

# How to Replace the Main Board of an RNS-E

Material support provided by “Rabbit” (Cem Ozkan).

So here's the story: about two months ago, after our beloved "Turtle" unceremoniously dumped my wife and I about 100 yards away from the inbound exit of the Lincoln Tunnel in Manhattan, we decided it was time to get a different car. (A moment of respectful silence please for the "Turtle" who, as we speak, may well be ferrying Swedish bikini models to and fro as she was purchased by a Swede and shipped overseas. God bless her...them...whatever.)

As such, we now drive an Audi with the following specs:

2004 Audi Allroad  
4.2L  
RNS-E  
Sirius Radio  
DICE unit (iPod) in the glovebox

When we purchased the car in December 2006, it had the factory-installed, CD-based navi system but my wife and I realized that we were unhappy with its performance when it failed to find some of the largest streets/towns in the tri-state area. Enter the RNS-E.

After cruising eBay, [www.navplus.us](http://www.navplus.us), and several other boards with which I am sure you, faithful reader, are familiar, I purchased an RNS-E and with TeddyBGame's and Lee Hicks' respective help, installed it in mid January. The only nagging issue (still to be resolved) is a persistent "ticking" sound when using the up/down keys on the multi-function steering wheel (MFSW), related to the iPod (DICE) unit and Sirius (not, I believe, the radio).



*Our previous car, the "Turtle"*

Then, in early March after the RNE-E had worked flawlessly, I was driving in New York City one evening when I looked down to find that the unit, while still playing the radio, said "System update in progress, please wait.". The progress bar that appeared reached approximately 75% and then the radio went dead and the unit went entirely dark. "Dark" as in dead. "Dead" as in no longer alive. As in, "What the F just happened to my RNS-E?!?!"

So, after crusing the boards again, contacting the seller, and speaking and emailing any number of people on Navplus (if you're reading this, you may be among them and thank you), I got the excellent advice that it might be a bad/recoded/posessed EEPROM, which would require me to replace the main board of the RNS-E.

"But Evan" you ask, "what's an EEPROM." I'm glad you asked.

I don't have the foggiest idea what it is.

What I do know is that it's part and parcel of the brain of the RNS-E, without which, it can't think straight, much less navigate or play your favorite Broadway showtunes on Sirius or XM. I mean...my wife loves showtunes. I like very manly stuff like speed metal and punk. I mean the chances of my belting out the songs from the musical "Oklahoma" while driving in the car are very, very slim. Where was I? Oh yeah...

Via Navplus, I eventually got in touch with "Rabbit" (Cem) who sold and shipped me a new main board with the PIN (thank you Cem). And while he sent some good pictures, I still spent a very, very nervous three hours dismembering my RNS-E, replacing the board, and putting it back together.

At this point, while I'm sure I'm not out of the woods, I have hooked it back up and it's definitely alive again. Now the trick is making sure it stays fixed and diagnosing and repairing the "ticking" issue. But that's for another post...

So, because these boards were so helpful to me, I wanted to try and do my part to pull together a more comprehensive account of how to pull your RNS-E apart, replace the main board, and put it back together again as it would have been helpful for me to have such an account. And please let me know if there are any mistakes in this document. I've tried to be as accurate as possible but this document can be certainly be clearer and better formatted.

Now, here's the psuedo legal part: be a man. I'm not your mommy and it's time that you accept that you're an adult who is responsible for his/her own actions. This is a self-help, online navigation board, not a big Tree of Trust where someone else gets the blame if something happens to you. So, if something goes horribly wrong and you render your RNS-E totally inoperable, man up and deal with it.

With that said, shall we get started?

## What You'll Need

I was seriously nervous about starting this process but at the same time, it wasn't that tough to dial up my courage because what could I possibly do, make the thing work less? It was already a very large, very useless paperweight on my dining room table. So, I decided to arm myself with some of the things you see below, including, but not limited to:

- Two small (watch/jewelry) screwdrivers with flat and phillips heads;
- Larger screwdrivers, preferably with many interchangeable heads of various types/gauges;
- Set of automotive picks (I purchased mine at Griot's Garage for \$14.99 - [www.griotsgarage.com](http://www.griotsgarage.com));
- Two flashlights - one a "headlamp" so you can work hands-free;
- A three-pronged "grabber" from a PC repair kit (yes, "grabber" is the technical term);
- A towel so when teeny tiny things dropped, they didn't go bouncing across the floor into a crack (you know they always do);
- Approximately ten "specimen" jars (I got mine during my last doctor's visit) which are perfect for putting small screws and other parts in;
- A pad and paper (not pictured) - as I pulled out screws, I would note where they came from - sometimes drawing a little diagram of the piece and the location of the screws - and put it in the specimen jar with the screws;
- Bubble wrap (not pictured) - to place the circuit boards and sensitive pieces (i.e. LCD screen) on as you pull them off/out;
- Small pliers, needle nosed and snub nosed;
- Blue "painter's tape";



*Some (not all) of the items used to remove the EEPROM.*

I know it all sounds a little paranoid but let me tell you that with hands my size and some screws that aren't much bigger than a grain of rice, you a) don't want to drop one and b) don't want to think you've put the whole RNS-E back together again only to find a few screws lying around. An extra 30 minutes of prep and care will serve you very, very well in this process. You do NOT want to do it twice if you can avoid it.

