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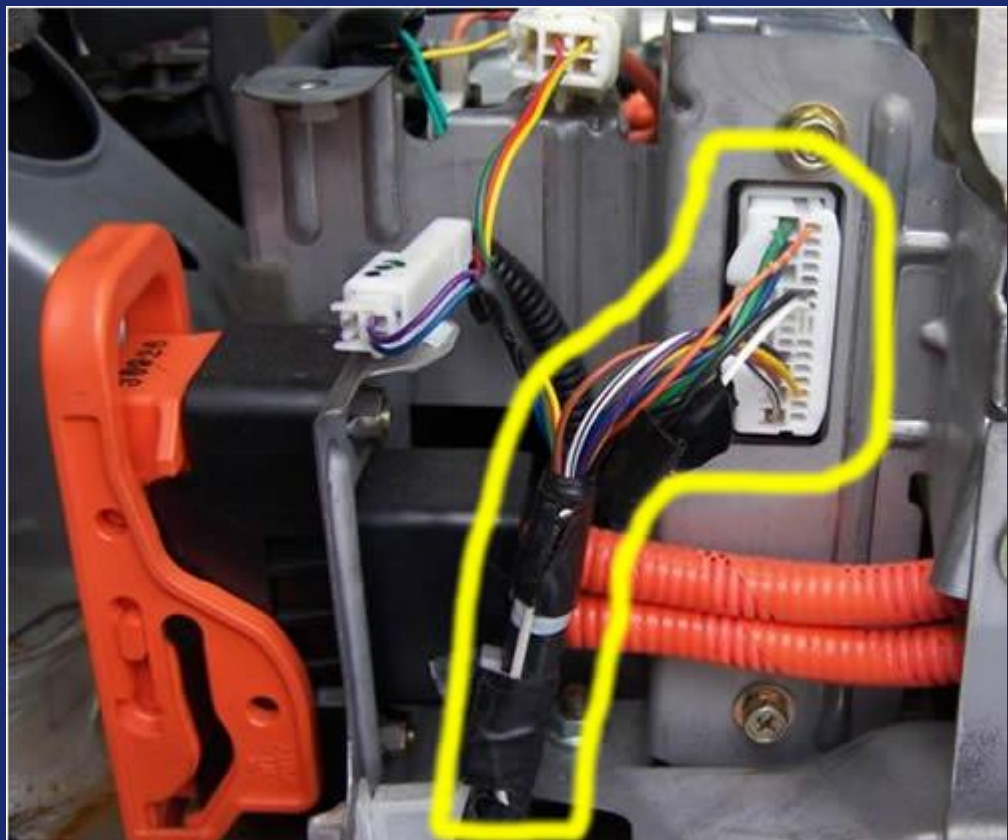
Installation

Plug-ins

Installation of a BMS+ harness.

A BMS+ system relies on an auxiliary ECU that is spliced into a few wires connecting to the OEM battery ECU. It is probably less work to do this at the same time that you have the OEM pack partially dismantled to connect the two power cables to an SB120 Anderson connector. That part is done exactly as for a CalCars type of PHEV conversion and you should study how this is done on their web-site.

The harness in question can be identified, highlighted in yellow, in this photo: these photos are courtesy of mrhigh@lipog.org, a very patient and persistent Prius enthusiast.



This shows the harness (with black tape around most of its length) feeding a few wires into the white plastic connector B11 that is inserted in the battery ECU. You have a total of 8 connections to make. Note only the GREEN harness wire and the two CAN wires (WHITE and BLACK) surrounded by a shield actually get cut: the others still go to their original destinations and are just tapped.

Start by disconnecting the 12v battery because 1 of the wires you are going to tap onto has 12v permanently on it even when the car is turned off. You can do this wire first. It is the only GREEN wire. Cut it roughly midway between the ECU connector and where the black tape starts. Put a piece of heatshrink over each cut end. Solder the GREEN wire in the BMS+ harness to either of the cut green ends and heat the heatshrink down on the join. Solder the RED wire in the BMS+ harness to the other cut green end and heatshrink that too. It does not matter which of the two cut GREEN ends goes to the BMS+ harness RED and GREEN. In this case only they are not polarity sensitive.

