

# AudioTroll 9400/9600

Operation + Installation Manual

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# A Message From GES...




Thank you for purchasing an AudioTroll iPod and auxiliary input adapter for your Saab 9-3 or 9-5 automobile! This system is the culmination of over two years of intensive research and development, ensuring the safety of the occupants of the vehicle, as well as attending to their auditory pleasure. This manual is designed to help you understand the installation as well as the operation of the system in your Saab. Should this manual fail to answer a question you may have, feel free to visit the GES Support Forum on the website (<http://support.granite-embedded.com/>) to see if someone else in the Saab community or at GES has the solution. Again, thank you for your purchase and enjoy the ride!

# Installation - 9-3

## Background and required tools

The Saab 9-3 (M98-M02, including M03 Convertible) utilize a purpose-built Clarion CD or Cassette head unit in all markets. The AudioTroll system uses a specially designed Y-Harness to bridge the connection between the car's instrumentation wiring harness and the radio chassis. Installation requires the removal of the radio and glove box assembly.

### Required Tools

DIN Radio Removal Tools	Torx T-25 Screwdriver	Ratchet with 10mm Socket
		
*Commonly available at auto parts stores.	*Your Saab toolkit contains one of these screwdrivers.	

## Installation

### Step 1: Removing the radio

Locate a set of DIN keys, these will be essential to removing the radio. Insert one DIN key into the vertical holes on the face of the radio, repeat for the opposing side. Once the keys have clicked in, and are not able to move further, gently pry outward on the tools as you extract the radio from the fascia panel. Unclip the 26-pin male connector, antenna lead and amplifier DIN lead (if equipped) from the rear of the radio. Place the unit aside. Reach inside the dashboard and press the climate control unit out from the rear to allow access to the lower console.

### Step 2: Removing the glove box

Open the glove box and pop the small hinged covers off the fasteners. Unscrew the T-25 screws revealed by prying off the covers, then proceed to remove the clips on the side of the dashboard. Finally, unbolt the 10mm bolt in the bottom right hand corner of the glove box (left hand for a RHD car). Slide the glovebox assembly out and downward.

### Step 3: Installing the AudioTroll

The Chassis Harness Adapter is designed to be a bridge between the Saab's dashboard wiring harness and the radio, providing the adequate connections to the AudioTroll. Press the female connector of the harness adapter over the 26-pin male connector from the dashboard harness, Carefully remove the AudioTroll from its static protection bag and connect the DB-9 connector from the harness adapter to the AudioTroll unit. Now is probably a good time to figure out where you want your iPod to sit when it is in the vehicle.

**Step 4a: Wiring into the glovebox**

Carefully cut a 1" (2.54cm) hole into the glovebox in a logical location. Run the audio and dock cable down through the radio opening and out the side of the console. Pull these wires through and put them through the hole you've cut in the glove box. Leave approximately 1' (30.5cm) of cable in the console to allow connections to reach.

**Step 4b: Wiring to an external dock**

If you've procured an iPod mount for your dashboard, you can opt to run the cables out of the console in whatever manner you feel is aesthetically correct to make the connections. Ensure that you leave 1' (30.5cm) of cable length in the console to complete the connections to the control unit.

**Step 5: Putting it all back together**



Once the cables have been run to the respective location, connect the DIN connector (the round one that says Belkin on it) and audio cable to the AudioTroll. Gently press the new assembly downward and out of the way of the radio's and climate control unit's space. Before refitting the radio into the fascia, refit the antenna lead and position the unit near the opening in the fascia. Insert the male connector from the harness adapter into the back of the radio unit. Slide radio unit back into the dashboard until it clicks.

# Installation - 9-5

## Background and required tools

The Saab 9-5 (M98-M05) utilize a purpose-built Clarion CD head unit (AS1) or Pioneer CD/Cassette head unit (AS2/AS3). The AudioTroll system uses a specially designed Y-Harness to bridge the connection between the car's instrumentation wiring harness and the radio chassis. Installation requires the removal of the radio and climate control panel.