## How This Document is Set Up

I wrote the document in chronological order, so that you can remove things in order. In addition, for each step, I tried to detail the things you do to remove the various items, and then what you'll do to put them back together. And that's where the step-by-step check lists comes in:

I suggest printing this document in color as there are photos that will be difficult to decipher in black and white. On the final page - page 12 - there is a simplified checklist of steps to remove/install your motherboard. Printing it - again, in color - is an easy way to make sure you don't end up with extra screws at the end.

As you walk through this document, you should be able to check the green boxes to deconstruct the RNS-E, and then on your way back, just go through the document in reverse and check the red boxes to make sure you've put everything back together. An example appears below.

☐ Remove four (4) screws

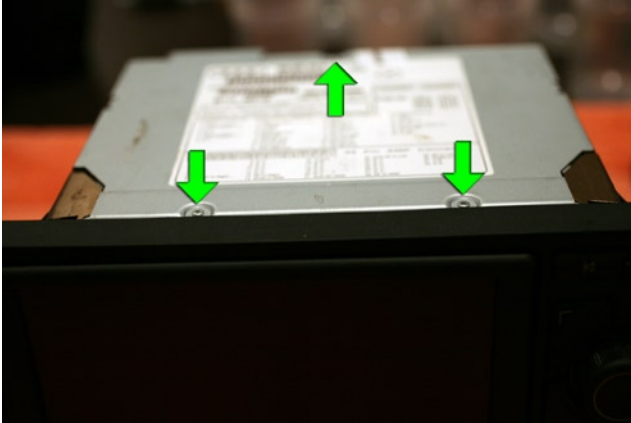
☐ Replace four (4) screws

📌 I've tried to use "NOTE" to indicate something that you should be aware of, but might not necessarily be a distinct step in the process.

## Be Free Motherboard, Be Free!

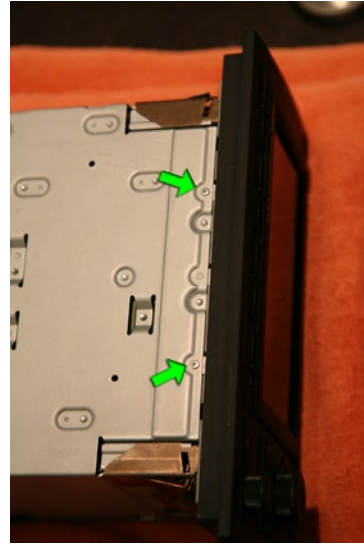
The first part is probably the easiest. You're just going to take the screws off the top, sides, bottom, in order to gain access to the guts of the RNS-E.

Once you've removed the screws from the sides, top and bottom, remove the top of the unit. Now, remove the screws (following page) from the back.



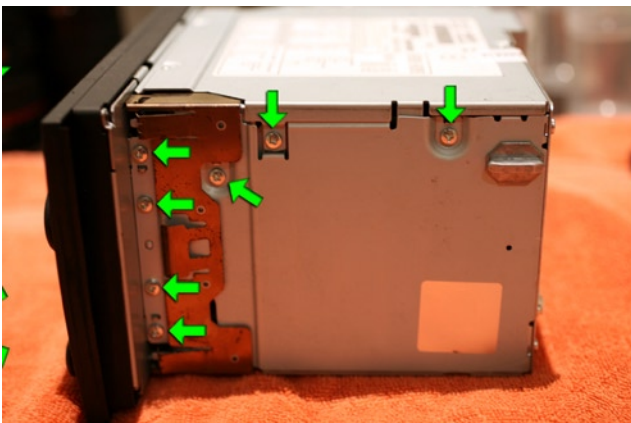
On the top of the RNS-E, there are three small screws: two in front and one in back. Be careful of the ones in front as each one is right next to a hole just large enough to drop into. You can use a little piece of the blue painter's tape to cover each hole as you remove the screw.

