

# EU RNS-E Firmware Update Release Notes

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## 1. Overview

Presented on this CD is an unofficial firmware release for the RNS-E “Audi Navigation Plus” navigation system. This release introduces a number of useful new features as well as fixing many outstanding bugs.

As of release 0280/0710 (Dogwood) we also add support for an optional feature pack which includes many entirely new features such as Album Art, Audible POI alerts, SD Card maps, SDHC support for 192 units, and much more. Purchase of the feature pack is entirely optional - all of the other bug fixes and enhancements will continue to work and are free of charge.

The firmware has been extensively tested on both major hardware versions of the RNS-E. However, users are reminded that this software is provided “as-is” and that they install modified firmware entirely at their own risk.

In some rare situations, the RNS-E may request the 4-digit security code PIN following an update or reboot. We advise you ensure you have your PIN to hand before performing a firmware update.

Support and feedback [rns@pcbbs.co.uk](mailto:rns@pcbbs.co.uk)

Check for future firmware updates and enhancements [rns.pcbbs.co.uk](http://rns.pcbbs.co.uk)

If you found this firmware useful and wish to contribute either purchase the optional [feature pack](#) or [paypal.me](http://paypal.me)

## 2. Release History

February 2020 – Acorn Release  
September 2020 – Beech Release  
October 2020 – Chestnut Release  
July 2021 – Dogwood Release  
November 2021 – Elm Release  
February 2023 – Fir Release

### 3. Identifying RNS-E Versions

Audi have a number of navigation systems, but we only support the RNS-E with our firmware. Please don't ask us about their other systems. They are based on a completely different hardware platform which we know nothing about.

An RNS-E has a fold down screen which reveals the DVD drive and 2 SD Card slots. Additionally, it has the text "Audi Navigation Plus" printed on the bottom of the bezel (except Seat versions). If your navigation system does not have these features, then it's NOT an RNS-E!

There were two different hardware models produced, which are usually referred to by the last 3 digits of their part numbers, either 192, or 193.

Note that Seat Media System-E units have a part number ending 192, but are actually based on the more advanced 193 Audi hardware. They also have a different firmware version numbering scheme. Audi version 0220 is equivalent to Seat version 0700. Please add 480 to the Audi version numbers to obtain the equivalent Seat version.

Here's how to tell the two models apart. You can check in the Engineering Menu "General → Version" screen for the HU/Navi SW version if you are unsure.

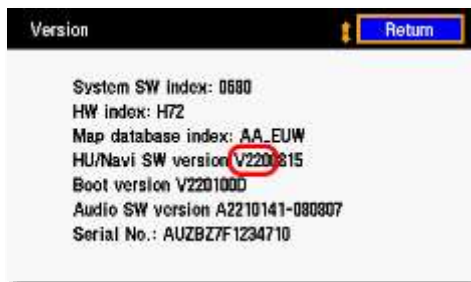
To access the Engineering Mode see [Enabling Features via the Engineering Menus](#)

#### 192 RNS-E (up until late 2009)

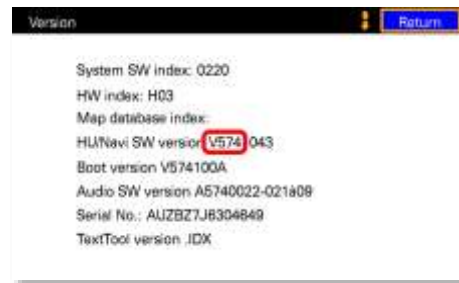
- Maximum 2 x 4GB SD cards (does **NOT** support SDHC cards)
- 400 x 240 LCD screen
- CD/TV button

#### 193PU RNS-E (from late 2009 on)

- Maximum 2 x 32GB SDHC cards
- 800 x 480 hi-res LED screen
- MEDIA button



V220 HU/Navi SW = 192 unit



V574 HU/Navi SW = 193 PU unit



192 = Solid text box and frame border





193 PU = Graduated text box and border

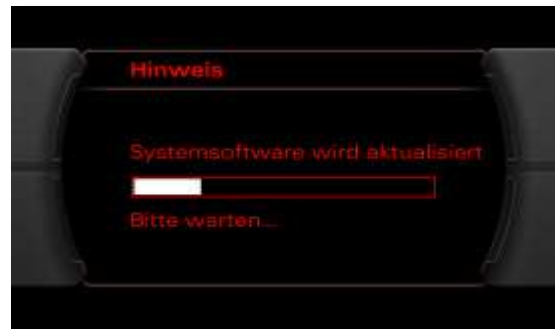
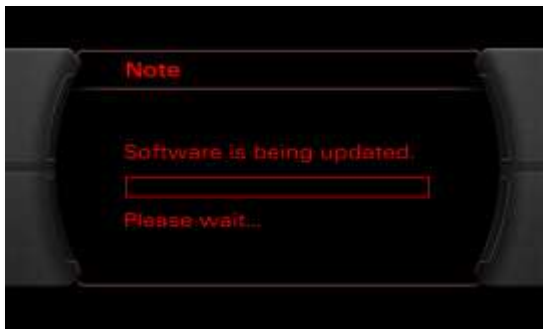
## 4. Installing RNS-E Firmware

To update your RNS-E...

- Burn the ISO image to a CD-R or CD-RW  
Tip: Burn the ISO directly, do not “copy and paste” files  
RNS-E requires ISO9660 file system contained in the ISO
- Remove your navigation DVD from the RNS-E and insert the CD  
If you have an SD Card map inserted, remove that also
- After a few minutes the firmware update will start automatically
- Wait for the update to complete  
Note: Do **not** turn off the ignition while the firmware update is in progress
- Once the firmware update has completed the RNS-E will reboot
- Remove the CD from the DVD slot and replace with your regular navigation media

 Note: DVD-R or DVD-RW media are **not** required for firmware updates. We highly recommend using a CD, although DVDs will also work.

 Any SD Cards containing maps must be removed before a software upgrade or downgrade can be started. Software updates from SD Cards are **not** possible.



