

Manual

Version 0.95



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Appendix A: Compatibility

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1 Introduction

Thank you for purchasing the iMIV-Volvo adapter!

By reading this manual and using the adapter, you'll soon find that this adapter has the most feature rich and multi-purpose functionality of any available adapter. The iMIV-Volvo takes full advantage of the extendible Volvo audio system and was designed to seamlessly integrate into the factory audio and video components without any of the limitations found in similar products.

The adapter's main features are listed in Table 1.

Seamless Integration into the OEM Volvo audio system
<ul style="list-style-type: none">• Works with RTI (navigation) and external CD-Changer¹ present
<ul style="list-style-type: none">• All HU-xxx models supported (S40(classic), V40, S60, V/XC70, S80)
<ul style="list-style-type: none">• User selectable HU-channel configuration. The iPod can be controlled via CD-C OR MD-C and VIDEO/AUDIO integration through the TV channel
<ul style="list-style-type: none">• ALL described iPod features controlled via HU. Steering wheel controls can be used to select tracks and playlists
<ul style="list-style-type: none">• Integration of VIDEO and AUDIO utilized via the HU TV-channel

¹ External CD-Changer cannot be used with HU-850 or HU-650 radio.

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Rich adapter functionality
<ul style="list-style-type: none">• Support for all iPod models (iPod 1G¹, iPod 2G, iPod 3G, iPod mini, iPod 4G, iPod Photo, iPod Nano, iPod Video)
<ul style="list-style-type: none">• Two modes of iPod operation controlled via the HU: Simple and Advanced. Playlist control for up to 99 playlists.
<ul style="list-style-type: none">• External VIDEO-input and audio input to connect a DVD player, TV tuner, rearview camera, or a PDA, gaming console, etc.
<ul style="list-style-type: none">• Supports the iPod Video, taking full advantage of the audio AND video capabilities of the iPod.
<ul style="list-style-type: none">• Firmware is upgradable by simple downloads and can easily be performed by the end-user without removing the adapter.
<ul style="list-style-type: none">• AUX-input for additional audio source, available on a separate HU-channel (e.g. MD-C or TV).

Table 1: Adapter's main features

1.1 Main Setup

The main component of the Volvo audio system is the HeadUnit (HU). It controls the internal audio devices such as radio, cassette, CD-player, as well as the external devices, like the CD-Changer, RTI and Television. Each device has its own channel in the HU and the external devices are connected via a proprietary electrical bus system, called Melbus. All external devices need to connect to this bus in order to operate correctly and to allow control via the HU. Once connected, the devices become known to the HU and are presented as

¹ iPod 1G and 2G can be connected to the AUX input



additional channels on the HU display. Genuine Volvo devices can be chained together with the appropriate cabling (or: wiring harness) which allows for multiple devices to be connected to the HU.

The iMIV-Volvo adapter is designed to seamlessly integrate into the Melbus and to respect other devices on the bus.

Figure 1 gives an overview of the main wiring of the adapter.

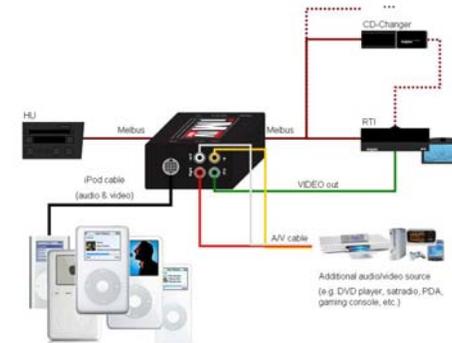


Figure 1: Main wiring of the iMIV-Volvo adapter

The iMIV-Volvo adapter contains a wiring-through Melbus connector to link other devices. The adapter connects to the HU using a standard Volvo Melbus cable and connects to other Melbus devices with a standard Melbus cable as well. Cars that have existing or pre-wired RTI, CD-CHGR or Satellite cabling, can use that cable directly without any change or additional



proprietary cables. The Melbus cable that is provided in the package can be used to connect your adapter to the existing Volvo audio system.

The iPod to adapter cable that is included in the package uses a 13-pin DIN connector to connect to the adapter. Don't ever confuse this connector with the Melbus 13pin DIN connector, which is used by Volvo for wiring through Melbus devices! The iPod cable provides audio, video and control signals from the iPod to adapter and no additional cables are needed for a fully integrated iPod audio and video solution. This cable can be used for all iPods that have a dock connector.

The iMIV-Volvo adapter has an extra AUX-in RCA input. This input can be used to connect e.g. a satellite radio, PDA, additional MP3 player and other devices. Furthermore, an external video source connected to the yellow RCA connector, can be used in conjunction with the AUX-input. This setup can be used to connect peripherals such as a DVD player, PDA, carputer, game console, rear view camera, etc.

The green video output connector on the adapter can be connected to the RTI system or to a separate external TFT display to display video. The video input requires a PAL composite video signal if the output is connected to the RTI system. The video source can be either PAL or NTSC when the external TFT panel is used and depends on the input signal capabilities of the TFT panel only.

A special VIDEO-out cable can be purchased from Sensolutions that connects the adapter to the RTI. This cable, together with special adapter firmware (which is pre-installed) allows for two video sources (iPod and an external video input) to be available on the HU's TV channel and the built-in RTI navigation display.

The iMIV-Volvo adapter is designed with the capability to upgrade its firmware, while the adapter is installed in the



car. Changes and updates can be made without removing and sending it back to the manufacturer. New features are made easy! The firmware is upgraded by initializing a firmware upload sequence and then playing a special music file on the iPod. Various firmwares are available that allow different configurations of the iMIV-Volvo adapter and the Volvo audio system. See section 3.3.2 for further information about upgrading the firmware.

The iMIV-Volvo adapter integrates the iPod and AUX/VIDEO inputs, each on their own HU channel. Table 2 shows the channels that can be used for each input.

iMIV-Volvo input	HU channel
iPod	CD-CHGR
	MD-CHGR
AUX only input(no video)	CD-CHGR
	MD-CHGR
AUDIO/VIDEO input	TV
	TV

Table 2: Different HU channels can be used by the iMIV-Volvo adapter

Each combination of channels is activated by downloading the appropriate firmware. For example, if the video capabilities of the iMIV-Volvo are to be used, the TV channel is utilized for both AUDIO-input and VIDEO-input.

It is not possible to use the same channel for both the iPod and AUX or AUDIO/VIDEO input.

2 Installation Manual

The basic installation steps to install the iMIV-Volvo involve:

1. Choosing a location for the adapter
2. Connecting the adapter to the HU
3. Installing the iPod cable
4. Connecting the adapter to battery power
5. Uploading the appropriate firmware if necessary

Installation Step 1: Choosing a location for the adapter

The iMIV-Volvo adapter can be installed at different locations in your car. For example the glove compartment, trunk, console, armrest, behind the dashboard or radio or under the front passenger seat are all possible locations.

Keep in mind that the provided cables are of limited length, so the mounting location will also depend on where you intend to keep the iPod.

It is recommended to first determine where you want the iPod located and then to work from that point on. Longer Melbus and iPod cables can be purchased separately to give you the maximum freedom of choice.

Other connected devices, e.g. RTI or CD-Changer, will affect your choice for the location of the adapter, because a Melbus cable will need to connect the iMIV adapter to those device(s) as well. This is not applicable if you don't have other Melbus devices.

The iMIV-Volvo adapter also needs a power connection to operate and should be closely located to a good, permanently battery power source or connection.

Choose an install location that suits you best and use the included Dual Lock strip to secure the adapter into position.

Installation Step 2: Connecting the adapter to the HU

Connecting the adapter to the HU is straightforward. You can use the male-male 8-pin DIN Melbus cable (see Figure 2) that is provided with the adapter or a pre-installed Volvo Melbus cable if you have one.



