lb in
Radio Control Assembly Bolt/Screw 2.5 Nm 22 lb in
Radio Front Side Door Speaker Bolt/Screw 2.5 Nm 22 lb in
Radio Front Side Door Upper Speaker Grille Bolt 2 Nm 18 lb in
Radio Front Speaker Bolt/Screw 2.5 Nm 22 lb in
Radio Rear Speaker Bolt/Screw 2.5 Nm 22 lb in
Radio Rear Speaker Nut 9 Nm 80 lb in
Radio Screw 2.5 Nm 22 lb in
Radio Speaker Amplifier Nut 9 Nm 80 lb in

All New Technical Service Bulletins (itype_432)

Tsbs
- Adding Radio Steering Wheel Control Switch (RPO NZL) (PIC5320C, 2025/01/31)
- Diagnostic Tip - Unable to Learn RKE Transmitters (PIT4945H, 2019/02/19)
- OnStar Module 2G Sunset Information (23-NA-001, 2025/03/28)
- Diagnostic Tip: Voice Recognition Errors When Using iPhone With One Or More Emojis/Emoticons/Symbols In Contacts List (PIC5953D, 2018/06/14)
- During Start Up Amber Forward Collision Alert Icon Illuminated and/or Startup Message Forward Collision Automatic Braking Off Illuminated on Driver Information Center (DIC) (25-NA-341, 2025/12/05)
- Concerns or Questions Regarding Installation of Dealer Installed Accessories (23-NA-219, 2024/09/20)
- Diagnostic Aid: Part Identification For Next Generation Infotainment Components And Correct Labor Codes (PIC6095C, 2018/07/06)
- Diagnostic Tip - Security Light on Intermittently / No Crank/No Start or Start Stall / Keyless Access Vehicles May Display No Remote/Fob Detected / Poor or No RKE Range / Service TPM (PIC5650M, 2025/08/06)

All Technical Service Bulletins (itype_100)

Tsbs
- Normal Characteristic - OnStar Power Consumption (PIC4935F, 2017/02/25)
- Navigation System - DVD Navigation Update Program (06-08-44-012G, 2013/09/24)
- Audio System - Radio Reprogramming Using Techline(R)/SPS (PI1266, 2014/06/24)
- Memory Mirror Positions Lost and/or Reverse Tilt is Inoperative (17-NA-297, 2017/11/17)
- Infotainment - System Will Not Return To Media After Call (16-NA-011, 2016/01/19)
- Blank Radio Displays Due to Bad NAV USB Update (PIT6122, 2024/01/31)
- Missing Channels or No Audio On Certain XM Radio Channels (PIC5959C, 2017/02/20)
- Accessory Power Outlet and Trailer Lighting Fuse Replacement Labor Operation N1720 Fuse Replacement (12-08-132-001E, 2018/04/20)
- Apple Phone Will Not Always Auto Connect Through Bluetooth To The Radio (PIC6120A, 2016/03/21)
- During Start Up Amber Forward Collision Alert Icon Illuminated and/or Startup Message Forward Collision Automatic Braking Off Illuminated on Driver Information Center (DIC) (25-NA-341, 2025/12/05)
- Loss of Radio Audio Shortly After an OnStar In-Vehicle Voice Message Is Heard (20-NA-026, 2020/07/22)
- GM of Canada OnStar® Cellular Communication Upgrade (15-08-44-001J, 2021/12/16)
- Campaign - SiriusXM(R) Travel Link Feature Availability (15747, 2015/12/18)
- Bluetooth Audio Skipping At Times (PIC6116A, 2016/03/04)
- Normal Characteristic - Heated Seat Operation After Performing A Remote Vehicle Start (RVS) (PIC5322D, 2015/05/29)
- OnStar- Unwanted Or Phantom Phone Calls (PIC3278G, 2017/02/20)
- Off Route Message During OnStar Turn By Turn Operation (PIC5374D, 2016/04/27)
- Programming And Activation Of Replacement OnStar Modules (VCIM) (PIC5588C, 2017/02/06)
- Audio - Radio Does Not Mute For OnStar Turn by Turn Directions (10-08-46-001C, 2016/04/20)
- Infotainment - Blower Speed Appears Frozen on Audio Display (PIC5895B, 2014/02/19)
- Questionnaire for Bluetooth Related Concerns (PIC5932B, 2017/08/09)

- Information on How to Prevent Inadvertent Vehicle Starting from Key Fob or OnStar Mobile Application (17-NA-244, 2017/07/25)
- Return or Reimbursement of Cust Owned CDs, DVDs or Nav Discs (05-08-44-024E, 2016/09/30)
- Diagnostic Tip: OnStar Vehicles with B101D and Symptom Codes (PIT5236K, 2017/09/29)
- Infotainment System - Radio Does Not Re-Pair iPhone(R) (PI1218A, 2014/08/21)
- Diagnostic Tips: XM Audio Traffic And Travel Link Availability And Operation (PIT5353C, 2018/11/20)
- Concerns or Questions Regarding Installation of Dealer Installed Accessories (23-NA-219, 2024/09/20)
- Intermittent Remote Keyless Entry Inoperative (PIT5119F, 2017/11/20)
- Requirements For OnStar Over The Air Programming And Updates (PIC6107A, 2018/11/20)
- OnStar Bluetooth Option Availability (PIT4733K, 2017/01/12)
- OnStar(R) - Voice Recognition Operation Issues (PIC3011H, 2014/02/26)
- Audio System - Buzz/Rattle From Rear Speaker Area (PI1249, 2014/05/27)
- XM Weather, Traffic, or Travel Link Displaying Dashes, NO DATA or UPDATING Message At Startup (PIC4707E, 2016/04/21)
- Information on Inappropriate Warranty Claims Submitted for Damaged Radios and Instrument Panel Clusters (IPCs) (08-08-44-015H, 2016/12/19)
- HomeLink® Programming to a Genie Intellicode® 2 Garage Door Opener (PI0751, 2012/06/25)
- Information for Fleet Vehicles - Ignition Key, Fob and Key Rings Configuration (14-00-89-004D, 2017/10/23)
- Diagnostic Tip: Voice Recognition Errors When Using iPhone With One Or More Emojis/Emoticons/Symbols In Contacts List (PIC5953D, 2018/06/14)
- Missing OnStar® Owner Kit Integration in Vehicle Owner Manual (PI0574A, 2013/05/28)
- Tire Monitor System - TPMS Lamp On, No Tire Pressures Displayed (PI1241, 2014/05/16)
- Changing Turn-By-Turn Voice Response To Metric Or English Units (PIC5614B, 2017/02/24)
- Diagnostic Tip: Unable To Connect Or Use Hands Free Calling Or No Data On The Call (Failed To Voice) (PIC4310L, 2015/04/17)
- Incoming Bluetooth Calls Cannot Be heard Through Vehicle Audio System - (Dec 5, 2016) (PIC6233, 2016/12/05)
- OnStar Bluetooth Pairing Limit And Operational Characteristics (PIC5759B, 2017/01/12)
- Cell Phone - Bluetooth(R) Connection Issues (PIC5901A, 2014/08/18)
- Diagnostic Tip - OnStar Back-up Battery Failure (PIC4541F, 2017/01/11)
- Cannot Delete Paired Phone, Phone Missing From List, HVAC Button Lock Up On Display (Volt Only), HVAC Fan Speed Freezing On Display(Camaro Only), Navigation Address Entry Concerns (Encore only), XM Background Graphics Default, Radio Freezes And/Or Resets (PIC6158B, 2016/02/15)
- Dead Battery After Exiting The Vehicle While On A Bluetooth Cal (PIC6198A, 2016/08/02)
- Behavior of Non-Upgraded OnStar® Equipped Vehicles Operating in Canada after Decommissioning of 2G CDMA Cellular Networks (16-NA-025, 2021/12/16)
- Collision Avoidance - Blind Spot Detection Stops Working (16-NA-069, 2016/03/03)
- OnStar Module 2G Sunset Information (23-NA-001, 2025/03/28)
- OnStar Will Not Power Up (PIC5491K, 2017/12/18)
- Information on Antenna COAX Repair Kit Availability (17-NA-346, 2019/01/29)
- Audio - Inadvertent Steering Wheel Button Activation (08-08-44-028A, 2012/04/11)
- Performance Of XM Radio System With Sunroof Fully Open (PIC3074F, 2019/02/04)
- Missing or Inaccurate Radio Map Disc Information (10-08-44-006D, 2016/10/05)
- Keyless Start Transmitter - Poor Appearence After Blade Removal (15-09-83-001A, 2015/07/20)
- Campaign - Connected Navigation Voice Command Not Working (12315A, 2013/01/31)
- Audio System - Noise When Using Portable Playback Unit (06-08-44-015C, 2012/03/30)
- Instructions for Installing Techline Infotainment DVD (GMNA Only) (PI0744, 2012/07/10)
- Vehicle Communication Interface Module (VCIM) Programming Not Completed (17398, 2018/03/09)
- Diagnostic Tip: Rear View Camera Brightness Control Options (PIC5611H, 2023/01/04)
- Adding Radio Steering Wheel Control Switch (RPO NZL) (PIC5320C, 2025/01/31)
- Key & Transmitter Programming (PIC6401, 2020/02/03)
- Diagnostic Tip - OnStar Turn By Turn /TBT Feature Inoperative (PIC4801H, 2017/02/20)
- Diagnostic Aid: Part Identification For Next Generation Infotainment Components And Correct Labor Codes (PIC6095C, 2018/07/06)
- Map Database Update Information (PIC6192A, 2017/03/16)
- Information on Multi-Media Infotainment Tester (MIT) Incompatibility Issues (17-NA-386, 2017/12/04)
- Audio System - USB/Multimedia Interface Information (09-08-44-013D, 2012/06/26)
- Information on Poor, Limited, Reduced Remote Keyless Entry (RKE) or Remote Vehicle Start (RVS) Range (PI1018A, 2015/02/05)
- Navigation Radio - Cannot Pause CD or Media (PIC5869A, 2014/07/01)

- Radio Displays Check DAB or DAB Re-Routing Message at all Times (16-NA-238, 2016/07/28)
- Diagnostic Tip - Unable to Learn RKE Transmitters (PIT4945H, 2019/02/19)
- Voice Recognition Release Note for v2017 Map Update (17-NA-058, 2017/03/02)
- Information on Using MyBuick, MyCadillac, MyChevrolet, and MyGMC Phone Applications to Control GM Accessory Remote Start Kits (16-NA-355, 2018/10/22)
- Electrical - Aftermarket Devices May Interfere With OnStar(R) (08-08-46-004A, 2012/11/30)
- Diagnostic Tip-Voice Recognition For Navigation Entry Inaccurate at times (PIC6185A, 2017/09/06)
- Red LED, No WiFi Operation, and/or Limited OnStar(R) Module Functionality After OnStar Module Replacement for Another Condition (17-NA-215, 2018/02/28)
- Diagnostic Tip: Apple Device Connectivity Issues due to USB Cord Concern (PIT5399A, 2018/05/23)
- CD/DVD Will Not Eject from Instrument Panel Mounted Player (PI0124E, 2012/12/07)
- OnStar® TBT (Turn by Turn) And Digit Display Location (PIC4510C, 2012/07/18)
- Diagnostic Tip: Diagnosing Vehicles with OnStar DTC B101D-37 (PIC5492F, 2017/10/05)
- Audio System - Normal Key OFF Operation (PIC5161D, 2014/01/27)
- XM Band Not Receiving All Channels (Preview Mode) (PIC5088F, 2016/04/21)
- Diagnostic Tip - Security Light on Intermittently / No Crank/No Start or Start Stall / Keyless Access Vehicles May Display No Remote/Fob Detected / Poor or No RKE Range / Service TPM (PIC5650M, 2025/08/06)
- Vehicle - Abnormal Noise/Vibration Due to Aftermarket Items (PIP3140F, 2014/01/16)

Customer Interest Bulletins (itype_109)

Tsbs
- Radio Displays Check DAB or DAB Re-Routing Message at all Times (16-NA-238, 2016/07/28)
- Collision Avoidance - Blind Spot Detection Stops Working (16-NA-069, 2016/03/03)
- Keyless Start Transmitter - Poor Appearence After Blade Removal (15-09-83-001A, 2015/07/20)
- Audio System - Noise When Using Portable Playback Unit (06-08-44-015C, 2012/03/30)

Repair Tips (itype_110)

Tsbs
- Audio System - Buzz/Rattle From Rear Speaker Area (PI1249, 2014/05/27)
- Audio - Radio Does Not Mute For OnStar Turn by Turn Directions (10-08-46-001C, 2016/04/20)
- Navigation System - DVD Navigation Update Program (06-08-44-012G, 2013/09/24)
- Audio System - Radio Reprogramming Using Techline(R)/SPS (PI1266, 2014/06/24)
- Infotainment - Blower Speed Appears Frozen on Audio Display (PIC5895B, 2014/02/19)
- Tire Monitor System - TPMS Lamp On, No Tire Pressures Displayed (PI1241, 2014/05/16)
- Infotainment - System Will Not Return To Media After Call (16-NA-011, 2016/01/19)
- Audio System - USB/Multimedia Interface Information (09-08-44-013D, 2012/06/26)
- Return or Reimbursement of Cust Owned CDs, DVDs or Nav Discs (05-08-44-024E, 2016/09/30)
- Cell Phone - Bluetooth(R) Connection Issues (PIC5901A, 2014/08/18)
- Infotainment System - Radio Does Not Re-Pair iPhone(R) (PI1218A, 2014/08/21)
- Navigation Radio - Cannot Pause CD or Media (PIC5869A, 2014/07/01)
- Dead Battery After Exiting The Vehicle While On A Bluetooth Cal (PIC6198A, 2016/08/02)
- Electrical - Aftermarket Devices May Interfere With OnStar(R) (08-08-46-004A, 2012/11/30)
- Audio System - Normal Key OFF Operation (PIC5161D, 2014/01/27)
- Audio - Inadvertent Steering Wheel Button Activation (08-08-44-028A, 2012/04/11)
- Vehicle - Abnormal Noise/Vibration Due to Aftermarket Items (PIP3140F, 2014/01/16)
- Missing or Inaccurate Radio Map Disc Information (10-08-44-006D, 2016/10/05)
- OnStar(R) - Voice Recognition Operation Issues (PIC3011H, 2014/02/26)

Software Update Bulletins (itype_434)

Tsbs
- Cannot Delete Paired Phone, Phone Missing From List, HVAC Button Lock Up On Display (Volt Only), HVAC Fan Speed Freezing On Display(Camaro Only), Navigation Address Entry Concerns (Encore only), XM Background Graphics Default, Radio Freezes And/Or Resets (PIC6158B, 2016/02/15)

Communication Interface Module Programming and Setup (Article 10726)

- DO NOT program a control module unless directed to by a service procedure or a service bulletin. If the control module is not properly configured with the correct calibration software, the control module will not control all of the vehicle features properly.
- Ensure the programming tool is equipped with the latest software and is securely connected to the data link

connector. If there is an interruption during programming, programming failure or control module damage may occur.
- Stable battery voltage is critical during programming. Any fluctuation, spiking, over voltage or loss of voltage will interrupt programming. When required install the EL-49642 - SPS Programming Support Tool to maintain system voltage. If not available, connect a fully charged 12 V jumper or booster pack disconnected from the AC voltage supply. DO NOT connect a battery charger.
- Turn OFF or disable systems that may put a load on the vehicles battery such as; interior lights, exterior lights (including daytime running lights), HVAC, radio , etc.
- During the programming procedure, follow the SPS prompts for the correct ignition switch position.
- Clear DTCs after programming is complete. Clearing powertrain DTCs will set the Inspection/Maintenance (I/M) system status indicators to NO.

Diagnostic Aids

- It is critical to use the service replacement Communication Interface Module only in the vehicle for which it was ordered.
- Failure to perform the following procedures will result in a red LED, DTC(s) being set, and limited or incomplete OnStar ® services.
- An OnStar® button press to the OnStar® call center is not required to complete the procedure.
- It may take up to 10 min for OnStar® service to become fully activated after performing the procedures.
- Perform the following procedure only once. Repeat attempts of the procedure may result in a delay of the activation process.
- To fully activate an OnStar® module, both the setup and activation request procedures must be completed on all vehicles with and without an active OnStar® subscription to insure the unit has been setup properly for the vehicle it has been installed into and also to update the OnStar® with the correct unit information.
- To initialize the Turn-by-Turn feature, the vehicle must first be driven In open sky condition at speeds greater than 10 mph (16 kph) or more for a minimum of 5 miles (8 km) , and perform at least 2 left and 2 right 90 degree turns coming to complete stops prior to each turn.
- On vehicles up fitted with TTY capabilities, it is necessary to perform a power cycle of the OnStar® Interface Module (OTIM), and toggle the TTY mode after completing the Communication Interface Module installation and setup procedures.

Reference Information

Special Tools

EL-49642 - SPS Programming Support Tool

For equivalent regional tools, refer to Special Tools .

Replace and Program Control Module or Reprogram Control Module

To program a replacement or an existing control module, perform the following procedure:
- Install EL-49642 - SPS programming support tool .
- Access the Service Programming System (SPS) and follow the on-screen instructions.
- On the SPS Supported Controllers screen, select ONSU Onstar® Module Setup and Service Activation and follow the on-screen instructions.
- At the end of programming, choose the “Clear All DTCs” function on the SPS screen.
- The default language for the new Communication Interface Module is English. To change to an alternate language, access the scan tool. If unavailable from the scan tool, press the phone button on the OnStar button assembly for 10 seconds and follow the setup instructions.