## 5. Enabling Features via the Engineering Menus

Additional features of this firmware are activated via the RNS-E Engineering Menu. To access the Engineering Menu:

- Press NAV
- Press RETURN (until either the “Destination Entry” or “Insert DVD” screen is displayed)
- Press and hold the TOP LEFT quadrant key for at least 6 seconds, then release
- Press and hold the TOP RIGHT quadrant key until the Engineering Mode menu appears



Toggles for new features can be found under the Engineering Mode’s “NAV” and “General → SDS” menus. Within each menu configurable features are prefixed with an asterisk.

Disabled features are shown with a dark blue background; enabled features with a light blue/cyan background. To enable or disable an option scroll to it using the main jog control and press select.



Under NAV menu you can find the options:

- FIS-Control – enables FIS-Control support
- Red DIS fix – enables a fix for the Red-DIS cluster bug
- Lowercase DIS units – displays KM/MI and AM/PM in lowercase for DIS directions
- Start on map – displays the map screen, in place of destination entry, on start up
- Scroll DIS – scroll the MP3 track names on the top line of the DIS

In the General → SDS menu you can find the options:

- SDS enable – enables the Speech Dialogue System
- CAR used as PTT – enables the CAR key to start an SDS session


Under General you can find options:

- Update splash – load or delete a custom splash screen



- Update map cols – load custom colours for the navigation map
- Update lang pack – load a user selected language pack for menus
- SW downgrade – revert to a previous firmware

See the [New Features](#) section for a full description of each feature.

 You can access items in the right column by scrolling to the top, and then back down

 To exit Engineering Mode, press RETURN until the RNS-E returns to the normal menus

## 6. Rebooting the RNS-E

To activate some features, it is necessary to reboot the RNS-E. To perform an immediate reboot press and hold the RADIO and SETUP buttons simultaneously for about 6 seconds until the unit reboots.



Alternatively, the selected feature will become active next time you use the car (after locking and a period of inactivity has expired such that the RNS-E fully powers down).

## 7. Reverting to an Earlier Firmware

We hope you are happy with your new firmware. However, if you want to revert to the official firmware then you can do so at any time.

You can find an original Audi Firmware on any RNS-E Navigation DVD. Any disk from the 2013 release (8P0 919 884 BK) and onwards will contain the latest firmware versions for both 192 and 193 units.

Alternatively, you can download a CD copy from our [downloads page](#).

All of our firmware releases (except for the SDS only version) contain an option in the Engineering Menus to perform a downgrade. Otherwise you can use VCDS and set adaption channel 97 to 1.

- Make sure you have the latest navigation DVD (Any DVD after 2012)
- If not, you should download a copy of the [220/650 firmware](#) and burn to CD
- Remove the navigation DVD from the RNS-E
- Enter the [RNS-E Engineering Mode](#)
- Select option: "General -> Firmware Downgrade"
- Press RETURN until you leave Engineering Mode
- Insert the DVD or CD containing the older firmware
- Wait for the firmware downgrade to complete

📄 Any SD Cards containing maps must be removed before a software upgrade or downgrade can be started. Software updates from SD Cards are **not** possible.



## 8. Release Notes – SW 0300 / SW 0730 (Fir)

EU 192 units - SW 0730

EU 193 PU units - SW 0300

### 8.1 Optional Feature Pack (Dogwood)

The Dogwood firmware introduces support for exciting new features to the stock RNS-E firmware.

You can purchase your optional feature pack [here](#).

#### Licence Activation

The feature pack is activated by placing the supplied licence.key file in the root directory of your RNSE SD Card and inserting into the RNSE left hand card slot.

With our Fir firmware and later you can check for successful activation on the RNSE CAR > Version menu...



#### Unlicensed unit


rns.pcbbc.co.uk address displayed




#### Licence successfully installed

NavPOInt licence key displayed


After you have activated your licence you can delete the licence.key file from your SD Cards. The licence is automatically copied and saved to the RNSE internal FLASH memory and no longer needs to be kept on your SD Cards.

 If you have enabled the CAR key as PTT in engineering, press and hold CAR key to obtain the CAR menu.

 All the other standard features mentioned later in this document are still free of charge. We encourage you to try the firmware for free to before deciding to purchase your feature pack.

### 8.1.1 SDHC Card Support on 192 (Fir - Optional Feature Pack)

Fir firmware adds support for SDHC cards up to 32GB on 192 units. 193 units already supported SDHC cards with the factory firmware. This allows us to introduce SD Maps support on the 192 units for the first time.


 SDHC support is only fully enabled with the purchase of a feature pack. However if you have purchased the pack you can use an SDHC card to load your licence.key file and active the pack. Simply place the licence.key file in the SD Card root directory and insert into the 192 RNSE.


### 8.1.2 MP3 Directory Cache for Quicker Boot Times (Fir - Optional Feature Pack)

The RNSE can be slow to start playing MP3 tracks, especially with large music collections. Fir firmware introduces a cache of your cards MP3 contents to speed up load times.

The first time a SD Card is inserted the card is scanned for MP3 in the normal way. After all folders and tracks have been identified the firmware now saves these details to a database file on the SD card.

As long as the SD Card remains in the RNSE the database file will be used instead of completely rescanning the card on subsequent cold boots. This can decrease the time until MP3s first start playing by 50% to 70%, depending on collection size.

 If you do not wish to use the MP3 Directory Cache feature, delete the dircache.dat file from your SD Cards and set the card write protect lock.

 If you have your RNSE set to display ID3 tags instead of filenames, these are also cached to the database. Note that 192 units only index ID3 tags when not playing MP3 tracks. Pause playback and wait for indexing to complete so MP3 Directory Cache is updated on 192 units.

### 8.1.3 Support for User Configurable Map Colours (Elm - Optional Feature Pack)

For example, British users can configure motorways to be displayed in blue, as per the more conventional UK colouring scheme for this road type.

To display motorways in blue...

- Download the [UK Motorway Colour Scheme file](#)
- Rename the file colours.map and place on a SD card in slot 1 (lefthand slot)
- Update the colour scheme via Engineering Menu -> General -> Update Map Cols
- Remove and reinsert the navigation medium, or restart the RNSE, to display the new colours

If you wish to revert to the standard map colours...