- ☐ Remove three (3) screws
- ☐ Replace three (3) screws



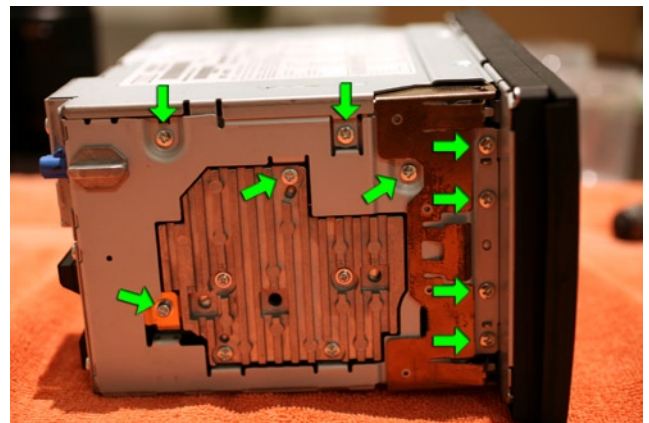
There are two screws on the bottom of the unit that are easy to remove. I believe that these secure the front face of the unit to the overall body.

- ☐ Remove two (2) screws
- ☐ Replace two (2) screws



There are seven screws to remove on the right side of the unit (right if you're looking directly at it).

- ☐ Remove seven (7) screws
- ☐ Replace seven (7) screws



The left-hand side has nine (9) screws to remove. Be careful because I'm NOT sure if they're all the same.

- ☐ Remove nine (9) screws
- ☐ Replace nine (9) screws

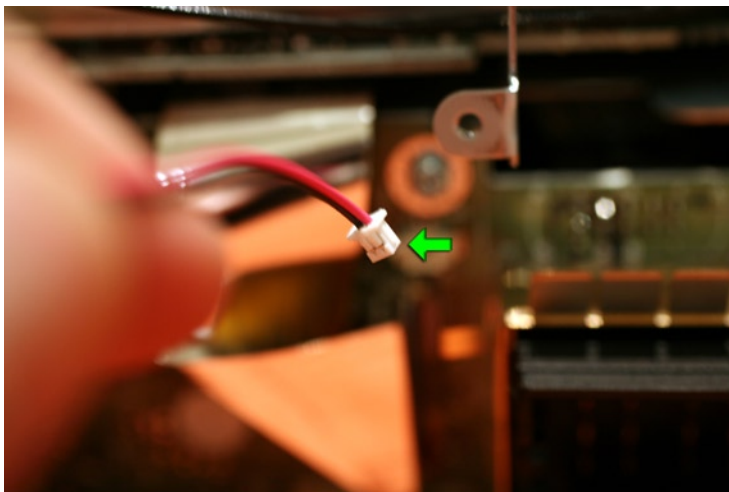




The back of the unit has eight (8) screws to remove. The only one that seemed different to me was the second one up from the bottom left-hand corner, which had a small, built-in washer.

**NOTE:** you do NOT remove the screws from around the fan unit. The fan unit will come away with the back of the unit, once you disconnect the fan's power from the circuit board. You'll remove the single screw directly beneath the blue plug (right-hand side) in a subsequent step.

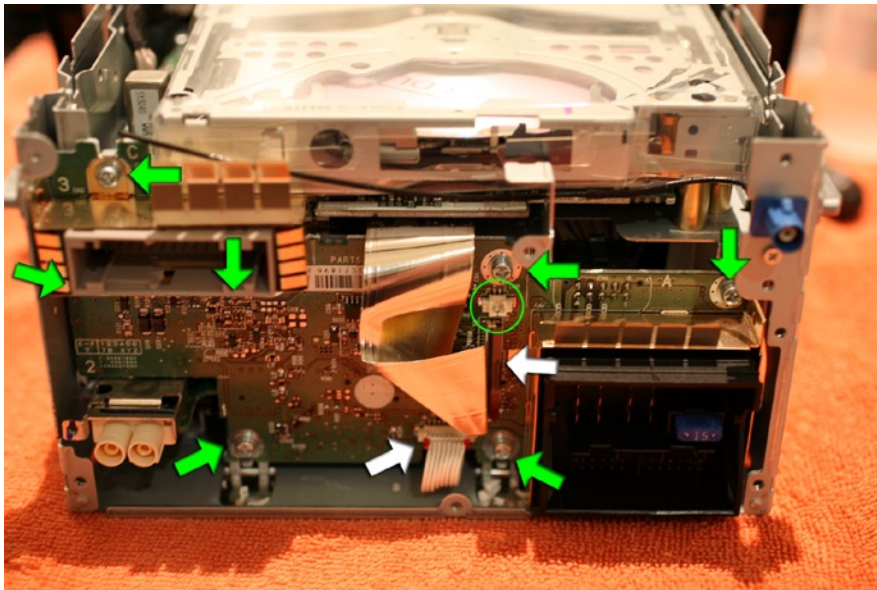
- ☐ Remove eight (8) screws
- ☐ Replace eight (8) screws



Before you pull the back of the unit fully away from the main body, make sure that you remove the small plug that connects the fan to the circuit board. You'll find the plug just behind the back casing.

The fan's plug, already removed from the board, is shown at left. Once removed, you can put the back of the unit aside. You won't need it 'til you're putting the unit back together.

- ☐ Unplug the fan's power and remove the back plate of the unit
- ☐ Plug the fan back in and replace the back plate.