Unsuccessful Programming Recovery

In the event of an interrupted or unsuccessful programming event, perform the following steps:
- Ignition ON. Ensure the control module, DLC and programming tool connections are secure and the SPS software is up to date.
- Verify the control module can be reprogrammed.
- If the control module cannot be reprogrammed
- Ignition OFF for one minute, ignition ON.
- If the control module cannot be reprogrammed, replace the control module.
- If the control module can be reprogrammed.
- All OK.
- If the control module can be reprogrammed

Communication Interface Module Scan Tool Information (Article 10774)

Parameter System State Expected Value Description

Operating Conditions: Ignition ON

GPS Data

Dead Reckoning Calibration Status — Calibrated or Not Calibrated Indicates the dead reckoning calibration

status.
- Dead Reckoning Calibration Status
Position Calibration Method — Varies Indicates the method used to determine current location. (0) GPS, (1) Wheel Speed Dead Reckoning only, (2) Combined Wheel Speed and GPS, (3) Gyro only, (4) Combined Gyro and GPS, (5) No Fix
- Position Calibration Method
Month — MM This displays the current month.
- Month
Day — DD This displays the current day of the month.
- Day
Year — YY This displays the current year.
- Year
Hour — HH This displays the GPS current hour (24 hour format – GMT).
- Hour
Minute — MM This displays the GPS current minute.
- Minute
Second — SS This displays the GPS current second.
- Second
GPS Signal — Varies The scan tool displays Yes or No. Yes is displayed if there is a GPS signal received by the telematics communication interface control module.
- GPS Signal
Signal Strength Data
Current Transceiver Identifier — Varies The scan tool displays a 2–5 digit value. This is the transceiver identification number.
- Current Transceiver Identifier
GSM Signal Strength — Varies The scan tool displays 0–127. This is the telematics communication interface control module signal strength.
- GSM Signal Strength
Signal Type — Digital This is the signal type received by the telematics communication interface control module.
- Signal Type
Bluetooth Data
Bluetooth — Enabled Indicates if the Bluetooth system is enabled or disabled.
- Bluetooth
Bluetooth Link Status — Varies Indicates the current link status. (0) Unconnected, (1) Connected / Idle, (2) Call active, (3) 3-way calling active
- Bluetooth Link Status
Bluetooth Link Quality — Varies The scan tool displays a decimal value between 0 and 255.
- Bluetooth Link Quality
Bluetooth Phone to Telematics Communication Interface Control Module Authentication Status — Active or Inactive Displays the bluetooth phone to telematics communication interface control module authentication status.
- Bluetooth Phone to Telematics Communication Interface Control Module Authentication Status
Bluetooth Phone to Telematics Communication Interface Control Module Communication Status — Active or Inactive Displays the bluetooth phone to telematics communication interface control module status.
- Bluetooth Phone to Telematics Communication Interface Control Module Communication Status
Bluetooth Phone Voice Recognition Status — Active or Inactive Displays the bluetooth phone to voice recognition status.
- Bluetooth Phone Voice Recognition Status
Output Control Description
B1000 Information This shows the data recorded when DTC B1000 was set in the telematics communication interface control module.
Green Indicator The telematics communication interface control module illuminates the green LED when ON is selected.
Phone Call Test When ON is selected, telematics communication interface control module commands OnStar to connect to the OnStar Center.
Red Indicator The telematics communication interface control module illuminates the red LED when ON is selected.
Preferred Roaming List Update The telematics communication interface control module performs a preferred roaming list (PRL) update when this is selected.

Remote Vehicle Speed Limiting Reset This function resets the speed limiting feature.

Mobile Telephone Control Module Scan Tool Information (Article 10787)

The mobile telephone control module scan tool data parameters list contains all mobile telephone control module related parameters that are available on the scan tool. The list is arranged in alphabetical order. A given parameter may appear in any one of the data lists.
Parameter System State Expected Value Description
Operating Conditions: Ignition ON
Battery Voltage — 11–14 V The scan tool displays V. This is the current battery voltage.
Bluetooth Signal Strength — 0–20 dB The scan tool displays the wireless devices (Bluetooth) reception field strength.
GSM Signal Strength — –113 to –51 dBm The scan tool displays the Global System for Mobile Communications (GSM) signal strength.
Microphone Signal — 1–16 V The scan tool displays the voltage level of the microphone power supply.
Phone Cradle to Vehicle Status Cradle is connected Connected The scan tool displays the different aspects of the cradle status.
Cradle is not connected Disconnected
Phone in Cradle Phone in cradle Yes The scan tool displays the status if a phone is connected in the cradle.
Phone not in cradle No
Output Control Description
Audio Tone This output control is used to command the Mobile Telephone Control Module audio tone enable or disable.

Multimedia Player Interface Module Scan Tool Information (Article 10788)

Parameter Expected Value Definition
Operating Conditions: Ignition ON/Engine OFF/ Radio ON
GM Part Number Varies The scan tool displays the part number.
Calibration Part Number 1 Varies The scan tool displays the primary software part number.
Calibration Part Number 2 Varies The scan tool displays the primary calibration part number
Battery Voltage Varies The scan tool displays volts. This is the voltage input supplied to the Multimedia Player Interface Module.
USB Device Detection Inactive The scan tool displays Active or Inactive. Being active indicates a USB device is connected.
Aux IN Detection Inactive The scan tool displays Active or Inactive. Sensing& Status. This parameter displays active when a device present on AUX In (ministereo plug).
USB Overcurrent Protection Inactive The scan tool displays Active or Inactive. USB over current detection indicates a USB device is drawing too much current and the USB functionality of the device is turned OFF.
Bluetooth Device Detection Inactive The scan tool displays Active or Inactive. Active indicates a Bluetooth device connected.
Mute Status Mute OFF The scan tool displays Mute OFF or Mute ON. This parameter displays the status of the mute.
Audio Source Status Internal The scan tool displays Internal Source, AUX or Bluetooth.This parameter displays the source of the audio.
USB Power Status OFF The scan tool displays OFF or ON. This is the status of the USB power.
Connected Device Type 1 None The scan tool displays None, USB Mass Storage Device, USB Media Transfer Protocol Device, Media Player– iPod , Bluetooth, AUX, Media Player– Zune, or Device Inserted But Not Supported. This parameter displays the type of auxiliary input source connected.
Connected Device Type 2 None The scan tool displays None, USB Mass Storage Device, USB Media Transfer Protocol Device, Media Player– iPod, Bluetooth, AUX, Media Player– Zune, or Device Inserted But Not Supported. This parameter displays the type of auxiliary input source connected.
Connected Device Type 3 None The scan tool displays None, USB Mass Storage Device, USB Media Transfer Protocol Device, Media Player– iPod, Bluetooth, AUX, Media Player– Zune, or Device Inserted But Not Supported. This parameter displays the type of auxiliary input source connected.
Connected Device Type 4 None The scan tool displays None, USB Mass Storage Device, USB Media Transfer Protocol Device, Media Player– iPod, Bluetooth, AUX, Media Player– Zune, or Device Inserted But Not Supported. This parameter displays the type of auxiliary input source connected.
Bluetooth Signal Strength DB The scan tool displays the signal strength of the Bluetooth connection.

Radio Poor Reception (Article 10938)

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

DTC Descriptors

Antenna Signal Circuit Short to Ground
Antenna Signal Circuit Open Circuit

Diagnostic Fault Information

Circuit Short to Ground Open/High Resistance Short to Voltage Signal Performance
Radio Antenna Coax B125A 02 B125A 04 1 —
Antenna Module Ground — 1 — —
1. May exhibit possible AM/FM interference.

Circuit/System Description

Active Antenna (U77)

The active antenna system uses an integral antenna applied as an appliqué to the rear glass. The antenna module receives both AM and FM signals from the rear glass antenna . The radio antenna module is enabled when the radio is turned on. The radio provides battery voltage to the antenna module using the center conductor of the antenna coaxial cable. When a 12 V signal is seen by the module on the center conductor of the antenna coax, both AM and FM signals are amplified.

Spoiler Antenna (UB3)

The radio antenna is integral to the spoiler on the rear decklid. The antenna module on the underside of the spoiler receives both AM and FM signals from the antenna. The radio antenna module is enabled when the radio is turned on. The radio provides battery voltage to the antenna module using the remote enable circuit. When a 12 V signal is seen by the antenna module on the remote enable circuit, both AM and FM signals are amplified.

Conditions for Running the DTC

- Ignition ON.
- Battery voltage must be between 9–16 V.

Conditions for Setting the DTC

B125A 02

The radio detects a short to ground in the antenna signal circuit center conductor.

B125A 04

The radio detects an open in the antenna signal circuit center conductor.

Action Taken When the DTC Sets

Radio reception may be poor or not available.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clears after 50 consecutive malfunction-free ignition cycles have occurred.

Diagnostic Aids

Poor AM and FM radio reception may be due to multiple influences, some of which may not be vehicle related. Areas which have high RF traffic or block the signal path may cause a degradation in radio reception. Radio reception may also be influenced by items within the vehicle, but not part of the radio system. Such examples are aftermarket electrical accessories or other items which may generate noise in the vehicle electrical system. Aftermarket window tinting, especially when there is a metallic in the film, may reduce radio reception.

AM reception is highly dependent on the antenna module receiving battery voltage from the radio and being properly grounded. The antenna module has a built in antenna amplifier that boosts both AM and FM reception. When the antenna module does not receive power, AM stations may not be received and FM reception will be limited. If the module is not properly grounded, excessive interference in the signal may occur, or reception may be limited.

Reference Information

Schematic Reference
Radio/Navigation System Schematics
Connector End View Reference
Component Connector End Views
Description and Operation
Radio/Audio System Description and Operation
Electrical Information Reference
- Circuit Testing

- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs
Scan Tool Reference
Control Module References for scan tool information
Circuit/System Verification
- Ignition ON, A11 radio ON.
- Verify station reception is normal when tuned to several known good AM and FM stations.
- If AM or FM reception is poor. Refer to Circuit/System Testing
- If reception is normal
- All OK.
Circuit/System Testing
- Ignition OFF, disconnect the radio antenna coax cable from the A11 radio and from the K46 radio antenna module.
- Verify the antenna coax cable passes the coax cable component test. Refer to Component Testing.
- If the coax cable does not pass the test Replace the antenna coax cable
- If the coax cable passes the test
- Connect the antenna coax cable to the A11 radio. Ignition ON, A11 radio ON.
- Verify a test lamp illuminates between the antenna coax cable center terminal and ground at the K46 radio antenna module connector.
- If the test lamp does not illuminate Replace the A11 radio.
- If the test lamp illuminates
- Test or replace the K46 radio antenna module.
- Ignition OFF, disconnect the radio antenna coax cable from the A11 radio and the K46 radio antenna module.
- Disconnect the harness connector at the K46 radio antenna module. Ignition ON, A11 radio ON.
- Verify a test lamp illuminates between the control circuit terminal A and ground.
- If the test lamp does not illuminate
- Vehicle OFF. Disconnect the X1 harness at the A11 radio.
- Test for less than 2 Ω in the control circuit end to end.
- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, replace the A11 radio.
Component Testing
Coax Cable Test
- Ignition OFF, disconnect the coax cable at both components.
- Test for less than 5 Ω between coax cable center terminal end to end.
- If 5 Ω or greater Replace the coax cable
- If less than 5 Ω
- Test for less than 5 Ω between the coax cable outer shield end to end.
- Test for infinite resistance between the coax cable center terminal and the coax cable outer shield.
- If less than infinite resistance Replace the coax cable
- If infinite resistance
- All OK
Repair Instructions
Perform the Diagnostic Repair Verification after completing the repair.
- Radio Antenna Module Replacement
- Control Module References for radio replacement, programming, and setup.

Secondary and Configurable Customer Controls (Article 11058)

Non Standards
- Symptoms - Secondary and Configurable Customer Controls (11060)
- Steering Wheel Controls Malfunction (11059)

Immobilizer (Article 13197)

Non Standards
- OnStar Stolen Vehicle Slowdown Active (13198)

Symptoms - Cellular Communication (Article 10972)

- Perform the Diagnostic System Check - Vehicle before using the Symptom Tables in order to verify that all of the following are true:

- There are no DTCs set.
- The control modules can communicate via the serial data link.
- Review the system operation in order to familiarize yourself with the system functions. Refer to OnStar Description and Operation .

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the Radio / Audio System . Refer to Checking Aftermarket Accessories .
- Inspect for easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to Testing for Intermittent Conditions and Poor Connections .

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:
- Bluetooth Malfunction
- OnStar Microphone Malfunction
- OnStar Audio Malfunction
- OnStar Button LED Malfunction
- OnStar Call Center Remote Function Requests Malfunction
- OnStar Button Malfunction
- Unable to Contact OnStar Call Center
- OnStar Voice Recognition Malfunction
- OnStar Steering Wheel Control Functions Malfunction

Symptoms - Cellular Communication (w/o UE1) (Article 10973)

- Perform the Diagnostic System Check - Vehicle .
- There are no DTCs set.
- The control modules can communicate via the serial data link.
- Review the system description and operation in order to familiarize yourself with the system functions. Refer to Cellular Telephone Description and Operation .

Visual/Physical Inspection

- Inspect for aftermarket devices which may affect the operation of the mobile telephone control module. Refer to Checking Aftermarket Accessories .
- Inspect the easily accessible or visible system components, for obvious damage or conditions, which may cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to Testing for Intermittent Conditions and Poor Connections .

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:
- Cellular Telephone Conversation Partner Does Not Hear You
- Cellular Telephone Conversation Partner Cannot Be Heard
- Cellular Telephone Microphone Malfunction

Symptoms - Entertainment (Article 10974)

- Perform the Diagnostic System Check - Vehicle before using the Symptom Tables in order to verify that all of the following are true:
- There are no DTCs set.
- The control modules can communicate via the serial data link.
- Review the system operation in order to familiarize yourself with the system functions. Refer to Radio/Audio System Description and Operation .

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the Radio / Audio System . Refer to Checking Aftermarket Accessories .
- Inspect for easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to Testing for Intermittent Conditions and Poor Connections .

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- Application Malfunction
- Auxiliary Audio Input Malfunction
- Bluetooth Malfunction
- Digital Radio Poor or No Reception
- No Global Positioning System (GPS) Reception
- Radio Controls Malfunction
- Radio Information Display Malfunction
- Radio Poor Reception
- Speaker Malfunction

Application Malfunction (Article 10921)

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provide an overview of each diagnostic category.

Circuit/System Description

The term application refers to any piece of software that works on a system (hardware) that is being operated by its own software. Applications are typically small software programs which uses the hardware to perform a specific task, as opposed to operating the entire system.

Diagnostic Aids

- For an application to be used, it must be installed on both the vehicle infotainment system and a compatible mobile device.
- The application must work correctly on the device to work with the vehicle infotainment system.
- The user may be required to log-in to the application on the mobile device before using the application from the vehicle controls.
- Applications use the mobile device and connection to a service provider to operate. Connection quality issues, or service provider data transmission issues can give the appearance of a vehicle malfunction.
- The device must be connected to the system. This may be done wirelessly via Bluetooth ®, or via the vehicle USB port. When a mobile device is connected via Bluetooth®, some or all of the device controls may be unavailable from the radio control s. This varies dependant upon the device being used. Refer to the vehicle owners manual, supplements, and the device manufacturers information for information on devices, control, and operation. Refer to the device manufacturers information for the preferred connection method.
- The device must be unlocked, and any additional applications should be closed.
- If the device has any sound enhancement features such as noise reduction or echo control, these features should be turned off.
- A low battery condition in the mobile device may not allow the device to connect to the system, or can create communication issues with the device. Verify the device battery state of charge and re-charge or replace as needed.
- If a ‘Please See Device’ or similar type error message is displayed, this may indicate the device has lost its connection to the vehicle, or the device has lost its external data connection.
- If a cable is used for connection, attempt to connect the device using a different cable; cables can deteriorate over time or become damaged.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Master Electrical Component List

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

- Verify the application is installed on the mobile device and is up to date.

- If the application is not installed or is not up to date. Install or update the application on the device.
- If the application is installed on the mobile device and is up to date
- Verify the application operates correctly on the mobile device.
- If the application is not operating correctly on the mobile device. Refer to the application website.
- If the application is operating correctly on the mobile device.
- Verify the A11 Radio calibrations are current.
- If the radio calibrations are not current Reprogram the A11 Radio and re-evaluate the concern.
- If no update calibrations are available
- Verify the application is installed on the A11 Radio and is up to date.
- If the application is not installed or is not up to date. Install or update the application on the A11 Radio.
- If the application is installed on the A11 Radio and is up to date
- Ignition ON, A11 Radio ON.
- Verify the mobile device can connect to the infotainment system. Refer to the owners manual for information on the preferred connection method for the device.
- If the mobile device cannot connect to the vehicle infotainment system.
- If unable to connect via Bluetooth, refer to Bluetooth Malfunction .
- If unable to connect via USB, refer to Auxiliary Audio Input Malfunction .
- If the mobile device connects to the vehicle infotainment system.
- Launch the application.
- Verify the applications operates properly with the vehicle infotainment system.
- If the application does not function properly Refer to diagnostic aids.
- If the application functions properly
- All OK.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.
Control Module References for radio replacement, programming, and setup.

Auxiliary Audio Input Malfunction (Article 10922)

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit Short to Ground Open/High Resistance Short to Voltage Signal Performance
Auxiliary Audio Common Signal — 6 — —
Auxiliary Detection Signal 5 6 — —
Left Auxiliary Audio Signal 2 2 2, 4 —
Right Auxiliary Audio Signal 3 3 3, 4 —
USB Cable 1 1 1 —

1. USB port Inoperative 2. No left side audio from device connected to AUX jack 3. No right side audio from device connected to AUX jack 4. Noticeable distortion may be present in affected audio channel 5. Radio does not detect auxiliary device connection, AUX not available as input selection 6. AUX always available as an input selection, with or without auxiliary device connected

Circuit/System Description

Auxiliary Audio Input Jack

The 3.5 mm (1/8 in.) auxiliary audio input jack is located in the console. All circuits from the auxiliary jack are connected directly to the radio. When a device is connected to the auxiliary jack an internal switch opens. The radio detects the device and switches to AUX as the audio source. Audio signals from the device are sent to the radio from the auxiliary input jack via the left, right, and common audio signal circuits.

USB Port

The vehicle may be equipped with a USB port in the console. This port allows USB connectivity to the infotainment system from portable media players or a USB storage device (memory stick/flash drive). When a device is connected to the USB port, the system detects the device and switches to USB as the audio source. Once connected, the device can be controlled from the radio control s.

The USB port is connected to the radio via a standard USB cable. Mini type USB connectors are used to connect the cable at the USB port and at the radio or multimedia player interface module. Standard USB male to female connections are typically used for connecting USB cables together where an in-line connection is required. An in-line cable connection is typically found between the console and I/P harness.

Not all portable media player devices are compatible. Refer to the owner’s manual for information on USB

devices, control, and operation.

Diagnostic Aids

- When a device is first connected to the 3.5 mm (1/8 in.) input jack the infotainment system automatically switches to that device. If an auxiliary device has already been connected, press the AUX or CD/AUX button to select the device.
- If the system detects the device, but the audio is not heard or is not clear, attempt to connect the device using a different cable; cables can deteriorate over time or become damaged.
- Playback of an audio device that is connected to the 3.5 mm jack can only be controlled using the controls on the device.
- The volume control on the device may need to be adjusted to ensure sufficient playback volume through the infotainment system.