- Delete the colours.map file from the SD card (or simply remove the card from slot 1)


- Update the colour scheme via Engineering Menu -> General -> Update Map Cols
- Remove and reinsert the navigation medium, or restart the RNSE, to display the original colours

### Custom Colour Schemes

If you would like to prepare your own custom colour scheme, [here is a spreadsheet](#) of the map colour codes and default colours.

The colours.map file is a binary file. The file format consists of pairs of 32-bit codes, followed by 32-bit ARGB colour values, in big endian byte order.


#### 8.1.4 Digital Speedo on DIS (Elm - Optional Feature Pack)

 Fir firmware adds support for A4 colour DIS.

Enable the feature in the engineering menu NAV setup screen.

Note you must have either the compass display active (NAV -> SETUP -> Compass) or an active route guidance for the speedo to display.

Without a feature pack licence this feature will be automatically disabled each time the RNS-E starts. Purchase a feature pack to permanently enable the digital speedo display.

 Some 193 units may display invalid speeds due to incompatible gateway module.

#### 8.1.5 Licence Key File Saved to FLASH Memory (Elm - Optional Feature Pack)

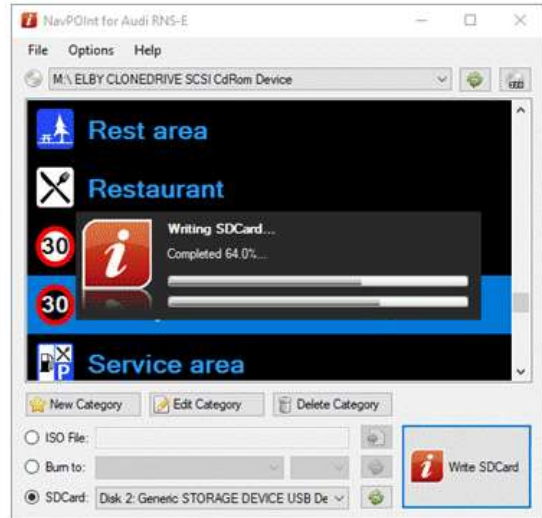
Starting with the Elm firmware release your licence.key file is copied to the RNSE internal FLASH storage when detected.

After this it is not necessary to retain the licence file on your SD Cards, although no harm will result if you choose to leave them there.

#### 8.1.6 Audible POI Alerts (Dogwood – Optional Feature Pack)

With the purchase of an optional [Feature Pack](#) our custom firmwares can notify you of approaching user added POI (e.g. Safety Cameras) with an audible alert.

The POI categories that trigger alerts can be individually configured from the Map Contents Navigation Setup screen.



Without an active Feature Pack our firmware will only allow you to set alerts for POI that were included on the original navigation media. Setting of alerts for user added POI (e.g. Safety Cameras) will be disabled.

Purchase of a feature pack also includes a complimentary licence key for our NavPOInt software (Windows only). With the NavPOInt software you can create your own custom navigation media, and add your own updated POI locations and also full UK 7-digit postcode lookup (UK only).

### 8.1.7 MP3 Album Art (Dogwood – Optional Feature Pack)

With the purchase of an optional [Feature Pack](#) our custom firmwares can display albumart on the RNS-E media screens.

Albumart is available for MP3s playing from the SD Cards or the integrated CD drive. This feature is not compatible with MP3s being played from external sources, such as CD changers, aux in or the AMI.



The 192 RNS-E supports basic albumart which requires albumart.bmp files to be added to the SD Card or CD media. Meanwhile our custom firmware for the 193 PU RNS-E is capable of reading albumart from either the MP3 ID3 tags, or albumart.jpg files.

For technical reasons on 192 units the album art displayed is based on the currently playing folder, and not the current track. 193 units can display ID3 artwork for the currently playing track inside that tracks folder. The album art feature therefore works best when you arrange your music in a folder structure thus: Artist Name/Album Name/Track Name.mp3

#### Optimal Albumart Format

192 units support albumart from albumart.bmp files only. Unfortunately, because the 192 stock firmware supports neither ID3V2 tags nor JPEG decoding, our custom firmware is unable to add support for these formats. Optimal image format for the 192 RNS-E is 128x128 pixels with 15 bit RGB555 colour bitmap format.

193 units support albumart from either albumart.jpg files or read directly from the MP3 file ID3V2 tags. Optimal image format for the 193 PU RNS-E is 256x256 pixels jpeg format.

#### Albumart Utility

We provide a complimentary [Windows Utility](#) for automatically creating optimal RNS-E albumart files.

Use this utility to prepare suitable BMP files for 192 units, and also artist level album stack images for both 192 and 193 units.

### 8.1.8 Custom Splash Screens (Dogwood – Optional Feature Pack)

With the purchase of an optional [Feature Pack](#) our custom firmwares can display a user defined splash screen on startup of the RNS-E.

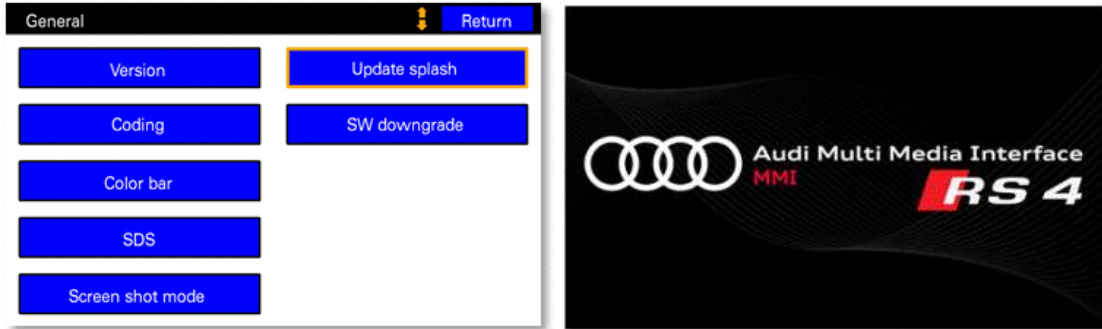
You can use this feature without purchasing a Feature Pack, but a nag link to our website will be added to any images you upload. Once you purchase and install the Feature Pack the nag link will be removed on all future image uploads.