Figure 2: Melbus cable

If the car is equipped with one or more of these options: RTI (navigation), remote CD-changer or Satellite radio, a preinstalled Melbus cable is present. Cars that are prepared for RTI, a CD-Changer or Satellite radio also have a pre-installed Melbus cable. Look for a round 8-pin DIN connector near remote device's intended installation location.

If you don't have a pre-installed Melbus cable you will need to install the cable yourself. You can have this done

by a local Volvo dealer or a car stereo installation company. The iMIV-Volvo adapter is connected to the 8-pin DIN connector on the back of the HU with the included Melbus cable.

Depending on the car and the HU model, removing the head unit can be somewhat challenging and require some technical skill. This manual will not explain how to remove the HU. Information about removing the HU can be found in the Volvo manuals (VADIS, VIDA or internet: <http://vccs.volvocars.se/accessories/ii/default.asp>, use keyword: 'IPOD'). Other good online resources are available on the forums of Volvo enthusiast websites, e.g. <http://forums.swedespeed.com>.

Now connect the Melbus cable to the iMIV-Volvo adapter by using the adapter's connector labeled as "HU" as shown in Figure 3. If applicable, connect a Melbus cable to the remaining devices, e.g. RTI, CD-Changer, etc. by using the adapter's connector labeled as "Melbus". You may use the Melbus cable included in the package or the existing pre-wired cable (mainly depending on the location of the adapter).

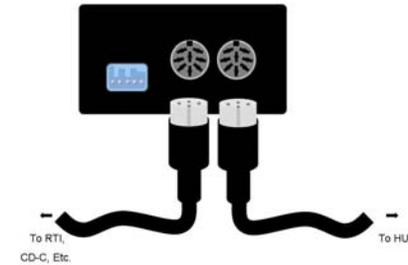


Figure 3: Connect Melbus cables



Important!

For the highest audio quality it is strongly recommended that the adapter be directly connected to the car's HU (via the "HU" DIN connector on the adapter) and that the remaining devices (e.g. RTI, CD-Changer, etc.) be attached to the adapter via its "Melbus" connector (see Figure 3).

Best results are achieved when the adapter is 'first in the chain'.

Use official Melbus cables from Volvo or the included Melbus cable only!

Installation step 3: Installing the iPod cable

The iPod to iMIV-Volvo adapter cable provided in the package is the only cable needed to connect the iPod to the adapter. This cable provides power for the iPod and carries the audio, video and control signals.



Important!

Using a non iMIV-Volvo iPod cable will result in poor sound and video quality and could cause other problems, possibly even damaging your iPod or the adapter.

Using a non iMIV-Volvo iPod cable will void your warranty.

Run the cable from the desired iPod location to the adapter and connect it to the iPod connector of the adapter (see Figure 4).



Figure 4: Connect iPod cable

An optional cradle is available from Sensolutions to hold your iPod and keep it in a convenient, reachable position.

If you have purchased this cradle, refer to its installation instructions for attaching the iPod connector to the cradle.

Installation step 4: Connecting the adapter to battery power

The adapter needs constant battery power to operate correctly and should not be wired to a switched power source.

However, the adapter will never drain your car's battery, because it is designed to shut down automatically after approximately 20 seconds.

 **Important!**

Before you connect to battery power, turn off ignition to position I, and disconnect the ground terminal on the battery. Once you have made the power connection(s) for the iMIV, turn the ignition key to position II, and connect the battery ground terminal.

Failure to follow this procedure may cause a trouble code, which would require a dealer visit to reset.

Use the provided power connector to connect the adapter to a non-switched 12V power source. The red wire is hot (12Volt) and the green wire is the ground. The green wire can be connected directly to the chassis or any good ground point. Make sure that secure contact

is made by scratching the paint under the contact point if necessary.

Now connect the power connector to the iMIV-Volvo adapter as shown in Figure 5.

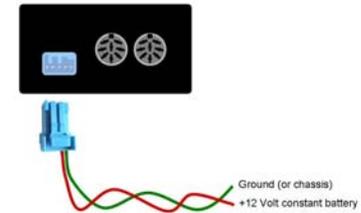


Figure 5: Connect constant battery power

 **Tip!**

If any interference, e.g. high pitched engine noise, is heard in the audio signal, it is most likely due to a ground loop situation. Though the adapter is designed to avoid audio ground loops, they may occur in rare situations.

In this case choosing another grounding point will solve the problem. We recommend using the same ground for the adapter as is used for the HU by tapping into the ground wire of the HU wiring harness. If the adapter is not located near the HU, use a conveniently located thick

grounding cable for the best results.

Installation step 5: Uploading the appropriate firmware if necessary

The iMIV-Volvo adapter has pre-installed firmware which allows the iPod to be controlled through the HU's CD-CHGR channel and the AUDIO/VIDEO input to be controlled using the TV channel.

However, other combinations are possible to suit your needs. For example if you have a CD-Changer already installed and would like to keep it, you may choose to control the iPod via the MD-CHGR channel (see the compatibility chart in Appendix A for your HU's available options). Or, if you don't have RTI you may want to have the AUX input enabled on the MD-CHGR channel.

See section 3.3.2 for a detailed description on how to change or upgrade your adapter's firmware.

Now that you've gone through the installation steps, it's time to connect your iPod and the other audio/ video devices if you have them, turn on the car's ignition and enjoy all the features of the iMIV-Volvo adapter!

Please consult the User manual chapter for a detailed description of all features.

3 User Manual

This User Manual explains all the operational details for using the iMIV-Volvo adapter. It includes topics such as using the iPod and the audio/video inputs and related subjects, such as firmware uploading.

Please consult your iPod manual for information about how to use the iPod itself. It is not covered in this document.

3.1 Getting started

Once the adapter is installed as described in the installation manual, Chapter 2, it is ready for use.

Switch on the HU to activate the iMIV-Volvo adapter. The indication LED on the side of the adapter will light green. The HU channel(s), that you have selected by uploading the corresponding firmware, will be highlighted on the HU's display (see Figure 6 which shows an example of the HU display with additional highlighted channels).¹



Figure 6: Additional channels added by the iMIV-Volvo

¹ The newer HU models, such as HU-650 and HU-850, only highlight the channel once it has been selected with the source knob.

If the channels are not highlighted, the adapter will not function properly. In this case check for the correct wiring and confirm that the adapter is properly powered and that the indication LED on the adapter is green (see Appendix B: troubleshooting).

3.1.1 iPod operation

Use the **source knob** on the HU to scroll to the channel assigned to the iPod, CD-CHGR as seen in Figure 6. If the iPod is not connected, the HU will display "CD LOAD CARTRIDGE" to indicate that the iPod is not present (see Figure 7).



Figure 7: HU display when the iPod is not connected

If an iPod is connected to the adapter, it will start to play automatically, once the channel is selected. If your iPod is not connected to the adapter, do so now. Because the adapter has not been used before, it will switch to Simple Mode¹ operation as shown in Figure 8.

¹ See section 3.2 for detailed explanation of the adapter's iPod modes.



Figure 8: HU display indicates Simple Mode operation¹

The iPod's display will show that it is connected to an external power source (battery icon) and will start to play automatically after a few seconds, as if the Play button on the iPod has been pressed manually. Please refer to section 3.2 for a more detailed explanation of the adapter's iPod modes.

¹ Dependant on the HU model the display will show "CD TRK99" or "CD00 TRK99" in Simple Mode operation

3.1.2 AUX input operation

Use the **source knob** on the HU to scroll to the channel assigned to the AUX input. In our example, as shown in Figure 9, this corresponds to the TV channel.



Figure 9: HU display shows AUX input

Note that the iPod will pause when the iPod channel is deselected. Now an external audio source can be connected to the RCA audio input connectors on the adapter and the external audio source will now be heard on your car audio system.