USB

- When a device is first connected to the USB port, the infotainment system automatically switches to that device. If an auxiliary device has already been connected, press the AUX or CD/AUX button to select the device.
- A low battery condition in a portable media player may not allow the device to connect to the system, or can create communication issues with the device. Verify the device battery state of charge and re-charge or replace as needed.
- Connect the device directly to the USB port if possible. Only use a cable if it is required to connect the device. The use of extension cables can cause communication issues.
- If a cable is required for connection, attempt to connect the device using a different cable; cables can deteriorate over time or become damaged.
- Attempt audio playback from multiple USB devices when diagnosing USB concerns. Device compatibility can vary based on vehicle equipment. If the infotainment system is capable of operating any USB type device, the cause of the concern is not with the vehicle system. The inoperative device(s) may be incompatible or contain no recognized media types.
- If a ‘Device Not Supported’ or similar type error message is displayed, this indicates the system has connected to the device but cannot communicate with it properly. This does not indicate an issue with the vehicle system. The device may be incompatible, may require a ‘reset’, or may require an update to its software/firmware.
- If a ‘No Supported Data Found’ or similar type error message is displayed, this indicates the system has connected to the device and is communicating, but cannot find any compatible files/data. This does not indicate an issue with the vehicle system. Verify the device contains compatible media/file types.
- Poor connections or damaged USB cables can cause intermittent or no operation of USB devices. Inspect connectors, terminals, and cables for damage and replace components as necessary. Ensure all USB inline connections and connections at components are fully seated and connector position retainers/locks are secure.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Special Tools

- EL-50334-20 - Multi-Media Interface Tester (MIT)
- EL-50334-50 - USB Cable and Adapter Kit

For equivalent regional tools, refer to Special Tools

Circuit/System Verification

- Verify no DTCs are present.
- If any DTCs are present Refer to Diagnostic Trouble Code (DTC) List - Vehicle .
- If no DTCs are present
- Ignition ON, radio ON.
- Verify the infotainment system switches to AUX as the audio source with the EL-50334-20 - Multi-Media

Interface Tester (MIT) connected to the auxiliary audio input jack.
- If the infotainment system does not switch to AUX as the audio source Refer to Circuit/System Testing – Auxiliary Input Jack.
- If the infotainment system switches to AUX as the audio source
- Verify the audio from the EL-50334-20 - Multi-Media Interface Tester (MIT) is heard through the vehicle infotainment system while operating the test tool to begin audio playback.
- If audio is not heard from the test tool. Refer to Circuit/System Testing – Auxiliary Input Jack.
- If audio is heard from the test tool.
- All OK
- Verify the infotainment system switches to USB as the audio source with the EL-50334-20 - Multi-Media Interface Tester (MIT) connected to the USB port.
- If the infotainment system does not switch to USB as the audio source Refer to Circuit/System Testing – USB Port.
- If the infotainment system switches to USB as the audio source
- Verify the audio from the EL-50334-20 - Multi-Media Interface Tester (MIT) is heard through the vehicle infotainment system while operating the system to play audio from the test tool.
- If audio is not heard from the test tool. Refer to Circuit/System Testing – USB Port.
- If audio is heard from the device
- All OK.

Circuit/System Testing
- Ignition OFF, disconnect the X1 harness connector at the X83 Auxiliary Audio Input. Ignition ON, radio ON.
- Test for 2.5–3.5 V between the signal circuit terminal 5 and ground.
- If less than 2.5 V
- Ignition OFF, disconnect the X1 harness connector at the A11 Radio.
- Test for infinite resistance between the signal circuit and ground.
- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance
- Test for less than 2 Ω in the signal circuit end to end
- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, replace the A11 Radio.
- If greater than 3.5 V
- Ignition OFF, disconnect the X1 harness connector at the A11 Radio, ignition ON.
- Test for less than 1 V between the detection circuit and ground.
- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the A11 Radio.
- If between 2.5–3.5 V
- Test for less than 1 V between the signal circuits listed below and ground:
- Left auxiliary audio signal circuit terminal 1
- Right auxiliary audio signal circuit terminal 2
- Auxiliary audio common signal circuit terminal 3
- If 1 V or greater
- Ignition OFF, disconnect the X1 harness connector at the A11 Radio. Ignition ON.
- Test for less than 1 V between the signal circuit and ground.
- If less than 1 V
- Test for infinite resistance between the signal circuits listed below and ground:
- Auxiliary audio common signal circuit terminal 23
- Left auxiliary audio signal circuit terminal 24
- Right auxiliary audio signal circuit terminal 10
- If less than infinite resistance Repair the short to ground on the circuit.
- Test for less than 5 Ω between the signal circuit terminals listed below:
- A11 Radio terminal 24 X1 and the X83 Auxiliary Audio Input terminal 1 X1
- A11 Radio terminal 10 X1 and the X83 Auxiliary Audio Input terminal 2 X1
- A11 Radio terminal 23 X1 and the X83 Auxiliary Audio Input terminal 3 X1
- If 5 Ω greater Repair the open/high resistance in the circuit.
- If less than 5 Ω
- Replace the X83 Auxiliary Audio Input. Connect all harness connectors.
- Connect and operate the EL-50334-20 - Multi-Media Interface Tester (MIT) .
- Verify the audio from the test tool is heard through the vehicle infotainment system.
- If audio is not heard from the test tool Replace the A11 Radio.
- If audio is heard from the test tool

- Ignition OFF, disconnect the USB cable connection at the A11 Radio.
- Connect the EL-50334-1 Type A male to Mini A male USB Cable to the A11 Radio. Connect the EL-50334-3 Type A female to Type A female adapter to the EL-50334-1 Cable.
- Ignition ON, radio ON, connect the EL-50334-20 - Multi-Media Interface Tester (MIT) to the EL-50334-3 adapter.
- Verify the infotainment system switches to USB as the audio source.
- If the infotainment system does not switch to USB as the audio source Replace the A11 Radio.
- Ignition OFF, connect the vehicle USB cable to the A11 Radio. Disconnect the I/P to floor console inline USB cable connector.
- Ignition ON, radio ON, connect the EL-50334-20 - Multi-Media Interface Tester (MIT) to the I/P side of the inline USB cable connector.
- If the infotainment system does not switch to USB as the audio source Replace the I/P USB cable assembly.
- Ignition OFF, connect the I/P to floor console inline USB cable connector.
- Disconnect the USB cable at the X83 Auxiliary Audio Input. Connect the EL-50334-4 Type A female to Mini B female adapter to the USB cable.
- Ignition ON, radio ON, connect the EL-50334-20 - Multi-Media Interface Tester (MIT) to the EL-50334-4 adapter.
- If the infotainment system does not switch to USB as the audio source Replace the console USB cable assembly.
- Test or replace the X83 Auxiliary Audio Input.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.
- Audio Player and USB Receptacle Replacement
- Control Module References for radio replacement, programming, and setup.

Bluetooth Malfunction (UHP) (Article 10923)

Diagnostic Instructions
- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Circuit/System Description

The Bluetooth ® antenna is internal to, or is a small fixed antenna connected directly to, the mobile telephone control module and is used to send and receive signals from a Bluetooth ® enabled cellular phone . The antenna utilizes no cabling and is not external to the vehicle.

In order to use hands-free calling, the cellular phone must be paired to the vehicle. Up to five devices can be paired to the vehicle at one time, but only one can be connected at any given time. To pair a phone, the customer must know how to operate the Bluetooth ® functionality of their phone. The pairing process must only be done one time for each phone, unless that phone's information is deleted. For safety reasons, the pairing process is disabled while the vehicle is moving.

Diagnostic Aids
- The purpose of this diagnostic is to verify the ability of the mobile telephone control module to pair to a Bluetooth ® device.
- If a vehicle passes the following tests and a compatible device is being used, the concern may be due to a device malfunction or an incomplete/improper pairing attempt.
- A Bluetooth ® test tool or equivalent can also be used to verify the ability of the customers cellular phone(s) to pair with another device.

Reference Information

Schematic Reference

Cellular Telephone Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Cellular Telephone Description and Operation

Electrical Information Reference
- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification
- Ignition ON.
- Verify DTC B2485 is not set.
- If DTC B2485 is set Refer to DTC B2485
- If DTC B2485 is not set
- Ignition ON, infotainment system ON.
- Verify the infotainment system successfully pairs with the Multi-Media Interface Tool.
- If the infotainment system does not successfully pair with the Multi-Media Interface Tool.
- Verify the vehicle is equipped with an external Bluetooth® Antenna.
- If not equipped with an external Bluetooth® Antenna, replace the K82 Mobile Telephone Control Module
- If equipped with an external Bluetooth® Antenna
- Replace the Bluetooth® Antenna.
- If the infotainment system does not successfully pair with the Multi-Media Interface Tool, replace the K82 Mobile Telephone Control Module.
- If the infotainment system successfully pairs with the Multi-Media Interface Tool.
- All OK.
Repair Instructions
Perform the Diagnostic Repair Verification after completing the repair.
Control Module References for mobile telephone control module replacement, programming and setup.

Bluetooth Malfunction (UP9) (Article 10924)

Diagnostic Instructions
- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provide an overview of each diagnostic category.
Circuit/System Description
Bluetooth ® wireless technology is a short-range communications technology intended to replace the cables connecting portable and/or fixed devices while maintaining high levels of security. The operating range of the signal is approximately 30 feet.
The available features and functions are determined by the type of device and the software within the devices being used. For a feature or function to operate, it must be supported in both devices.
The Bluetooth ® hardware is internal to the radio . The radio supports streaming of data (music, voice, information) from cellular phone s and other mobile devices that support those features. The radio may also be capable of interfacing with cellular phones for hands-free features.
Refer to the vehicle owners manual, supplements, and the device manufacturers information for information on devices, control, operation. and pairing instructions.
Diagnostic Aids
- Verify the mobile device is properly configured for the feature being used. Refer to the device manufacturers information.
- Verify the function/feature that is being used is supported by the mobile device.
- The device must be paired to the radio to use the available Bluetooth ® feature(s). The pairing process must only be performed once for each device, unless that device’s information is deleted.
- The system can store pairing information for multiple devices, but can only be actively connected to one at any given time.
Reference Information
Schematic Reference
Radio/Navigation System Schematics
Connector End View Reference
Component Connector End Views
Description and Operation
Radio/Audio System Description and Operation
Electrical Information Reference
- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs
Scan Tool Reference
Control Module References for scan tool information
Special Tools
EL-50334-20 - Multi-Media Interface Tester (MIT)

For equivalent regional tools, refer to Special Tools .

Circuit/System Verification

- Verify no DTCs are present.
- If any DTCs are present Refer to Diagnostic Trouble Code (DTC) List - Vehicle .
- If no DTCs are present
- Verify the A11 Radio calibrations are current.
- If the radio calibrations are not current Reprogram the A11 Radio and re-evaluate the concern.
- If no update calibrations are available
- Ignition ON, infotainment system ON.
- Verify the infotainment system successfully pairs with the MIT tool.
- If the infotainment system does not successfully pair with the MIT tool. Replace the A11 Radio.
- If the infotainment system successfully pairs with the MIT tool.
- Verify the infotainment system successfully completes the desired feature test using the MIT tool.
- If the feature test is not successful Replace the A11 Radio.
- If the feature test is successful
- All OK. Refer to Diagnostic Aids.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for radio replacement, programming, and setup

Bluetooth Malfunction (UPF) (Article 10925)

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provide an overview of each diagnostic category.

Circuit/System Description

The Bluetooth ® antenna is internal to, or is a small fixed antenna connected directly to, the telematics communication interface control module and is used to send and receive signals from a Bluetooth ® enabled cellular phone . The antenna utilizes no cabling and is not external to the vehicle.

In order to use hands-free calling, the cellular phone must be paired to the vehicle. Up to five devices can be paired to the vehicle at one time, but only one can be connected at any given time. To pair a phone, the customer must know how to operate the Bluetooth ® functionality of their phone. The pairing process must only be done one time for each phone, unless that phone’s information is deleted. For safety reasons, the pairing process is disabled while the vehicle is moving.

Diagnostic Aids

- The purpose of this diagnostic is to verify the ability of the telematics communication interface control module to pair to a Bluetooth ® device.
- Before performing this test, verify compatibility of the cellular phone(s) the customer is attempting to use with the vehicle. Based on the cellular phone’s service provider and the manufacturer’s implementation of Bluetooth ®, not all phones support all available Bluetooth ® functionality. A vehicle and feature compatibility list will be provided via the GM Bluetooth ® website: http://www. onstar .com/web/Bluetooth/
- If the vehicle passes the following tests and a compatible device is being used, the concern may be due to a device malfunction or an incomplete/improper pairing attempt.
- A Bluetooth ® test tool or equivalent can also be used to verify the ability of the customers cellular phone(s) to pair with another device.

Schematic Reference

OnStar/Telematics Schematics

Connector End View Reference

Master Electrical Component List

Description and Operation

OnStar Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Special Tools

EL-50334-20 - Multi-Media Interface Tester (Multi-Media Interface Tool)

Circuit/System Verification
- Ignition ON.
- Verify no DTCs are set.
- If any DTCs are set Refer to Diagnostic Trouble Code (DTC) List - Vehicle
- If no DTCs are set
- Ignition ON, infotainment system ON.
- Verify the infotainment system successfully pairs with the Multi-Media Interface Tool.
- If the infotainment system does not successfully pair with the Multi-Media Interface Tool.
- Verify the vehicle is equipped with an external Bluetooth® Antenna.
- If not equipped with an external Bluetooth® Antenna, replace the K73 Telematics Communication Interface Control Module
- If equipped with an external Bluetooth® Antenna
- Replace the Bluetooth® Antenna.
- If the infotainment system does not successfully pair with the Multi-Media Interface Tool, replace the K73 Telematics Communication Interface Control Module.
- If the infotainment system successfully pairs with the Multi-Media Interface Tool.
- All OK.
Repair Instructions
Perform the Diagnostic Repair Verification after completing the repair procedure.
Control Module References for telematics communication interface control module replacement, programming, and setup.

Cellular Telephone Conversation Partner Does Not Hear You (Article 10927)

Diagnostic Instructions
- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.
Diagnostic Fault Information
Circuit Short to Ground Open/High Resistance Short to Voltage Signal Performance
Cellular Telephone Microphone Signal Terminal A 2 1 1 —
Cellular Telephone Microphone Low Signal Terminal B — 1 2 —
Voice Recognition Audio Signal Terminal 18 2 1 2 —
Voice Recognition Audio Low Signal Terminal 17 — 2 2 —
1. Voice Cannot be Heard by Telephone Conversation Partner 2. Customer Voice may be distorted for Telephone Conversation Partner
Circuit/System Description
The mobile telephone control module provides the cellular phone microphone with a supplied voltage on the cellular phone microphone signal circuit. When the cellular phone microphone is in use, voice data from the user is sent back to the mobile telephone control module on the signal circuit.
If equipped with a navigation radio , the mobile telephone control module and navigation radio use the cellular telephone microphone to allow driver communication with a cellular telephone, as well as to operate the voice recognition guidance feature of the navigation radio.
Diagnostic Aids
- It is necessary to have the vehicle in a quiet, open outside area where a cellular call can be successfully placed.
- Refer to the Owners Manual and/or Navigation System Owners Manual for voice recognition use and commands.
Reference Information
Schematic Reference
Cellular Telephone Schematics
Connector End View Reference
Component Connector End Views
Description and Operation
Cellular Telephone Description and Operation
Electrical Information Reference
- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs
Scan Tool Reference
Control Module References for scan tool information

Circuit/System Verification
- Ignition ON.
- Verify the mobile telephone voice recognition is operating normally.
- If the mobile telephone voice recognition is not operating normally Refer to Circuit/System Testing – Microphone Malfunction.
- If the mobile telephone voice recognition is operating normally
- Verify the infotainment system responds correctly to radio voice commands normally.
- If the infotainment system does not respond correctly to radio voice commands normally Refer to Circuit/System Testing – Voice Recognition Malfunction.
- If the infotainment system responds correctly to radio voice commands normally
- All OK.

Circuit/System Testing

Microphone Malfunction
- Ignition OFF, disconnect the harness connector at the B24 Cellular Phone Microphone, ignition ON.
- Test for 8.0-10.5 V between the signal circuit terminal A and ground.
- If less than 8.0 V
- Ignition OFF, disconnect the harness connector at the K82 Mobile Telephone Control Module.
- Test for infinite resistance between the signal circuit and ground.
- If less than infinite resistance, repair the short to ground in the circuit.
- If infinite resistance
- Test for less than 2 Ω in the signal circuit end to end.
- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, replace the vehicle K82 Mobile Telephone Control Module.
- If greater than 10.5 V
- Ignition OFF, disconnect the harness connector at the K82 Mobile Telephone Control Module, ignition ON.
- Test for less than 1 V between the signal circuit and ground.
- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K82 Mobile Telephone Control Module.
- If between 8.0-10.5 V
- Test for less than 1 V between the signal circuit terminal B and ground.
- If greater than 1 V
- If 1 V or greater, repair the short to voltage in the circuit.
- If less than 1 V, repair the K82 Mobile Telephone Control Module.
- If less than 1 V
- Test for greater than 8 V between the signal circuit terminal A and the signal circuit terminal B.
- If less than 8 V
- If greater than 9 V
- Test or replace the B24 Cellular Phone Microphone.

Cellular Telephone Voice Malfunction
- Ignition OFF and vehicle systems OFF, disconnect the harness connector at the K82 Mobile Telephone Control Module and the X4 harness connector at the A11 Radio, ignition ON.
- Test for less than 1 V between the signal circuits listed below and ground.
- K82 Mobile Telephone Control Module signal circuit Terminal 18
- K82 Mobile Telephone Control Module signal circuit Terminal 17
- If greater than 1 V Repair the short to voltage in the circuit.
- Ignition OFF.
- Test for infinite resistance between the between the signal circuits listed below and ground.
- If less than infinite resistance Repair the short to ground on the circuit.
- Test for less than 2 Ω in the the signal circuits listed below end to end.
- If 2 Ω or greater Repair the open/high resistance in the circuit.
- If less than 2 Ω
- Replace the K82 Mobile Telephone Control Module.
- Connect the harness connector at the K82 Mobile Telephone Control Module and the X4 harness connector at the A11 Radio, ignition ON.
- If the infotainment system does not respond correctly to radio voice commands normally Replace the A11 Radio.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.
- Mobile Telephone Microphone Replacement
- Control Module References for radio or mobile telephone control module replacement, programming, and setup.

Cellular Telephone Microphone Malfunction (Article 10928)

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit Short to Ground Open/High Resistance Short to Voltage Signal Performance
Cellular Telephone Microphone Signal Terminal A 2 1 1 —
Cellular Telephone Microphone Low Signal Terminal B — 1 2 —
Voice Recognition Audio Signal Terminal 18 2 1 2 —
Voice Recognition Audio Low Signal Terminal 17 — 2 2 —
1. Voice Cannot be Heard by Telephone Conversation Partner 2. Customer Voice may be distorted for Telephone Conversation Partner

Circuit/System Description

The mobile telephone control module provides the cellular phone microphone with a supplied voltage on the cellular phone microphone signal circuit. When the cellular phone microphone is in use, voice data from the user is sent back to the mobile telephone control module on the signal circuit.
If equipped with a navigation radio , the mobile telephone control module and navigation radio use the cellular telephone microphone to allow driver communication with a cellular telephone, as well as to operate the voice recognition guidance feature of the navigation radio.