#### Setting a Custom Splash Screen

To upload a custom splash screen, place a file named splash.bmp in the root directory of the SD Card in drive 1 (left hand slot). Make sure the image file is of the correct size and format as detailed below.

Select the Update Splash option from the Engineering Menu General screen. Your RNS-E will reboot and the new splash screen should be displayed in place of the default.





### Removing a Custom Splash Screen

Remove the SD Card from drive 1 (left hand slot) and/or remove the splash.bmp file from the root directory.

Select the Update Splash option from the Engineering Menu General screen. Your RNS-E will erase the currently programmed start screen and reboot. The default splash screen will have been restored.

### Supported Splash Screen Format

The splash.bmp file must be a 32bpp, 24bpp or 16bpp uncompressed bitmap file. The image size must be exactly 400x240 for the 192 RNS-E, or 800x480 for the 193 RNS-E.

If you attempt to upload a new splash screen, but no image is displayed on reboot, then either the splash.bmp file is not present, or it is not to correct size or format.


### Sample Splash Screens

Some users have kindly provided custom splash screens for models that do not have default screens in the stock firmware. You can download them from our [website](#).

#### 8.1.9 VIM Unlock (Dogwood – Optional Feature Pack)

With the purchase of an optional [Feature Pack](#) our custom firmwares you can unlock the VIM feature of the RNS-E on 192 and 193 units.

To enable “VIM” you must also code adaptation channel 005 (Speed Threshold Video Input) to your desired speed limit in kilometres per hour using VCDS or similar diagnostic tool. Code your desired speed up to a maximum of 255.

 You purchase a licence on the strict understanding that you enter into a legally binding agreement to accept all responsibility for your own safety once you enable this feature, that it will be used only for provision of static “media player” type screens, that you understand that viewing video whilst driving is universally illegal and that you will not be using this feature for that purpose under any circumstances.

#### 8.1.10 SD Card Maps (Dogwood – Optional Feature Pack)

 Fir firmware adds support for SD Maps on 192 units.

With the purchase of an optional [Feature Pack](#) our custom firmwares allow you to store your navigation media on an RNS-E SD Card instead of a DVD.

Note that on 192 units, if the SD Maps feature is used, the right slot is exclusively reserved for the maps SD Card. The left slot can still be used for simultaneous MP3 playback.

Purchase of a feature pack also includes a complimentary licence key for our Windows NavPOint software.

NavPOint will allow you to format your SD Card to contain a map data partition, and copy over your selected navigation media. Additionally, NavPOint can be used to add custom POI and full 7-digit postcode lookup (UK only) to your map data.



### SD Map Operation


The SD Card with the specially formatted map partition should be placed in the SD Card slot 2 (right hand slot). When a map card is present in slot 2 it takes precedence over any DVD based navigation media in the RNS-E optical drive.

Firmware updates are not started when a navigation SD Card is present in slot 2. To perform a firmware upgrade you must use CD or DVD media, and you must remove any SD Card navigation media from slot 2.

Approximately 8GB of SD Card space is reserved for the special map data partition. The remainder of the space on the card will be formatted as a FAT32 partition and can be used for MP3 media on 193 units. We recommend using a 32GB card for your map media, which will leave you with approximately 22GB space remaining for MP3s. On 192 units 8GB map cards are supported, although you may choose to use 16GB or 32GB cards and leave the remaining space unused.

While maps are being read from a SD Card you can use the build in DVD drive for other purposes. For example, playing an audio CD or MP3 data CD. Navigation functions from the SD Card will continue uninterrupted.


## SD Card Map FAQ

 I've copied my maps to an SD Card using NavPOInt but the RNS-E still says "Please Insert Navigation Medium"?

- Make sure you have the Map SD Card in slot 2 (right hand side).
- Make sure you have placed the supplied licence.key file in the root directory of the SD card in slot 1 (left hand side).
- If you only have one SD Card available you can also, but less ideally, place the licence.key file on the Map SD Card.
- If the maps still won't load, eject the SD Card, wait 10 seconds, then re-insert the card.

 The RNS-E Displays "Unknown Files" when I insert the SD Card maps?


- This is normal. The media player displays this message when there are no playable MP3 files present. It does NOT affect the availability of the SD card maps. Maps will work regardless of this message being displayed. Optionally add some MP3s to the cards FAT32 partition if you really want to remove this message.

 I've tried all of the above, and my SD Maps still won't work?

- Do the other Feature Pack enhancements (album art, custom splash screens) work?
- Perhaps you supplied us with an incorrect serial number for your RNS-E and so your licence.key file is invalid?  
Check for successful activation on the CAR > Version screen.
- You can check your registration details in NavPOInt: Help -> About.  
If it is wrong, contact us for support.

 The RNS-E says "Navigation Media not authorised for use in this unit"?

- You've used an installation of NavPOInt with a different licence than the one registered to this RNS-E!
- Use the correct install of NavPOInt to author the new navigation media for this unit.

 Can I place maps, MP3 and licence.key file on a single SD card?

- Yes, but it's not ideal.
- For best performance we recommend licence.key file and MP3s on the card in slot 1 (lefthand side) and maps in slot 2 (righthand side).
- You must place the card in slot 2 (righthand side). Maps are only read from slot 2.
- If the maps are not recognised when the license.key file is on the same card as maps, eject the card, wait 10 seconds and re-insert.

 The RNS-E reports "Unknown Files" on the maps SD Card?

- This message is displayed by the MP3 media player when there aren't any valid MP3 files present on the SD Card. It is not related to the SD Maps feature in any way, and does not indicate the map data is unreadable. Place some MP3 tracks in the FAT32 partition of the Maps SD Card if you want to remove this message.