With the plug removed from the fan (green circle), you're able to fully remove the back of the case and put it aside.

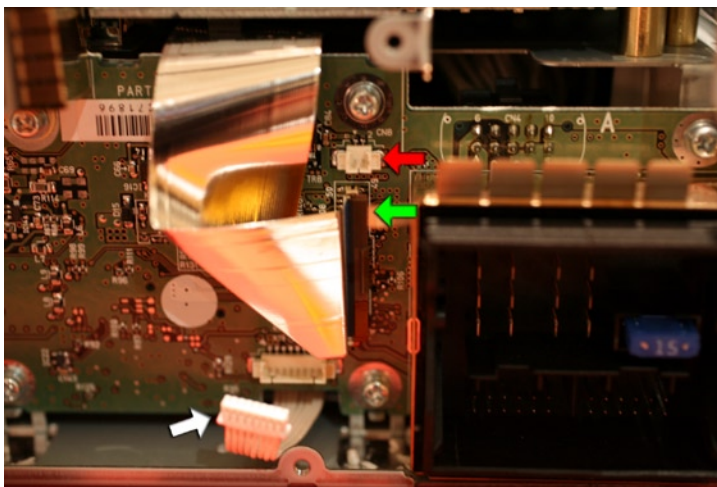
The first step (of several) is to remove the small plug towards the bottom (lower of two white arrows). Second, remove the vertical ribbon connector (second white arrow). DON'T just pull this out. You need to flip the small, brown clip up/out to release the silver ribbon. As the clip is vertical, you're sort of pulling it towards you. Don't force it. When you do it right, it should open fairly easily and the ribbon wire should pull smoothly.

Once you've disconnected those two wires, it's a simple matter of removing seven (I'm nearly sure it's seven) screws (green arrows).

☐ Remove seven (7) screws, disconnect two (2) wires

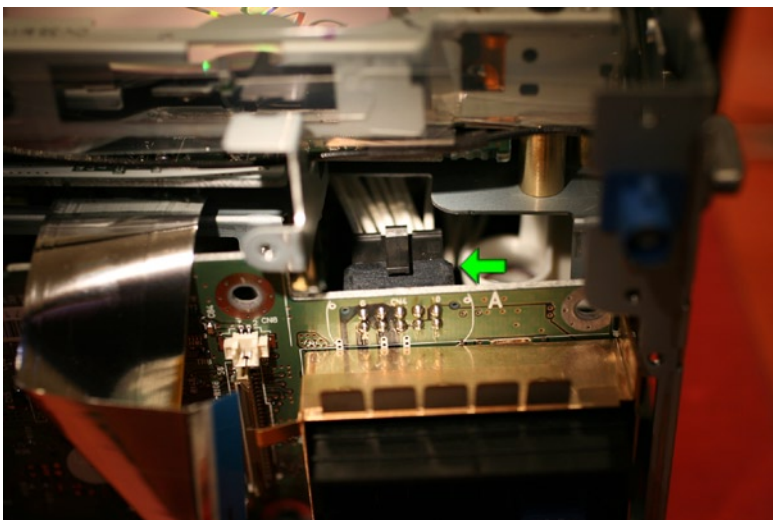
☐ Replace seven (7) screws, connect two (2) wires

**NOTE:** In the upper-left of the picture, there are two screws you can't see. They're under the large grey rectangle.



A close-up of the three connectors on the front of the circuit board, as described above:

- 1) the fan plug (red arrow)
- 2) vertical ribbon connector (green arrow)
- 3) small horizontal plug (white arrow)



As you GENTLY begin to pull the circuit board away, you'll find two wire connectors and one static connector on the back of the board.

This picture (left) is of the first wire connector on the upper right-hand side, behind and above the 15amp mini fuse you can see pictured above.

It's firmly connected so it takes some time and patience to disconnect it.

☐ Disconnect three (3) plugs on the back of the board

☐ Connect three (3) plugs on the back of the board

**NOTE:** Remember that there are three connectors on the back of this board but two are wires and one is static. So really, when you disconnect/connect them, you need to actively deal with the wire connectors but really just pull (to remove) and push (to install) smoothly with the static connector lined up appropriately. I've pointed to this static plug in subsequent photos.





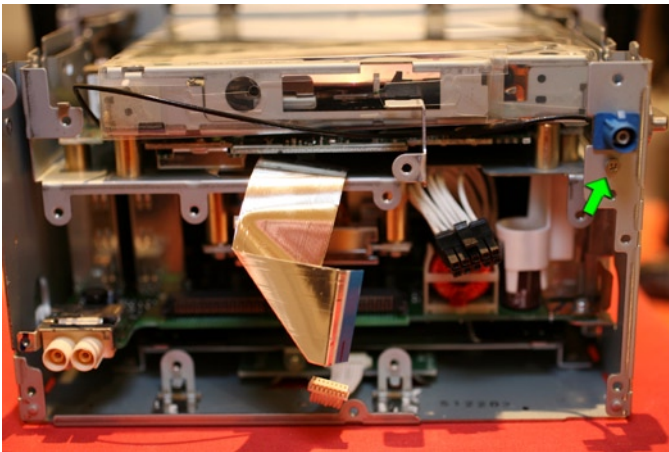
The second of the two wire connectors is behind the board, more or less in the middle, behind the silver ribbon cable. You can see the green arrow pointing to it at left, where it's mostly blocked by the silver ribbon cable you disconnected a few steps ago.