Using special iPod Video firmware

Pressing the TRK Change buttons (|<<, >>|) on the HU, while the TV channel is selected, will change between the two AUDIO/VIDEO source inputs. **TV 1** and **TV 2**. **TV 1** enables the iPod video input and **TV 2** enables the external AUDIO/VIDEO input RCA connectors on the adapter. **TV 0** disconnects the video output of the adapter from the RTI system and only the audio will be heard. This is true for both TV channels (see also section 3.5.1).

A video signal from the iPod can only be viewed if the iPod has video capability (iPod Photo, iPod Video) and the video output of the iPod is enabled. If you want to display video on the RTI screen, the iPod's video output needs to be set to PAL. (See your iPod manual for further details). Further, the special iPod Video firmware has to be uploaded to the adapter for high quality audio and video from the iPod.

Now, if you have RTI present in your car and the TV channel is set to **TV 1** or **TV 2** the RTI screen will raise and the video signal is shown on the screen. Note that when the car is moving, the video signal will be switched off automatically for your safety.



Important!

If you want to use the video capabilities of your iPod, you need to upload the special iPod Video firmware to the iMIV-Volvo adapter. This firmware will give you high quality video and audio signals from the iPod. Your adapter comes preloaded with this special iPod Video firmware. See section 3.3 for further details on firmware upgrading.



Tip!

Even if you don't have the RTI system in your car, you can still take advantage of the video capabilities of the iMIV-Volvo adapter. If you connect a TFT screen with composite video input (either NTSC or PAL) to the Video output of the adapter you can enjoy video as well. E.g. using an iPod Video, you can select movies for the kids to watch while the sound is heard via the audio system.

3.2 iPod operation

The main function of the iMIV-Volvo adapter is to offer a versatile interface for your iPod. The iMIV-Volvo adapter has been designed from a true user experience with maximum flexibility in mind to meet the needs of music and iPod lovers.

This has resulted in an interface that basically has two modes of operation:

- Simple Mode
- Advanced Mode

In *Simple Mode* the iPod can be fully controlled manually like you would do normally. However the HU will show no information of current track, playlist or shuffle mode.

In *Advanced Mode* the iPod is locked and will show the iMIV-Volvo logo. The iPod cannot be manually operated. In this mode all Playlists (up to 99) on the iPod can be accessed by using the HU buttons, while the HU will show information of current track, playlist and shuffle mode.



Important!

All information below is based upon the CD-CHGR being the iPod channel. If you use the MD-CHGR as iPod channel instead, please substitute the "CD" indication with an "MD" indication. The described functions are fully transparent on either the CD-CHGR or MD-CHGR channel.

3.2.1 HU display

The HU displays valuable information about the two modes of operation. The adapter has been designed in such a way that you can see at once what your current mode of operation is.

When the adapter operates in Simple Mode, the HU display will always show

CD TRK99 or **CD00 TRK99** (see also Figure 8). The exact indication depends on your HU model.

When the adapter operates in Advanced Mode, the *CD number* indicates either the iPod's current Playlist or the iPod's current Song, while the *TRK number* indicates the actual Playlist or Song number (see Table 4).

3.2.2 Connect/ disconnect your iPod

This section assumes you have selected the iPod channel on your HU.

When there is no iPod connected to the adapter the HU display will always show **CD LOAD CARTRIDGE** (see also Figure 7).

When your iPod is connected, the iMIV-Volvo adapter will always try to resume in the play mode it was last operated in. (see section 3.2.6 for resuming); that is, either Simple Mode or Advanced Mode. In either mode the iPod will always start playing automatically after a delay of a few seconds.

The iPod, when connected, will charge as long as the adapter is powered (ignition on).

The iPod power up with a "cold boot" if it has not been on for a longer time or has an empty battery. This means the iPod startup takes a longer time and the Apple logo is displayed on the iPod. During a "cold boot" of the iPod the iMIV-Volvo adapter is not able to resume the last

playing situation. After the "cold boot", the adapter will operate in *Simple Mode*¹.

After the iPod is disconnected, the display will show **CD LOAD CARTRIDGE** again, independent of whichever mode the adapter was operating in.

3.2.3 Simple Mode

In *Simple Mode* the iPod can be controlled manually as you would normally do. As soon as the iPod channel is selected on the HU (using the **source knob**), the iPod starts playing and then pauses when the channel is deselected.



The iPod will also pause if the HU is interrupted, e.g. by a telephone call (if you have telephone mute or the integrated carphone/ hands free kit installed) or by a traffic announcement via the radio (if TP has been enabled). Once the interruption is finished the iPod resumes playing.



Important!

Always connect the iPod to the adapter when the iPod is paused.

The adapter expects this and will otherwise reverse the Play / Pause operation.

¹ Some iPod's require to have the Play button pushed manually after a 'cold start'.

In *Simple Mode* operation, the iPod can be controlled by the HU as well as the audio controls on the steering wheel, as shown in Table 3.

HU button (Simple Mode)	Steering Wheel control	iPod operation (Simple Mode)
⏭ (next track)	Yes	Advances to the next song
⏮ (prev track)	Yes	Advances to the previous song
⏩ (fast forward)	n/a	Scrolls through the current song in forward direction
⏪ (rewind)	n/a	Scrolls through the current song in reverse direction

Table 3: HU control of the iPod in *Simple Mode*

3.2.4 Advanced Mode

In the *Advanced Mode*, the iPod is locked and displays the iMIV-Volvo logo; the iPod cannot be manually operated. All iPod control is accomplished by using the HU buttons and all relevant information is shown on the HU display.



The *Advanced Mode* of the iMIV-Volvo adapter is used to access the playlists on your iPod, of which up to 99 are supported by the adapter.

3.2.4.1 View types

It is important to understand the purpose of the CD and TRK numbers in *Advanced Mode*. The CD portion on the HU screen will always be either **CD01** or **CD02**, whilst the TRK portion will vary from **TRK01** to **TRK99**.

CD01 indicates that the number displayed after "TRK" is the Playlist number; this is the *Playlist View*.

CD02 indicates that the number displayed after "TRK" is the current Song; this is called the *Song View*.

The HU display is able to show TRK numbers from **TRK01** to **TRK99**. Therefore, if a song number in a Playlist is greater than 100, only the last two digits are visible. The song numbers 100, 200, 300, etc. are displayed as **TRK01** (or **TRK00**, see footnote).

View type	CD# indication (Adv.Mode)	TRK # indication (Adv.Mode)
Playlist View	CD01	Indicates the iPod's current Playlist E.g. CD01 TRK15 indicates that <i>Playlist 15</i> is currently selected.
Song View	CD02	Indicates the iPod's current Song E.g. CD02 TRK33 indicates that <i>Song 33</i> is currently playing.

Table 4: View types of HU display in *Advanced Mode*

3.2.4.2 Playlists

Standard Enumeration Mode

Every time the iPod is connected to the iMIV-Volvo adapter, its Playlists are enumerated. The Playlists of the

¹ Some HU's are capable of displaying **TRK00** to **TRK99**.

iPod are enumerated in the order of appearance in the iPod Playlists menu (alphabetically) and which is the same as your iTunes Playlists.

The first playlist in your list will be enumerated as index No.1, the second will be index No.2, etc. up to No.99. Playlists above No.99 are ignored and cannot be accessed in the *Advanced Mode*. The index numbers assigned by the adapter to the playlists will show on the HU display; e.g. the second playlist in your iPod Playlists menu will show as: **CD01 TRK02**.

Indexed Enumeration Mode

With a large Playlists collection, it can be hard to remember the details, e.g. "what playlist with index No.33 was about." To remedy this, a second method of enumerating playlists has been designed into the iMIV-Volvo adapter. This will help you better organize your playlists better and, when scrolling, locate them faster on the HU display.

Instead of using an automatic enumeration (where the index number is increased by one for each successive playlist), the first part of the playlist name is used for the index number of the playlist.

When the playlist enumeration starts, the iMIV-Volvo adapter always checks the name of the *first* playlist. If the first two characters of this playlist name are numbers, then the playlist is not assigned to index No.1 but to the index number that is formed by the first two numbers in the name. This index will show on the HU as Playlist number.