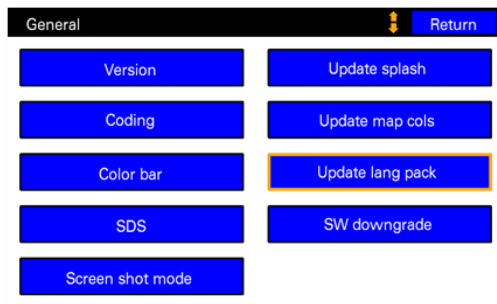
## 8.2 New Standard Features

### 8.2.1 Custom Language Packs (Fir)

The Fir firmware introduces user installable language packs. If you would like to provide a translation for an as yet unsupported language, please [contact us](#).

#### Language Pack Installation

- Download one of our language packs from the [downloads page](#).
- Unzip the language.pak file to the root directory of your RNS-E SD Card
- Insert the SD Card in the lefthand slot of your RNS-E
- Select the "Update lang Pack" option from the RNS-E Engineering Menu General screen



- If the Language Pack installs successfully the RNS-E will reboot
- Select the User language from the RNS-E SETUP > Settings > Menu Language screen



- If the User language option is greyed-out, no language pack is currently installed

### 8.2.2 Scrolling MP3 track names in DIS (Dogwood)

You can have the MP3 track names scroll across the top line of the DIS display.


Note that there is a known issue with 192 units. Scrolling only occurs correctly when the Navigation Compass Display (NAV -> SETUP -> Compass) is turned ON. We will correct this in a future firmware update.

To enable/disable scrolling track names, see [Enabling Features via the Engineering Menu](#)

### 8.2.3 OPS rear only display (Dogwood – 193 Only – for Arduino bridge from 8Z0-919-283)

We introduce support for a special rear only display mode for the OPS system. This blanks the display of the front sensors.

We provide Arduino sketches to provide OPS support for 8Z0/8E0-919-283 PDC modules over K-Line on our [website](#). You can either build your own Arduino hardware, or purchase one of our custom built modules.


 Elm firmware has a more “correct” OPS implementation for rear only mode. This allows support of native OPS capable 8P0-919-475 rear-only PDC modules on later vehicles. If you have one of our earlier Arduino sketches to work with legacy xxx-919-283 modules you will need to update it.


### 8.2.4 Experimental support for SDXC cards (Dogwood – 193 only)

We have added support for SDXC cards to the 193 units. This potentially allows you to use cards of 64GB and above. We have tested with a 256GB card and this works successfully.

Please note that speed of loading of the SD Card in the media player will be proportional to the size of the card, regardless of how many files it contains. As a result, larger cards can take several minutes to load. This delay is unavoidable.

Still, larger cards may be useful for some users, especially when used in conjunction with the Feature Pack SD Card maps.

 Cards must be formatted as FAT32 to be recognized by the RNS-E. Windows only allows exFAT format for SDXC cards so you must use a 3<sup>rd</sup> party formatting tool to format your cards.


 Please make sure your 3<sup>rd</sup> party tool sets the correct partition type ID for FAT32 media otherwise the RNS-E will fail to recognize your card. If necessary, you can adjust the partition type with windows DISKPART utility: SELECT DISK=n, SELECT PARTITION=1, SET ID=0C OVERRIDE


### 8.2.5 Support for FIS-Control

When FIS-Control is installed on certain vehicles it is necessary for FIS-Control to share the cluster's CANBUS communications channel with the navigation system. This leads to a conflict for access to the cluster display if FIS-Control is used in conjunction with an RNS-E.

This firmware introduces the ability to switch the RNS-E to use an alternate CANBUS communication channel, and thus resolve this conflict. FIS-Control can then be started in "CAN Bridge" mode where it will re-route messages between the RNS-E and the cluster.

To enable/disable FIS-Control support, see [Enabling Features via the Engineering Menus](#)  
Following activation, a reboot is required, see [Rebooting the RNS-E](#)

 In FIS-Control enable the "CAN Bridge" User Mod:  
Settings → User Mods → CAN Bridge  
Save settings and restart the ignition

 To start FIS-Control in RNS-E CAN Bridge Mode, press the UP stalk button when turning on the ignition

### 8.2.6 SDS Soft Coding

Activation of the Speech Dialogue System used to require a custom firmware.



This firmware includes the ability to dynamically enable or disable SDS via the Engineering Menus without the need for another special firmware.

To enable/disable SDS, see [Enabling Features via the Engineering Menus](#)  
Following activation, a reboot is required, see [Rebooting the RNS-E](#)

### 8.2.7 CAR Key Acts as SDS PTT

In case you do not have a MFSW (Multi-Function Steering Wheel) installed, or it is lacking the PTT (Press To Talk) button, you can configure the CAR key on the RNS-E to start a Speech Dialogue Session in its place.

To enable/disable CAR as PTT, see [Enabling Features via the Engineering Menus](#)

 In case you need to access the CAR menu with this feature enabled, press and hold CAR  
 Pressing and holding the PTT (CAR) key will also cancel a currently active SDS session

### 8.2.8 Show Map on Cold Boot

By default, the Navigation Sub-System displays the Destination Entry screen following a cold boot.

This firmware includes an option to have the unit automatically switch to the Map screen instead.

To enable/disable showing the map on boot, see [Enabling Features via the Engineering Menus](#). The new setting will take effect the next time the RNS-E is cold booting.

- 📄 When the RNS-E reboots it displays the last selected sub-system, RADIO, MEDIA, NAV etc.
- 📄 To have the map display at start, leave the RNS-E in NAV mode when leaving the car
- 📄 To enter a destination, press RETURN or the Bottom Right Quadrant Key from the Map View

### 8.2.9 Reverse Gear over CAN

When a basic reversing camera is installed the camera can be selected via a 12v signal on the RNS-E C2 pin. Unfortunately, some later 193PU models of RNS-E lack the physical circuitry that implemented the C2 function. For these units it was not possible to have the camera input auto select on reverse.

This firmware introduces the ability for either RFSL C2 (if present) or the CANBUS reverse gear message to select the basic reversing camera.