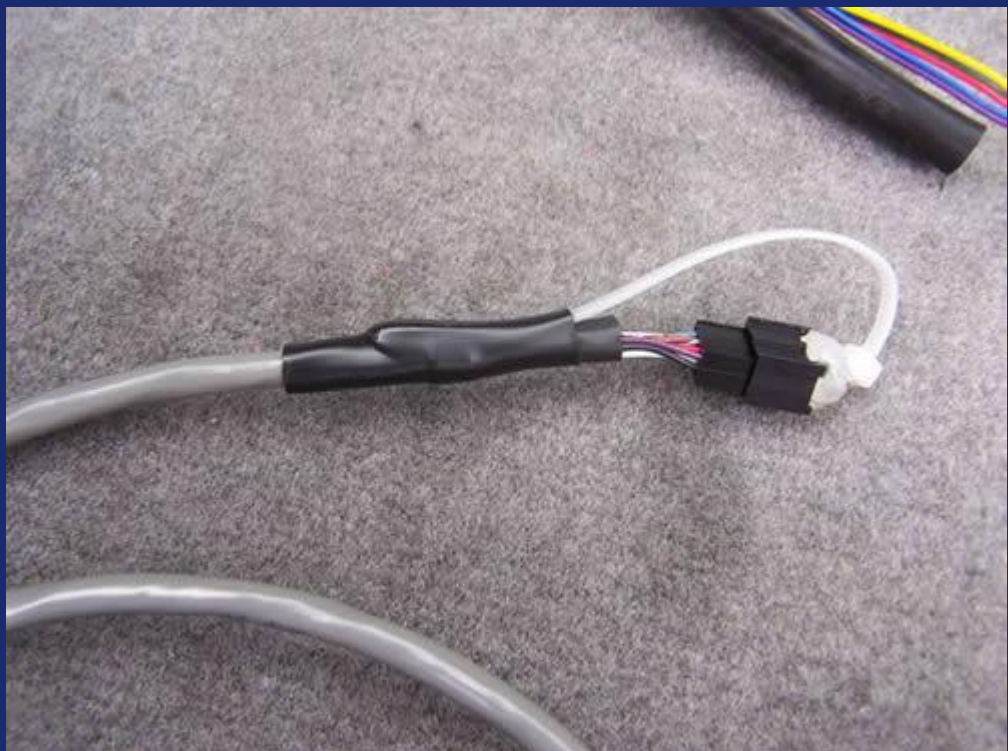
You need to solder the BMS+ harness BLUE wire to the only BLUE wire going to the ECU connector. You can either bare a bit of BLUE ECU wire and solder the two blue wires together without having to actually cut the blue wire, or a neater install may be to cut it and solder the three BLUE ends together with heatshrink on top.

You need to solder the BMS+ harness BROWN wire together with the bare shield wire to the WHITE/BLACK wire going to the ECU connector. You may have to peel the tape back a couple more inches to find this shield. Again, whether you cut that wire and use heatshrink, or just bare it enough to solder onto and then use tape is up to you.

Next cut the WHITE ECU wire which is the CAN lo. Connect the BMS+ harness WHITE wire to the end of the cut WHITE wire that comes from the black tape end. Connect the BMS+ harness YELLOW wire to the cut WHITE wire that goes to the ECU connector. In this case it DOES matter which end of the cut white wire is used.

In a similar manner cut the BLACK ECU wire which is the CAN hi. Connect the BMS+ harness BLACK wire to the end of the cut BLACK wire that comes from the black tape end. Connect the BMS+ harness PURPLE wire to the cut BLACK wire that goes to the ECU connector. In this case it also DOES matter which end of the cut white wire is used.

That is the splicing completed. Using tie-wraps secure the BMS+ harness so that it cannot fret on the metal edges as it exits the battery pack and bring the end with the back 8 pin connector out to wherever you are going to put the BMS+ unit.