For example, if your first playlist is named "28 - Pop classics" then it is displayed on the HU as: **CD01 TRK28**. If the first two characters of the playlist name had not been numbers, it would have displayed as: **CD01 TRK01**.

A few rules apply to use this type of enumeration:

1. You have to make sure that the first playlist in the list begins with two numbers. This means index number one has to be typed as "01", not "1". Change the names of your playlists accordingly if this is not the case (remember the playlists are ordered alphabetically).
2. Number "00" as first characters in the Playlist name cannot be used for indexed enumeration, because this can be confused with "Simple Mode" operation. If "00" is used, standard enumeration applies.
3. The enumeration will stop as soon as a playlist name is found where one or both of the first two characters are not numeric. *It is important to understand that when the first playlist begins with two numbers, all successive playlists that do not begin with two numbers will not be enumerated and then cannot be accessed.* This is different from the first enumeration method, where all playlists are enumerated up to 99.

This enumeration method is particularly attractive, because the index numbers can be designated by the user, instead of having them automatically assigned by the adapter.

Inserting a new playlist half way down the list is now quite convenient, because all the other index numbers will be preserved, as these are part of the Playlist name.

Playlists can also be categorized with this enumeration method, so they can be remembered and selected easily. For example, you could make playlist categories by separating the lists into groups of ten or less i.e. 01-09, 10-19, 20-29 and so on.

The name that is assigned to a certain Playlist is not important to the iMIV-Volvo adapter, as long as it doesn't exceed 50 characters in length.



Important!

Do not use Playlist names that exceed 50 characters in length. The iMIV-Volvo adapter may not function correctly in this case.

Here is an example of naming playlists. Suppose you have defined the following Playlists in iTunes:

- "Birthday songs for kids"
- "Greatest hits of Jazz"
- "Miscellaneous pop music"
- "Modern classical"
- "Mozart's symphonies"
- "North Sea Jazz Festival 2000"
- "Number one hits from the 90's"
- "Pop Classics"
- "Sing along songs"
- "The best of Miles Davis"
- "On-The-Go 1"
- "On-The-Go 2"
- "On-The-Go 3"
- "On-The-Go 4"

Suppose you would like to categorize your playlists like this, so you can easily choose the music that you want to listen to:

- Category 1: Pop music
- Category 2: Classical music
- Category 3: Jazz music
- Category 4: Music for the kids

Note that playlist categories do not really exist in iTunes! It's only a convenient method to organize the playlists.

Now if you use playlist index numbers that are grouped by 10 or less to indicate the category, your playlists would look like this:

- "10 - Miscellaneous pop music"
- "11 - Number one hits from the 90's"
- "12 - Pop Classics"
- "20 - Modern classical"
- "21 - Mozart's symphonies"
- "30 - Greatest hits of Jazz"
- "31 - North Sea Jazz Festival 2000"
- "32 - The best of Miles Davis"
- "40 - Birthday songs for kids"
- "41 - Sing along songs"
- "On-The-Go 1"
- "On-The-Go 2"
- "On-The-Go 3"
- "On-The-Go 4"

This particular list would be enumerated by the iMIV-Volvo adapter using the index numbers from the playlist names, because the first playlist name meets the requirements. Scrolling through the playlists on the HU will show:

```
CD01 TRK10 -> CD01 TRK11 -> CD01 TRK12 ->
CD01 TRK20 -> CD01 TRK21 -> CD01 TRK30 ->
CD01 TRK31 -> CD01 TRK32 -> CD01 TRK40 ->
CD01 TRK41
```

Note that the On-The-Go playlists are not enumerated, because their name does not begin with two numbers; the enumeration stopped at "On-The-Go 1".

Now, if you would change the first playlist to "1 - Miscellaneous pop music", the iMIV-Volvo adapter will not enumerate the playlists using the index number from the name, because the first playlist name does not begin

with two numbers (it should have been "01..." instead). Scrolling through the playlists will now show:

```
CD01 TRK01 -> CD01 TRK02 -> CD01 TRK03 ->
CD01 TRK04 -> CD01 TRK05 -> CD01 TRK06 ->
CD01 TRK07 -> CD01 TRK08 -> CD01 TRK09 ->
CD01 TRK10 -> CD01 TRK11 -> CD01 TRK12 ->
CD01 TRK13 -> CD01 TRK14
```

Note that all playlists are now enumerated, including the On-The-Go playlists.

3.2.4.3 Using playlists and Songs (Playlist and Song access)

During normal operation, when the iPod plays songs, the *Song View* is active and the HU display represents the current playing Song no.

For example, **CD02 TRK13** shows that Song No.13 of the selected Playlist is playing currently. As soon as the next Song starts playing, the HU display will update the Song number accordingly.

Selecting Songs

You can search through the Songs using the HU buttons, when the *Song View* is active. The HU display will immediately update the Song number to the one you have selected.



The |<< and >>| buttons are used to search through the Songs in the Playlist. The >>| knob advances to the next Song. Pressing the |<< knob once will restart the current Song from the beginning. Pressing the |<< knob again immediately advances to the previous Song.



The << and >> buttons have been defined for two purposes: 1) searching in the current song and 2) large interval step search of Songs. Pressing the >> knob shortly will advance 10 Songs at once forward. Pressing the << knob shortly will advance 10 Songs at once back¹. Holding down the >> knob for a few seconds will start fast forward searching of the current Song. Holding down the << knob for a few seconds will start fast reverse searching of the current Song.

A short delay follows, when searching through the Songs is finished, before the Song actually starts playing on the iPod. The delay is approximately 0.5 seconds and within this timeframe search buttons can be combined to scroll to your favorite Song fast and convenient.

For example, if your current song is No.11 and you want to scroll to Song No.32, press >> twice shortly and immediately press >>| once after that.

Changing from Song View to Playlist View



The **1-20/Disc** rotary knob on the HU is used to change from *Song View* to *Playlist View*. By turning the **1-20/Disc** knob once (1 click) clockwise or counterclockwise, the *Playlist View* is activated and the HU displays the current selected Playlist.

¹ HU's that only have the |<< and >>| buttons need to press and hold these buttons to access searching. For large interval step release the button as soon as the time information shows up on the HU display.

For example, if you are listening to Song 22 of a Playlist with index No.7,

the adapter operates in *Song View* and the HU shows **CD02 TRK22**; turning the **1-20/Disc** knob once will set the adapter to *Playlist View* and the HU shows **CD01 TRK07**.



If your HU doesn't have the **1-20/Disc** knob, but has the **1-6** preset knobs instead, you'll have to use **preset knob 1** to activate *Playlist View*.

The adapter switches back to *Song View* automatically after a few seconds, when *Playlist View* is active.

Selecting Playlists

Once the current view is *Playlist View*, the playlist can be changed. Either the rotary **1-20/Disc** knob, the |<< and >>| knobs or the steering wheel controls may be used to change the playlist.



Use the **1-20/Disc** knob to search through the Playlists. **CD01** starts blinking to indicate that a new Playlist is currently being selected. Turning the knob clockwise advances to the next Playlist and turning the knob counterclockwise advances to the previous Playlist.



Use the |<< and >>| buttons to search through the Playlists. **CD01** starts blinking to indicate that a new Playlist is currently being selected. The >>| knob advances to

the next Playlist and the |<< knob advances to the previous Playlist.



Use the steering wheel controls to search through the Playlists. Operation is similar to using the |<< and >>| buttons.

You can search through the available Playlists by using any of the buttons as long as **CD01** blinks. **CD01** will continue to blink for a few seconds, if you stop scrolling. Once the blinking stops, the Playlist you have selected becomes the active Playlist and the iPod starts playing the first Song of the Playlist after a few seconds.



Important!