- 📄 Not all vehicles support reverse over CANBUS – for example it is not present on earlier vehicles such as the TT 8N.
- 📄 You can check if your RNS-E is correctly detecting reverse via the Engineering Menu: NAV → Nav sensor info → Vehicle Signal REV OFF/ON

### 8.2.10 CAN Reverse Gear for A6 Mode (193PU only)

As discussed above the A6 uses only the dedicated RFSL C2 pin as reverse is not present on CAN. This presents a problem for later 193PU units where the RFSL C2 hardware is absent as there is then no way to have the basic reversing camera auto select in reverse.

In this firmware we offer an override CAN message for the A6 coding, which can be injected onto the bus by an Arduino, or similar, hardware.

- 📄 Sent a single byte CAN packet to ID 0x351: 0x52 = Reverse, 0x00 = Forward
- 📄 An Arduino Sketch for sending the required CAN messages is included in the appendix.



### 8.2.11 CAN Speed for A6 Mode (Beech - 193PU only)

In addition to the Reverse gear over CAN, the Beech firmware release also adds the ability to send speed pulse counts over CAN to compensate for the missing V-Signal B3 hardware pin on later 193 units.

 Sent a three-byte CAN packet to ID 0x351:

Byte 0: 0x52 = Reverse, 0x00 = Forward

Byte 1/2: Pulse count

 An Arduino Sketch for sending the required CAN messages is included in the appendix.

### 8.2.12 Lowercase Units on DIS

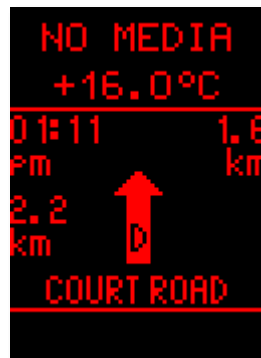
When a distance or time is displayed on the DIS by the navigation system it uses upper case, so either KM/MI or AM/PM.

With this firmware it is possible to switch to displaying these in a more pleasing lower case.

To enable/disable Lowercase Units, see [Enabling Features via the Engineering Menus](#)



Normal Units




Lowercase Units

### 8.2.13 SDS System Restores 2D or 3D Map View

It is possible to switch between map views with the SDS commands “Destination Map”, “Overview Map” and “Current Position Map”. With the stock firmware the command “Current Position Map” always re-selects the “2D Map”, even if the “3D Map” was selected previously.

With this firmware the SDS command “Current Position Map” returns the user’s map view to either “Position 2D” **or** “Position 3D”, depending on which of these views was last selected.

 To change the preferred Current Position Map view between 2D and 3D options, select the required view via the setup menu:

NAV → SETUP → Map Type – position / position 3D



### 8.2.14 Start Screen Coding

The stock firmware prohibits coding of start screens which do not correspond with the coded vehicle type. However, in some situations it is necessary to code a different vehicle type. For example, an RNS-E installed in a TT 8N needs to be coded to A6 mode.

This firmware introduces the ability to code an override screen in such situations. The required override needs to be coded in addition to the true vehicle variant screen:

0??x – Override screen	0xx? – Coded vehicle variant screen
00 – use vehicle variant screen	0 – default screen
01 – Lamborghini	1 – S3
02 – S3	2 – S4 **
03 – S4 **	3 – RS4 **
04 – RS4 **	4 – TT
05 – TT	5 – R8
06 – R8	6 – Seat *
07 – Seat *	7 – TTS *
08 – TTS *	8 – TTRS *
09 – TTRS *	9 – R8GT *
10 – R8GT *	

\* Not available on 192 units

\*\* Not available on 193PU units

e.g. for a TT 8N code value 050:

05x = override to TT screen

xx0 = from default screen (for A6)

📄 The override screen is coded in the hundreds and tens positions, the true screen for the vehicle variant should be coded normally in the units position

📄 NB: the numbering of the override screens **differs** from the vehicle variant



### 8.2.15 Background Indexing of MP3 ID3 Tags (193PU only)

The RNS-E scans the SD Cards for MP3 tracks and extracts the track details from the ID3 tags. You can select either filenames or ID3 tags to be displayed via the MEDIA/CD → SETUP → List Display – file / track option.

The stock RNS-E firmware only performs this indexing task when an MP3 track is NOT currently playing. As soon as a track starts playing, indexing is suspended. This was necessary on the 192 units which had an slower SD Card interface that was not capable of handling the demands of 2 processes (indexer and player) both accessing the card simultaneously.

The 193PU units have a greater bandwidth available to the SD Card reader and so this firmware continues to run the indexer in the background. After a short while, with “track” List Display mode enabled, all tracks will be updated on screen with their ID3 tags in place of filenames.



Media Setup Screen

“File” view – Filenames

“Track” view – ID3 Tags

## 8.3 Bug Fixes

### 8.3.1 Fix Memory Leak in POI Alert (Elm)

Fixed a memory leak that would cause spurious operation and reboots after extended periods of use.


### 8.3.2 Support for Native Rear Only OPS (Elm)

Added support for 4-sensor rear only OPS modules, for example 8P0-919-475. Not strictly a bug, but the stock Audi firmware appears to only been tested to work with 8-sensor front+rear OPS modules, so it balked at the CANBUS data from a 4-sensor module.

You must use VCDS (or similar) to code OPS on both the RNSE (see coding digit 2 “Optical Parking Aid”) and on the PDC module itself. In order to modify the PDC coding you must enter Security Access (16), and VCDS will prompts with the correct security code if you hover the input box.

OPS support relies on a compatible PDC module (usually ending 475), plus a CAN Gateway/Instrument Cluster that supports forwarding the necessary CANBUS messages to/from the PDC module onto the Infotainment CANBUS.

If your CAN Gateway/Cluster do not support OPS, then FISControl can provide this function. Or you could build your own Gateway using and Arduino or other CANBUS hardware.

 Legacy PDC modules without OPS support (e.g. 8Z0-919-283 and 8E0-919-283) still required an Arduino assist regardless of this fix.

### 8.3.3 Re-Enable OPS on Seat 193 Units (Elm)

For some reason Audi disabled the OPS feature on the VB48 Seat 193 firmware build. Re-enabled support for coding this feature.