Again, this horizontal connector is firmly plugged in and will take some patience to disconnect. I ended up using my steel picks to get some leverage and slowly work it away from the board.

☐ Disconnect white horizontal plug from board.

☐ Connect white horizontal plug to board.

⚠ **NOTE:** The last plug, a static connection, is *NOT* pictured. It is not nearly as tricky to disconnect as the two wire connections pictured, but when you're putting the unit back together, you need to make sure it's lined up so when you push it in, it connects smoothly.

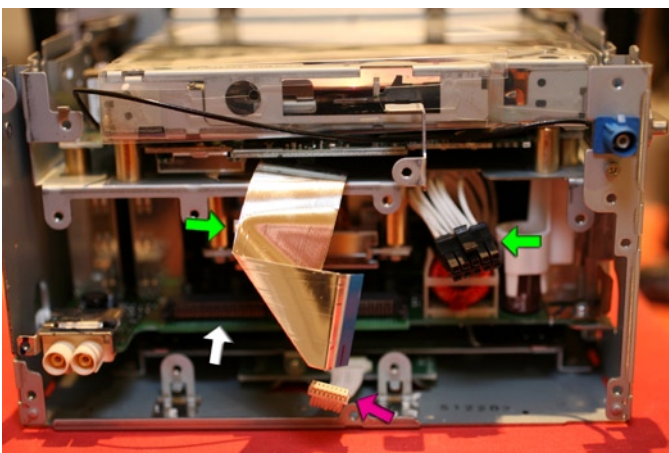


Remove the screw holding the blue connector in. Once you've removed the screw and set it aside, the blue connector (with wire attached) will slide out to the left.

⚠ **NOTE:** The black wire and blue connector will remain attached to the motherboard so be aware that it's still attached and don't let it dangle where it might get caught and accidentally ripped off the board. This is of particular note when you're working with your new motherboard.

☐ Remove one (1) screw and slide blue connector out.

☐ Slide blue connector in and replace one (1) screw.



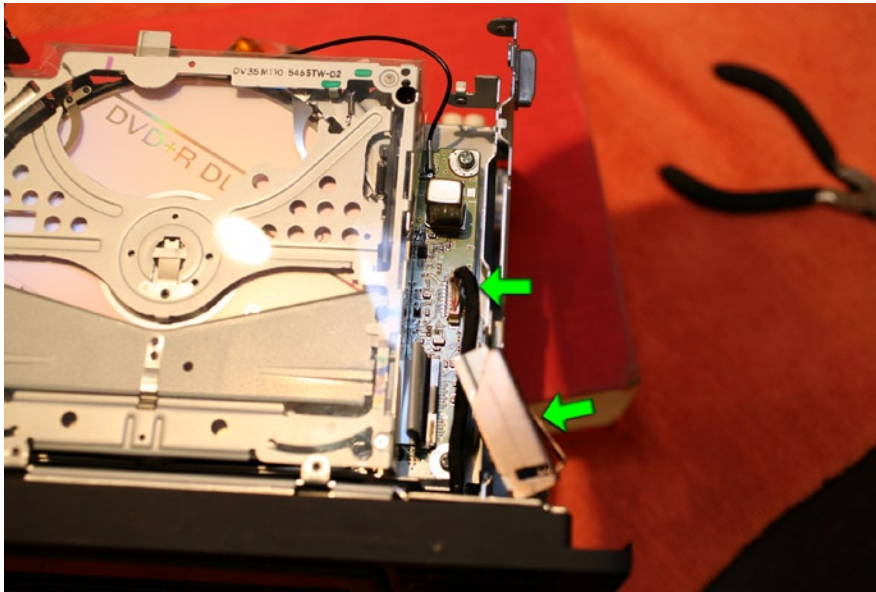
With the board removed, you can get a better view of some of the connectors.

- The green arrows show the two connectors that go to the back of the board (the green arrow at left only points to the edge of the horizontal connector, most of which is hidden behind the silver ribbon cable).
- The magenta arrow shows the small connector that connects to the front of the board.
- The white arrow points to the static connector that connects to the back of the board.

O.K., now it's time to move to the top of the unit, and then the front, including the screen.

Don't worry, you're doing great. (Actually, I have no idea how you're doing - you may have already spilled your beer into the unit but so what? If it was already broken, what did you do - break it more?)