Note that if you are currently listening to a Song and want to change the Playlist using the **1-20/Disc** knob, you will need to turn the knob at least two clicks. One click to select *Playlist View* and one click to change to the next or previous Playlist.

Automatic Playlist turnover

The iMIV-Volvo adapter will turn over automatically to the next indexed Playlist if the current Playlist has reached the end. The adapter switches to *Simple Mode*, if the last indexed Playlist has reached the end, and the iPod starts playing the first song of all available music.



Tip!

If you want the Playlist to turn over to the first song of that Playlist after playing the

last song, set the "Repeat" option to "All" on your iPod.

3.2.4.4 Shuffle Play

The Random button (RND) on the HU is used to toggle the Shuffle play mode of your iPod between "Off" and "Songs". Pressing the RND button if the iPod's Shuffle mode is "Off" sets Shuffle mode to "Songs" and displays the "RANDOM" word on the HU screen (See Figure 10). Pressing RND again sets the iPod's Shuffle mode back to "Off". The "RANDOM" word disappears from the HU screen.



Figure 10: iPod's "Shuffle Songs" displayed as *RANDOM*

If the iPod is already set to Shuffle play and Advanced Mode is selected, the HU will reflect the mode by displaying the "RANDOM" word on the screen.

3.2.5 Switching between Simple Mode and Advanced Mode

An outstanding feature of the iMIV-Volvo adapter is that it can switch between Simple and Advanced Mode on the fly using the HU, without touching or disconnecting your iPod. This way you'll be able to always listen to your favorite music without any limitations.

Simple Mode -> Advanced Mode



Switching from *Simple Mode* to *Advanced Mode* is accomplished by turning the **1-20/Disc** knob once (1 click) clockwise.



Press **disc knob 1** once to switch from *Simple Mode* to *Advanced Mode*, if your HU doesn't have the **1-20/Disc** knob, but the 1-6 preset knobs instead.

When *Advanced Mode* has been activated, the iMIV-Volvo adapter initializes the *Advanced Mode* and the iPod gets locked and displays the iMIV-Volvo logo. This will take a few seconds. Next, the *Advanced Mode* starts in *Playlist View* with CD01 blinking. The desired Playlist can now be selected.

Advanced Mode -> Simple Mode

Switching from *Advanced Mode* to *Simple Mode* is accomplished by first searching through the Playlists as described earlier (see section 3.2.4.3).

Simple Mode is regarded as an extra Playlist, which is positioned between the last and first indexed Playlist. For example, if you have 3 Playlists that have been enumerated as 01,02,03, searching through the Playlists in forward direction is presented as illustrated in Figure 11.



Figure 11: searching through Playlists includes *Simple Mode*

The indication for *Simple Mode* is shown after the last indexed Playlist. After the *Simple Mode* indication, searching starts at the first Playlist again.

Searching through the Playlists backwards is the same, but then in reverse direction.

Simple Mode becomes effectuated after a few seconds, which is the same as with a normal Playlist switch when the CD-indication stops blinking. Next, the iPod pauses, the iPod's display will be unlocked and the iPod starts playing again after a few seconds at the current Song.

3.2.6 Resuming

The adapter will always try to resume the last playing situation of the iPod if the iPod is connected or the iMIV-Volvo adapter is powered on with the iPod already connected.

The actual playing situation is stored in flash memory and therefore preserved when ignition is switched off or when the iPod is disconnected. The adapter remembers the last mode of operation and the current playlist and song.

When the adapter resumes, it first checks the last mode of operation.

If the last mode of operation had been *Simple Mode*, the iPod starts playing at the currently selected Song.

If the last mode of operation had been *Advanced Mode*, the adapter initializes the *Advanced Mode* and locks the iPod. Then the adapter matches the following criteria:

1. The index number of the currently selected Playlist on the iPod has to be the same as the stored index number of the Playlist
2. The name of the currently selected Playlist on the iPod has to be the same as the stored name of the Playlist.
3. The total number of Songs in the currently selected Playlist on the iPod has to be the same as the stored total number of Songs of the Playlist.
4. The index number of the currently selected Song on the iPod has to be the same as the stored index number of the Song

If all criteria match, the iPod starts playing and the HU shows the information accordingly.

Basically, the iPod needs to be in the same playing situation (i.e. no Song change and no updates) as it was when it was disconnected or when the adapter lost its power (ignition off).

Advanced Mode cannot be resumed if one of the criteria doesn't match, and the adapter switches to *Simple Mode* automatically. In *Simple Mode*, the iPod starts playing at the currently selected Song.

3.2.7 Ignition on/off

The adapter is powered on and the indication LED lights green when ignition is switched on. The adapter charges the iPod immediately, if it is connected. Next, the adapter tries to resume the last playing situation (see section 3.2.6).

When ignition is switched off, the adapter remains powered for approximately 15-20 seconds, before it shuts down completely and switches off the indication LED. Your car's battery is never drained, because the adapter won't use power when the ignition is off.

The iPod pauses as soon as the ignition is switched off, if it was playing.

The adapter will continue to charge the iPod for about 6 seconds and then the adapter switches off and stops charging the iPod.

In *Advanced Mode*, the adapter unlocks the iPod display at the same time the power is switched off to the iPod, i.e. after about 6 seconds.

By doing so, the iPod can always be operated when it is disconnected, regardless of the Mode that had been active and regardless of the adapter being powered or not.

3.3 Service mode

The iMIV-Volvo adapter is designed with a special *Service Mode* feature. The *Service Mode* allows for firmware uploading and showing specific service information. To set the adapter in *Service Mode*, it is unnecessary to remove the adapter from its location. It only takes a special button sequence on the HU to enable *Service Mode*.

The adapter also features an emergency procedure to upload the firmware, even if the former upload failed and caused disfunction of the adapter. It is never required to send the adapter to Sensolutions for a firmware upgrade.

3.3.1 Setting the adapter in Service Mode

A special sequence is required to set the adapter in *Service Mode*:

1. Make sure the adapter is operating (ignition on) and turn on the HU.
2. Connect your iPod to the adapter
3. Select your iPod channel on the HU (CD-C or MD-C)
4. Set the adapter to *Simple Mode* (see section 3.2.5)
5. a) HU's with the rotary **1-20/Disc** knob:
Service Mode is entered by turning the **1-20/Disc** knob *10 clicks counterclockwise*.
b) HU's with **1-6 disc** knobs:
Service Mode is entered by pushing **preset knob 2 10 times**.
6. The button that is pressed next executes a certain service request. If, however, the iPod responds in a normal fashion when pressing the button, you need to repeat step 5.

In *Service Mode*, two additional buttons can be used (step 6) to select either firmware uploading or displaying service information, which are explained below. Any other button will leave the *Service Mode* and returns to normal operation of the adapter. It is important to perform all the steps accurately. For example, pressing/ turning the knob 9 or 11 times will not enable *Service Mode*.

3.3.2 Uploading Firmware

The iMIV-Volvo adapter features a sophisticated method to upload new firmware into the adapter's flash memory. By simply playing a sound file on the iPod, the adapter has new firmware installed.

Other firmware is needed when you would like to change the channel configuration on the HU and assign different channels to the iPod or AUX input. It is highly recommended to upgrade the firmware when a new firmware release becomes available.

Before firmware uploading can be commenced, the firmware sound file needs to be uploaded to your iPod. Please check www.sensolutions.com for available firmware releases. After selecting and downloading the appropriate firmware file, it has to be transferred to the iPod, using iTunes.

It is recommended to place the firmware sound file(s) in a unique Music library location in iTunes, so the file is isolated from the rest of your music collection and can be easily found and selected. For example, create a new Genre named as "_vol_iMIV" and place the firmware sound file(s) in there. When the iPod is synced with iTunes, the firmware file(s) can be located easily.

To execute firmware uploading, read through the following steps first, so you'll know what steps to take on forehand.