Diagnostic Aids

- It is necessary to have the vehicle in a quiet, open outside area where a cellular call can be successfully placed.
- Refer to the Owners Manual and/or Navigation System Owners Manual for voice recognition use and commands.

Reference Information

Schematic Reference
Cellular Telephone Schematics
Connector End View Reference
Component Connector End Views
Description and Operation
Cellular Telephone Description and Operation
Electrical Information Reference
- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference
Control Module References for scan tool information

Circuit/System Verification

- Ignition ON.
- Verify the mobile telephone voice recognition is operating normally.
- If the mobile telephone voice recognition is not operating normally Refer to Circuit/System Testing – Microphone Malfunction.
- If the mobile telephone voice recognition is operating normally
- Verify the infotainment system responds correctly to radio voice commands normally.
- If the infotainment system does not respond correctly to radio voice commands normally Refer to Circuit/System Testing – Voice Recognition Malfunction.
- If the infotainment system responds correctly to radio voice commands normally
- All OK.

Circuit/System Testing

Microphone Malfunction
- Ignition OFF, disconnect the harness connector at the B24 Cellular Phone Microphone, ignition ON.
- Test for 8.0-10.5 V between the signal circuit terminal A and ground.
- If less than 8.0 V
- Ignition OFF, disconnect the harness connector at the K82 Mobile Telephone Control Module.
- Test for infinite resistance between the signal circuit and ground.
- If less than infinite resistance, repair the short to ground in the circuit.
- If infinite resistance
- Test for less than 2 Ω in the signal circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, replace the vehicle K82 Mobile Telephone Control Module.
- If greater than 10.5 V
- Ignition OFF, disconnect the harness connector at the K82 Mobile Telephone Control Module, ignition ON.
- Test for less than 1 V between the signal circuit and ground.
- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K82 Mobile Telephone Control Module.
- If between 8.0-10.5 V
- Test for less than 1 V between the signal circuit terminal B and ground.
- If greater than 1 V
- If 1 V or greater, repair the short to voltage in the circuit.
- If less than 1 V, repair the K82 Mobile Telephone Control Module.
- If less than 1 V
- Test for greater than 8 V between the signal circuit terminal A and the signal circuit terminal B.
- If less than 8 V
- If greater than 9 V
- Test or replace the B24 Cellular Phone Microphone.

Cellular Telephone Voice Malfunction

- Ignition OFF and vehicle systems OFF, disconnect the harness connector at the K82 Mobile Telephone Control Module and the X4 harness connector at the A11 Radio, ignition ON.
- Test for less than 1 V between the signal circuits listed below and ground.
- K82 Mobile Telephone Control Module signal circuit Terminal 18
- K82 Mobile Telephone Control Module signal circuit Terminal 17
- If greater than 1 V Repair the short to voltage in the circuit.
- Ignition OFF.
- Test for infinite resistance between the between the signal circuits listed below and ground.
- If less than infinite resistance Repair the short to ground on the circuit.
- Test for less than 2 Ω in the the signal circuits listed below end to end.
- If 2 Ω or greater Repair the open/high resistance in the circuit.
- If less than 2 Ω
- Replace the K82 Mobile Telephone Control Module.
- Connect the harness connector at the K82 Mobile Telephone Control Module and the X4 harness connector at the A11 Radio, ignition ON.
- If the infotainment system does not respond correctly to radio voice commands normally Replace the A11 Radio.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Mobile Telephone Microphone Replacement
- Control Module References for radio or mobile telephone control module replacement, programming, and setup.

Cellular Telephone Conversation Partner Cannot Be Heard (Article 10926)

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit Short to Ground Open/High Resistance Short to Voltage Signal Performance
Cellular Telephone Voice Signal 1 1 2 —
Cellular Telephone Voice Low Signal — 1 2 —
1. Cellular telephone conversation partner can not be heard 2. Cellular telephone audio is distorted

Circuit/System Description

When a call is made using the mobile telephone control module, a serial data message is sent to the audio system to mute all radio functions and output the telephone call to the speakers. After the audio system is muted, the mobile telephone control module transmits signals to the audio system on the audio signal circuits.

Reference Information

Schematic Reference
Cellular Telephone Schematics
Connector End View Reference
Component Connector End Views
Description and Operation

Cellular Telephone Description and Operation
Electrical Information Reference
- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs
Scan Tool Reference
Control Module References for scan tool information
Circuit/System Verification
- Ignition ON, radio ON.
- Verify that audio is heard clearly through all speaker channels when tuning radio to a known good station.
- If audio is not heard clearly Refer to Speaker Malfunction
- If audio is heard clearly
- Verify that the audio tone can be heard clearly through the audio system when commanding the Audio Tone ON with a scan tool.
- If the audio tone is not heard clearly Refer to Circuit/System Testing
- If the audio tone is heard clearly
- All OK.
Circuit/System Testing
- Ignition OFF and vehicle systems OFF, disconnect the X1 harness connector at the K82 Mobile Telephone Control Module, ignition ON.
- Test for less than 4 V between the cellular telephone voice signal circuit terminal 6 and ground
- If 4 V or greater
- Ignition OFF, disconnect the X1 harness connector at the A11 Radio, ignition ON.
- Test for less than 1 V between the signal circuit and ground.
- If greater than 1 V, repair the short to voltage in the circuit.
- If less then 1 V, replace the A11 Radio.
- If less than 4 V
- Test for less than 4 V between the cellular telephone voice low signal circuit terminal 15 and ground
- Ignition OFF.
- Test for infinite resistance between the cellular telephone voice signal circuit terminal 6 and ground
- If less than infinite resistance Repair the short to ground on the circuit.
- If infinite resistance
- Test for infinite resistance between the cellular telephone voice low signal circuit terminal 15 and ground
- Disconnect the X1 harness connector at the A11 Radio.
- Test for less than 2 Ω in the cellular telephone voice low signal circuit between A11 Radio terminal 6 X1 and K82 Mobile Telephone Control Module terminal 15 .
- If 2 Ω or greater Repair the open/high resistance in the circuit.
- If less than 2 Ω
- Test for less than 2 Ω in the cellular telephone voice signal circuit between A11 Radio terminal 20 X1 and K82 Mobile Telephone Control Module terminal 6.
- Replace the K82 Mobile Telephone Control Module.
- If audio tone is not heard clearly Replace the A11 Radio.
- If audio tone is heard clearly
Repair Instructions
Perform the Diagnostic Repair Verification after completing the repair procedure.
Control Module References for radio or mobile telephone control module replacement, programming, and setup

Digital Radio Poor or No Reception (Article 10929)

Diagnostic Instructions
- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.
DTC Descriptors
Satellite Antenna Circuit Short to Battery
Satellite Antenna Circuit Short to Ground
Satellite Antenna Circuit Open
Circuit/System Description
The digital radio receiver, located inside the radio , receives digital radio information from the digital radio antenna located on the outside of the vehicle. The digital radio receiver is connected to the digital

radio antenna via a shielded coax cable. The digital radio antenna contains an amplifier which is powered by the radio through the coax cable.

Conditions for Running the DTC

This DTC is run every 300 milliseconds.

Conditions for Setting the DTC

The radio detects a circuit fault in the digital radio antenna.

Action Taken When the DTC Sets

The radio displays No XM Signal or Check Antenna.

Conditions for Clearing the DTC

- A current DTC clears when the condition for setting the DTC is no longer present.
- A history DTC clears after 100 malfunction-free ignition cycles.

Diagnostic Aids

The digital radio antenna requires a clear line of sight to the sky to operate properly. Reception may be limited, intermittent, or unavailable inside structures.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Master Electrical Component List

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Special Tools

EL-48028 - Digital Radio Test Antenna

For equivalent regional tools, refer to Special Tools .

Circuit/System Verification

- With the vehicle outside in an area with an unobstructed view of the southern sky, tune to XM.
- Verify DTC B125C is not set as current and the No XM Signal message is not displayed on the radio.
- If DTC B125C is set as current or the No XM Signal message is displayed. Refer to Circuit/System Testing.
- If the customer complaint indicates certain XM channels are missing or certain XM channels have no audio Refer to Missing XM Channels or No Audio On Certain XM Channels
- If DTC B125C is not set as current and the No XM Signal message is not displayed and all expected channels are present and functioning correctly.
- All OK.

Circuit/System Testing

- Ignition OFF, disconnect the digital radio antenna coax cable from the A11 Radio. Connect the EL-48028 - Digital Radio Test Antenna to the radio and place on the roof of the vehicle.
- Ignition ON, radio tuned to XM channel 1.
- Verify DTC B125C is not set as current and XM reception is improved.
- If DTC B125C is set as current or XM reception is not improved Replace the A11 Radio.
- If DTC B125C is not set as current and XM reception is improved
- Ignition OFF, disconnect the digital radio antenna coax cable from the T4G Cellular Phone , Navigation, and Digital Radio Antenna.
- Verify the digital radio antenna coax cable passes the coax cable component test. Refer to Component Testing.
- If the coax cable does not pass the test Replace the antenna coax cable
- If the coax cable passes the test
- Test or replace the T4G Cellular Phone, Navigation, and Digital Radio Antenna.

Missing XM Channels or No Audio On Certain XM Channels

- Locate vehicle with a clear view of the southern and western sky while channel 1 is playing audio.
- Record the XM Radio ID from channel 0 in the vehicle and call XM at US: www.xmradio.com or 1-800-556-3600 prompt 2 or Canada: 1-877-438-9677 and verify the customer’s account is properly setup for the customer and has active XM service for the vehicle. Note: For concerns with missing channels, it is necessary to verify channel status with XM (some channels may be moved or deleted by XM and some are package specific or are listed as Online listening only).
- Perform an Ignition/RAP Power cycle

- Verify that “no audio” or "missing channels" condition still exists (Review all channels and documenting those channels that are missing or have no audio).
- Call XM again and request the XM advisor to deactivate the service. From there, verify that the deactivation was received by the receiver by verifying they only have Channels 0 and 1 available. This process could take 5+ minutes.
- Perform an Ignition/RAP Power cycle (Should still see only channel 0 and channel 1 present after this power cycle).
- Call XM and Activate the receiver with the SiriusXM programming package appropriate for the capability of the audio system .
- The activation can take up to 30 minutes to complete. Do not attempt to change from channel 1 until the XM advisor says it is ok to change channels. (Note: A slight mute in the audio may be heard on some models during the activation).
- Once other channels appear, wait a few more minutes for all channels to load properly, then turn the radio off.
- Check activation status (Proceeded with checking ALL available channels for no audio condition).
- Power cycle vehicle.
- Recheck activation status (Checked all previously suspect channels written down earlier in step 4).

Component Testing

Coax Cable Test

- Ignition OFF, disconnect the coax cable at both components.
- Test for less than 5 Ω between coax cable center terminal end to end.
- If 5 Ω or greater Replace the coax cable
- If less than 5 Ω
- Test for less than 5 Ω between the coax cable outer shield end to end.
- Test for infinite resistance between the coax cable center terminal and the coax cable outer shield.
- If less than infinite resistance Replace the coax cable
- If infinite resistance
- All OK

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Radio Antenna Base Replacement
- Control Module References for radio replacement, programming, and setup.

OnStar Global Positioning System (GPS) Data Not Current or Inaccurate (Article 10961)

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Circuit/System Description

The telematics communication interface module receives information from a specific antenna located on the outside of the vehicle. The antenna is connected to the telematics communication interface module via a shielded coaxial cable. The antenna cable also provides a path for DC current for powering the antenna.

Diagnostic Aids

- The GPS Signal parameter will display a Yes or No dependant upon whether or not the module sees an increment of the seconds transmitted by GPS signals to the telematics communication interface module. Upon entering this screen, the GPS signal title will automatically display Yes, regardless of the presence of time increment, for at least 2 seconds, while the algorithm in the scan tool determines the status of the clock. If increment is found, Yes is continually displayed. If the clock remains static, No is displayed. The scan tool looks for increment every second, regardless of current display.
- Inaccurate or aged GPS position concerns which are no longer present may have been due to the temporary loss of GPS signal reception by the vehicle. Conditions such as driving through tunnels or parking structures while making an OnStar ® keypress will restrict the radio antenna from a clear view of the satellites in the sky and may have caused this temporary data loss.

Reference Information

Schematic Reference

OnStar/Telematics Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

OnStar Description and Operation

Electrical Information Reference
- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs
- OnStar Description and Operation
Scan Tool Reference
Control Module References for scan tool information
Special Tools
EL-49903 - GM OnStar Antenna Diagnostic Tool Kit
Circuit/System Verification
- Ignition ON.
- Verify that DTC B2470 is not set.
- If DTC B2470 is set Refer to DTC B2470
- If DTC B2470 is not set
- Verify the scan tool GPS Signal parameter is Active.
- If the parameter is not Active Refer to Circuit/System Testing
- If the parameter is Active
- All OK.
Circuit/System Testing
- The vehicle may be equipped with sectioned coax. Test each section and replace only the faulty section, not the entire length of coax.
- The following verification requires the vehicle to be outside with an unobstructed view of the southern sky. Allow 5 minutes after turning the ignition ON for the GPS satellites to acquire vehicle signal.
Without Navigation Radio
- Ignition OFF and all vehicle systems OFF, disconnect the GPS and cellular coax cable connector at the K73 Telematics Communication Interface Control Module. It may take up to 2 minutes for all vehicle systems to power down.
- Using the EL-49903–3 kit (EL-49903–5 adapter and EL-49903–4 coax cable), connect the EL-49903 - GM OnStar antenna diagnostic tool kit to the K73 Telematics Communication Interface Control Module. Place the test antenna on the roof of the vehicle, ignition ON.
- Verify the DTC does not set while operating the vehicle within the conditions for running the DTC.
- If the DTC sets Replace the K73 Telematics Communications Interface Control Module.
- If the DTC does not set
- Ignition OFF.
- Disconnect the EL-49903 - GM OnStar antenna diagnostic tool kit from the K73 Telematics Communication Interface Control Module
- Test the coax cable. Refer to Component Testing.
- If the coax cable does not pass the test Replace the coax cable.
- If the coax cable passes the test
- Test or replace the T4D Cellular Phone and Digital Radio Antenna.
With Navigation Radio
- If the DTC sets Replace the K73 Telematics Communication Interface Control Module.
- Connect the coax cable to the K73 Telematics Communications Interface Control Module and disconnect the coax cable from the T15 Navigation Antenna Signal Splitter, ignition ON.
- Test for 4.5–5.5 V between the coax cable center conductor and the outer shield.
- If less than 4.5 V
- If the coax cable does not pass the test, replace the coax cable.
- If the coax cable passes the test, test or replace the K73 Telematics Communications Interface Control Module.
- If greater than 5.5 V
- If between 4.5–5.5 V
- Ignition OFF, connect the coax cable to the T15 Navigation Antenna Signal Splitter and disconnect the coax cable from the T4D Cellular Phone and Digital Radio Antenna, ignition ON.
- If the coax cable passes the test, test or replace the T15 Navigation Antenna Signal Splitter.
Component Testing
- Before testing the coax cable, check the cable exterior for being pinched, cut, damaged, or having loose connections at the components, which can cause reception issues.
- To prevent false readings when testing the center coax terminals, use care not to ground the test probe on the outer housing/shield.

Coax Cable Test
- Ignition OFF, disconnect the coax cable at both components.
- Test for less than 5 Ω between the coax cable center terminal end to end.
- If 5 Ω or greater Replace the coax cable.
- If less than 5 Ω
- Test for greater than 5 Ω between the coax cable outer shield end to end.
- Test for infinite resistance between the coax cable center terminal and the coax cable outer shield.
- If less than infinite resistance Replace the coax cable.
- If infinite resistance
Repair Instructions
Perform the Diagnostic Repair Verification after completing the repair procedure.
- Radio Antenna Base Replacement
- Control Module References for telematics communication interface module replacement, programming, and setup.

OnStar Microphone Malfunction (Article 10962)

Diagnostic Instructions
- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.
Diagnostic Fault Information
Circuit Short to Ground Open/High Resistance Short to Voltage Signal Performance
Signal Terminal 9 X2 B2455 02 B2455 04 B2455 04 —
Signal Terminal 10 X2 B2455 02 B2455 04 B2455 04 —
Circuit/System Description
The telematics communication interface control module provides the Cellular Phone Microphone with a supplied voltage on the cellular phone microphone signal circuit. When the cellular phone microphone is in use, voice data from the user is sent back to the telematics communication interface control module on the signal circuit.
Reference Information
Schematic Reference
OnStar/Telematics Schematics
Connector End View Reference
Master Electrical Component List
Description and Operation
OnStar Description and Operation
Electrical Information Reference
- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs
Scan Tool Reference
Control Module References for scan tool information
Circuit/System Verification
- Ignition ON.
- Verify that DTC B2455 is not set.
- If DTC B2455 is set Refer to DTC B2455 .
- If DTC B2455 is not set
- Verify that a successful OnStar voice command can be made.
- If your voice can not be heard clearly. Refer to Circuit/System Testing – Microphone Malfunction.
- If your voice can be heard clearly
- All OK.
Circuit/System Testing
Microphone Malfunction
- Ignition OFF, disconnect the harness connector at the B24 Cellular Phone Microphone, ignition ON.
- Test for 8.0-10.5 V between the signal circuit terminal B and ground.
- If less than 8.0 V
- Ignition OFF, disconnect the X2 harness connector at the K73 Telematics Communication Interface Control Module.
- Test for infinite resistance between the signal circuit and ground.
- If less than infinite resistance, repair the short to ground in the circuit.

- If infinite resistance
- Test for less than 2 Ω in the signal circuit end to end.
- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, replace the vehicle K73 Telematics Communication Interface Control Module.
- If greater than 10.5 V
- Ignition OFF, disconnect the X2 harness connector at the K73 Telematics Communication Interface Control Module, ignition ON.
- Test for less than 1 V between the signal circuit and ground.
- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K73 Telematics Communication Interface Control Module.
- If between 8.0-10.5 V
- Test for less than 1 V between the signal circuit terminal A and ground.
- If greater than 1 V
- If 1 V or greater, repair the short to voltage in the circuit.
- If less than 1 V, repair the K73 Telematics Communication Interface Control Module.
- If less than 1 V
- Test for greater than 8 V between the signal circuit terminal B and the signal circuit terminal A.
- If less than 8 V
- If greater than 9 V
- Test or replace the B24 Cellular Phone Microphone.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair procedure.
- Mobile Telephone Microphone Replacement
- Control Module References for radio or telematics communication interface control module replacement, programming, and setup.