### Required Tools

DIN Radio Removal Tools	Torx T-25 Screwdriver
	
<p>*Commonly available at auto parts stores.</p>	<p>*Your Saab toolkit contains one of these screwdrivers.</p>

## Installation

### Step 1: Removing the radio

Locate a set of DIN keys, these will be essential to removing the radio. Insert one DIN key into the vertical holes on the face of the radio, repeat for the opposing side. Once the keys have clicked in, and are not able to move further, gently pry outward on the tools as you extract the radio from the fascia panel. Set the radio aside. With a flat-head screwdriver, gently pry inwards on the sides of the radio cage to release the clips from the fascia panel. Carefully pull the cage out of the fascia panel. Unclip the 26-pin male connector and antenna lead from the rear of the cage. Place the cage aside. Press the climate control unit out from the rear and disconnect the harness. Place the climate control unit aside.

### Step 2: Installing the AudioTroll

The Chassis Harness Adapter is designed to be a bridge between the Saab's dashboard wiring harness and the radio, providing the adequate connections to the AudioTroll. Press the female connector of the harness adapter over the 26-pin male connector from the dashboard harness, Carefully remove the AudioTroll from its static protection bag and connect the DB-9 connector from the harness adapter to the AudioTroll unit. Now is probably a good time to figure out where you want your iPod to sit when it is in the vehicle. The recommended installation location in a Saab 9-5 is in the center console beneath the armrest. You may choose any location that you wish, but instructions for installation in the center console are as follows.

### Step 3: Running the interface and audio cables through the console

Remove the ashtray (or cubby depending on the year) by gently prying upwards on the bottom with a screwdriver and then release the boot or gently pull off the indicator plate surround from the respective transmission control lever.

There will be screws behind where the ashtray/cubby came out, pop the seat heater/fan switches out, disconnect the electrical connections on that panel and gently pull up on the end closest to the rear of the car. The panel will pop out. Exercising great caution, disengage the wiring to the power lock switch, remove the panel and set it aside. Remove any screws in the top of the console to gain clearance, and pry out the window switch pack and coin box. Twist the collar around the ignition lock clockwise and pull upward to disengage it from the console cover. Disconnect the wiring to the collar and set it aside. Move to the back seat. Pry upward and backward on the rear of the console to gain access to the two remaining console cover screws. You may choose to disconnect the wiring for the rear lighter socket and rear heated seat (if applicable), but it is not necessary for this procedure. Removing the rear cover exposes the last two screws that hold the console cover onto its framework. Remove these two screws and remember which way that metal bracket orients itself to the hinge assembly. The device end of the cables can be fished through under the top of the console next to the shifter and up through to the radio area. The iPod end of the cables can be fished through in the same manner in the vicinity of the window switchpack. Once the iPod ends are through, pull them down towards the bottom of the center armrest bin and with the rubber mat removed in said bin, pull the iPod ends of the cables through. Pull a reasonable amount of cable into the storage bin, but make sure you have enough to reach the control box in the dash. Gently tuck the remainder of the cables up and under the plastic top of the console and it will neatly fall into the center console. Replace the screws, window switches, coin box, shifter surround panel and ashtray.

#### **Step 4: Putting it all together**

Once the cables have been run to the respective location, connect the DIN connector (the round one that says Belkin on it) and audio cable to the AudioTroll. Gently press the new assembly downward and out of the way of the radio's and climate control unit's space.

#### **--CAUTION--**

**The locking tabs on the harness adapter's male connector MUST be removed!**

**Damage will result if tabs are not removed.**

Before refitting the cage into the fascia, refit the antenna lead, slide the radio into the cage and position the assembly near the opening in the fascia. Insert the male connector from the harness adapter into the back of the radio unit. Slide radio unit back into the dashboard.



# Operation

## Plugging in your iPod

AudioTroll has TWO wires for the iPod. The one with the green connector carries audio signals, the other carries serial data and 12-volts DC power to charge the iPod. Make sure you have both connected before attempting to use AudioTroll. You may ask why there are two wires and the answer is simply that a Saab is a very noisy place from an electrical interference standpoint and carrying audio, power and data over the same wire made a lot of strange sounds in early testing during development. It's all about the music.