Upload the firmware file to your iPod:

1. Create a Genre in iTunes, named as "_vol_iMIV". You can use a different name, if you like.
2. Add the desired firmware file to your iTunes music library, assign it to the Genre created in step 1 and sync your iPod with iTunes.

Upload the firmware file to the adapter:

3. Turn down the volume of your HU.
4. Pause the iPod and navigate to the firmware sound file on your iPod, but don't start playing it yet.
5. Set the adapter in *Service Mode* (see 3.3.1).
6. Now push the >>| knob on the HU once and wait approximately 2 seconds.
The indication LED on the adapter lights red. The indication LED starts blinking red/green after approximately 2 seconds and the adapter is now ready to receive new firmware. Note that the adapter has stopped charging the iPod. Also, the adapter loses communication with the HU. This results in an error being displayed on the HU (like "CD ERROR"). This is normal behavior. Make sure that these indications are present, otherwise repeat step 3.
7. Start playing the firmware sound file on your iPod.
The adapter expects the firmware sound file to be started within approximately 30 seconds. The indication LED remains blinking red/green during this time to indicate that a firmware file can be started. If the adapter does not recognize a valid firmware file or the file has not been started

during the blinking of the indication LED, it breaks off the procedure without uploading firmware and returns to normal operation. The indication LED will light green and the iPod gets charged again.

8. Uploading has started and the indication LED lights red constantly with a short green flash every 2 seconds. The uploading will take a few minutes to finish. A beeping/ crackling noise is heard on the audio system. You can select another channel or turn down the volume completely. *It is very important NOT to pause the iPod during uploading; this results in corrupted firmware and causes the adapter to fail!*
Once the sound file has finished playing, the indication LED flashes green 4 times shortly to indicate a successful upload. The adapter returns to normal operation with a green indication LED and the HU reflects the changes after a few seconds.
9. Turn off the ignition and wait for at least 30 seconds or until the indication LED is switched off. Turn on the ignition and check if everything works as expected. If the expected HU channels do not show up at all, something went wrong with the upload and the adapter fails to operate normally. Refer to the emergency procedure (see section 3.3.4) to restore correct firmware to the adapter.

If your current adapter firmware is configured to only support the AUX channel (without any iPod support), you'll never be able to connect an iPod and execute the above mentioned steps. In this case the iMIV-Volvo adapter expects the firmware soundfile on the RCA AUX-inputs.



Important!

The adapter stops charging the iPod, once the firmware uploading is enabled. Therefore, it is critical that the iPod is charged sufficiently, since firmware uploading takes a few minutes to finish. If the iPod stops in the middle of firmware uploading for any reason, the firmware of the adapter is corrupted and the adapter won't operate normally anymore. Only the emergency procedure can be used in this case to upload new firmware and have the adapter operational again.

3.3.3 Displaying service information

The iMIV-Volvo adapter is able to display service information on the iPod's screen. Currently, the service information comprises of the adapter's serial number and the current firmware revision number.

The serial number allows for better tracking of your current adapter model and therefore may be needed as input for service requests.

The firmware revision number can be used to check if your adapter's firmware is up to date.

The service information is displayed by following these steps.

1. Set the adapter in *Service Mode* (see section 3.3.1).
2. Push the |<< knob on the HU once.
3. The iPod is locked and the service information appears on the iPod's screen.

4. To unlock the iPod, disconnect and reconnect the iPod from the adapter.

The format of the service information on the iPod's screen is: `cccccc/vxx.xx.xx` which is shown in Figure 12.



Figure 12: Service information on the iPod display

The first six characters (c) represent the adapter's serial number. Beyond the slash the adapter's firmware revision number is displayed, with a preceding 'v' character. For example, serial number 0 and firmware revision 01.00.00 would be displayed as: `000000/v01.00.00`

3.3.4 Emergency procedure for uploading firmware

In rare occasions, uploading firmware may have been unsuccessful for any reason, causing corrupted firmware of the adapter and failure of its operation.

The most likely reason is that the transfer of the sound file has been interrupted, e.g. because the iPod was paused accidentally or the iPod lacked enough power to play for a few minutes or the cables introduced some kind of unacceptable electrical noise.

Because the adapter won't operate anymore with corrupted firmware, it is no longer possible to enter *Service Mode* via the HU buttons and upload correct firmware. Therefore, an emergency procedure is provided to be able to get a working adapter always.

To execute the emergency procedure the jumper location, marked as "prg", on the side of the adapter next to the indication LED needs to be reached. Pull the jumper from its position marked as "2". Re-insert the jumper at position "1" (see Figure 13).



Figure 13: Insert the jumper at position "1" to execute the emergency upload procedure

The emergency procedure steps are explained below. Read through the steps first, so you'll know what steps to take on forehand.

Upload the firmware file to your iPod:

1. Create a Genre in iTunes, named as "_vol_iMIV". You can use a different name, if you like.
2. Add the desired firmware file to your iTunes music library, assign it to the Genre created in step 1 and sync your iPod with iTunes.

Upload the firmware file to the adapter:

3. Turn off the ignition and wait for at least 30 seconds or until the indication LED is switched off.

4. Set the jumper on the side of the adapter, marked as "prg" to position "1".
5. Connect your iPod, pause the iPod and navigate to the firmware sound file on your iPod, but don't start playing it yet.
6. Turn on the ignition. The indication LED on the adapter lights red.
7. Wait approximately 2 seconds. The adapter starts up in firmware upload mode, as if normal firmware uploading had been activated via the HU, and is ready to receive new firmware. The iPod is not being charged.
The indication LED starts blinking red/green after approximately 2 seconds. The adapter won't communicate with the HU, which results in an error being displayed on the HU (like "CD ERROR"). This is normal behavior.
8. Start playing the firmware sound file on your iPod.
The adapter expects the firmware sound file to be started within approximately 30 seconds. The indication LED remains blinking red/green during this time to indicate that a firmware file can be started. If the adapter does not recognize a valid firmware file or the file has not been started during the blinking of the indication LED, it breaks off the procedure without uploading firmware and returns to normal operation.
9. Uploading has started and the indication LED lights red constantly with a short green flash every 2 seconds. The uploading will take a few minutes to finish.
It is very important NOT to pause the iPod during uploading; this results in corrupted firmware and causes the adapter to fail!

Once the sound file has finished playing, the indication LED flashes green 4 times shortly to indicate a successful upload. The adapter returns to normal operation with a green indication LED and the HU reflects the changes after a few seconds.

10. Turn off the ignition and wait for at least 30 seconds or until the indication LED is switched off. Pull the jumper from position "1" and re-insert it in position "2".
11. Turn on the ignition and check if everything works as expected. If the additional HU channels do not show up, something went wrong with the upload and the adapter fails to operate normally. Re-engage the emergency procedure to restore correct firmware to the adapter.

3.4 AUX operation

The iMIV-Volvo adapter is capable of connecting an external audio source, which is available on a separate HU channel. The audio source is connected to the adapter via two RCA audio connectors (see Figure 14).

Your adapter comes pre-installed with firmware where the AUX input is available on the TV channel of the HU. Since this default firmware also supports the iPod Video, two aux/video inputs are available, utilized via **TV 1** and **TV 2**.

TV 1 selects the iPod as audio/video input and **TV 2** selects the external audio/video source, available via the RCA connectors, as input.

The input that has been selected is remembered, even when the adapter is switched off and can be selected by using the [**<<** and **>>**] buttons or the steering wheel controls. See also section 3.5.

The AUX channel is available on two other channels besides TV which are CD-CHGR or MD-CHGR, by downloading another firmware version into the adapter. The AUX channel is always different from the iPod channel. See also Table 2 and Appendix A for possible combinations of channel configurations on your HU.

If the AUX input is configured as the CD-CHGR channel, the HU will display **CD01 TRK01** constantly. Pressing buttons on the HU will not affect the display.

If the AUX input is configured as the MD-CHGR channel, the HU will display **MD01 TRK01** constantly. Pressing buttons on the HU will not affect the display.