OnStar Audio Malfunction (Article 10956)

Diagnostic Instructions
- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit Short to Ground Open/High Resistance Short to Voltage Signal Performance
Audio High Signal terminal 1 1 1 1 —
Audio Low Signal terminal 2 1 1 1 —
1. No (or Noisy) OnStar ® Audio

Circuit/System Description

When an OnStar® keypress is made, a serial data message is sent to the audio system to mute all radio functions and output OnStar® originated audio. After the audio system is muted, the telematics communication interface control module transmits signals to the audio system on the audio signal and audio common circuits.

Reference Information

Schematic Reference
- OnStar/Telematics Schematics
- Radio/Navigation System Schematics

Connector End View Reference
Master Electrical Component List
Description and Operation
OnStar Description and Operation
Electrical Information Reference
- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference
Control Module References for scan tool information

Circuit/System Verification
- Ignition ON/vehicle in Service Mode, radio ON.
- Verify that audio is heard clearly through all speaker channels when tuning radio to a known good station.
- If audio is not heard clearly Refer to Speaker Malfunction
- If audio is heard clearly

- Verify that the Connecting to OnStar® message is heard clearly through the audio system when the OnStar® blue button is pressed.
- If OnStar message is noisy or distorted Refer to Circuit/System Testing
- If OnStar message is heard clearly
- All OK.

Circuit/System Testing

- Ignition OFF/vehicle OFF, and all vehicle systems OFF, disconnect the X2 harness connector at the K73 Telematics Communication Interface Control Module, ignition ON/vehicle in Service Mode.
- Test for less than 4 V between each of the signal circuits listed below and ground:
- Terminal 1
- Terminal 2
- If 4 V or greater
- Ignition OFF/vehicle OFF, disconnect the X1 harness connector at the A11 Radio, ignition ON/vehicle in Service Mode.
- Test for less than 1 V between the signal circuits and ground.
- If greater than 1 V, repair the short to voltage on the circuit.
- If less then 1 V, replace the A11 Radio.
- If less than 4 V
- Ignition OFF/vehicle OFF.
- Test for infinite resistance between each of the signal circuits listed below and ground:
- If less than infinite resistance Repair the short to ground on the circuit.
- If infinite resistance
- Disconnect the X1 harness connector at the A11 Radio.
- Test for less than 2 Ω in each of the signal circuits listed below end to end:
- K73 Telematics Communication Interface Control Module Terminal 1 X2
- K73 Telematics Communication Interface Control Module Terminal 2 X2
- If 2 Ω or greater Repair the open/high resistance on the circuit.
- If less than 2 Ω
- Replace the K73 Telematics Communication Interface Control Module.
- If audio is not heard clearly Replace the A11 Radio.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.
Control Module References for radio or telematics communication interface control module replacement, programming, and setup.

No Global Positioning System (GPS) Reception (Article 10955)

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Circuit/System Description

The navigation antenna is connected to the Telematics Communication Interface Control Module. The module supplies 5 V to the antenna to power the internal amplifier through the center conductor of the antenna coax cable.
When the vehicle is equipped with the optional navigation radio , a Navigation Antenna Signal Splitter is installed to distribute the navigation signal to both the Telematics Communication Interface Control Module and the navigation radio. The Telematics Communication Interface Control Module supplies 5 V through the coax cable to power the internal antenna amplifier through the signal splitter.

Diagnostic Aids

- The scan tool Telematics Communication Interface Control Module GPS signal parameter will display a Yes or No dependent upon whether or not the module sees an increment of the seconds transmitted by GPS signals to the Telematics Communication Interface Control Module. Upon entering this screen, the GPS signal title will initially display Yes, regardless of the presence of time increment, for at least 2 seconds, while the algorithm in the scan tool determines the status of the clock. If increment is found, Yes is continually displayed. If the clock remains static, No is displayed. The scan tool looks for increment every second, regardless of current display.
- Inaccurate or aged GPS position concerns which are no longer present may have been due to the temporary loss of GPS signal reception by the vehicle. Conditions such as tunnels or parking structures will restrict the cellular phone and navigation antenna from a clear view of the satellites in the sky and may have caused this temporary data loss.

- The GPS requires a clear line of sight to the sky to operate properly. In most cases the GPS will not have reception near tall buildings or inside structures.

Reference Information

Schematic Reference

- OnStar/Telematics Schematics
- Radio/Navigation System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

- OnStar Description and Operation
- Radio/Audio System Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Special Tools

EL-49903 - OnStar Antenna Diagnostic Tool Kit

Circuit/System Verification

- Ignition ON.
- Verify that no DTCs are set.
- If any DTCs are set Refer to Diagnostic Trouble Code (DTC) List - Vehicle .
- If no DTCs are set
- Verify that an OnStar advisor can locate the vehicle after performing a blue button press.
- If the advisor can not locate the vehicle and the vehicle is not equipped with a navigation radio Refer to Circuit System Testing Without Navigation Radio.
- If the advisor can not locate the vehicle and the vehicle is equipped with a navigation radio Refer to Circuit System Testing With Navigation Radio.
- If the advisor can locate the vehicle
- Verify that the NO GPS symbol/message is not displayed on the radio.
- If the NO GPS symbol/message is displayed Refer to Circuit System Testing With Navigation Radio– Step 9.
- If the NO GPS symbol/message is not displayed
- All OK.

Circuit/System Testing

without Navigation Radio

- Ignition OFF, disconnect the GPS and cellular coax cable connector at the K73 Telematics Communication Interface Control Module.
- Connect EL-49903–4 - coax cable , purple connector to the K73 Telematics Communication Interface Control Module and the grey connector to EL-49903–5 - combiner . Connect both coax cable connectors from EL-49903–1 - OnStar test antenna to the combiner and place the test antenna on the roof of the vehicle, ignition ON.
- If the advisor can not locate the vehicle Replace the K73 Telematics Communication Interface Control Module.
- Test the coax cable between the K73 Telematics Communication Interface Control Module and the T4G Cellular Phone, Navigation, and Digital Radio Antenna . Refer to component testing.
- If the coax cable does not pass the test Replace the coax cable.
- If the coax cable passes the test
- Test or replace the T4G Cellular Phone, Navigation, and Digital Radio Antenna.

with Navigation Radio

- Ignition OFF, disconnect the T4G Cellular Phone, Navigation, and Digital Radio Antenna coax cable at the T15 Navigation Antenna Signal Splitter.
- Connect both coax cable connectors from EL-49903–1 - OnStar test antenna to theEL-49903–5 - combiner and use EL-49903–7 - coax cable to connect the combiner to the T15 Navigation Antenna Signal Splitter. Place the test antenna on the roof of the vehicle, ignition ON.
- Verify that an OnStar advisor can not locate the vehicle after performing a blue button press.
- Test the coax cable between the T15 Navigation Antenna Signal Splitter and the T4G Cellular Phone, Navigation, and Digital Radio Antenna. Refer to Component Testing.
- Replace the T4G cellular phone, navigation and digital radio antenna.
- If the advisor can not locate the vehicle
- Connect EL-49903–4 - coax cable , purple connector to the K73 Telematics Communication Interface Control

Module and the grey connector toEL-49903–5 - combiner . Connect both coax cable connectors from EL-49903–1 - OnStar test antenna to the combiner and place the test antenna on the roof of the vehicle, ignition ON.
- If the advisor can not locate the vehicle. Replace the K73 Telematics Communication Interface Control Module.
- If the advisor can locate the vehicle.
- Ignition OFF.
- Test the coax cable between the T15 Navigation Antenna Signal Splitter and the K73 Telematics Communication Interface Control Module. Refer to Component Testing.
- If the coax cable does not pass the test. Replace the coax cable.
- If the coax cable passes the test.
- Ignition OFF, disconnect the GPS coax cable at the A11 Radio.
- Connect blue coax cable connector from EL-49903–1 - OnStar test antenna to the A11 Radio. Place the test antenna on the roof of the vehicle.
- Verify that the NO GPS symbol/message is not displayed on the A11 Radio.
- If the NO GPS symbol/message is displayed Replace the A11 Radio
- If the NO GPS symbol/message is not displayed.
- Test the coax cable between the T15 Navigation Antenna Signal Splitter and the A11 Radio. Refer to Component Testing.
- Test or replace the T15 Navigation Antenna Signal Splitter.

Component Testing
- Before testing the coax cable, check the cable exterior for being pinched, cut, damaged, or having loose connections at the components, which can cause reception issues.
- To prevent false reading when testing the center coax terminals, use care not to ground the test probe on the outer housing/shield.
- The vehicle may be equipped with sectioned coax. Test each section and replace only the faulty section, not the entire length of coax.

Coax Cable Test
- Ignition OFF, disconnect the coax cable at both components.
- Test for less than 5 Ω between the coax cable center terminal end to end.
- If 5 Ω or greater Replace the coax cable.
- If less than 5 Ω
- Test for greater than 5 Ω between the coax cable outer shield end to end.
- Test for infinite resistance between the coax cable center terminal and the coax cable outer shield.
- If less than infinite resistance Replace the coax cable.
- If infinite resistance

Repair Instructions
Perform the Diagnostic Repair Verification after completing the repair.
- Radio Antenna Base Replacement
- Control Module References for radio or telematics communication interface control module replacement, programming, and setup.

Onstar Button LED Malfunction (w/ DBX) (Article 10957)

Diagnostic Instructions
- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Circuit Description
The OnStar ® error indicator is internal to the inside rearview mirror. The Red error indicator is illuminated when a system malfunction is present. If no error indicator is seen on the mirror the system is ON and operating normally. In the event there is a system malfunction and the OnStar® system is still able to make a call, the indicator will flash red during the call. The OnStar® error indicator is controlled internally by the inside rearview mirror via serial data from the telematics communication interface control module.

Reference Information
Schematic Reference
OnStar/Telematics Schematics
Connector End View Reference
Component Connector End Views
Description and Operation
OnStar Description and Operation
Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs
Scan Tool Reference
Control Module References for scan tool information
Circuit/System Verification
- Ignition ON.
- Verify no DTC are set.
- If any DTC are set Refer to Diagnostic Trouble Code (DTC) List - Vehicle
- If no DTC are set
- Verify that the Red error indicator turns ON and OFF when commanding ON and OFF with a scan tool.
- If the Red error indicator does not turn ON and OFF Replace the A10 Inside Review Mirror.
- If the Red error indicator turns ON and OFF
- All OK.
Repair Instructions
Perform the Diagnostic Repair Verification after completing the repair.
- Inside Rearview Mirror Replacement
- Control Module References for telematics communication interface control module replacement, programming and setup.

Onstar Button LED Malfunction (w/o DBX) (Article 10958)

Diagnostic Instructions
- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.
Diagnostic Fault Information
Circuit Short to Ground Open/High Resistance Short to Voltage Signal Performance
10 V Reference — B2476 04 B2476 04 —
Control Terminal 6 1 1 2 —
Control Terminal 7 1 1 2 —
Ground — B2476 04 — —
1. OnStar ® LED Inoperative 2. LED Illuminated At All Times 3. OnStar® Buttons Inoperative
Circuit Description
The OnStar® status LEDs are located in the inside rearview mirror telematic button assembly. The green LED is illuminated when the system is ON and operating normally. When the green LED is green and flashing, it is an indication that a call is in progress. When the red LED is illuminated, a system malfunction is present. In the event there is a system malfunction and the OnStar® system is still able to make a call, the LED will flash red during the call. The OnStar® LEDs are controlled by the telematics communication interface control module via the keypad green LED control circuit and the keypad red LED control circuit.
Reference Information
Schematic Reference
OnStar/Telematics Schematics
Connector End View Reference
Component Connector End Views
Description and Operation
OnStar Description and Operation
Electrical Information Reference
- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs
Scan Tool Reference
Control Module References for scan tool information
Circuit/System Verification
- If the green LED is off with the ignition ON and the LED does not function when commanded with the scan tool, contact the OnStar Center to confirm the vehicle has a current subscription.
- Ignition ON.
- Verify no DTC are set.
- If any DTC are set Refer to Diagnostic Trouble Code (DTC) List - Vehicle

- If no DTC are set
- Verify that the green LED turns ON and OFF when commanding the Green Indicator ON and OFF with a scan tool.
- If the green LED does not turn ON and OFF Refer to Circuit/System Testing – Green LED Test
- If the green LED turns ON and OFF
- Verify that the red LED turns ON and OFF when commanding the Red Indicator ON and OFF with a scan tool.
- If the red LED does not turn ON and OFF Refer to Circuit/System Testing – Red LED Test
- If the red LED turns ON and OFF
- All OK.

Circuit/System Testing

Green LED Test

- Ignition OFF, and all vehicle systems OFF, disconnect the harness connector at the A10 Inside Rearview Mirror. It may take up to 2 minutes for all vehicle systems to power down. Doors closed, courtesy lamps OFF.
- Test for less than 10 Ω between the ground circuit terminal 5 and ground.
- If 10 Ω or greater
- Ignition OFF.
- Test for less than 2 Ω in the ground circuit end to end.
- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, repair the open/high resistance in the ground connection.
- If less than 10 Ω
- Test for less than 1 V between the control circuit terminal 6 and ground while commanding the Green Indicator OFF with a scan tool.
- If 1 V or greater
- Ignition OFF, disconnect the X1 harness connector at the K73 Telematics Communication Interface Control Module, ignition ON.
- Test for less than 1 V between the control circuit terminal 6 and ground.
- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K73 Telematics Communication Interface Control Module.
- If less than 1 V
- Test for greater than 8 V between the control circuit terminal 6 and ground while commanding the Green Indicator ON with a scan tool.
- If 8 V or less
- Ignition OFF, disconnect the X1 harness connector at the K73 Telematics Communication Interface Control Module.
- Test for infinite resistance between the control circuit terminal 6 and ground.
- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance
- Test for less than 2 Ω in the control circuit end to end.
- If less than 2 Ω, replace the K73 Telematics Communication Interface Control Module.
- If greater than 8 V
- Test or replace the A10 Inside Rearview Mirror.

Red LED Test

- Test for less than 1 V between the control circuit terminal 7 and ground while commanding the Red Indicator OFF with a scan tool.
- Test for less than 1 V between the control circuit terminal 7 and ground.
- Test for greater than 8 V between the control circuit terminal 7 and ground while commanding the Red Indicator ON with a scan tool.
- Test for infinite resistance between the control circuit terminal 7 and ground.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair procedure.

- Inside Rearview Mirror Replacement
- Control Module References for telematics communication interface control module replacement, programming and setup.

OnStar Call Center Remote Function Requests Malfunction (Article 10960)

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Circuit/System Description

The telematics communication interface control module has the capability of commanding the horn, initiating

door lock/unlock, or operating the exterior lamps using the serial data circuits. These functions are commanded by the OnStar ® Call Center per a customer request.

Diagnostic Aids

The customer concern may have been due to a lack of cellular service in a given area, or a failure in the National Cellular Network infrastructure that has since been corrected.

Reference Information

Schematic Reference
OnStar/Telematics Schematics
Connector End View Reference
Master Electrical Component List
Description and Operation
OnStar Description and Operation
Electrical Information Reference
- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs
Scan Tool Reference
Control Module References for scan tool information

Circuit/System Verification

- It is necessary to inform the OnStar® Call Center advisor that this call is for vehicle diagnostic purposes.
- It is necessary to have the vehicle in an open outside area where a cellular call can be successfully placed and GPS data can be received from satellites.
- Ignition ON/vehicle in Service Mode.
- Verify that the horn, lights, and the door locks on the vehicle operate properly.
- If an applicable vehicle system does not operate properly Refer to Diagnostic System Check - Vehicle .
- If all applicable vehicle systems operate properly
- Verify that a call can be successfully placed to the OnStar Call Center by pressing the blue OnStar button.
- If unable to contact the OnStar® call center Refer to Unable to Contact OnStar Call Center
- If able to contact the OnStar Call Center
- Verify with the OnStar advisor that all remote functions (door locks, lights, and horn) work.
- If the remote functions do not operate when requested Replace the K73 Telematics Communication Interface Control Module
- If the remote functions operate when requested
- All OK.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.
Control Module References for telematics communication interface control module replacement, programming and setup.

OnStar Button Malfunction (Article 10959)

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit Short to Ground Open/High Resistance Short to Voltage Signal Performance
10 V Reference B2476 04 B2476 04 B2476 04 —
Signal Terminal 3 B2476 04 B2476 04 B2476 59 B2476 59, B2482 00
Ground — B2476 04 — —
1. Red LED Illuminated At All Times 2. OnStar ® Buttons Inoperative

Circuit/System Description

The OnStar® button assembly consists of 3 buttons: Call/Answer, OnStar® Call Center, and OnStar® Emergency. The telematics communication interface control module supplies the OnStar® button assembly with 10 V via the keypad voltage reference circuit . Each of the buttons, when pressed, completes the circuit across a resistor allowing a specific voltage to be returned to the telematics communication interface control module over the keypad signal circuit. Depending upon the voltage range returned, the telematics communication interface control module is able to identify which button has been activated.
For this vehicle there are multiple mirror options: with capacitive touch and without capacitive touch. The mirrors with capacitive touch may not have a status LED like other mirrors. In all other mirrors the status

LED is green once the vehicle ignition is on and the OnStar® service is active, but for mirrors with capacitive touch the three indicators above the buttons illuminate when the ignition is on. When each button is pressed it's corresponding indicator is illuminated above.

Reference Information

Schematic Reference

OnStar/Telematics Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

OnStar Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

- Ignition ON.
- Verify no DTC is set.
- If any DTC is set Refer to Diagnostic Trouble Code (DTC) List - Vehicle
- If no DTC is set
- Verify that each OnStar® button operates normally by pressing each button individually.
- If none of the buttons operate normally Refer to Circuit System Testing.
- If some, but not all, of the buttons operate normally Test or replace the A10 Inside Rearview Mirror.
- If all of the buttons operate normally
- All OK.