## It's just like the CD Changer!

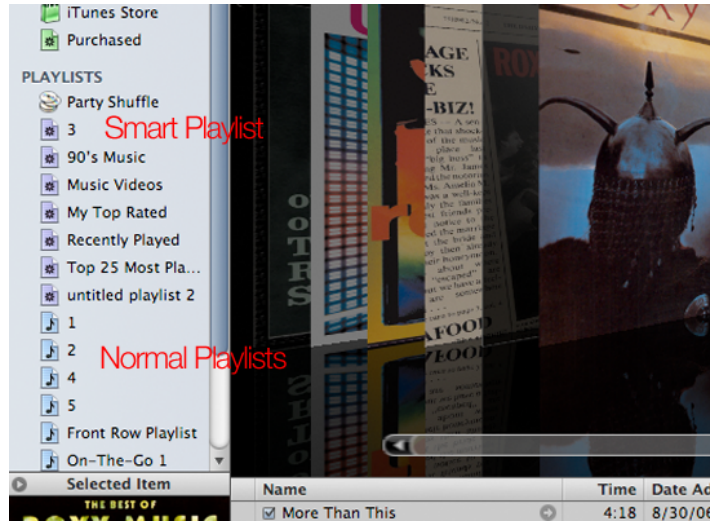
When you activate AudioTroll for the first time by pressing your CD button twice, you will find a very transparent user interface that is intuitive and slick.

### Audio System Button Functions with AudioTroll:

AudioTroll Function	Button	Steering Wheel Button (if applicable)
Access Playlists 1-5 defined in iTunes	Preset 1-5	n/a
Access Entire Library	Preset 6	n/a
Select Tracks	Seek >> / Seek <<	Seek >> and Seek <<
Reset iPod connection (9-5 Only!)	Center SEEK (hold down)	n/a
Shuffle Mode	Preset 6 then hold CD	n/a
Recall Title	n/a	NXT

## Preparing your iPod for use with AudioTroll

AudioTroll is a playlist-centric device given the hardware limitations of the Saab Audio System. For the greatest ease of use, GES recommends defining playlists in iTunes numbered 1-5 and putting songs that you'd want to hear in them. These playlists can be "Smart Playlists" as well, which can be programmed to automatically select music based on various criteria.



## The long and winding road...

Long road trips can really be a pain... especially with commercial radio stations blaring out the same junk from city to city. Your passengers can swap their iPod into the system very easily to switch up the musical variety. Simply unplug the iPod that is plugged into AudioTroll, plug the new one in and initiate the reset function. On a 9-5, you hold down the middle of the SEEK button until the SID chirps, then you select a playlist from the preset buttons. On a 9-3, you simply switch to a different source then come back.

## Auxiliary Input

AudioTroll functions as an auxiliary input for any device that utilizes a 3.5mm (1/8") stereo jack. For best results, unplug the iPod from the system before attaching another device. The SID will read as whatever playlist you left off in, track zero.

## ...and because you know someone's gonna do it...

Please do not try and connect anything to the iPod dock connector on the AudioTroll that is not an iPod. Yeah, the Zune's connector looks the same but you'll either fry the Zune or your car... same goes for Creative Zen, dockable Satellite Radio systems, etc. GES will not cover any damages caused by improper use of the AudioTroll device, and the warranty will be voided by such activities within the warranty period.

## Nominal electrical interference, it could have been worse.

You are going to hear the hard drive of your iPod spool up from time to time, or the occasional digital burst of data flooding across the ground plane of the board. The noise should never be so bad that it inhibits your ability to enjoy the music coming from the speakers.

# Troubleshooting

Symptom	Cause	Remedy
AudioTroll will not turn on when I hit CD twice.	Software timer has stopped for some reason.	Pull and re-insert the respective audio system fuse (9 in a 9-5, 13 in a 9-3).
iPod battery is not charging, and I hear ticking over the speakers.	iPod has been subject to a sustained thermal departure from normal.	Tip the dock plug out at a 15-degree angle and plug it back in.
AudioTroll randomly kicked back into FM1	Software timer has stopped for some reason.	Pull and re-insert the respective audio system fuse (9 in a 9-5, 13 in a 9-3).
None of my normal SID information is showing up after installation	Connectors are loose, they take a bit of strength to set effectively	Crank down on the connector between the car harness and the Y-harness.
The song title is stuck on the SID	Software got stuck in a loop	Pull and re-insert the respective audio system fuse (9 in a 9-5, 13 in a 9-3).
The AIRBAG light illuminated briefly on my instrument cluster and cased a "ding-dong" sound from the SID	Saab's i-bus has been overloaded temporarily, and unfortunately, it sends its most grim message to alert you of that fact.	Don't press the steering wheel buttons so fast.
The track number never leaves 0 and the song titles went away	Software got stuck in a loop	Pull and re-insert the respective audio system fuse (9 in a 9-5, 13 in a 9-3).