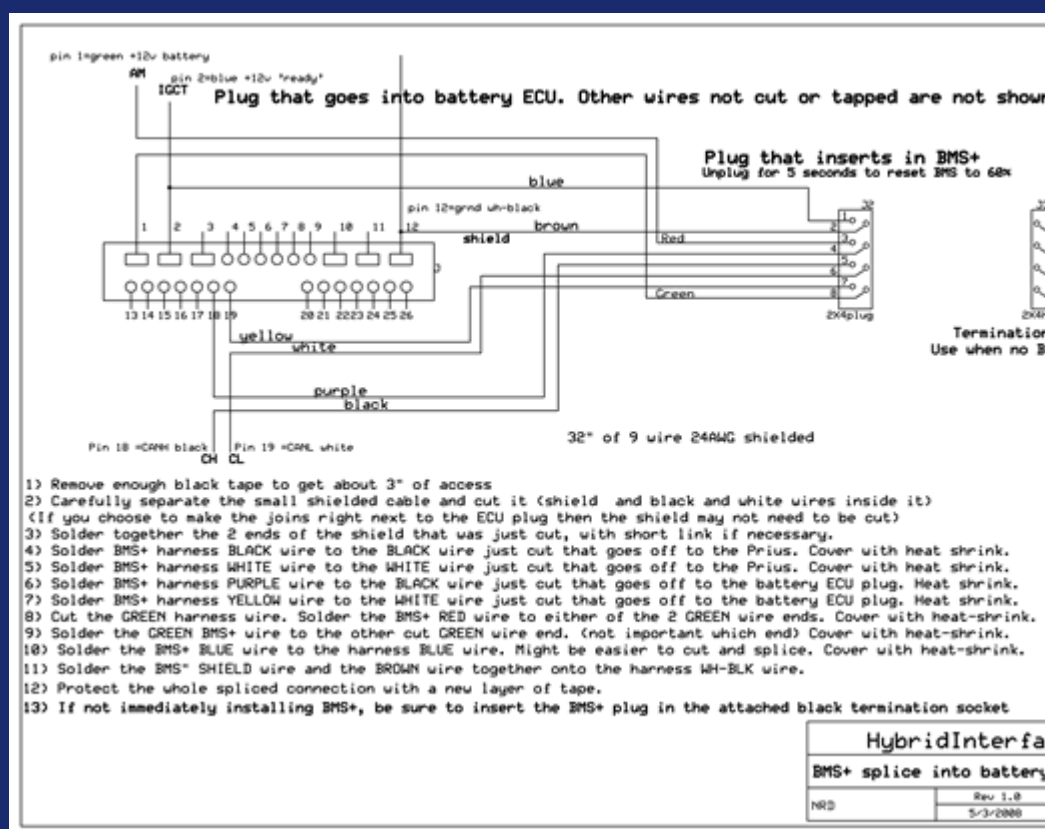
If you leave it as shown above with the termination plug installed in the end

instead of the BMS+ unit, then you can re-connect the 12v battery and check that the Prius behaves normally. From this point on, you must EITHER have this termination plug installed or the BMS+ unit installed: you cannot operate the Prius with nothing in that connector end. I recommend that you drive the Prius with just the terminator in, as a normal Prius, for a minimum of 1 day to be certain that it operates normally before proceeding to the next stage. There is no point in plugging in the BMS+ if you have any problems with just the harness splice addition.

Important note: the 8 pin connector may look similar to others used for monitor or CAN-view but there is an important difference. All these types of connector come with a locking tab which requires a small screwdriver to pry open in order to release. For all other connectors I cut this tab off to make removal easier in confined spaces (under the seat for example). Should it work loose, no harm is done. But the BMS connector, whether in the BMS board or in the terminator plug, must *not* be allowed to work loose, so this tab is left intact. Be aware then for this connector only a small tool is mandatory to remove it: just applying brute force will shear the wires off.

Basically with only these few wires involved, as long as the wires are connected as described to the correct colors and the termination plug is in place, it should work. If it doesn't, you will have to re-check your connections more carefully as there is no electronic circuitry involved at this point to go wrong, just a few spliced wires. *With the terminator plug in, all these wires go to exactly the same places as before this install.*

Here is the schematic for the changes involved in the wire splicing:



You can install the added packs before plugging in the BMS+ and confirm that this addition also operates as a normal Prius. You will however see little or no significant improvement in MPG with the OEM battery ECU in control. This is because the OEM ECU is not aware that you have added more capacity and so will not try to use it. The final stage after you are satisfied that the harness splice and added packs have not affected normal operation is to remove the terminator plug (using a small tool to prise

the locking tab: you cannot remove the plug just by pulling on it) and plug in the BMS+ instead.

As an example of how others are assembling salvaged packs to show that it is possible to do it much neater than my prototype, here is early BMS installer Ron's approach: This uses a small amount of room behind the rear seat but leaves the spare wheel and the underfloor area still usable.



It is also possible to rearrange modules to use the space where the spare wheel went for some of the modules such that enough space then exists above that (but still under floor) for the other modules plus the charger so that nothing is normally visible:

For more details on this person's PHEV, follow the thread at [aminorjourney](https://aminorjourney.com)







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