The Dr. Prius / Dr. Hybrid app

A Learn in 30 presentation by
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For PATACS + OPCUG
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AGENDA

- Why you should be interested
- The On-Board Diagnostics 2 (OBD2) socket in your vehicle
- Duration-based PHEV charging
- How to use the Dr. Prius app with your PHEV to calculate your per-minute charging rate
- Get the app
- Reliable and low-priced Bluetooth OBD2 adapters tested by the app maker

Why You Should Be Interested

- When you own a Hybrid, Pluggable Hybrid Electric Vehicle (**PHEV**) like mine, or an Electric Vehicle (**EV**), the large and expensive lithium-ion **traction battery** in the car plays a key part in the car's behavior.
- Hybrid and PHEV cars also contain a gasoline engine and a normal lead-acid battery to start the gasoline engine.
- A PHEV can operate as an EV, on battery power alone, and as a Hybrid, using traction battery power to augment the gasoline engine power.
- A PHEV is the cure for range anxiety. Mine gets 500+ miles per tank and averages 56 MPG in Hybrid mode.

Why you should be interested

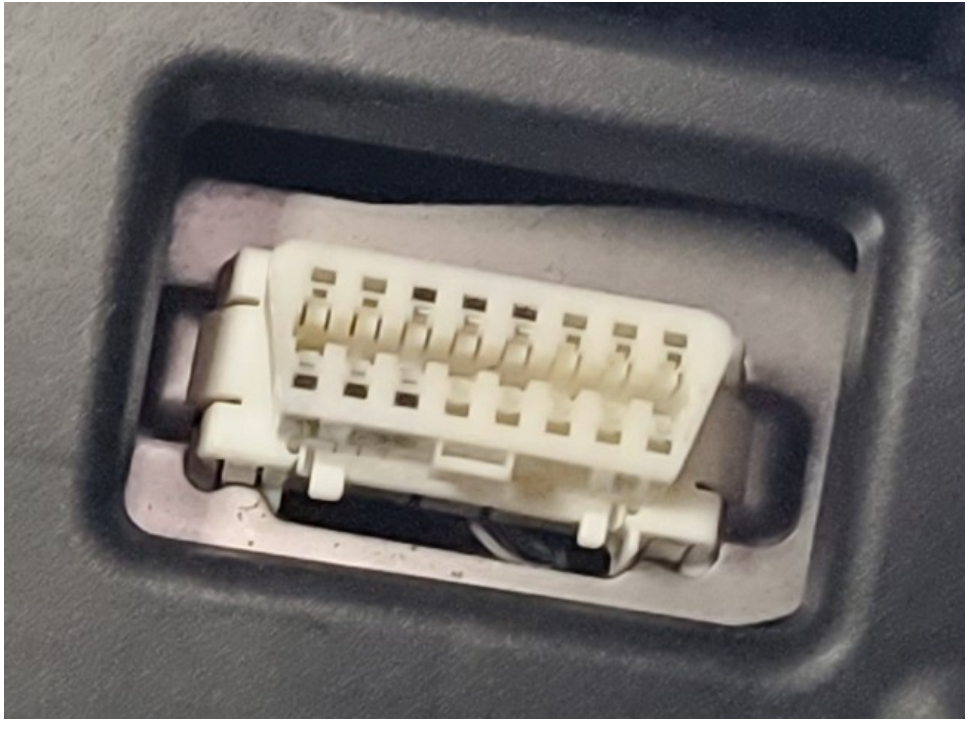
- The traction battery is made up of many smaller component batteries sometimes called **blades or cells**.
- Battery making is not perfect. Individual components can fail over time.
- One use of the app is to **identify a failed component**. A failed component can be replaced for a relatively cost.
- A second use of the app is to **check the traction battery condition** when test-driving a new or used Hybrid or PHEV.
- A third use is to calculate the traction battery **charging rate** so you can avoid charging the traction battery above 80%.

What is On-Board Diagnostics?

- All passenger vehicles sold in the US since 1994 include an On-Board Diagnostics (OBD) socket under the dashboard to collect data from vehicle computers.
- Your car contains many computers. Some are tiny single-purpose 4-bit computers.
- Apps exist that enable vehicle data collection from a Bluetooth adapter connected to the OBD2 socket to your Android or Apple portable.
- The current OBD standard, OBD2, was mandated by Federal regulations beginning in 1996.

The OBD2 socket in your vehicle

- The socket is usually below the dash and near the steering column. It is a trapezoid.
- You can spot it using your smartphone or tablet camera app in selfie mode. Put the portable on the floor below the steering column.
- On my 2020 Prius Prime LE, the socket is close to the driver door.



BlueDriver

- I demonstrated the BlueDriver app and OBD2 adapter in July 2019 for PATACS+OPCUG. That app works with all cars.
- The BlueDriver app does **not** provide traction battery info that the Dr. Prius / Dr. Hybrid app provides. The BlueDriver app gives specific diagnostic info for the dreaded ambiguous Check Engine light.
- The BlueDriver app is zero-cost for Android and Apple portable devices.
- The expensive BlueDriver OBD2 adapter will NOT work with the Dr. Prius app.