If the AUX input is configured as the TV channel, the HU displays **TV 1** or **TV 0**¹, in case the special iPod Video firmware is *not* used (see section 3.5.3 for use with iPod Video firmware). Pressing the |<< , >>| buttons on the HU will toggle between **TV 0** and **TV 1**. **TV 1** connects the video output to the RTI and **TV 0** disconnects the video output from the RTI (see section 3.5.1). In both cases the RCA audio connectors on the adapter are selected as audio source.

¹ Some HU models display 'TV 0' while other models display 'TV' without the '0' indication

3.5 VIDEO operation

The iMIV-Volvo adapter is designed to support video signals as well. Two video sources are available, one that is integrated in the iPod cable for video signals coming from the iPod and one that is available via the yellow RCA input connector on the adapter (see Figure 14).

The video output signal is available on the green RCA connector on the adapter and is active when the HU's TV channel is available and is selected as source.



Figure 14: RCA connectors



Important!

The adapter can handle both PAL and NTSC based video signals. All video signals are composite video with 75 Ohm impedance.

The RTI unit requires a PAL based video signal.

On the output video connector of the adapter a video display can be connected. This may be a separate TFT/LCD screen or, if you have RTI in your car, a special cable can be purchased to connect the video output to the RTI unit to show video on the built-in navigation screen in the dashboard.

The adapter seamlessly integrates with the RTI, raises or lowers the screen when needed and displays the video signal.

If the special iPod Video firmware has not been uploaded to the adapter, only the external video source via the RCA connector is available, when selecting the TV channel. Refer to the section 3.5.3 to select video from the iPod.

3.5.1 RTI and video signal

If you have RTI in your car and want to connect the iMIV-Volvo adapter to your built-in navigation screen, first you need to purchase a special video cable. This cable connects the video output of the adapter to the RTI unit.

This cable is available for DVD-based RTI units and plugs into the RTI with a special green connector. This connector can only be inserted in the correct receptacle at the back of the RTI unit in the trunk, so installation is straightforward and easy (see Figure 15).

Information about removing the RTI unit in the trunk is not covered in this document and can be found in the Volvo manuals (VADIS, VIDA or internet: <http://vccs.volvocars.se/accessories/ii/default.asp>, use keyword: 'RTI').



Figure 15: Installation of RTI video cable

Since the RTI unit is mainly designed for navigation, the unit itself determines the precedence of the navigation screen and the connected video signal. Navigation

always has priority over the video signal as explained in the following paragraph.

Suppose that you have a video source connected to the adapter and have installed the video cable to the RTI.

Selecting the TV channel

Select the TV channel on the HU and set the source to **TV 1** or **TV 2**.

With the *navigation system switched on*, the screen switches from navigation to video automatically, if the car is not moving. The screen switches from video to navigation automatically, if the car starts moving with a higher speed than 5mph.

With the *navigation system switched off*, the screen raises and shows the video, if the car is not moving. The screen turns black for your safety, if the car starts moving with a higher speed than 5mph.

Deselecting the TV channel

Deselect the TV channel on the HU and switch to another channel.

With the *navigation system switched on*, the screen switches from video to navigation automatically

With the *navigation system switched off*, the screen lowers and turns black.

Temporarily turning off the video signal

Selecting **TV 0** by using either |<<, >>| buttons or steering wheel controls, disconnects the video signal from the RTI unit.

With the *navigation system switched on*, the screen no longer switches to video automatically, if the car stops, but navigation remains visible as if you had not selected the TV channel. This feature is for your convenience when e.g. you drive in a (unknown) city and need the navigation all the time, but do not want to deselect the TV channel.

External TFT without RTI

The video output is available all the time on the TV channel, if you have a separate TFT/LCD screen connected and have no RTI unit installed in your car, whether the car drives or not.

3.5.2 Steering wheel controls and TV channel

It is possible to use the steering wheel controls while operating the TV channel. Using either direction of the steering wheel control always results in a change in forward direction of the selected TV source as if the >>| button was pressed.

3.5.3 iPod Video version

A special firmware is created to fully support iPods with a video output (iPod Photo and especially iPod Video). The iMIV-Volvo adapter has been designed so that the audio and video capabilities of your iPod can be leveraged into the factory audio system, without the need for extra cables or additional hardware.

The adapter's iPod Video firmware enables a second video input on the TV channel and provides high quality audio and video signals from the iPod. Besides video, your iPod can still be used as a music player via the CD-CHGR or MD-CHGR channel as described in previous sections, without disconnecting it.

All features of AUX and Video, as described above in previous sections remain unchanged.

Switching between the A/V inputs

The TV channel is the only available channel for the external AUDIO/VIDEO input on the adapter, with the iPod Video version firmware. The TV channel can switch between the two AUDIO/VIDEO inputs, using **TV 1** and **TV 2**. **TV 1** switches the iPod AUDIO/VIDEO input and **TV 2** switches the external AUDIO/VIDEO RCA connectors on the adapter as input to connect e.g. a DVD player, rear-view camera, gaming console, etc.

Temporarily turning off the video signal

Besides **TV 1** and **TV 2**, **TV 0** is available as well to disconnect the video signal from the RTI and temporarily turn off the video signal (see section 3.5.1).

The << knob can be used to switch from **TV 1** to **TV 0**.

The >> knob can be used to switch from **TV 2** to **TV 0**.

iPod video settings

To use the iPod as video source, it's video settings need to be set up correctly. Scroll to the "Videos / Video Settings" menu on your iPod Video. Now set the "TV Out"

option to "On" and set the "TV Signal" option to "PAL", if the RTI screen is used for video.

If an external TFT is used to display video, either PAL or NTSC can be used for the "TV Signal" setting, depending on whether the video input signal setting of the TFT panel supports it.

4 Warranty, Disclaimer, Liability and Trademarks

4.1 Warranty

Please retain the receipt as proof of purchase and write down the information below in case you need to obtain support information

Sensolutions Product

Date of Purchase

Serial Number

Invoice Number and/or Dealer:

The Sensolutions iMIV carries a one year limited warranty that protects you from defects in material and workmanship. We do not warrant any installation.

Should a product fail to perform as described above within the warranted period, it will be repaired or replaced with the same functionally equivalent product by Sensolutions, at its discretion, free of charge provided you:

1. Return the failed product to a Sensolutions designated repair facility with shipping charges pre-paid, and
2. Provide Sensolutions with proof of the original date of purchase

Repaired or replacement products will be returned to you with shipping charges prepaid. If Sensolutions is unable to repair or replace the defective product, it will issue a refund at a fair market value.

Warranty does not cover normal tear and wear, damages due to negligence, improper installation or operation. Warranty is void if opened.

The maximum liability of Sensolutions under this warranty is limited to the purchase price of the product covered by the warranty.

Prior to returning any defective product, you must obtain a Returns Materials Authorization (RMA) number from Sensolutions. All defective products should be returned to Sensolutions with shipping charges prepaid. Sensolutions will not accept collect shipments.

4.2 Disclaimer and Liability

The iMIV adapter's design and specifications are subject to change without notice.

Future firmware updates for your iPod may affect the features and functions described in this manual.

In general, the iPod has not been designed to withstand temperature extremes in automobiles. Consult the iPod's Owner Manual regarding acceptable operation and storage temperatures

Display of artist and song title information on your HU (HeadUnit) display is not supported. Searching the iPod by trackname, artist, song title, album or genre via the HU is not supported.

Sensolutions is not liable for any incidental, consequential or indirect damages. Nor can we be held liable for warranties that are voided because of the use of this adapter.

In case of erratic behavior of your car's electrical system please disconnect your iMIV first and have it checked by your installer. Sensolutions assumes no liability for any diagnostic fees.

The maximum liability of Sensolutions under its warranty is limited to the purchase price of the product covered by the warranty.