And away we go...

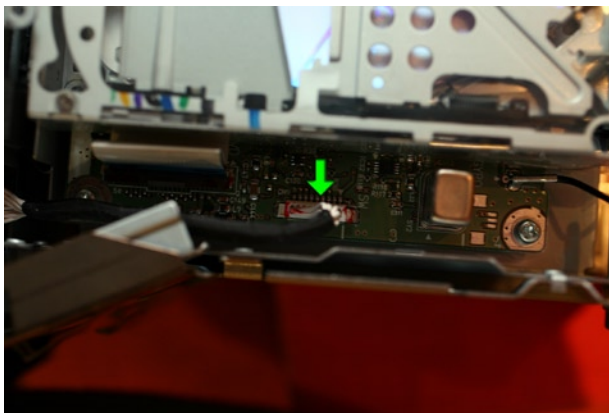


- ☐ Disconnect one (1) cable connector from the right of the DVD unit and hinge left and right side pieces away from main body.
- ☐ Hinge left and right side units back to main body and connect one (1) cable connector to the right of the DVD unit

As you face the unit and look at it from the top down, you'll find a connector that goes from the front of the unit to the motherboard, that connects to the right of the DVD unit. Disconnect this piece.

Next, towards the front of the unit, on both the left and right side (only the right side is shown here), the metal pieces towards the front of the unit more or less hinge away from the main body of the unit. In a later step you'll remove them entirely, but for now, angle them away from the unit, which will allow you to pull the face and LCD screen away.

**NOTE:** In this step - and throughout this process - I think it's good to be working on a towel as it prevents screws from bouncing if dropped and increases the chances of a delicate part (i.e. an LCD screen) surviving a fall.



This is simply a top-down close-up of the connector that plugs into the motherboard to the right of the DVD unit.



Now, this is the step where you want to be firm, yet gentle (ah, so many jokes, so little time).

The LCD unit connects to a small tray underneath the RNS-E that slides forward, which in turn allows the screen to lower, revealing the two memory slots as well as the DVD drive.

Grasp the front of the RNS-E on the sides - do NOT get your meat hooks all over the screen itself - and pull the entire face and LCD screen towards you. As you can see from the photo, I found it easier to get some leverage during the whole process by placing the RNS-E on a book, in this case, a dictionary.

The green arrows are the pieces on either side of the LCD that lock into a channel in the face to allow the LCD screen to slide up and down.





O.K., this is an intentional duplicate photo.

Once you've successfully pulled the LCD and face towards you, you should be able to slide the LCD screen down and at the same time, push the face back towards the unit. You're basically just manually doing what the unit does every time you open the face. But it does not feel good 'cause it feels a little like you're forcing it. Again, be cautious. If it feels like you're really forcing it, makes sure you've disconnected everything you need to before proceeding.

☐ Pull face away from main unit and open/lower LCD screen.

☐ Push face back towards unit and close/raise LCD screen.



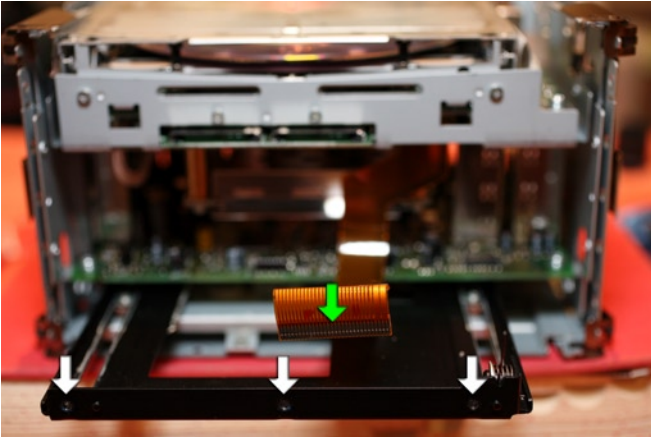
With the LCD screen down and forward, you can remove it from the main unit. Again, go slowly.

There are three small screws that connect the LCD to the sliding plate underneath the RNS-E. The left-hand-most screw is shown in the left-hand photo and the approximate location of all three is shown in the right-hand photo.

**NOTE:** Once you remove these screws, the LCD is NOT disconnected. It's still connected by another ribbon cable at the back of the unit. You'll disconnect it in the next step.