Circuit/System Testing

- Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the A10 Inside Rearview Mirror. It may take up to 2 minutes for all vehicle systems to power down.
- Test for less than 10 Ω between the ground circuit terminal 5 and ground.
- If 10 Ω or greater
- Ignition OFF.
- Test for less than 2 Ω in the ground circuit end to end.
- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, repair the open/high resistance in the ground connection.
- If less than 10 Ω
- Test for 8.0–10.5 V between the 10 V reference circuit terminal 4 and ground.
- If less than 8.0 V
- Ignition OFF, disconnect the harness connector at the K73 Telematics Communication Interface Control Module.
- Test for infinite resistance between the 10 V reference circuit and ground.
- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance
- Test for less than 2 Ω in the 10 V reference circuit end to end.
- If less than 2 Ω, replace the K73 Telematics Communication Interface Control Module.
- If greater than 10.5 V
- Ignition OFF, disconnect the harness connector at the K73 Telematics Communication Interface Control Module, ignition ON.
- Test for less than 1 V between the 10 V reference circuit and ground.
- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K73 Telematics Communication Interface Control Module.
- If between 8.0–10.5 V
- Test for 500–900 Ω between the signal circuit terminal 3 and ground.
- If less than 500 Ω
- Disconnect the X1 harness connector at the K73 Telematics Communication Interface Control Module.
- Test for infinite resistance between the signal circuit and ground.
- If infinite resistance, replace the K73 Telematics Communication Interface Control Module.
- If greater than 900 Ω
- Disconnect the X1 harness connector at the K73 Telematics Communication Interface Control Module, ignition ON.

- Test for less than 1 V between the signal circuit and ground.
- If less than 1 V
- Test for less than 2 Ω in the signal circuit end to end.
- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, replace the K73 Telematics Communication Interface Control Module.
- If between 500–900 Ω
- Test or replace the A10 Inside Rearview Mirror.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.
- Inside Rearview Mirror Replacement
- Control Module References for telematics communication interface control module replacement, programming and setup.

OnStar Steering Wheel Control Functions Malfunction (Article 10963)

Some vehicles equipped with the OnStar ® system have the capability of accessing voice mailboxes and other automated phone systems by means of the steering wheel controls, while the OnStar® Personal Calling feature is in use. If the "Talk" or "Mute" button (depending upon the vehicle) on the steering wheel controls is depressed during an OnStar® Personal Calling call, the telematics communication interface control module receives the message on the serial data bus from either the radio or body control module. This message is interpreted as a request to turn any spoken numbers into dual tone multi-frequency tones to be delivered over the airwaves to the phone system the user is communicating with. Complete instructions for operation of these features can be found in the information provided to the customer with the OnStar® system.

The steering wheel controls are a resistor network that consist of multiple momentary contact switches and a series of resistors. The switches and resistor network are arranged so that each switch has a different resistance value. When a switch is pressed, a voltage drop occurs in the resistor network, which produces a specific voltage value unique to the switch selected, to be interpreted by either the radio or BCM. In the event the OnStar® steering wheel control functions are inoperative, technicians should refer to Steering Wheel Controls Malfunction , to begin diagnosis of the steering wheel control concern.

Radio Controls Malfunction (w/ Color Display) (Article 10965)

Diagnostic Instructions
- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit Short to Ground Open/High Resistance Short to Voltage Signal Performance
B+ U0257, 1, 2, 3 U0257, 1, 3, 4 — —
Remote Enable Circuit U0257, 1, 4 U0257, 1, 4 — —
Radio Control s Reset Signal U0257, 1, 2 — — —
Radio Controls Wake up Signal — U0257, 1, 2 U0257, 1, 2 —
Radio Display Reset U0257, 1 — — —
CGI Serial Data + U0257, 1, 2 U0257, 1, 2 U0257, 1, 2 —
CGI Serial Data – U0257, 1, 2 U0257, 1, 2 U0257, 1, 2 —
Touch Screen Serial Data + U0257, 1 U0257, 1 U0257, 1 —
Touch Screen Serial Data – — U0257, 1 U0257, 1 —
Ground — — — —
1. Display Inoperative 2. Controls inoperative 3. Fault affects multiple components, dependant on vehicle equipment additional communication DTCs may be set 4. Fault may affect one or more components, dependant on fault location

Circuit/System Description

The radio/HVAC control is a separate component from the radio, combined into an assembly. The assembly contains the radio control knobs and buttons for all audio and HVAC functions and the information display . The assembly is supplied battery voltage and ground .

When the radio is on, a discrete 12 V signal is supplied on the remote enable circuit to the color display module. This signal is used to control the power state of the display, which is active when the signal is high and inactive when the signal is low. The info display module receives digital video data from the radio for on-screen display information through a dedicated video cable. The radio communicates with the info display module over the touch screen serial data circuits for touch screen inputs and backlighting dimming level.

The radio uses a wake up circuit to control the power state of the controls. The radio controls communicate

radio control inputs directly to the radio through the CAN Graphical Interface (CGI) data circuits. After receiving the message the radio will perform the requested function. Messages communicated between the radio and the radio/HVAC controls include the following:
Communications between the HVAC controls and the HVAC control module are on a separate LIN circuit. The HVAC control module communicates status information to the radio via GMLAN for HVAC information display.

Reference Information

Schematic Reference
Radio/Navigation System Schematics
Connector End View Reference
Component Connector End Views
Description and Operation
Radio/Audio System Description and Operation
Electrical Information Reference
- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs
Scan Tool Reference
Control Module References for scan tool information

Circuit/System Verification

- Ignition ON, A11 radio ON.
- Verify that all radio knob and button controls operate and perform the correct function.
- If some, but not all, radio knob and button controls operate normally. Replace the A20 radio/HVAC controls.
- If all radio knob and button controls are inoperative. Refer to Circuit/System Testing
- If all radio knob and button controls operate and perform the correct function.
- All OK.

Circuit/System Testing

- Ignition OFF and all vehicle systems OFF. It may take up to 2 min for all vehicle systems to power down.
- Disconnect the X1 harness connector at the A20 radio/HVAC controls.
- Test for less than 10 Ω between the ground circuit terminal 17 and ground.
- If 10 Ω or greater
- Ignition OFF.
- Test for less than 2 Ω in the ground circuit end to end.
- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, repair the open/high resistance in the ground connection.
- If less than 10 Ω
- Test for less than 20 Ω between the data shield circuit terminal 3 and ground.
- If 20 Ω or greater
- Ignition OFF, disconnect the X1 connector at the A11 radio.
- Test for less than 2 Ω in the data shield circuit end to end.
- If less than 2 Ω, replace the A11 radio.
- If less than 20 Ω
- Verify that a test lamp illuminates between the B+ circuit terminal 10 and ground.
- If the test lamp does not illuminate and the circuit fuse is good
- Test for less than 2 Ω in the B+ circuit end to end.
- If less than 2 Ω, refer to Power Mode Mismatch .
- If the test lamp does not illuminate and the circuit fuse is open
- Test for infinite resistance between the B+ circuit and ground.
- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the A20 radio/HVAC controls.
- If the test lamp illuminates.
- Ignition ON.
- Test for 2–3 V between the serial data circuit terminals listed below and ground.
- terminal 1
- terminal 2
- If less than 2 V
- Ignition OFF, disconnect the X1 harness connector at the A11 radio.
- Test for infinite resistance between the serial data circuit and ground.
- If infinite resistance
- Test for less than 2 Ω in the serial data circuit end to end.

- If greater than 3 V
- Ignition OFF, disconnect the X1 harness connector at the A11 radio. Ignition ON.
- Test for less than 1 V between the serial data circuit and ground.
- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the A11 radio.
- If between 2–3 V
- Test for less than 1 V between the control circuit terminals listed below and ground.
- terminal 4
- terminal 15
- If greater than 1 V
- Test for less than 1 V between the control circuit and ground.
- If less than 1 V
- Test for infinite resistance between the control circuit terminals listed below and ground.
- A20 radio/HVAC controls terminal 4
- A20 radio/HVAC controls terminal 15
- If less than infinite resistance, Repair the short to ground on the circuit.
- Test for less than 2 Ω between the control circuits listed below.
- A20 radio/HVAC controls terminal 4 X1 and the A11 radio terminal 13 X1
- A20 radio/HVAC controls terminal 15 X1 and the A11 radio terminal 27 X1
- If 2 Ω or greater Repair the open/high resistance in the circuit.
- If less than 2 Ω.
- Replace the A20 radio/HVAC controls. Connect all harness connectors.
- Ignition ON, radio ON.
- If the radio knob and button controls still malfunction. Replace the A11 radio.
- All OK

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for radio or radio control assembly replacement, programming, and setup.

Radio Controls Malfunction (w/ Monochrome Display) (Article 10966)

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit Short to Ground Open/High Resistance Short to Voltage Signal Performance
B+ U0257, 1, 2, 3 U0257, 1, 3, 4 — —
Reset Signal U0257, 1, 2 — — —
Wake up Signal — U0257, 1, 2 U0257, 1, 2 —
CGI Serial Data + U0257, 1, 2 U0257, 1, 2 U0257, 1, 2 —
CGI Serial Data – U0257, 1, 2 U0257, 1, 2 U0257, 1, 2 —
Ground — — — —
1. Display Inoperative 2. Controls inoperative 3. Fault affects multiple components, dependant on vehicle equipment additional communication DTCs may be set 4. Fault may affect one or more components, dependant on fault location

Circuit/System Description

The radio /HVAC controls is a separate component from the radio, combined into an assembly. The assembly contains the radio control knobs and buttons for all audio and HVAC functions and the information display .
The assembly is supplied battery voltage and ground . The radio uses the wake up circuit to control the power state of the display. The radio controls communicate inputs internally to the display. Display backlighting dimming level, graphical data, and radio control inputs are communicated over the CGI serial data circuits between the display and the radio.
Communications between the HVAC controls and the HVAC control module are on a separate LIN circuit. The HVAC control module communicates status information to the radio via GMLAN for HVAC information display.

Reference Information

Schematic Reference
Radio/Navigation System Schematics
Connector End View Reference
Component Connector End Views
Description and Operation

Radio/Audio System Description and Operation
Electrical Information Reference
- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs
Scan Tool Reference
Control Module References for scan tool information
Circuit/System Verification
- Ignition ON, A11 radio ON.
- Verify DTC U0257 is not set.
- If DTC U0257 is set Refer to Radio Information Display Malfunction .
- If DTC U0257 is not set
- Verify DTC B1020 is not set.
- If DTC B1020 is set Refer to DTC B1020 .
- If DTC B1020 is not set
- Verify the information display module turns on and information is shown on the display.
- If the information display malfunctions. Refer to Radio Information Display Malfunction .
- If the info display module turns on and information is shown on the display.
- Verify that all radio controls operate and perform the correct function.
- If some, but not all, controls operate normally. Replace the A20 radio/HVAC controls.
- If all radio controls operate and perform the correct function.
- All OK.
Repair Instructions
Perform the Diagnostic Repair Verification after completing the repair.
Radio Control Assembly Replacement

Radio Information Display Malfunction (w/ Color Display) (Article 10967)

Diagnostic Instructions
- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.
Diagnostic Fault Information
Circuit Short to Ground Open/High Resistance Short to Voltage Signal Performance
B+ U0257, 1, 2, 3 U0257, 1, 3, 4 — —
Remote Enable Circuit U0257, 1, 4 U0257, 1, 4 — —
Radio Control s Reset Signal U0257, 1, 2 — — —
Radio Controls Wake up Signal — U0257, 1, 2 U0257, 1, 2 —
Radio Display Reset U0257, 1 — — —
CGI Serial Data + U0257, 1, 2 U0257, 1, 2 U0257, 1, 2 —
CGI Serial Data – U0257, 1, 2 U0257, 1, 2 U0257, 1, 2 —
Touch Screen Serial Data + U0257, 1 U0257, 1 U0257, 1 —
Touch Screen Serial Data – — U0257, 1 U0257, 1 —
Ground — — — —
1. Display Inoperative 2. Controls inoperative 3. Fault affects multiple components, dependant on vehicle equipment additional communication DTCs may be set 4. Fault may affect one or more components, dependant on fault location
Circuit/System Description
The radio/HVAC control is a separate component from the radio, combined into an assembly. The assembly contains the radio control knobs and buttons for all audio and HVAC functions and the information display . The assembly is supplied battery voltage and ground .
When the radio is on, a discrete 12 V signal is supplied on the remote enable circuit to the color display module. This signal is used to control the power state of the display, which is active when the signal is high and inactive when the signal is low. The info display module receives digital video data from the radio for on-screen display information through a dedicated video cable. The radio communicates with the info display module over the touch screen serial data circuits for touch screen inputs and backlighting dimming level.
The radio uses a wake up circuit to control the power state of the controls. The radio controls communicate radio control inputs directly to the radio through the CAN Graphical Interface (CGI) data circuits. After receiving the message the radio will perform the requested function. Messages communicated between the radio and the radio/HVAC controls include the following:

Communications between the HVAC controls and the HVAC control module are on a separate LIN circuit. The HVAC control module communicates status information to the radio via GMLAN for HVAC information display.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

- Verify DTC B1265 is not set.
- If DTC B1265 is set. Refer to Diagnostic Trouble Code (DTC) List - Vehicle .
- If DTC B1265 is not set.
- Ignition ON, radio ON.
- Verify the information display turns on and information is shown on the display.
- If the information display does not turn on, or information is not shown in the display. Refer to Circuit/System Testing
- If the information display turns on and information is shown on the display.
- All OK.

Circuit/System Testing

- Ignition OFF.
- Verify the video interface cable is properly connected at the A20 radio/HVAC controls X2 and A11 radio X5 connections and there is no damage to the cable or connections.
- If connection problems or cable damage is noted. Perform the appropriate repair or replacement to correct any issues.
- If no issues are found with the video interface cable.
- Disconnect the X1 harness connector at the A20 radio/HVAC controls.
- Test for less than 10 Ω between the ground circuit terminal 17 and ground.
- If 10 Ω or greater
- Test for less than 2 Ω in the ground circuit end to end.
- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, repair the open/high resistance in the ground connection.
- If less than 10 Ω
- Test for less than 20 Ω between the data shield circuit terminal 7 and ground.
- If 20 Ω or greater
- Ignition OFF, disconnect the X1 connector at the A11 radio.
- Test for less than 2 Ω in the data shield circuit end to end.
- If less than 2 Ω, replace the A11 radio.
- If less than 20 Ω
- Verify that a test lamp illuminates between the B+ circuit terminal 10 and ground.
- If the test lamp does not illuminate and the circuit fuse is good
- Test for less than 2 Ω in the B+ circuit end to end.
- If less than 2 Ω, refer to Power Mode Mismatch .
- If the test lamp does not illuminate and the circuit fuse is open
- Test for infinite resistance between the B+ circuit and ground.
- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the A20 radio/HVAC controls.
- If the test lamp illuminates.
- Verify that a test lamp illuminates between the control circuit terminal 18 and ground.
- If the test lamp does not illuminate.
- Ignition OFF, disconnect the X1 harness connector at the A11 radio.
- Test for infinite resistance between the control circuit and ground.
- If infinite resistance

- Test for less than 2 Ω in the control circuit end to end.
- Test for 2–3 V between the data circuit terminals listed below and ground.
- terminal 5
- terminal 6
- If less than 2 V
- Test for infinite resistance between the data circuit and ground.
- Test for less than 2 Ω in the data circuit end to end.
- If greater than 3 V
- Ignition OFF, disconnect the X1 harness connector at the A11 radio. Ignition ON.
- Test for less than 1 V between the signal circuit and ground.
- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the A11 radio.
- If between 2–3 V
- Ignition ON.
- Test for less than 1 V between the control circuit terminal 14 and ground.
- If greater than 1 V
- Ignition OFF, disconnect the X2 harness connector at the A11 radio. Ignition ON.
- Test for less than 1 V between the control circuit and ground.
- If less than 1 V
- Ignition OFF, disconnect the X4 harness connector at the A11 radio.
- Test for infinite resistance between the A20 radio/HVAC controls control circuit terminal 14 X1 and ground.
- If less than infinite resistance, Repair the short to ground on the circuit.
- Test for less than 2 Ω between the A20 radio/HVAC controls control circuit terminal 14 X1 and the A11 radio control circuit terminal 10 X4.
- If 2 Ω or greater Repair the open/high resistance in the circuit.
- If less than 2 Ω.
- Replace the video interface cable.
- Connect all harness connectors.
- Verify the A20 radio/HVAC controls turns on and information is shown on the display.
- If the A20 radio/HVAC controls does not turn on, or information is not shown in the display.
- Replace the A20 radio/HVAC controls.
- If the information display malfunctions, replace the A11 radio.
- If the info display module turns on and information is shown on the display.
- All OK

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Radio Control Assembly Replacement
- Control Module References for radio replacement, programming, and setup.

Radio Information Display Malfunction (w/ Monochrome Display) (Article 10968)

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit Short to Ground Open/High Resistance Short to Voltage Signal Performance
B+ U0257, 1, 2, 3 U0257, 1, 3, 4 — —
Reset Signal U0257, 1, 2 — — —
Wake up Signal — U0257, 1, 2 U0257, 1, 2 —
CGI Serial Data + U0257, 1, 2 U0257, 1, 2 U0257, 1, 2 —
CGI Serial Data – U0257, 1, 2 U0257, 1, 2 U0257, 1, 2 —
Ground — — — —
1. Display Inoperative 2. Controls inoperative 3. Fault affects multiple components, dependant on vehicle equipment additional communication DTCs may be set 4. Fault may affect one or more components, dependant on fault location

Circuit/System Description

The radio /HVAC controls is a separate component from the radio, combined into an assembly. The assembly contains the radio control knobs and buttons for all audio and HVAC functions and the information display .
The assembly is supplied battery voltage and ground . The radio uses the wake up circuit to control the power state of the display. The radio controls communicate inputs internally to the display. Display backlighting

dimming level, graphical data, and radio control inputs are communicated over the CGI serial data circuits between the display and the radio.
Communications between the HVAC controls and the HVAC control module are on a separate LIN circuit. The HVAC control module communicates status information to the radio via GMLAN for HVAC information display.