4.3 Trademarks

- *iPod, iPod mini, iPod Photo, iPod Nano, iPod Video and iTunes are registered trademarks of Apple Computer, Inc.*
- *Volvo is a registered trademark of Volvo Trademark Holding AB and/ or Volvo Cars.*
- *Sensolutions is not affiliated with AB Volvo, Volvo Car Corporation, Volvo Cars or any other Volvo companies.*

Appendix A: Compatibility

HU compatibility chart

Head Unit	HU (model)	CD-CHGR	MD-CHGR	TV
S80 ('99-'05) S60/V70/XC70 ('99-'06)	HU-850	✓	✗	✓
	HU-650	✓	✗	✓
	HU-450	✓	✗	✓
	HU-803	✓	✓	✓
	HU-603/613	✓	✓	✓
	HU-403/413	✓	✓	✓
	HU-801	✓	✓	✓
	HU-601/611	✓	✓	✓
	HU-401/411	✓	✓	✓
	S40/V40 ('01-'04)	HU-655	✓	✗
HU-555		✓	✗	?
HU-1205		✓	✓	✓ ¹
HU-605		✓	✓	✓
HU-615		✓	✓	✓
HU-405		✓	✓	✓
HU-415		✓	✓	✓
HU-105		✗	✗	✗

¹ The TV channel is available and fully operational, but it won't show up in the device list on the HU

✓	available
?	unknown/ to be determined
✗	not available

iPod compatibility

All iPods that feature a dock connector can be connected to the adapter.

The following iPods with dock connector are compatible with the iMIV-Volvo adapter:

- iPod 3G, firmware 2.3
- iPod 4G, firmware 3.0.2 and beyond
- iPod Photo, firmware 1.1 and beyond
- iPod Mini, firmware 1.3 and beyond
- iPod Nano, all firmwares
- iPod Video (5G), all firmwares

iPods without a dock connector (1G and 2G) can also be connected. The AUX input of the adapter is used to connect the iPod to the RCA inputs with an audio cable.

Appendix B: Troubleshooting

Use the Symptoms Guide to locate your problem and work through the possible problems in the correct order, using the Troubleshooting Guide.

Symptoms Guide

Symptom	See Troubleshooting Guide
No green indication LED	
Possible problems: 1. Power failure 2. Firmware failure 3. Adapter failure	2.1 2.2 2.3
iPod does not charge	
Possible problems: 1. Power failure 2. Firmware failure 3. iPod failure 4. Adapter failure	2.1 2.2 2.4 2.3
iPod does not respond to controls	
Possible problems: 1. iPod failure 2. Adapter failure	2.4 2.3
No sound	
Possible problems: 1. Audio failure 2. iPod failure 3. Firmware failure 4. Power failure	2.5 2.4 2.3 2.1

5. Adapter failure	2.3
No video	
Possible problems: 1. Video failure 2. iPod failure 3. Firmware failure 4. Power failure 5. Adapter failure	2.6 2.4 2.2 2.1 2.3
“CD ERROR” / no HU channels (or “MD ERROR” or “TV ERROR”)	
Possible problems: 1. Power failure 2. Firmware failure 3. Adapter failure	2.1 2.2 2.3
Whining noise from engine / distorted audio	
Possible problems: 1. Audio interference 2. Adapter failure	2.7 2.3

Troubleshooting guide

Item	Troubleshooting
2.1 Power failure	Make sure ignition is switched on and that other electrical systems in your car operate normally. If other electrical systems fail as well, your problem is not adapter related and your car will need repair.

	<p>Make sure the power connector on the adapter is connected and secured in place</p> <p>Make sure that permanent battery power is applied to the power lines of the power connector from the adapter.</p> <p>Check the fuse on the power line and replace if defective.</p> <p>Check the Melbus cable from the adapter to the HU and make sure it is connected correctly</p> <p>Replace the Melbus cable from the adapter to the HU and check if it fixes the problem</p>
2.2 Firmware failure	<p>Upload appropriate firmware to the adapter using the emergency upload procedure (see section 3.3.4)</p> <p>Make sure that the HU channel configuration of the firmware supports your HU! (see Appendix A)</p>
2.3 Adapter failure	<p>If all other steps according to the Symptoms guide did not solve your problem, contact Sensolutions to have the adapter and/ or cables replaced or repaired.</p>
2.4 iPod failure	<p>Adapter related: Check if the iPod cable is connected correctly to the adapter and to the iPod.</p>

	<p>Replace the iPod cable from iPod to adapter and check if it fixes the problem.</p> <p>iPod related: Check if the iPod charges via the Firewire wall outlet adapter. If not, your iPod is defective and needs repair.</p> <p>Connect a different iPod and check if the problem is solved. If a different iPod works correctly with the adapter, your iPod is defective and needs repair.</p>
2.5 Audio failure	<p>Turn up the volume on the HU</p> <p>If there is no sound on the HU's iPod channel, check if sound is present on the AUX channel by connecting an audio source to the adapter's RCAs. If there is sound on the AUX channel refer to 2.4 iPod failure.</p> <p>If there is no sound on the HU's AUX channel, check if sound is present on the iPod channel by connecting an iPod. If there is sound on the iPod channel, make sure that the audio source is connected properly with good quality audio cables and that it produces a line output signal.</p> <p>Check if the Melbus cable is connected to the HU.</p> <p>Check if the Melbus cable on the adapter that runs to the HU is connected to the connector labeled as "HU" on the adapter. There won't be any sound, if the HU Melbus cable is connected to the</p>

	<p>adapter's "Melbus" connector!</p> <p>Replace the Melbus cable from the adapter to the HU and check if it fixes the problem</p>
2.6 Video failure	<p>Verify that your adapter's firmware supports video signals, i.e. it must have the TV channel configured for AUX.</p> <p>Make sure that the HU's TV channel is active and set to either TV1 or TV2. Don't drive the car.</p> <p>TV1 related: If using TV1, check that the iPod is properly connected to the adapter and has been set to the required video settings (see section 3.5.3.). Make sure that the iPod plays a <i>video</i> file.</p> <p>If RTI is used to display video, check if the special video cable from adapter to RTI is installed correctly.</p> <p>If an external TFT panel is used to display video, check if the panel accepts a video input signal directly.</p> <p>TV2 related: If using TV2, check if the external video source is properly connected to the yellow RCA video input on the adapter with the correct cable and that it generates a video signal.</p> <p>If RTI is used to display video, check if the special video cable from adapter to RTI is installed correctly and check if the</p>

	<p>external video source generates a PAL based video signal.</p> <p>If an external TFT panel is used to display video, check if the panel accepts the video input signal from the external video source directly.</p> <p>General: Check if the Melbus cables from the adapter and the RTI unit in the trunk are installed and connected properly.</p>
2.7 Audio interference	<p>Check if other channels on your HU that are not adapter related, like CD player, radio, tape, etc. pick up the audio interference (like a whining noise). If the interference is noticeable on all channels then your problem is not adapter related. Have your audio system checked by a Volvo dealer.</p> <p>Activate the AUX channel on the HU and disconnect any external audio source from the adapter's RCA connectors. If the noise is gone then either your external audio source or RCA audio cable causes the interference. Replace the audio cable or, if that does not help, use an audio ground loop isolator to get rid of the interference.</p> <p>Replace the iPod cable if the audio interference is present on the iPod channel, but not on the AUX channel. If that does not solve your problem either your iPod or your adapter is defective. Refer to the corresponding troubleshooting guides.</p>

	<p>Check if the Melbus cable on the adapter that runs to the HU is connected properly and inserts into the connector labeled as "HU" on the adapter.</p> <p>Check if connecting the Melbus cable directly from adapter to HU, without connecting ANY other Melbus devices, solves your problem. If it does, your problem is not adapter related, but is either a defective Melbus cable somewhere in the setup or a defective Melbus device. Have your audio system checked by a Volvo dealer or replace the Melbus cables in your setup one by one to fix the problem.</p>
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