### 8.3.4 Re-Enable AMI on Seat 193 Units (Elm)

For some reason Audi disabled the AMI feature on the VB48 Seat 193 firmware build. Re-enabled support for coding this feature.

### 8.3.5 Fix Scrolling MP3 Track Names 192 Units (Elm)

Fixed a bug whereby MP3 track names would not scroll on some 192 units.

### 8.3.6 Retain MP3/CD Mix/Shuffle Setting (Chestnut)

Perhaps not strictly a bug and probably intended to work this way, but the stock RNS-E firmware resets the mix/shuffle setting to OFF when the unit is turned on. The reset occurs after both a cold and warm boot.

This firmware removes the reset of the mix/shuffle setting so the unit will continue in mix/shuffle mode if it was previously set when the unit was turned off.

 Mix/shuffle will still be reset if you change media source

### 8.3.7 BCD Clock Fix (Beech)

On vehicles where the RNS-E was fitted as standard the date/time is set by the cluster over CAN in packed BCD format. e.g. 12:34 is sent as two bytes, 0x12 and 0x34. The RNS-E knows this and displays the time correctly.

Unfortunately, on some other vehicles, e.g. Audi S4 C5/B5 platform, the date/time is sent in raw binary format. This causes the displayed time on the RNS-E to be displayed incorrectly where any hour or minute value is 10 or more.

This firmware contains an automatic fix for this situation. We use the century value to automatically differentiate if the values sent are being transmitted in BCD or raw binary. Values 0x19 and above for the century are assumed to be BCD. Values less than 0x19 (e.g. 19<sub>10</sub>) are used to imply that the received date/time is in raw binary.

Thanks to Stefan from [fis-control.de](http://fis-control.de) for recommending this fix.

### 8.3.8 Red-DIS Protocol Fixes

The RNS-E does not work correctly with certain early vehicles fitted with a Red DIS (for example TT 8N and A4 B7). These are cars fitted with clusters for which the RNS-E was never an official factory fit option.

The symptoms of an incompatible cluster are garbled turn direction graphics on the cluster, and inability to re-select the RNS-E display using the stalk button. When the stalk button malfunctions the DIS display remains blank and it is necessary to stop and restart route guidance to re-enable turn directions.

This firmware includes fixes for both of the above issues. The fix for the stalk button (AKA “Red DIS Bug”) needs to be enabled via the Engineering Mode.

To enable/disable the “Red DIS Bug” fix, see [Enabling Features via the Engineering Menu](#)

 This new setting takes effect immediately

### 8.3.9 Fix Abend Processing ID3 Tags

The ID3 indexing task often randomly quits while indexing MP3 tracks. This means that even if MP3 playback is paused SD Cards can often be left only partially indexed.

When this happens tracks in the first few folders are displayed with their ID3 tags, the remainder are left permanently displaying their mp3 filename (or until such time as they are individually played).

This fix ensures that the indexing task remains active. However, note that on 192 units the indexer is still paused while MP3 playback is being performed. See [Background Indexing of MP3 ID3 Tags \(193PU only\)](#)

📄 On 192 units a workaround is either pause MP3 playback, or switch to an alternate audio source (e.g. RADIO), to allow the indexer time to complete reading of all ID3 tags

### 8.3.10 Fix Bug in Unicode Comment Tags (193PU only)

The 193PU units support reading of ID3v2 tags, however there is a bug in the handling of Unicode COMMENT tags. The causes the unit to fallback to using the ID3v1 tags on MP3s with Unicode comment tags present.

This bug has been corrected in this release.

📄 192 units only support ID3v1 tags and so are unaffected by this bug

### 8.3.11 Fix Display of Kombi Date/Time in Engineering Menus

The display of the current date/time received from the cluster in the Engineering Menu is garbled:

NAV → GPS signal info → more → Kombi time/date

This is because the firmware assumes binary values, but the actual values received from the cluster are in BCD. For example, a value of 0x20 received from the cluster for the 20<sup>th</sup> day of the month is actually displayed as its decimal equivalent: 32.

This firmware rectifies this coding oversight and correctly decodes BCD date/times.

📄 Note this bug was cosmetic – it did not affect data time processing elsewhere



2020 is shown as 2032  
13:34 is shown as 19:52



Correct display after update

### 8.3.12 Reinstated A6 Coding (193PU only)

On the 193PU RNS-E model introduced in late 2009 Audi stopped supporting the A6 mode. This was because by this point production of the A6 C4/4A had ceased. With firmware 0200 Audi also completely removed the ability to code for an A6.

This firmware fixes a number of outstanding bugs that were left in the 193PU firmware for the A6. It also reinstates the ability to code for it.

 It is now no longer necessary to downgrade to firmware 0150 to perform an A6 coding

### 8.3.13 Fix Gala in A6 Mode (193PU only)

At the same time as removing the ability to code for A6 mode, Audi also disabled the correct processing of GALA messages from the CANBUS. The GALA feature no longer has any effect when running a 193PU firmware after SW 0150.

This firmware reintroduces the correct processing of GALA messages when enabled.


 To enable GALA see adaptation channel 8 in VCDS.

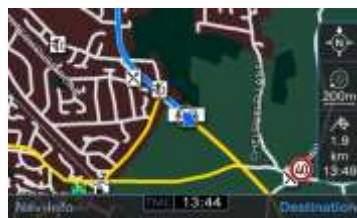
### 8.3.14 Display Speed Limits Icons in A6 Mode (193PU only)

The RNS-E 193PU units include a road speed limit display. This feature includes the ability to display a warning when the speed limit is exceeded. However, all vehicles on which the RNS-E was factory by this stage received speed over CANBUS. Consequently, no provision was made for this feature to receive speed via the dedicated C2 pin.

Therefore, the speed limit display does not function on vehicles without speed over CAN and which use only the C2 pin.

This firmware resolves this issue. First a check is made to see the vehicle is sending speed over CANBUS. If it is, then the CANBUS speed is used. If speed is NOT available from CANBUS, the firmware now falls back to using the speed derived from the dedicated C2 pin.