Reference Information

Schematic Reference
Radio/Navigation System Schematics
Connector End View Reference
Component Connector End Views
Description and Operation
Radio/Audio System Description and Operation
Electrical Information Reference
- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs
Scan Tool Reference
Control Module References for scan tool information

Circuit/System Testing

- Ignition OFF, disconnect the harness connector at the A20 radio/HVAC controls.
- Test for less than 10 Ω between the ground circuit terminal 17 and ground.
- If 10 Ω or greater.
- Ignition OFF.
- Test for less than 2 Ω in the ground circuit end to end.
- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, repair the open/high resistance in the ground connection.
- If less than 10 Ω.
- Test for less than 20 Ω between the data shield circuit terminal 3 and ground.
- If 20 Ω or greater.
- Ignition OFF, disconnect the X1 connector at the A11 radio.
- Test for less than 2 Ω in the data shield circuit end to end.
- If less than 2 Ω, replace the A11 radio.
- If less than 20 Ω.
- Verify that a test lamp illuminates between the B+ circuit terminal 10 and ground.
- If the test lamp does not illuminate and the circuit fuse is good.
- Test for less than 2 Ω in the B+ circuit end to end.
- If less than 2 Ω, refer to Power Mode Mismatch .
- If the test lamp does not illuminate and the circuit fuse is open.
- Test for infinite resistance between the B+ circuit and ground.
- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the A20 radio/HVAC controls.
- If the test lamp illuminates.
- Ignition ON, test for 2–3 V between the data circuit terminals listed below and ground.
- terminal 1
- terminal 2
- If less than 2 V
- Ignition OFF, disconnect the X1 harness connector at the A11 radio.
- Test for infinite resistance between the data circuit and ground.
- If infinite resistance
- Test for less than 2 Ω in the data circuit end to end.
- If greater than 3 V
- Ignition OFF, disconnect the X1 harness connector at the A11 radio. Ignition ON.
- Test for less than 1 V between the signal circuit and ground.
- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the A11 radio.
- If 2–3 V
- Ignition ON.
- Test for less than 1 V between the control circuit terminals listed below and ground.
- terminal 4
- terminal 15

- If greater than 1 V
- Test for less than 1 V between the control circuit and ground.
- If less than 1 V
- Test for infinite resistance between the control circuit terminals listed below and ground.
- A20 radio/HVAC controls terminal 4
- A20 radio/HVAC controls terminal 15
- If less than infinite resistance, Repair the short to ground on the circuit.
- Test for less than 2 Ω between the control circuits listed below.
- A20 radio/HVAC controls terminal 4 and the A11 radio terminal 13 X1
- A20 radio/HVAC controls terminal 15 and the A11 radio terminal 27 X1
- If 2 Ω or greater Repair the open/high resistance in the circuit.
- If less than 2 Ω.
- Replace the A20 radio/HVAC controls. Connect all harness connectors.
- Ignition ON, radio ON.
- Verify the information display turns on and information is shown on the display.
- If the information display still malfunctions. Replace the A11 radio.
- If the info display module turns on and information is shown on the display.
- All OK

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.
- Radio Control Assembly Replacement
- Control Module References for radio replacement, programming, and setup.

Speaker Malfunction (Convertible) (Article 10969)

Diagnostic Instructions
- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit Short to Ground Open/High Resistance Short to Voltage Signal Performance
Amplifier B+ 1 1 — —
Subwoofer B+ (convertible with UQ3) — 5 — —
Amplifier Center Audio Signal 2 2 2, 3 2
Amplifier LF Audio Signal 2 2 2, 3 2
Amplifier LR Audio Signal 2 2 2, 3 2
Amplifier RF Audio Signal 2 2 2, 3 2
Amplifier RR Audio Signal 2 2 2, 3 2
Amplifier Subwoofer Audio Signal 2 2 2, 3 2
Radio LF Audio Signal B1025 02*, 2 B1025 02*, 2 B1025 02*, 2, 3 2
Radio LR Audio Signal B1035 02*, 2 B1035 02*, 2 B1035 02*, 2, 3 2
Radio RF Audio Signal B1045 02*, 2 B1045 02*, 2 B1045 02*, 2, 3 2
Radio RR Audio Signal B1055 02*, 2 B1055 02*, 2 B1055 02*, 2, 3 2
Remote Enable Signal B1265 02, 1 1, 4 — —
Amplifier Control B1287 02 B1287 04 B1287 01 —
Amplifier Ground 1 1 — —
Subwoofer Ground (convertible with UQ3) — 5 — —

1. Audio inoperative, no sound from all speakers. 2. No or reduced audio from speaker (s) on the affected audio circuit. 3. Noticeable audio distortion may be present. 4. Fault may affect one or more components, dependant on vehicle equipment. 5. Powered Subwoofer inoperative. * When equipped with an amplifier, the radio does not set this DTC.

Circuit/System Description

Each of the audio output channel circuits (+) and (-), at the radio and audio amplifier have a DC bias voltage that is approximately one half of battery voltage. When using a DMM, each of the audio output channel circuits will measure approximately 6.5 V DC. The audio being played on the system is produced by a varying AC voltage that is centered around the DC bias voltage on the same circuit. The AC voltage is what causes the speaker cone to move and produce sound. The frequency (Hz) of the AC voltage signal is directly related to the frequency of the input (audio source playing) to the audio system . Both the DC bias voltage and the AC voltage signals are needed for the audio system to properly produce sound.

The base (no amplifier) speaker system on the convertible also includes a self-amplified subwoofer. The subwoofer receives audio input from the rear audio signal circuits. The subwoofer assembly receives power and

ground from the vehicle harness. The radio control s the power state of the subwoofer via the remote enable circuit.

Diagnostic Aids

- Improper speaker mounting or loose trim may cause an audible buzz or distortion. Inspect the appropriate speaker and the surrounding interior trim for proper and secure mounting. The EL-50334-6 Audio System Diagnostic CD contains audio tracks that can be used to duplicate and isolate such concerns. Tracks 11 and 12 contain audio sweep tones for testing for speaker and grill rattles. If the speaker or surrounding interior trim is found to be loose or improperly secured, correctly secure the item.
- The test tones on the CD may be copied to a USB drive or other device to use during testing.
- When equipped with an amplifier, it is possible for some individual circuit faults to affect more than one speakers operation. Perform diagnostic tests in the sequence listed to avoid misdiagnosis.
- The amplifier control circuit will measure less than 1 V when the mute function is OFF, and approximately 8 V DC when at full mute. When mute is active, the radio stops sending the varying AC voltage to the amplifier/speakers.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Special Tools

EL-50334-50 - USB Cable and Adapter Kit

Circuit/System Verification

Without Amplifier

- Ignition ON, A11 radio ON, mute OFF.
- Verify clear audio is heard from each speaker, adjusting fade and balance controls to test each speaker individually.
- If audio is inoperative from one or more speakers, or the audio emitted is not clear Refer to Speaker Malfunction – without Amplifier.
- If clear audio is heard from all speakers
- All OK.

With Amplifier

- If audio is inoperative from one or more speakers, or the audio emitted is not clear Refer to Speaker Malfunction – with Amplifier.

Circuit/System Testing

Speaker Circuit Malfunction – without Amplifier

- Ignition OFF, disconnect the harness connector at the P19AC subwoofer speaker .
- Test for less than 10 Ω between the ground circuit terminal 8 and ground.
- If 10 Ω or greater
- Ignition OFF.
- Test for less than 2 Ω in the ground circuit end to end.
- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, repair the open/high resistance in the ground connection.
- If less than 10 Ω
- Verify that a test lamp illuminates between the B+ circuit terminal 16 and ground.
- If the test lamp does not illuminate and the circuit fuse is good
- Test for less than 2 Ω in the B+ circuit end to end.
- If less than 2 Ω, refer to Power Mode Mismatch .
- If the test lamp does not illuminate and the circuit fuse is open
- Test for infinite resistance between the B+ circuit and ground.
- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the P19AC subwoofer speaker.

- If the test lamp illuminates
- Verify a test lamp does not illuminate between the control circuit terminal 7 and ground.
- Disconnect the X1 harness at the A11 radio.
- Verify a test lamp does not illuminate between the control circuit and ground.
- If the test lamp illuminates, repair the short to voltage on the circuit.
- If the test lamp does not illuminate, replace the A11 radio.
- If the test lamp does not illuminate
- Ignition ON, A11 radio ON.
- Verify a test lamp illuminates between the control circuit terminal 7 and ground.
- Ignition OFF. Disconnect the X1 harness at the A11 radio.
- Test for less than 2 Ω in the control circuit end to end.
- If less than 2 Ω, replace the A11 radio.
- Ignition OFF, disconnect the harness connector at the appropriate P19 speaker.
- Test for 5–7 V between the signal circuit terminals listed below and ground:
- Door speaker , rear speaker or tweeter speaker audio signal (–) terminal 1
- Door speaker, rear speaker or tweeter speaker audio signal (+) terminal 2
- Subwoofer audio signal (–) terminals 1 and 9
- Subwoofer audio signal (+) terminals 2 and 10
- If less than 5 V
- Ignition OFF, disconnect the X1 harness connector at the A11 radio.
- Test for infinite resistance between the signal circuit and ground.
- If infinite resistance
- Test for less than 2 Ω in the signal circuit end to end.
- If greater than 7 V
- Ignition OFF, disconnect the X1 harness connector at the A11 radio. Ignition ON.
- Test for less than 1 V between the signal circuit and ground.
- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the A11 radio.
- If between 5–7 V
- . Play track number three (50 Hz bass test tone) from the EL-50334-6 Audio Test CD.
- Test for 49–51 Hz AC between the signal circuit terminals listed below and ground:
- Door speaker, rear speaker or tweeter speaker audio signal (–) terminal 1
- If not between 49–51 Hz AC Replace the A11 radio.
- If between 49–51 Hz AC
- Test or replace the P19 speaker.

Speaker Malfunction- with Amplifier

- Ignition OFF, disconnect the X1 harness connector at the T3 audio amplifier.
- Verify that a test lamp illuminates between the B+ circuit terminal 4 and ground.
- If infinite resistance, replace the T3 audio amplifier.
- Disconnect the X3 harness connector at the T3 audio amplifier.
- Verify a test lamp does not illuminate between the control circuit terminal 1 and ground.
- Verify a test lamp illuminates between the control circuit terminal 1 and ground.
- Radio ON, mute ON.
- Test for 7.5–8.5 V between the control circuit terminal 11 and ground.
- If greater than 8.5 V
- Test for less than 1 V between the control circuit and ground.
- If less than 7.5 V
- Test for infinite resistance between the control circuit and ground.
- If between 7.5–8.5 V
- Radio ON, mute OFF.
- Test for less than 1 V between the control circuit terminal 11 and ground.
- If greater than 1 V Replace the A11 radio.
- If less than 1 V
- Left front low level audio signal (+) terminal 15
- Left front low level audio signal (–) terminal 7
- Right front low level audio signal (+) terminal 14
- Right front low level audio signal (–) terminal 6
- Left rear low level audio signal (+) terminal 13
- Left rear low level audio signal (–) terminal 5
- Right rear low level audio signal (+) terminal 12

- Right rear low level audio signal (–) terminal 4
- Test for 49–51 Hz AC between the audio signal circuit terminals listed below and ground:
- Ignition OFF, connect all harness connectors.
- Disconnect the harness connector at the appropriate P19 speaker. Ignition ON, A11 radio ON, mute OFF.
- Center I/P, door speaker, rear speaker or tweeter speaker audio signal (–) terminal 1
- Center I/P, door speaker, rear speaker or tweeter speaker audio signal (+) terminal 2
- Subwoofer audio signal (–) terminals A and C
- Subwoofer audio signal (+) terminals B and D
- Ignition OFF, disconnect the X1 and X2 harness connectors at the T3 audio amplifier.
- If less than 2 Ω, replace the T3 audio amplifier.
- Ignition OFF, disconnect the X1 and X2 harness connectors at the T3 audio amplifier. Ignition ON.
- If less than 1 V, replace the T3 audio amplifier.
- Ignition ON, A11 radio ON, mute OFF, play track number three (50 Hz bass test tone) from the test CD.
- If not between 49–51 Hz AC Replace the T3 audio amplifier.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.
- Speaker Replacement Reference
- Control Module References for amplifier or radio replacement, programming and setup

Speaker Malfunction (Coupe) (Article 10970)

Diagnostic Instructions
- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit Short to Ground Open/High Resistance Short to Voltage Signal Performance
Amplifier B+ 1 1 — —
Amplifier Center Audio Signal 2 2 2, 3 2
Amplifier LF Audio Signal 2 2 2, 3 2
Amplifier LR Audio Signal 2 2 2, 3 2
Amplifier RF Audio Signal 2 2 2, 3 2
Amplifier RR Audio Signal 2 2 2, 3 2
Amplifier Subwoofer Audio Signal 2 2 2, 3 2
Radio LF Audio Signal B1025 02*, 2 B1025 02*, 2 B1025 02*, 2, 3 2
Radio LR Audio Signal B1035 02*, 2 B1035 02*, 2 B1035 02*, 2, 3 2
Radio RF Audio Signal B1045 02*, 2 B1045 02*, 2 B1045 02*, 2, 3 2
Radio RR Audio Signal B1055 02*, 2 B1055 02*, 2 B1055 02*, 2, 3 2
Remote Enable Signal B1265 02, 1 1, 4 — —
Amplifier Control B1287 02 B1287 04 B1287 01 —
Amplifier Ground 1 1 — —

1. Audio inoperative, no sound from all speakers. 2. No or reduced audio from speaker (s) on the affected audio circuit. 3. Noticeable audio distortion may be present. 4. Fault may affect one or more components, dependant on vehicle equipment. * When equipped with an amplifier, the radio does not set this DTC.

Circuit/System Description

Each of the audio output channel circuits (+) and (-), at the radio and audio amplifier have a DC bias voltage that is approximately one half of battery voltage. When using a DMM, each of the audio output channel circuits will measure approximately 6.5 V DC. The audio being played on the system is produced by a varying AC voltage that is centered around the DC bias voltage on the same circuit. The AC voltage is what causes the speaker cone to move and produce sound. The frequency (Hz) of the AC voltage signal is directly related to the frequency of the input (audio source playing) to the audio system . Both the DC bias voltage and the AC voltage signals are needed for the audio system to properly produce sound.

Diagnostic Aids
- Improper speaker mounting or loose trim may cause an audible buzz or distortion. Inspect the appropriate speaker and the surrounding interior trim for proper and secure mounting. The EL-50334-6 Audio System Diagnostic CD contains audio tracks that can be used to duplicate and isolate such concerns. Tracks 11 and 12 contain audio sweep tones for testing for speaker and grill rattles. If the speaker or surrounding interior trim is found to be loose or improperly secured, correctly secure the item.
- The test tones on the CD may be copied to a USB drive or other device to use during testing.
- When equipped with an amplifier, it is possible for some individual circuit faults to affect more than one speakers operation. Perform diagnostic tests in the sequence listed to avoid misdiagnosis.

- The amplifier control circuit will measure less than 1 V when the mute function is OFF, and approximately 8 V DC when at full mute. When mute is active, the radio stops sending the varying AC voltage to the amplifier/speakers.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Special Tools

EL-50334-50 - USB Cable and Adapter Kit

Circuit/System Verification

Without Amplifier

- Ignition ON, A11 radio ON, mute OFF.
- Verify clear audio is heard from each speaker, adjusting fade and balance controls to test each speaker individually.
- If audio is inoperative from one or more speakers, or the audio emitted is not clear Refer to Speaker Malfunction – without Amplifier.
- If clear audio is heard from all speakers
- All OK.

With Amplifier

- If audio is inoperative from one or more speakers, or the audio emitted is not clear Refer to Speaker Malfunction – with Amplifier.

Circuit/System Testing

Speaker Malfunction – without Amplifier

- Ignition OFF, disconnect the harness connector at the appropriate P19 speaker. Ignition ON, radio ON, mute OFF.
- Test for 5–7 V between each audio signal circuit terminal 1 and terminal 2 and ground.
- If less than 5 V
- Ignition OFF, disconnect the X1 harness connector at the A11 radio.
- Test for infinite resistance between the signal circuit and ground.
- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance
- Test for less than 2 Ω in the signal circuit end to end.
- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, replace the A11 radio.
- If greater than 7 V
- Ignition OFF, disconnect the X1 harness connector at the A11 radio. Ignition ON.
- Test for less than 1 V between the signal circuit and ground.
- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the A11 radio.
- If between 5–7 V
- . Play track number three (50 Hz bass test tone) from the EL-50334-6 Audio Test CD.
- Test for 49–51 Hz AC between each signal circuit terminal 1 and terminal 2 and ground.
- If not between 49–51 Hz AC Replace the A11 radio.
- If between 49–51 Hz AC
- Test or replace the P19 speaker.

Speaker Malfunction- with Amplifier

- Ignition OFF, disconnect the X1 harness connector at the T3 audio amplifier.
- Test for less than 10 Ω between the ground circuit terminal 8 and ground.
- If 10 Ω or greater
- Ignition OFF.

- Test for less than 2 Ω in the ground circuit end to end.
- If less than 2 Ω, repair the open/high resistance in the ground connection.
- If less than 10 Ω
- Verify that a test lamp illuminates between the B+ circuit terminal 4 and ground.
- If the test lamp does not illuminate and the circuit fuse is good
- Test for less than 2 Ω in the B+ circuit end to end.
- If less than 2 Ω, refer to Power Mode Mismatch .
- If the test lamp does not illuminate and the circuit fuse is open
- Test for infinite resistance between the B+ circuit and ground.
- If infinite resistance, replace the T3 audio amplifier.
- If the test lamp illuminates
- Disconnect the X3 harness connector at the T3 audio amplifier.
- Verify a test lamp does not illuminate between the control circuit terminal 1 and ground.
- Disconnect the X1 harness at the A11 radio.
- Verify a test lamp does not illuminate between the control circuit and ground.
- If the test lamp illuminates, repair the short to voltage on the circuit.
- If the test lamp does not illuminate, replace the A11 radio.
- If the test lamp does not illuminate
- Ignition ON, A11 radio ON.
- Verify a test lamp illuminates between the control circuit terminal 1 and ground.
- Ignition OFF. Disconnect the X1 harness at the A11 radio.
- Test for less than 2 Ω in the control circuit end to end.
- Radio ON, mute ON.
- Test for 7.5–8.5 V between the control circuit terminal 11 and ground.
- If greater than 8.5 V
- Test for less than 1 V between the control circuit and ground.
- If less than 7.5 V
- Test for infinite resistance between the control circuit and ground.
- If between 7.5–8.5 V
- Radio ON, mute OFF.
- Test for less than 1 V between the control circuit terminal 11 and ground.
- If greater than 1 V Replace the A11 radio.
- If less than 1 V
- Test for 5–7 V between the signal circuit terminals listed below and ground:
- Left front low level audio signal (+) terminal 15
- Left front low level audio signal (–) terminal 7
- Right front low level audio signal (+) terminal 14
- Right front low level audio signal (–) terminal 6
- Left rear low level audio signal (+) terminal 13
- Left rear low level audio signal (–) terminal 5
- Right rear low level audio signal (+) terminal 12
- Right rear low level audio signal (–) terminal 4
- Test for 49–51 Hz AC between the audio signal circuit terminals listed below and ground:
- Ignition OFF, connect all harness connectors.
- Disconnect the harness connector at the appropriate P19 speaker. Ignition ON, A11 radio ON, mute OFF.
- Center I/P, door speaker , rear speaker or tweeter speaker audio signal (–) terminal 1
- Center I/P, dear speaker or tweeter speaker audio signal (+) terminal 2
- Subwoofer audio signal (–) terminal 3
- Subwoofer audio signal (+) terminal 4
- Ignition OFF, disconnect the X1 and X2 harness connectors at the T3 audio amplifier.
- If less than 2 Ω, replace the T3 audio amplifier.
- Ignition OFF, disconnect the X1 and X2 harness connectors at the T3 audio amplifier. Ignition ON.
- If less than 1 V, replace the T3 audio amplifier.
- Ignition ON, A11 radio ON, mute OFF, play track number three (50 Hz bass test tone) from the test CD.
- Test for 49–51 Hz AC between the signal circuit terminals listed below and ground:
- Center I/P, door speaker, rear speaker or tweeter speaker audio signal (–) terminal 1
- If not between 49–51 Hz AC Replace the T3 audio amplifier.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Speaker Replacement Reference

- Control Module References for radio replacement, programming, and setup.