☐ Remove three (3) small screws

☐ Replace three (3) small screws



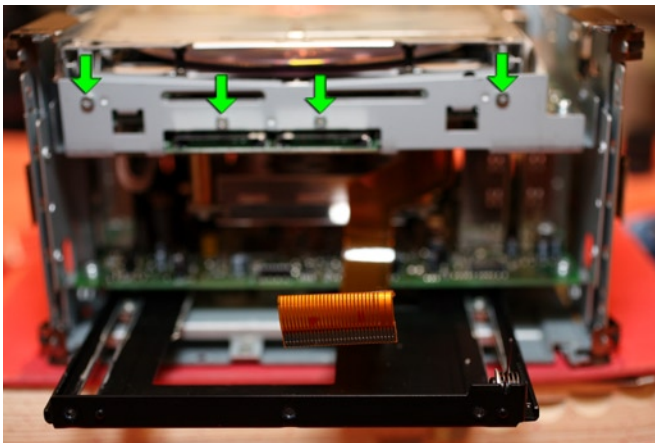
- ☐ Remove side panels, disconnect LCD ribbon cable and remove unit's face
- ☐ Replace side panels, replace unit's face, and connect LCD ribbon cable.

There are a few steps in one here so bear with me:

Holding the LCD screen, flip the small plastic ribbon connector on the back of the LCD screen up, so you can remove the ribbon cable connecting the LCD (green arrow, left). Carefully place the LCD unit aside on bubble wrap or the equivalent.

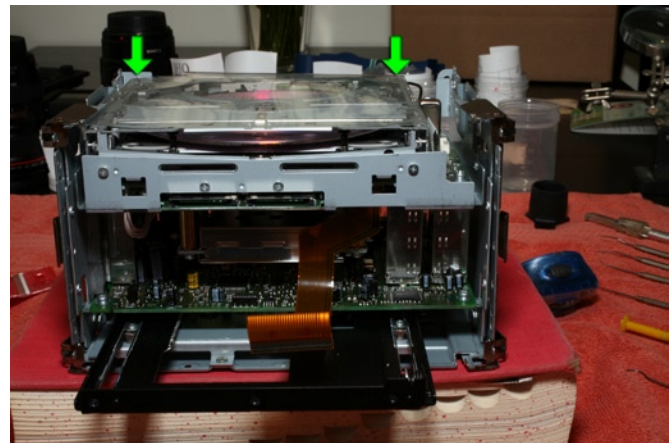
Now, remove the face of the unit (NOT pictured). It will probably get caught on the small spring connected to the tray but it's easy to maneuver around. Place the unit's face aside carefully - again, on some bubble wrap or similar. (The white arrows are a better look at the screw locations from the previous step.)

Again, NOT pictured, but you should also remove the two small side panels that you had hinged outwards to release the front face in a previous step. They are NOT shown here as they've already been set aside.



With the LCD ribbon cable disconnected and the face set aside, there are four screws in the front face that need to be removed.

- ☐ Remove four (4) screws.
- ☐ Replace four (4) screws.



Looking from the top down, there are also two recessed screws in the back corner of the unit that need to be unscrewed.

- ☐ Remove two (2) screws.
- ☐ Replace two (2) screws.

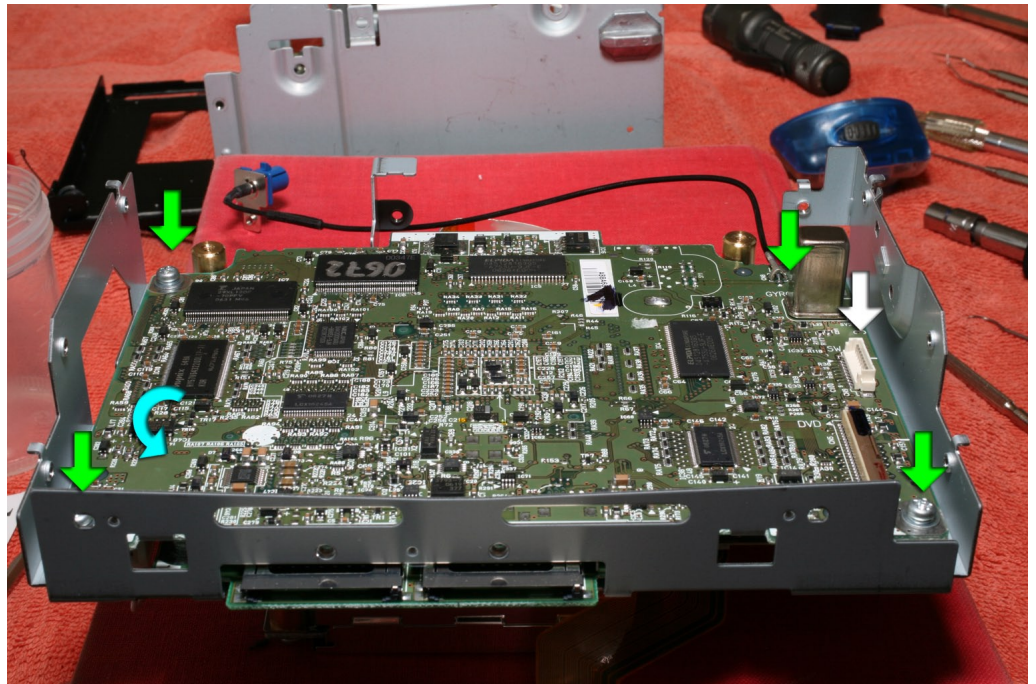
Now, with those six (above) screws removed, you should be able to lift the entire DVD unit straight out. Be CAREFUL, as the unit - and in particular, the top of the unit - are fragile. DON'T put any pressure on the top, as it will break. Lift it out carefully and put it aside.



Successfully and carefully lifting out the DVD unit will reveal the motherboard below it. We're almost there.

You can see four screws - one in each corner - that you need to remove in order to lift out the motherboard. But note that it's still connected by a small white plug UNDERNEATH. So, once you've removed the screws, you'll be able to lift it about an inch and you'll need to get your fingers in there to unplug that last item.

In the picture above, the white arrow is NOT what I'm talking about. That's the plug that was to the right of the DVD player, which you unplugged in a previous step.



Instead, the plug I'm talking about is underneath the board, near the blue arrow in the picture. When you're dealing with the motherboard, be careful. You don't want to go to this trouble, only to knock off some critical transistor at the last step. Once you've removed the four screws and unplugged the connector underneath, remove the bad motherboard gently and set it aside.

Bad motherboard...bad.

☐ Remove four (4) screws, disconnect plug underneath.

☐ Reconnect plug underneath, replace four (4) screws



## The End

That's it. With the old motherboard removed, substitute the new one and start reconnecting it by following the steps, but backwards. Good luck and happy navigating!



# Abbreviated Checklist

The checklist below is an abbreviated version of the one in the body of the document. Until you're familiar with the process, I would use the pictures on the previous pages to help with the deconstruction and installation of your new motherboard.

Remove old motherboard  
Install new motherboard

- |                          |                          |  |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Remove/replace three (3) screws from top of unit (pg. 4).  |
| <input type="checkbox"/> | <input type="checkbox"/> | Remove/replace two (2) screws from bottom of unit (pg. 4).   |
| <input type="checkbox"/> | <input type="checkbox"/> | Remove/replace seven (7) screws from right side (facing) of unit (pg. 4).  |
| <input type="checkbox"/> | <input type="checkbox"/> | Remove/replace nine (9) screws from left side (facing) of unit (pg. 4).  |
| <input type="checkbox"/> | <input type="checkbox"/> | Remove/install top of unit (pg. 4).  |
| <input type="checkbox"/> | <input type="checkbox"/> | Remove/replace eight (8) screws from the back of the unit - NOT including screws by fan or underneath blue connector (pg. 5) |
| <input type="checkbox"/> | <input type="checkbox"/> | Disconnect/reconnect fan's plug from board and remove/install rear plate of RNS-E (pg. 5).                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | Remove/replace seven (7) screws from board and disconnect/reconnect two cables from front of board (pg. 6).                  |
| <input type="checkbox"/> | <input type="checkbox"/> | Disconnect/reconnect two (2) wire connectors and one (1) static connector from back of board (pg. 6).                        |
| <input type="checkbox"/> | <input type="checkbox"/> | Remove/replace one (1) screw from beneath blue connector and slide out/in blue connector (pg. 7).                            |
| <input type="checkbox"/> | <input type="checkbox"/> | Unplug/plug connector to right of DVD unit and angle/hinge left and right metal plates away from/to unit's face (pg. 8).     |
| <input type="checkbox"/> | <input type="checkbox"/> | Pull/push LCD screen and unit face away/to main unit body (pg. 8).   |
| <input type="checkbox"/> | <input type="checkbox"/> | Lower/raise LCD screen and remove/replace three screws affixing LCD screen to tray beneath RNS-E (pgs. 8-10)                 |
| <input type="checkbox"/> | <input type="checkbox"/> | Disconnect/reconnect ribbon cable to back of LCD screen (pg. 10)   |
| <input type="checkbox"/> | <input type="checkbox"/> | Remove/replace LCD screen (pg. 10)   |
| <input type="checkbox"/> | <input type="checkbox"/> | Remove/replace unit's face (pg. 10)  |
| <input type="checkbox"/> | <input type="checkbox"/> | Remove/replace left- and right-side pieces, as angled away from main body on page 8 (pg. 10)                                 |
| <input type="checkbox"/> | <input type="checkbox"/> | Remove/replace four (4) screws from front of DVD unit (pg. 10)   |
| <input type="checkbox"/> | <input type="checkbox"/> | Remove/replace two (2) recessed screws from top back right and left corner of DVD unit (pg. 10)                              |
| <input type="checkbox"/> | <input type="checkbox"/> | CAREFULLY remove/replace DVD unit from top of unit (pg. 10).   |
| <input type="checkbox"/> | <input type="checkbox"/> | Remove/replace four (4) screws, one from each corner, from EEPROM board (pg. 11).  |
| <input type="checkbox"/> | <input type="checkbox"/> | Remove/replace small white plug from underneath EEPROM board (pg. 11).   |