Factory EV Button Install

First of all - thanks Tosh for arranging the import of these buttons!

Second of all - this task really isn't suitable for the novice.

Now that I've said that, here are the details:

I've installed the EV switch using a factory switch and adapter housing. I constructed my own harness of sorts, and tapped existing wires for illumination and ground.

Tools used:

- 15ft of 22 gauge wire - 24 gauge recommended for EV + connector
- 4 connectors from plug kit (mentioned below)
- 3 telephone style taps from radio shack (p/n below)
- Wire connector crimper ($5 Wal-Mart job does just fine)
- soldering iron and solder
- Needle nosed pliers
- 1/4" flat head screwdriver
- 1/16" or smaller miniature screwdriver
- Multimeter or continuity tester
- Electrical tape
- Head mounted flash light (Mag-Lite with head-strap)
- Patience
- Digicam
- EV button and housing imported from Japan (Europe works too)

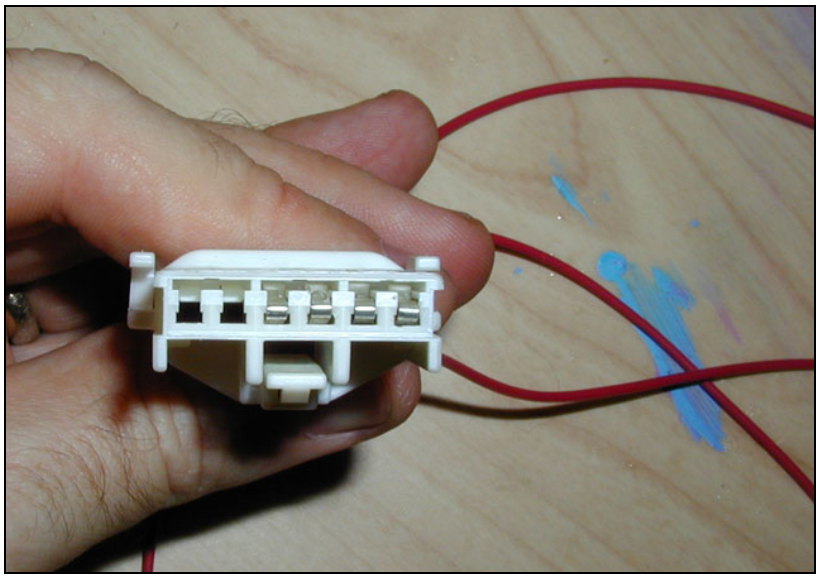
I used Evan's installation instructions. The only difference is that I used the factory button, and had to construct the harness for this, and tap the appropriate wires. I also installed the button and wiring first, and then ran the EV positive to the ECU using a coat hanger. I also disassembled more of the dash to facilitate wiring; however this was probably an unnecessary step for those who are good w/ the coat hanger.

First thing was to come up with some workable connectors. After checking with a Toyota dealer (Power Toyota Irvine), Radio Shack, and a few auto parts stores, I discovered a local store in Lake Forest, CA called RVAC Electronics. They have a lot of old stuff just strewn everywhere, however they had something that appeared that it could work. Turns out that a Philmore Branded .156 Lock Socket (Polarized 4 position - part number 70-6854) had enough connectors for me to play with - 8. Good thing - I ended up using 5 - one was an “experiment”. At 82 cents ($0.82) after tax, it wasn't a huge loss if they didn't work.

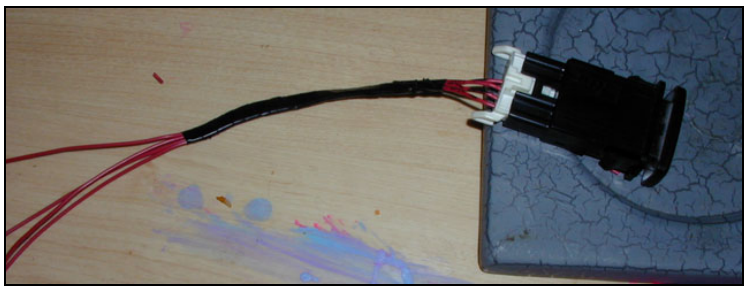
Picture of connectors:

Once I figured out that they were the perfect width, and were shaped in a way that I could insert them and have them semi-retained, I began constructing the harness. First I stripped 1/8" off one end of each wire, then crimped and soldered connecters to 4 lengths of 22 gauge stranded wire (note - 24 gauge would have been a bit easier, I'll explain later). I initially cut the lengths to 3 x 24in and 1 x 75in. In the end, it turns out that 12 inches was more than enough for the 3 short leads, and that 60 inches was probably fine for the longer lead - leave room to screw up though.