Unable to Contact OnStar Call Center (Article 10975)

Diagnostic Instructions
- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Circuit/System Description
The telematics communication interface control module is a cellular device that allows the user to communicate data and voice signals over the national cellular network. When an OnStar ® keypress is made, the telematics communication interface control module activates and connects the system to the cellular carriers communication system by interacting with the national cellular infrastructure. The module sends and receives all cellular communications over the cellular phone and navigation antenna and cellular antenna coax.

Diagnostic Aids
- The customer concern may have been due to a lack of cellular service in a given area. A failure in the National Cellular Network infrastructure at the time of the customers failed connection that has since been repaired may also have been the cause.
- If an OnStar® emergency call is able to successfully connect the vehicle to the OnStar® Call Center when an OnStar® Call Center button press is not, there may be a failure in the ability of the OnStar® system in the vehicle to be recognized by the local cellular carrier.
- If the prompt "OnStar® request ended" is heard, without pressing the white dot button at the end of the OnStar® keypress, the OnStar® system at one time has made a successful cellular connection, but was unable to complete the call.
- It is important to have the vehicle in an open outside area where a cellular call can be successfully placed and GPS data can be received from satellites.

Reference Information
Schematic Reference
OnStar/Telematics Schematics
Connector End View Reference
Component Connector End Views
Description and Operation
OnStar Description and Operation
Electrical Information Reference
- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference
Control Module References for scan tool information
Special Tools
EL-49903 - GM OnStar Antenna Diagnostic Tool Kit

Circuit/System Verification
Ignition ON, wait 5 minutes, then contact the OnStar call center consultant by pressing the blue OnStar button. A call center consultant should answer the call, verifying the vehicle OnStar system is functioning and the consultant can locate the vehicle.
- If the unit does not connect to the OnStar Call Center, use a scan tool to obtain and record the following information: Electronic Serial Number (ESN), Station Identifier (STID), GM 8-digit part number, Mobile Identification Number (MIN), Mobile Dialed Number (MDN), Transceiver ID (Trans ID) and call GM TAC to confirm a valid subscription.

Circuit/System Testing
- Ignition OFF, disconnect the GPS and cellular coax cable connector at the K73 telematics communication interface control module.
- Using the EL-49903-3 kit (EL-49903-5 adapter and EL-49903-4 coax cable), connect the EL-49903 - GM OnStar antenna diagnostic tool kit to the K73 telematics communication interface control module.
- Ignition ON, wait 5 minutes, and then contact the OnStar call center consultant by pressing the blue OnStar button. A call center consultant should answer the call.
- If the unit does not connect to the OnStar Call Center, replace the K73 telematics communication interface control module.
- Ignition OFF, disconnect the EL-49903 - GM OnStar antenna diagnostic tool kit from the K73 telematics communication interface control module and perform the coax cable test on the coax cable between the K73

telematics communication interface control module and the T4D cellular phone and digital radio antenna .
- If the coax cable does not pass the test, replace the coax cable.
- If all circuits test normal, replace the T4D cellular phone and digital radio antenna.

Component Testing

Coax Cable Test
- Ignition OFF, disconnect the GPS and cellular phone coax cable at both components.
- Test both for less than 5 Ω between both ends of the coax cables center terminals.
- If greater than the specified range, replace the failed coax cable.
- Test for greater than 10k Ω between the coax cable center wire and the outer coax shield.
- If less than the specified range, replace the coax cable.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.
- Radio Antenna Base Replacement
- Control Module References for telematics communication interface control module replacement, setup, and programming

OnStar Voice Recognition Malfunction (Article 10964)

Diagnostic Instructions
- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Circuit/System Description

The telematics communication interface control module is capable of interpreting voice commands received over the cellular microphone circuit. Speech recognition allows the user to speak to one computer in the vehicle, and one reached over the cellular communication network. The module attempts to understand the users command, and responds by speaking back, or by taking the appropriate action, e.g. dialing the phone.

Reference Information

Schematic Reference

OnStar/Telematics Schematics

Connector End View Reference

Master Electrical Component List

Description and Operation

OnStar Description and Operation

Electrical Information Reference
- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Circuit/System Verification
- It is necessary to have the vehicle in an open outside area where a cellular call can be successfully placed and GPS data can be received from satellites.
- The vehicle should be located in a quiet area.
- Ignition ON/vehicle in Service Mode, press the blue OnStar Call button.
- Verify that your voice is heard clearly by the OnStar Call center.
- If your voice can not be heard clearly Refer to OnStar Microphone Malfunction
- If your voice can be heard clearly
- Verify that the system responds appropriately to all voice commands by pressing the voice command button and attempting to operate the system using multiple voice commands.
- If the OnStar system does not respond to any voice commands Replace the K73 Telematics Communication Interface Control Module
- If the OnStar system responds to some, but not all voice commands Refer to OnStar Description and Operation for tips on proper pronunciation
- If the OnStar system responds to all voice commands
- All OK.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair procedure.

Control Module References for telematics communication interface control module replacement, programming, and setup.

Cellular, Entertainment, and Navigation - Special Tools (Article 11003)

Illustration Tool Number/Description
Click for full-size image EL–50334–20 Multi-Media Interface Tester (MIT)
Click for full-size image EL–50334–50 USB Cable and Adapter Kit
Click for full-size image EL-48028 Digital Radio Test Antenna
Click for full-size image EL-49903–1 Test Antenna, Navn-Cell Comn
Click for full-size image EL-49903–2 Adapter Cable-UHF RT Angle
Click for full-size image EL-49903–3A Combiner Kit, Test Antenna
Click for full-size image EL-50334–12 Infotainment Test Cable – RSE
Click for full-size image EL-50334–13 Infotainment Test Cable – RSE Splitter
Click for full-size image EL-50334–14 Infotainment Test Cable
Click for full-size image EL-50334–15 Video Bypass Cable
Click for full-size image EL-52552 COAX FAKRA Cable Adapter Kit

Cellular, Entertainment, and Navigation - Special Tools (MIT Tool Instructions) (Article 11004)

Bluetooth Pairing for Vehicles with Radio RPO: UF7
Either reset the pin code on the radio to 0000, or go under Device Info on the radio and see what the pin code is (to enter it later on the MIT).
- Turn the BT discoverable ON in the radio Bluetooth settings.
- Press Pair Device on radio (DO NOT PRESS SEARCH BLUETOOTH DEVICES ON THE RADIO).
- Press the Pair button on the MIT.
- When the three LED lights begin flashing on the MIT, enter the pin code (either 0000 if you reset it to that or what the radio pin code was).
- MIT will then automatically connect with the radio and should show "MIT Connected" message. Make test call and the audio streaming test.

Holden Radio Bluetooth Pairing Instructions
- Using the radio control s, place the radio into “Discoverable Mode”.
- Place the MIT into Bluetooth mode by pressing TEST SELECTOR until the Bluetooth LED is illuminated.
- With the MIT in Bluetooth mode Press and Release the #1 button (the Bluetooth LED will begin to slowly blink).
- Now Press and release the PAIR/CALL button on the MIT (the Bluetooth LED will begin to blink a little faster).
- On the radio Enter the PASSKEY when prompted: (press “0000” then Press “OK”).
- The MIT and radio will PAIR and CONNECT (the Bluetooth LED will be Fast Flashing).
- Use as regular MIT at this point.

For all other Radios
Testing the Bluetooth Function
- Verify connection of the MIT to the USB port.
- Press and release the TEST SELECTOR button until the Bluetooth LED illuminates.
- Disable all other Bluetooth devices present in the vehicle (ie. cell phones, laptops, etc.).

Standard Bluetooth Pairing/Bonding
- Use the vehicle controls to place the radio into Bluetooth Pairing mode. The vehicle will prompt you with a security code.
- Press and release the PAIR/CALL button. The Bluetooth LED will blink slowly while preparing to have a security code entered.
- Wait for the all three LEDs to blink confirming it is ready to have the security code entered.
- Enter the code with the MIT keypad and hit ENTER.
- The Bluetooth LED will blink slowly while pairing/bonding and move to a quick flash once paired/bonded. The vehicle should confirm pairing/bonding is complete.

Streaming Audio
- Confirm pairing/bonding is complete – the Bluetooth LED will be in a quick flash mode.
- On some radios the MIT automatically begins streaming audio via A2DP. The audio playback will confirm that the Bluetooth connection using streaming and the audio is working correctly.
- On other radios you will need to select Bluetooth Audio from the Source menu to verify Audio Streaming.
- Audio playback confirms that the Bluetooth connection using Streaming Audio is working correctly.
- Placing a test call will temporarily stop the streaming audio function, but upon disconnection of that test call, the streaming audio from the MIT will resume.

To Place a Test Call
- Confirm pairing/bonding is complete – the Bluetooth LED will be in a quick flash mode. If the vehicle is

equipped with streaming audio, and the radio is set to play a Bluetooth audio file, the streaming audio playback will be audible.
- Press and release PAIR/CALL button to place a test call. Streaming audio will be temporarily turned off.
- Use the vehicle controls to answer the call.
- Audio playback confirms that the Bluetooth connectivity is working correctly.
- Use the vehicle controls to end the call. If applicable, streaming audio will resume.
Testing the AUX/Line-In Function
- Verify connection of the MIT as stated above.
- Press and release the TEST SELECTOR button until the MIT AUX LED illuminates.
- Use the vehicle controls to put the audio system into Audio (Line-In) mode.
- Audio playback confirms that the audio input is working correctly.
Testing the USB Function
- Press and release the TEST SELECTOR button until the MIT USB LED illuminates.
- Use the vehicle controls to put the audio system into USB mode.
- Audio playback confirms that the USB is working correctly.
Troubleshooting Guide
If the MIT unit is still not working properly after following the below troubleshooting, the unit is malfunctioning and should be repaired or replaced.
Unit not Working
- Verify the MIT is powered on correctly as indicated by the green Power LED.
- If Power LED is not illuminated, verify USB power source is working properly.
- If USB power adapter is being used to power the MIT, check and, if necessary, replace the fuse in adapter.
Problem with Aux/Line-In Test
- Verify Aux/Line- In test cable is inserted properly into the vehicle audio input jack . Verify the MIT is in Aux/Line-In mode as indicated by the red AUX LED.
- Verify the vehicle audio system is in Auxiliary or Line-in mode. Verify the vehicle audio system volume is turned up and not in mute mode.
Problem with USB Test
- Verify MIT is in USB mode as indicated by the red USB LED. Verify the vehicle audio system is in USB mode.
- Verify the vehicle audio system volume is turned up and not in mute mode.
Problem with Bluetooth Pairing
- Delete previous devices stored in the device list of the radio and the pair the MIT
- Remove USB cable, and then reconnect to reset the MIT. Carefully follow the bonding instructions for the correct Passkey procedure.
Problem with Bluetooth Test Call Audio
- Verify the MIT is paired with the vehicle. This is indicated by the quick flashing Bluetooth LED.
- Audio system should have indicated the MIT is bonded.

Erratic Operation (itype_132)

Tsbs
- OnStar- Unwanted Or Phantom Phone Calls (PIC3278G, 2017/02/20)
- Cannot Delete Paired Phone, Phone Missing From List, HVAC Button Lock Up On Display (Volt Only), HVAC Fan Speed Freezing On Display(Camaro Only), Navigation Address Entry Concerns (Encore only), XM Background Graphics Default, Radio Freezes And/Or Resets (PIC6158B, 2016/02/15)
- Off Route Message During OnStar Turn By Turn Operation (PIC5374D, 2016/04/27)
- Diagnostic Tip - Unable to Learn RKE Transmitters (PIT4945H, 2019/02/19)
- Diagnostic Tip: Apple Device Connectivity Issues due to USB Cord Concern (PIT5399A, 2018/05/23)
- Apple Phone Will Not Always Auto Connect Through Bluetooth To The Radio (PIC6120A, 2016/03/21)
- Diagnostic Tip: Voice Recognition Errors When Using iPhone With One Or More Emojis/Emoticons/Symbols In Contacts List (PIC5953D, 2018/06/14)
- Memory Mirror Positions Lost and/or Reverse Tilt is Inoperative (17-NA-297, 2017/11/17)
- Infotainment - System Will Not Return To Media After Call (16-NA-011, 2016/01/19)
- Performance Of XM Radio System With Sunroof Fully Open (PIC3074F, 2019/02/04)
- Keyless Start Transmitter - Poor Appearence After Blade Removal (15-09-83-001A, 2015/07/20)

Inoperative (itype_148)

Tsbs
- XM Weather, Traffic, or Travel Link Displaying Dashes, NO DATA or UPDATING Message At Startup (PIC4707E, 2016/04/21)

- Red LED, No WiFi Operation, and/or Limited OnStar(R) Module Functionality After OnStar Module Replacement for Another Condition (17-NA-215, 2018/02/28)
- OnStar Will Not Power Up (PIC5491K, 2017/12/18)
- Memory Mirror Positions Lost and/or Reverse Tilt is Inoperative (17-NA-297, 2017/11/17)
- Diagnostic Tip - OnStar Turn By Turn /TBT Feature Inoperative (PIC4801H, 2017/02/20)
- Intermittent Remote Keyless Entry Inoperative (PIT5119F, 2017/11/20)
- Missing Channels or No Audio On Certain XM Radio Channels (PIC5959C, 2017/02/20)

Low, Dead battery (itype_153)

Tsbs
- Diagnostic Tip - OnStar Back-up Battery Failure (PIC4541F, 2017/01/11)
- Dead Battery After Exiting The Vehicle While On A Bluetooth Cal (PIC6198A, 2016/08/02)

Noise (itype_156)

Tsbs
- Audio System - Noise When Using Portable Playback Unit (06-08-44-015C, 2012/03/30)

Out of specification (itype_158)

Tsbs
- Normal Characteristic - OnStar Power Consumption (PIC4935F, 2017/02/25)
- CD/DVD Will Not Eject from Instrument Panel Mounted Player (PI0124E, 2012/12/07)
- XM Band Not Receiving All Channels (Preview Mode) (PIC5088F, 2016/04/21)

Poor performance (itype_162)

Tsbs
- Diagnostic Tip-Voice Recognition For Navigation Entry Inaccurate at times (PIC6185A, 2017/09/06)
- Apple Phone Will Not Always Auto Connect Through Bluetooth To The Radio (PIC6120A, 2016/03/21)
- Loss of Radio Audio Shortly After an OnStar In-Vehicle Voice Message Is Heard (20-NA-026, 2020/07/22)
- XM Band Not Receiving All Channels (Preview Mode) (PIC5088F, 2016/04/21)
- Diagnostic Tip: Unable To Connect Or Use Hands Free Calling Or No Data On The Call (Failed To Voice) (PIC4310L, 2015/04/17)
- Performance Of XM Radio System With Sunroof Fully Open (PIC3074F, 2019/02/04)
- Bluetooth Audio Skipping At Times (PIC6116A, 2016/03/04)
- Information on Poor, Limited, Reduced Remote Keyless Entry (RKE) or Remote Vehicle Start (RVS) Range (PI1018A, 2015/02/05)

Miscellaneous Information (itype_111)

Tsbs
- Normal Characteristic - Heated Seat Operation After Performing A Remote Vehicle Start (RVS) (PIC5322D, 2015/05/29)
- Diagnostic Tips: XM Audio Traffic And Travel Link Availability And Operation (PIT5353C, 2018/11/20)
- Accessory Power Outlet and Trailer Lighting Fuse Replacement Labor Operation N1720 Fuse Replacement (12-08-132-001E, 2018/04/20)
- Information on Using MyBuick, MyCadillac, MyChevrolet, and MyGMC Phone Applications to Control GM Accessory Remote Start Kits (16-NA-355, 2018/10/22)
- Diagnostic Tip: Apple Device Connectivity Issues due to USB Cord Concern (PIT5399A, 2018/05/23)
- Information for Fleet Vehicles - Ignition Key, Fob and Key Rings Configuration (14-00-89-004D, 2017/10/23)
- Questionnaire for Bluetooth Related Concerns (PIC5932B, 2017/08/09)
- Information on How to Prevent Inadvertent Vehicle Starting from Key Fob or OnStar Mobile Application (17-NA-244, 2017/07/25)
- Requirements For OnStar Over The Air Programming And Updates (PIC6107A, 2018/11/20)

OEM Policies and Procedures (itype_120)

Tsbs
- Key & Transmitter Programming (PIC6401, 2020/02/03)
- Missing OnStar® Owner Kit Integration in Vehicle Owner Manual (PI0574A, 2013/05/28)
- Concerns or Questions Regarding Installation of Dealer Installed Accessories (23-NA-219, 2024/09/20)
- Diagnostic Tip - Security Light on Intermittently / No Crank/No Start or Start Stall / Keyless Access Vehicles May Display No Remote/Fob Detected / Poor or No RKE Range / Service TPM (PIC5650M, 2025/08/06)

- GM of Canada OnStar® Cellular Communication Upgrade (15-08-44-001J, 2021/12/16)

Software Updates (itype_435)

Tsbs
- Map Database Update Information (PIC6192A, 2017/03/16)

Tools and Equipment (itype_113)

Tsbs
- Information on Antenna COAX Repair Kit Availability (17-NA-346, 2019/01/29)
- Information on Multi-Media Infotainment Tester (MIT) Incompatibility Issues (17-NA-386, 2017/12/04)

Vehicle / Component Identification (itype_118)

Tsbs
- Diagnostic Aid: Part Identification For Next Generation Infotainment Components And Correct Labor Codes (PIC6095C, 2018/07/06)

Warranty Information (itype_119)

Tsbs
- Information on Inappropriate Warranty Claims Submitted for Damaged Radios and Instrument Panel Clusters (IPCs) (08-08-44-015H, 2016/12/19)

Service Campaigns (itype_108)

Tsbs
- Vehicle Communication Interface Module (VCIM) Programming Not Completed (17398, 2018/03/09)
- Campaign - SiriusXM(R) Travel Link Feature Availability (15747, 2015/12/18)
- Campaign - Connected Navigation Voice Command Not Working (12315A, 2013/01/31)