# Warranty

## Limited Warranty

Granite Embedded Systems ("GES") warrants that when shipped from GES each GES product ("GES Product") will conform to GES's current published specifications in existence at the time of shipment and will be free, for the warranty period ("Warranty Period") described below, from defects in materials and workmanship. The limited warranty described herein ("Limited Warranty") is not transferable, shall extend only to the first end-user ("User") purchasing the GES Product from either GES or a dealer expressly authorized by GES to sell GES Products ("Authorized GES Dealer"), and is subject to the following terms, conditions and limitations:

1. A Warranty Period of ninety (90) days shall apply to all new GES Products. Unless otherwise stated by GES, a Warranty Period of ninety (90) days shall apply to: (a) a used GES Product sold either by GES or by an Authorized GES Dealer who has been expressly authorized by GES to sell such used GES Product; and (b) services provided by GES, including testing, servicing, and repairing an out-of-warranty GES Product. The Warranty Period shall begin from the later of: (i) the date of shipment of the GES Product from GES, or (ii) the date of shipment (or other delivery) of the GES Product from an Authorized GES Dealer to User.
2. GES's sole obligation under this Limited Warranty shall be limited to either repairing, replacing, or adjusting, at GES's option, a covered GES Product that has been determined by GES, after reasonable inspection, to be defective during the foregoing Warranty Period. All warranty inspections, repairs and adjustments must be performed by GES. All warranty claims must include proof of purchase, including proof of purchase date, identifying the GES Product by serial number.

### WHAT IS NOT COVERED

This Limited Warranty excludes all damage, including damage to any GES Product, due to: failure to follow GES's user's manual and other GES instructions; abuse; misuse; neglect; accident; fire; flood; Acts of God; improper applications; connection to incorrect line voltages and improper power sources; use of incorrect fuses; overheating; contact with high voltages or injurious substances; or other events beyond the control of GES. This Limited Warranty does not apply to any equipment not manufactured or supplied by GES nor, if applicable, to any damage or loss resulting from use of any GES Product outside the designated country of use. By accepting a GES Product, User agrees to carefully evaluate the suitability of the GES Product for User's intended use and to thoroughly read and strictly follow all instructions supplied by GES (including any updated GES Product information which may be obtained at the GES website). In no event shall this Limited Warranty cover any damage arising during shipment of the GES Product to or from GES.

User agrees that the following will render the above Limited Warranty void: (i) alteration, removal or tampering with any serial number, identification, instructional, or sealing labels on the GES Product, or (ii) any unauthorized disassembly, repair or modification of the GES Product. In no event shall GES be responsible for the cost of or any damage resulting from any changes, modifications, or repairs to the GES Product not expressly authorized in writing by GES, and GES shall not be responsible for the loss of or damage to the GES Product or any other equipment while in the possession of any service agency not authorized by GES.

GES reserves the right to make changes in design and improvements upon GES Products from time to time, and User understands that GES shall have no obligation to upgrade any previously manufactured GES Product to include any such changes.

The foregoing Limited Warranty is GES's sole warranty and is made in place of all other warranties, express or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose and any implied warranty arising from course of performance, course of dealing, or usage of trade. If GES has substantially complied with the warranty claim procedures described below, such procedures shall constitute User's sole and exclusive remedy for breach of the Limited Warranty.

In no event shall GES be liable for any indirect, special, incidental, or consequential damages or for any cover, loss of information, profit, revenue or use based upon any claim by User for breach of warranty, breach of contract, negligence, strict liability, or any other legal theory. In no event shall GES's liability exceed the amount User has paid for the GES Product. To the extent that any applicable law does not allow the exclusion or limitation of incidental, consequential or similar damages, the foregoing limitations regarding such damages shall not apply.

This Limited Warranty gives you specific legal rights, and you may also have other rights which vary from state to state. This Limited Warranty shall be governed by the laws of the State of New Hampshire, USA.

## Filing a warranty claim

In the event you should have to file a claim with GES for repair/replacement of your AudioTroll under the 90-day limited warranty, please call the owner of GES, Carl Levine, directly at 603-397-3548 during normal business hours (Eastern Time)

# Specifications

## **Control Unit**

Dimensions: Approx. 4"x2"x0.5"

RoHS Compliance: Available upon request

Processor: Microchip PIC2585 @ 8mhz

Audio Processor (2): Analog Devices SSM2142 or Equivalent

## **Interface Harness**

26-pin ISO-DIN Male and Female with DB-9 to control unit

## **Interface Cable**

Belkin 6' made exclusively for GES

## **Audio Cable**

6' M/M Stereo