To install into the plug housing, I aligned the small locking tab (near the base) on the connector with the retaining clip in the housing and inserted. They will push all the way through if you go too far, however you'll know it's far enough when the connectors click and you can't pull them back out the way they came in. If they don't retain, they're in upside down.



I then plugged everything in (first time will be a bit tight while the connectors bend into place - the tabs on the EV button ride up over the top of the connectors, but they do provide a good enough connection). Then I tested the continuity between wires 1 and 2 (~50ohm is good, it's a light bulb), and the continuity between wires 3 and 4 with the button depressed. I then labeled each wire at both ends (pin 1 IL +, pin 2 IL -, pin 3 EV +, and pin 4 EV -), and wrapped with electrical tape. Don't forget to label - while the long wire is obvious, it's easy to confuse the shorter wires.

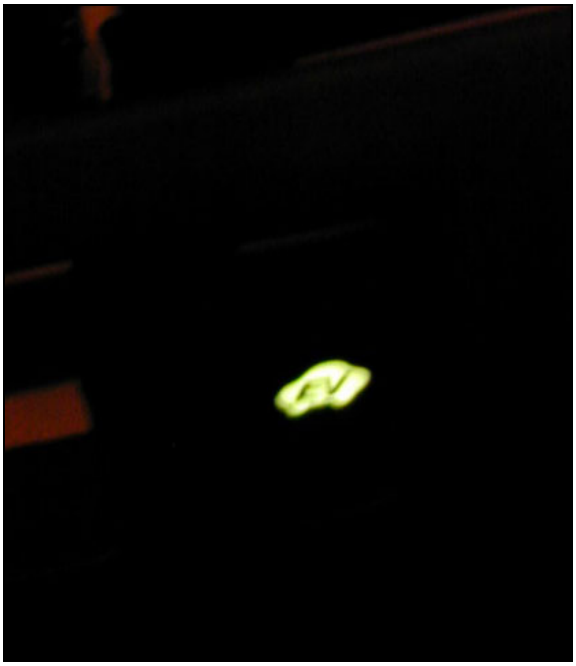


With the harness constructed, I took the "kit" out to the car, and proceeded to disassemble the areas per the other instructions. I also pulled apart the portion where the EV button and illumination dimmer resided for easier access - this just pulls out once you have the vent removed.

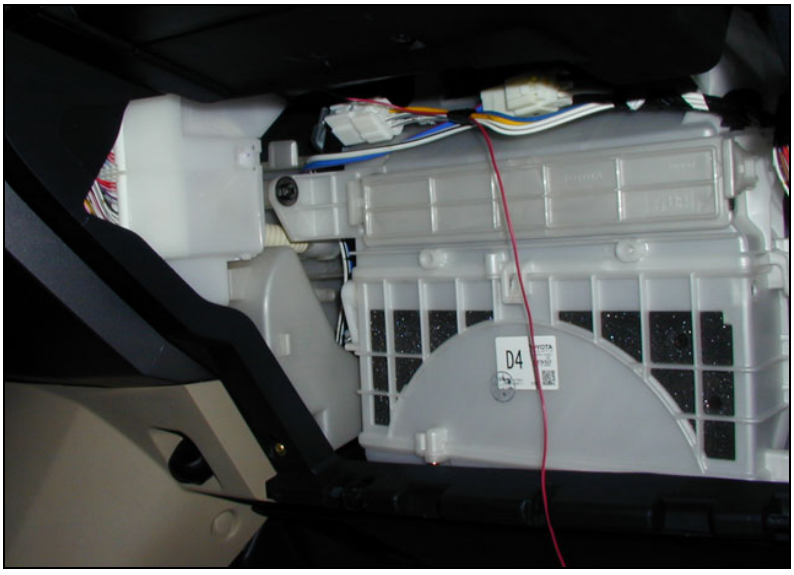
Next, remove the dimmer harness from the dimmer. I found it easier to remove the switch from the hole by squeezing the upper and lower retaining tabs and pushing the switch out. This harness is wrapped with some rubber which is somewhat glued together. It's easy to separate, and no cutting is required. Separate about 3-5 inches back, and then note the red, grey, and white with black stripe wires. These will be used for illumination and EV ground.

After trimming the 3 short leads to a reasonable size, using green Radio Shack Telephone taps (RS part number 64-3081, I tapped the IL(+) lead - pin 1 - to the grey wire from the dimmer harness, the IL(-) lead - pin 2 - to the red wire from the dimmer harness, and the EV(-) - pin 4 - to the white/black stripe wire from the dimmer harness. I then taped the wires together, and then closed the rubber coating as best as I could, using electrical tape to hold it together.

After that, I tested the EV button illumination by plugging in the dimmer to the plug, and turning on the parking lights. Success should yield an illuminated EV button which is brightness adjustable.



Next came the time consuming part. After removing the glove box and right vent (not really necessary, but makes it a bit easier to see), I fished a straightened coat hanger through the area behind/under the MFD to the drivers side dash. My dash was partially disassembled, so I could see the hanger. I then attached the wire to the hanger (had a loop at the end), and pulled it on through. I taped the wire on both ends to an existing loom to keep it from moving around, and to make peering technicians less leery about a stray wire floating around.



Up to this point, I hadn't attached the pin (I had obtained 6 the night before from the headlight/flasher assembly), and ended up using 3 of them due to trial and error). This is where 24 gauge would have made things a bit easier. The insulation on the 22 gauge is a bit too wide to slide into the pin without using the probe on my multimeter and a very small (1/16") screwdriver to widen the hole. Having done that, and then pushing the wiring firmly into place (no stripping required), and then crimping the stretched connector back together, I tested the continuity of the pin by touching the + of a multimeter to the pin, and the - to a chassis ground. I then reached over and pressed the EV to ensure that I was making contact.

I then followed the instructions on inserting the pin. The pin IS DIFFICULT to insert. I found that using a spare in and inserting 1-2 times to "stretch the hole" made final insertion a bit easier. It appears these pins aren't a perfect fit, but rather do the job if you choose not to use the Toyota parts. I also found that the metal doesn't need to be below the plastic, but flush. The retaining clip won't close all the way, but I discovered that most of the way is enough to get the plug back in. On my third pin, I settled on almost all the way in, with .5mm of metal still showing. I tested, and we worked.

Side notes

I tried to start the car w/o the 4th plug on the HV ecu plugged in. This was because I Feared my 12v battery could be running low due to my continued use of interior lighting (it's dark outside where my car parks). I had also unplugged the power button in order to remove that part of the dash for easier threading of the wire. Subsequently once the HV ECU was plugged back in, I had a check engine light with a red car with an exclamation (!) mark within. This went away after 3 or so restarts. I was a bit scared though - didn't want to explain to the service advisor why I felt I had a check-engine light...

I spent enough time to exhaust a set of AA batteries on my little Mag-Lite, and also managed to burn out a bulb mid-job. I found it very useful to use a head-strap for the Mag-Lite so that I had light on my job at all times. I wouldn't recommend inadequate lighting for this task.

All in all this took me two nights to complete, plus half a day of running around trying to find connectors. The first night was more exploratory, as well as retrieving the pins from the flasher. The second night, I had my wires and tools, and got the job done in about 4-5 hours. A bulk of the time was spent fishing the wire across (45 min) and inserting the pin (bent one, and took nearly an hour trying to ensure that I was doing it correctly). Dash assembly and disassembly goes quick thanks to the plastic clips - it's pretty much a tool free task to remove the panels.

EV is pretty cool - I did test the limits both speed wise and throttle wise. Surprising, but it's not going to let you overdo it on the battery.

Enjoy - let me know if you have questions.

-Rick
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