 To enable the speed display function on 193PU units see adaptation channel 17 in VCDS.



## 9. Appendix - Arduino CAN Reverse & Speed Injection Sketch

Provided here is a simple Arduino Sketch for injecting suitable CAN messages for out Beech firmware for use in A6 mode 193 units where physical C2 RFSL and B3 V-Signal input pins are unavailable.

```
/*
 * Audi CANBUS RFSL/V-Signal Injector
 *
 * Author: Stuart McConnachie
 * Target: Arduino UNO with MCP2515 CANBUS Shield
 *
 * Injects a special direction and speed CAN packet for RNS-E 193
units operating in A6 mode.
 * This is of use where the RFSL (C2) and V-Signal (B3) pins are not
present (later 193 models).
 * Note that this requires a special firmware to receive the packet:
https://rnse.pcbbc.co.uk
 *
 * Acorn firmware supports a 1 byte CAN packet with the reverse
indicator.
 * Beech firmware also supports a 3 byte packet with reverse AND speed
pulse count.
*/

//CANBUS Library: https://github.com/sandeepmistry/arduino-CAN
#include <CAN.h>

#define DELAY_TIME 100

uint32_t delayPacket;
uint8_t sendCount;

void setup()
{
  // Input from reverse gear
  pinMode(7, OUTPUT);
  digitalWrite(7, 0);

  // Input from reverse gear
  pinMode(6, INPUT);

  // Configure T1 to count V-Signal pulses on pin 5
  pinMode(5, INPUT);
  TCCR1A = 0x00;
  TCCR1B = 0x07;
  TCNT1 = 0;

  // Start debug output
  Serial.begin(9600);
  while (!Serial);
  Serial.println("Audi CANBUS RFSL/V-Signal Injector");

  // Start the CAN bus at 100 kbps
  if (!CAN.begin(100E3))
```



```

{
  Serial.println("Starting CAN failed!");
  while (1);
}

// Enable rx
CAN.filter(0x271,0x7FF);

// register the receive callback
CAN.onReceive(onReceive);

// Start delay between sending CAN packets
delayPacket = millis();
}

void loop()
{
  // Send a CAN packet every 100ms
  if (millis() - delayPacket >= DELAY_TIME && sendCount > 0)
  {
    // Get V-Signal pulse count
    uint16_t count = TCNT1;

    uint8_t packet[3];

    // Get the reverse gear state
    packet[0] = digitalRead(6) ? 'R' : 0x00;

    // Set the V-Signal pulse count
    packet[1] = count >> 0;
    packet[2] = count >> 8;

    // Send the custom CAN direction and pulse count packet
    CAN.beginPacket(0x351);
    CAN.write(packet, 3);
    CAN.endPacket();

    // Time for next packet
    delayPacket += DELAY_TIME;

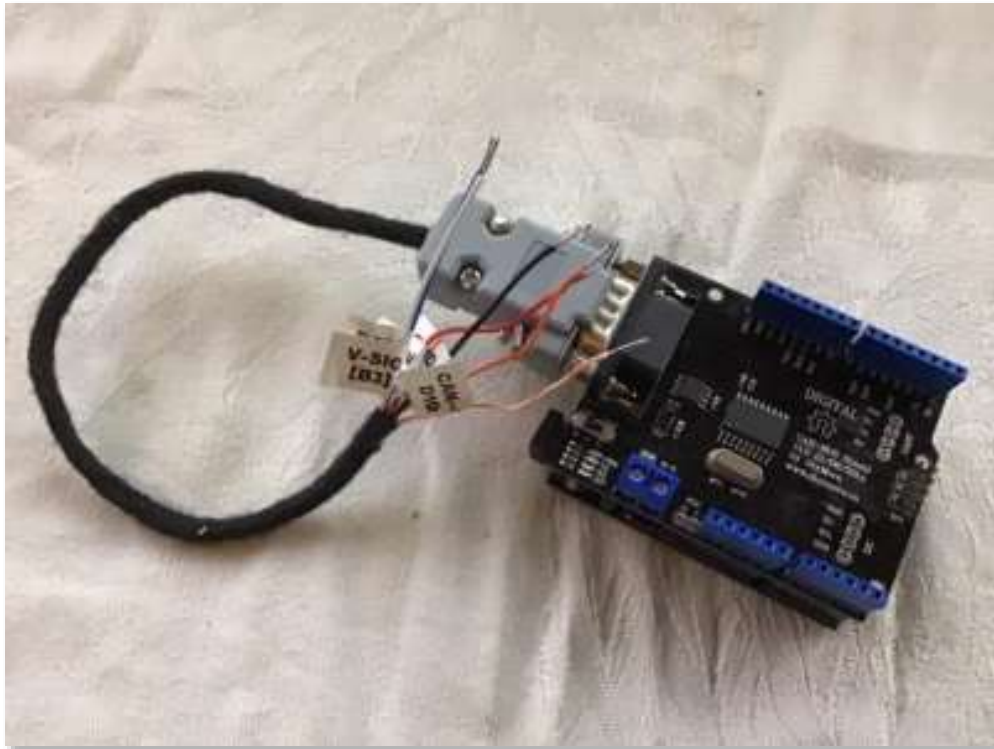
    // Send while ignition on
    sendCount--;
  }
}

void onReceive(int packetSize)
{
  // Receive ignition status packet
  if (CAN.packetId() == 0x271)
  {
    uint8_t packet[8];
    uint8_t i = 0;
    while (CAN.available())
    {
      packet[i++] = CAN.read();
    }
  }
}

```

```
// Ignition on?  
bool ignitionOn = packet[0] >= 0x02;  
digitalWrite(7, ignitionOn);  
if (ignitionOn)  
{  
  sendCount = 8;  
}  
}  
}
```

We used an Arduino Uno with an MCP2515 EF02037 CAN BUS Shield. The advantage of the Uno is that it can be run directly from the car's 12v supply as it has an onboard voltage regulator:



Note however that the Arduino's inputs are still only 5v, and the reverse gear and speed signals as 12v. You will need to buffer the input signals so as not to damage the Arduino:

