

Summary

This document will show you how to add the SKS (Smart Key System) sensors to the front passenger door and rear hatch on a Gen III Prius that only came with the driver's door SKS system. I believe that this will get you as close as possible to the factory three door SKS system. Because the ECU on the cars that only come with one door SKS will only support one door we need to connect all three doors to the driver's door connections on the ECU. This has the following side effects and makes it slightly different than the factory three door system:

Bringing the key close to any door will allow any other door to open. On the factory system if your key is near the driver's door handle then someone standing at the passenger door or hatch cannot unlock and open the door by touching it. However that is not the case with this mod. If you have your key in your pocket and you're within range of the driver's door antenna then your wife or girlfriend will be able to touch the passenger door handle and unlock the car. Some see this as an advantage and some see this as a disadvantage... theoretically it could be a security concern if someone is standing on the passenger side of your car then they could open the door and get in as soon as you got within range.

The range where the system can detect the SKS key is slightly reduced. Because we're connecting three antennas where the factory system only had one this seems to reduce the range where the car can detect the key. From my limited testing it seems like the factory system has about a 3 foot range and after performing this mod the range is reduced to about 2 feet. However, this range reduction hasn't been a problem for me and I'm still able to walk up to the car and open the door with the key in my pocket as I always have. Other than the testing I did to see if it reduced the range I probably wouldn't have even noticed.

You need to configure the system so that touching the driver's door will unlock all the doors. By default the car comes configured so that touching the driver's door will only unlock the driver's door. Since we're connecting all of our sensors to the driver's door connections then if we left the system that way touching the passenger door handle or the rear hatch would only unlock the driver's door which wouldn't really be very useful. Making this change is easy to do yourself and is documented in the Prius manual. As above, doing this could be a security risk as now all the doors will unlock when you enter the car and theoretically someone could enter the car as you do.

Parts

You'll need the following parts to complete this mod. I got my parts from parts.com as they were the least expensive place I could find. The prices I have listed below are the current parts.com prices. Note that if you order from parts.com (or most other online parts places) they will give you the option to enter your VIN number. Do **not** enter your VIN number here. They use the VIN number to verify that you're ordering the correct parts for your vehicle, however, since our cars didn't come with these parts then they will see them as incorrect. If you enter the VIN they will likely either cancel the order or change the parts to the non SKS equivalent.



SKS enabled front door handle. \$144.77. In my case it was part number 69210-74030-E1. However, note that the handles come pre-painted and unless your Prius is gold like mine you'll need a different part number. To find this handle for your car go to parts.com, then click on Toyota under the Automotive Catalogs section on the left side. Select the year 2010, then click on Prius Parts. Then click on Front Door, Lock and Hardware, Handle Outside, then W/smart key. Finally, select the correct handle for your car's color. As near as I can tell, parts.com doesn't give you any way to see the part number online, however once you receive the part you'll find the part number on the bag it comes in. If you order a different color handle, when you receive it let me know the color and the part number and I'll update this document to make it easier for others.



Wiring harness for passenger door SKS handle. \$37.55. Part number 89746-47040. Note that this is for the right hand side. If you have a RHD car or you're trying to enable SKS for the rear doors then you want part number 89746-47050 for the left hand side.



Rear antenna for SKS system. \$60.11. Part number 89997-30070.



Two button hatch switch. \$55.80. Part number 84840-28040.

You will also need:

Two nuts for the rear antenna. The Toyota part number is 90179-06274 and they're 58 cents each at parts.com. I didn't realize I needed these nuts, so I just used number 6 metric nuts from Lowes which did work, but they didn't seem like they quite fit right. Since you need to order parts anyway I'd suggest ordering two of these as well.

12V Zener diode. \$1.49. Radio Shack part number 276-0563.

Wire. I purchased three 20 foot spools and used nearly all of it. The wire I used was 18 gauge because that was all I could find locally, but most of the internal wiring seems to be more like 22 gauge, so you could definitely go with thinner wire than I used. Each of my spools was a different color and that was helpful because you need to run three wires from the hatch up to the front. They generally recommend using stranded wire in cars.

Taps and butt connectors. You'll need a number of these to make all of the connections you could also solder the connections and use heat shrink tubing if you wanted. You'll need to use two butt connectors for the rear antenna that will be outside the car, so I would suggest getting weatherproof butt connectors for those connections.

Zip ties. To help hold the wire in place.

Parts installation

Once you have all of the parts and supplies we'll need to get them installed in your car. We'll start with the front door handle and harness.

First, use a small flat screw driver to remove the trim piece behind the inside front door handle revealing the screw behind it. I held the handle open, then inserted the screw driver between the handle and the trim piece and gently pulled it out. Be careful not to mark anything with the screw driver.



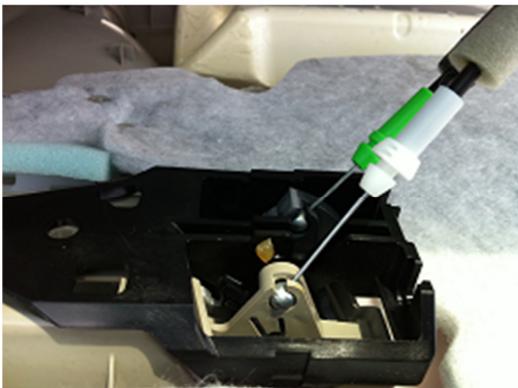
Next lift the rubber piece out of the finger hold on the door. This isn't attached to anything and can just be lifted up.



Using a Phillips screw driver remove the two screws, then starting at the bottom pull the interior door trim out away from the door. The top is hooked over the window sill, so once you have all of the latches released lift it up a little to release it from the door. You won't be able to move it too far from the door until you release two connectors for the power window and lock switches, the cables for the door handle and lock, and one more connector for the courtesy light at the bottom of the door.



To disconnect the wires just pinch the release and slide the connector out of the socket. They should come out very easily, so if you can't get them out then you probably don't have it released correctly. To disconnect the cables for the door handle and locks, simply pull the cables forward as shown below and pull the ball out of the socket.



Once it's disconnected set the panel aside where it won't get scratched, then gently pull the moisture shield down to expose the inside of the exterior door handle.



Pull the yellow clip forward to release it.



Locate this circular black plug on the side of the door just above the latch.



Remove the plug to expose the screw behind it.



Using a T27 Torx screwdriver loosen the screw. Note that it's a captive screw so even when it's totally unscrewed it won't fall out into the inside of the door. Once the screw has been loosened pull out the small trim piece next to the exterior handle.



Finally, pull the handle back and out to remove it from the car.



Put the new handle in, then relatch the yellow clip on the inside of the door. Make sure the handle is fully seated and operates the door latch, then install the little exterior trim piece and tighten the torx screw. Finally put the circular plug back in the door.

Now comes the fun part... we need to get the SKS wiring harness placed in the door and connected. The wiring harness is reasonably stiff, so this makes it a bit difficult to put in place where it needs to go, but it is possible. Looking at the picture below note the black window guide and the silver bar that releases the door latch. The wiring harness needs to go around and behind both of these so it won't get in the way of the window when you lower it.



Below is a picture of the wiring harness installed correctly. Note that there are two white plastic locks that get pushed into holes in the black handle to hold the harness in place. One is in the front under the yellow clip and one is way back behind the silver bar.



I discovered the hard way that it's very difficult to remove those locks once they've been pushed in, so be absolutely certain that the harness is correctly installed before you push them in. Because the harness is so stiff it is not very easy to get it around everything and in place and I'm not sure I have any really good advice other than just keep working at it and eventually you'll get it in.

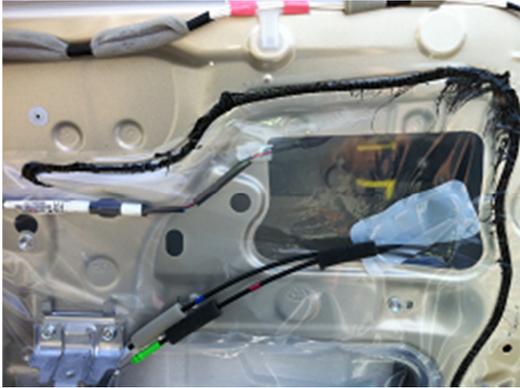
Once the harness is in place, plug the connector into the door handle and make sure all of the black clips are clipped in place as shown below.



Connect the other end of the new harness to the blue connector that's already on the door and push the white and black locks into the door to hold the harness in place.



Push the moisture seal back up and run your finger around the edge to reseal it



Then reattach the interior door panel. Start by holding it close to the door and reattaching the wires for the courtesy light, the power window and lock switches and the cables for the door handle and lock. Remember that the white cable is the lock and it goes on top. Then hook the panel over the top of the window sill and push the fasteners in starting with the top of the panel and working your way down. Reattach the two screws and put the trim back behind the door handle and into the finger hole.

Next we'll install the new hatch switch. First, remove the lower piece of the interior trim from the rear hatch. There are no screws, so just start up by the bottom of the lower window and pull it out away from the hatch. It was a bit difficult to get started, but once you can get your fingers under it you should be able to pull it out without too much trouble.

Next use a socket wrench with a number 10 socket to remove the 4 nuts where I've circled the picture below. Note that I've already removed the nuts in that picture.



Remove the outside trim from above the license plate. Those four nuts are what hold it on, so once they're removed you can simply pry it away from the car. The hatch release switch is simply slid onto two of the bolts that stay attached to the trim piece, so once that's been removed the switch is no longer attached to anything. You can see the hatch release switch dangling from the cable in the picture below.



Disconnect the existing hatch release switch and set it aside. I found it easiest to slide the new switch onto the bolts on the trim piece (make sure you don't put it on upside down), then reinstall the trim piece, then connect the wire to the switch from the inside. Finally, put all four bolts back on and reattach the trim panel.

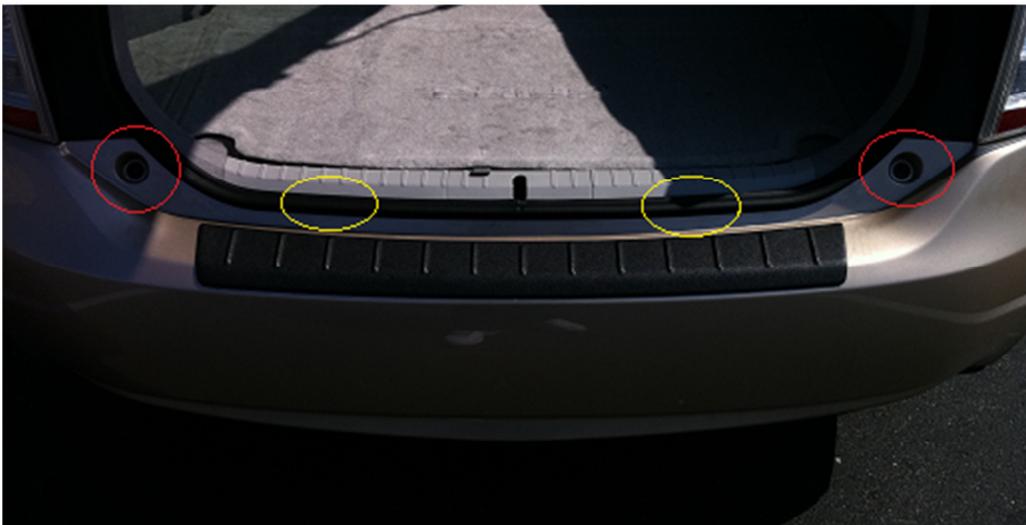
Now we'll connect the rear antenna. Unfortunately I was unable to identify a connector that would plug into the connector on the antenna. I spent some time with a guy at a Toyota parts counter and the best he could do was to sell me the main vehicle wiring harness that includes that connector... for \$499. Since that wasn't going to happen and I couldn't get the connector from anywhere else I decided to just cut off the connector on the antenna and use butt connectors to attach wires to it. To do this, open the cover on the antenna and disconnect the clip that holds the connector to the black plastic frame.



Cut off the connector and use the butt connectors to attach wires to the antenna. Since the antenna gets mounted outside the car I would suggest using weatherproof connectors. The ones I used came with heat shrink tubing over the connector, so after crimping it down I used a lighter to shrink the tubing... the lighter burned it a bit, so you can see some soot on the connector. Oops.



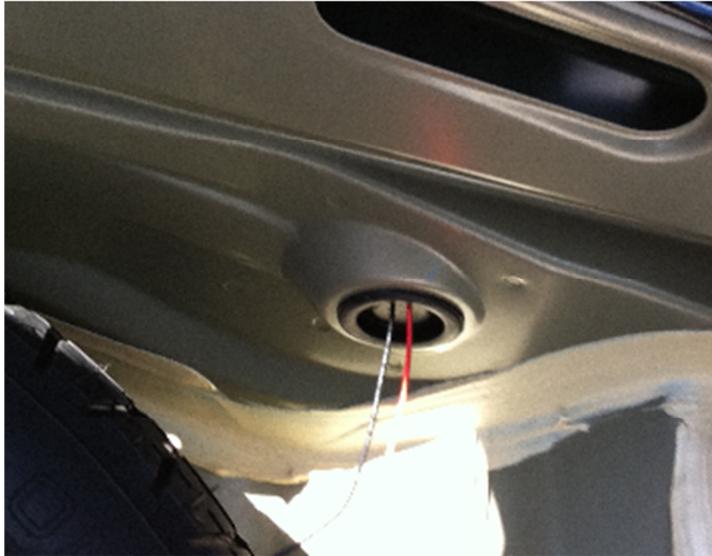
Now, technically you're supposed to remove the rear bumper cover to access the antenna. However, I found that I could undo the top of the bumper cover and pull it back enough to be able to get the antenna installed. To do that I removed the two screws circled in red and pulled back to release two clips that are in the areas circled in yellow.



Remove the cargo area floor and the black tray, then locate the rubber plug circled below

Note that I had also removed the trim piece surrounding the latch for the hatch, but in retrospect I don't think that bought me anything and I don't think it's necessary to remove that piece.

Pull the antenna wires through so there's not much slack left outside the car, then clip the bumper back on and reattach the two bumper screws. I poked two holes into the rubber plug and ran my wires through those holes so I could put the plug back in place.



I ran those wires along the back of the car using zip ties and little clips from radio shack that stuck to the car with double sided tape. When you run them make sure they stay out of the way of the tray.



Then I ran them around the corner by the 12V battery and zip tied them to the positive lead from the battery.



Finally, I tucked them down between the HV battery cover and the side of the car leaving the wires coming out next to the rear seat for now.



Next we need to get above the headliner in the rear to connect to the cable coming from the new 'lock' button in the two button hatch release switch we put in. Toyota was kind enough to run the wire out of the hatch for us, but that wire terminates above the headliner. With the hatch open gently remove the three circled clips:



Gently pull the headliner down (being careful not to damage it) and you can follow the wire harness where it comes in from the hatch to a junction block slightly to the left of center and in about 6 or 8 inches. I wasn't able to get a great picture of this, but it shouldn't be hard to find. Now, working mostly by feel you'll need to stick your hand in and unclip the two connections coming from the hatch. As with the connectors from the door there is a release button on the connector and once pressed the connector will slide out easily. If it's not coming out easily you don't have the release button pressed correctly. Once they're disconnected, pull the connectors back so you can actually get to them.



You need to locate the light green wire on the larger connector with more wires going to it (the one mostly hidden by my hand). I needed to peel back some of the black sheath around the wire bundle to be able to find the wire and get enough exposed to be able to work with it. Now, I simply clipped the wire close to the connector and used a butt connector to attach a longer wire to it. If you don't want to be as destructive you could use a tap connector and leave the wire connected to the clip (although there is very little room to work and that might be easier said than done) or attempt to remove the pin from the connector. As I understand it you should be able to release the pins on the connectors and pull

them out individually, however, I tried for a bit of time on this connector and some of the others and was not successful, so I just gave in and clipped it. Here is what it looked like after it was connected:



Once the wire is connected then guide the wires back into the connectors in the roof and clip them back in, then route your new wire over to the passenger side above the headliner. I pulled off the top part of this trim piece...



...just by pulling back on it so I could route the wire behind it and bring it out by the rear passenger door. Be careful because there is an airbag behind the headliner above the rear door... you don't want to accidentally puncture the airbag or route the wire over it such that it would get in the way if the airbag deployed.

I pulled back the weather stripping around the rear of the rear passenger door and slipped the wire in behind it.



Once you've got the wire routed that far you can, go back and push the trim piece back into place and reattach the headliner (be careful not to pinch the wire against a clip or anything).

Now come back around to the rear passenger door and pull up the door sill... it's just clipped on and it comes off by lifting it straight up... start toward the front. The weather stripping around the bottom of the door comes up and off with it.

If you look in the picture below you can see the new wires that I'm routing through there. The two (red and black, in my case) from the antenna come from behind the rear seat and the one (green, in my case) from the hatch switch is coming down the side behind where the weather strip goes. I joined them together and ran them along the wires that were already running through that channel zip tying them every few inches.



Now open the front passenger door and pull up that door sill... again, it just lifts straight up. I pulled the bottom of the trim on the pillar between the doors out enough that I could run the wires under it without taking it all the way off. Continue running the wires up toward the front of the car.



At this point you can put the rear door sill back in place and reattach the weather stripping, then come back up front and remove the lower glove box by opening it, then unclipping the damper on the right side. Then lift the box up a bit to unclip the hinges, then pull it all the way out. You'll also want to remove the trim panel on the side of the passenger footwell. You'll find a thumbscrew holding it in on the part closest to the front of the car, then you just pull the panel out away from the side of the car. Once that's done you should see something like this...



The group of white wires is the harness coming from the passenger door that contains the wires going to the SKS handle we installed earlier. We need to locate the wires that we need from that group. The wires you need to locate are:

Pin 6, White wire with two black dots

Pin 7, White wire with two yellow dots

Pin 8, White wire with two red dots

Pin 20, White wire with two blue dots

Pin 21, White wire with two green dots

As before, I simply clipped these wires close to the connector. You're welcome to try to remove the pins from the connector, or use a tap connector on the wire instead if you want to be somewhat less destructive.

Be careful if you do clip the wires... by the time I clipped them and then stripped a bit off to go into my connectors I had completely removed the colored dots that identified the wires. Either work on them one at a time or re-mark the wires higher up on the insulation.

Now, we're going to connect those wires to the certification ECU behind the glove box... the certification ECU looks like this and the wires we're looking for are in the connector that's circled.



The wires we need to locate there are the following:

Pin 3, green wire

Pin 4, red wire

Pin 18, black wire

Pin 20, yellow wire

Pin 32, light blue wire

Except for one wire, the wires here all need to stay connected and we'll have to use tap connectors to tap into them. Now, here are the connections you need to make:

1. The white wire with blue dots from the passenger door needs to be connected to the light blue wire on the ECU. This is the power connector for the switches in the door handle.
2. The white wire with black dots from the passenger door should be connected to the wire coming from the new hatch switch (the green wire, in my case), then both of those should be connected with the black wire on the ECU. This is the 'lock' sensor wire.
3. The white wire with yellow dots from the passenger door should be connected to the yellow wire on the ECU. You should also leave a short length of wire connected to this circuit to tie the existing hatch switch into later. It only needs to be a couple of inches long. This is the 'unlock' sensor wire.

4. The white wire with green dots should be connected to the green wire on the ECU. This is one of the antenna wires.

Now, the red wire on the ECU does need to be cut (or, if you can manage to pull out the pin and replace it with another pin you could do it that way). But this needs to be cut so we can hook the two door antennas up in parallel and wire that pair in series with the rear hatch antenna. Be sure to cut it leaving enough wire on both sides of the cut to connect other wires to.

5. One of the wires from the hatch antenna (it doesn't matter which) will be connected to the half of the red wire that is left in the ECU connector.
6. The other wire from the hatch antenna will be connected to the white wire with red dots from the passenger door, then both of those wires will be connected to the half of the red wire that's going back into the wire loom.

Here is how my car looked after making the above connections. The black wire you can see going off to the left is the lead that we left disconnected for now from step 3.



We're almost done... just one connection left to make. For this you'll need to go over to the driver's side and remove some additional trim pieces to get at the main body ECU. Start with the driver's side door sill... like the passenger side this just pulls straight up. Next remove the panel on the wall, and again, like the passenger side there's a thumb screw on the part toward the front of the car, then the panel just pulls away from the side of the car. Finally, unscrew one screw from the panel on the dash above that (the panel with the hood release) and pull that panel out of the way. Unclip the wires going to the switches and if you want, unclip the hood release, but you can probably just leave that connected and push it out of the way.

Now find the light grey wire on the connector circled in the picture below and using a tap connector connect a wire to it. I've already connected a red wire to it, which you can also see in the picture.



Route that new wire over to the passenger side of the car. I did this by pulling off the trim pieces on the right side of the driver's footwell and the left side of the passenger's footwell, then passing the wire through as the pictures below show.



Finally, connect the end of this wire to the lead that you had left disconnect earlier with the diode you got from radio shack between them. The cathode end of the diode (the end with the band) should be connected to the wire that goes to the ECU on the driver's side.

Button everything up and then go ahead and test it. You should be able to lock and unlock the car from the driver's and passenger's door handles as well as the rear hatch. Do note that the system won't allow you to immediately lock, then unlock the car... you need to pause for 20 or 30 seconds after you lock it before you try to unlock it or nothing will happen.

For my test round I started at the driver's door and locked the doors with the driver's door handle. Then I walked back to the hatch and unlocked them and opened the hatch. I shut the hatch and locked the doors with the new button on the hatch, then I walked to the passenger door and unlocked the car and opened the passenger door. I shut the door and locked them with passenger's door handle. Finally I walked around to the driver's side and unlocked the car and opened the driver's door.

If only the driver's door unlocks as you're testing this you forgot to set up your SKS system to unlock all the doors when the driver's handle is touched. The directions for doing this are in your manual and it can be done yourself in a few minutes.

Good luck☺