The charging range that extends your PHEV or EV traction battery life

- As mentioned in prior presentations on Lithium-ion batteries in smartphones and laptop computers:
- Charging from 0% to 20% of capacity generates battery heat
- Charging from 80% 100% of capacity generates battery heat
- Battery heat permanently damages part of the battery.
- Repeat that damage often enough and, the battery loses much of its capacity.
- Start charging at no lower than 20%. Stop charging at no higher than 80%.

What is duration-based charging?

- Figure out the **per-minute charging rate** for your PHEV. An example of that effort is shown later in this presentation.
- Use the app to see the traction battery initial charge level as as percent of its full capacity.
- Subtract 80% - traction battery initial charge level. That is the charge to be added to the traction battery.
- Divide charge to be added by per-minute charging rate. Result is number of minutes to charge the traction battery to 80% of its capacity.

Keep this in mind

- You can use the app to check the traction battery charge level only while the car is **powered up**.
- Normally, you can charge the car only while the car is **powered down**.
- The per-minute charging rate depends on the **charger being used** and the charging speed limit imposed by the car itself**.** That speed limit is seldom publicized.
- The charging rate for my home charger is much lower than the rate for most Level 2 public charging stations.

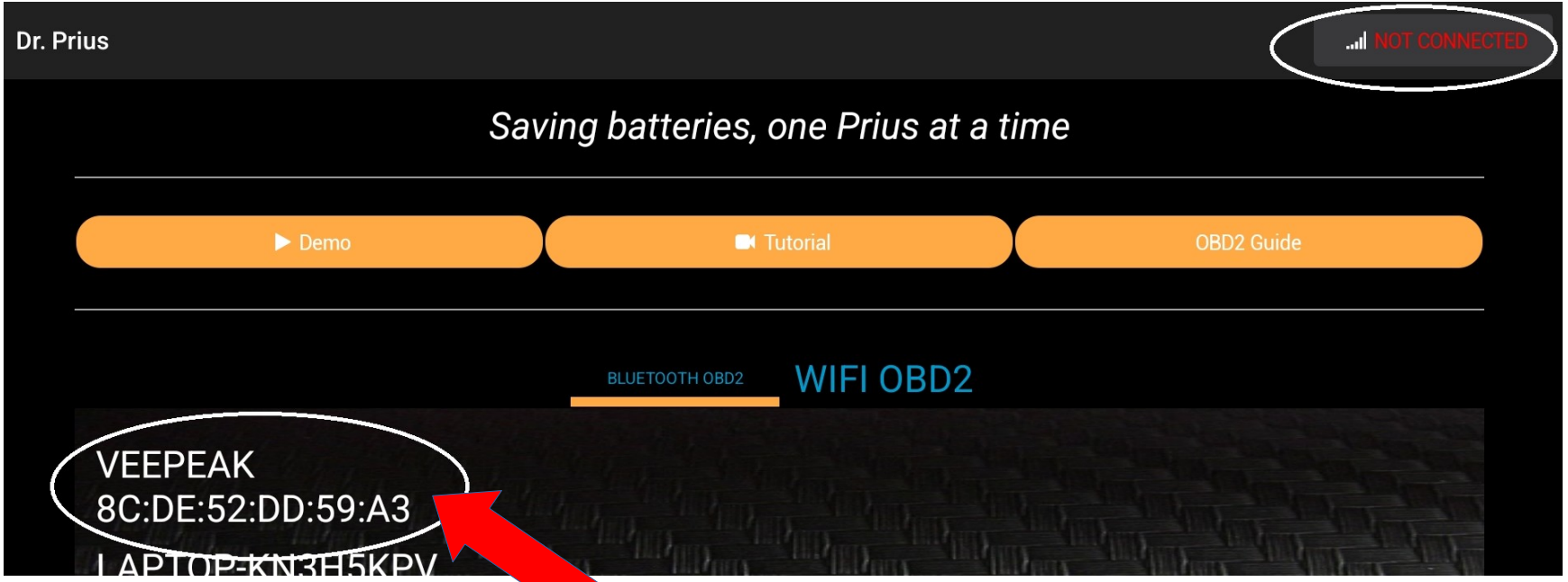
Steps to start the Dr. Prius app

- 1. Plug the OBD2 adapter into the OBD2 socket.
- 2. Power up the car. The OBD2 adapter LED glows blue.

- 3. Using Bluetooth on your portable device, pair (first time) your OBD2 adapter and your portable device.
- On Android devices, often it is not required to use Settings to **Connect** to the paired OBD2 adapter.
- 4. Start the Dr. Prius app.

The Dr. Prius app initial screen

The initial status in the upper right corner (circled) says **Not Connected** to an OBD2 adapter.



Tap your OBD2 adapter name.
Status shows **the adapter name.**

How to determine your PHEV per-minute charging rate

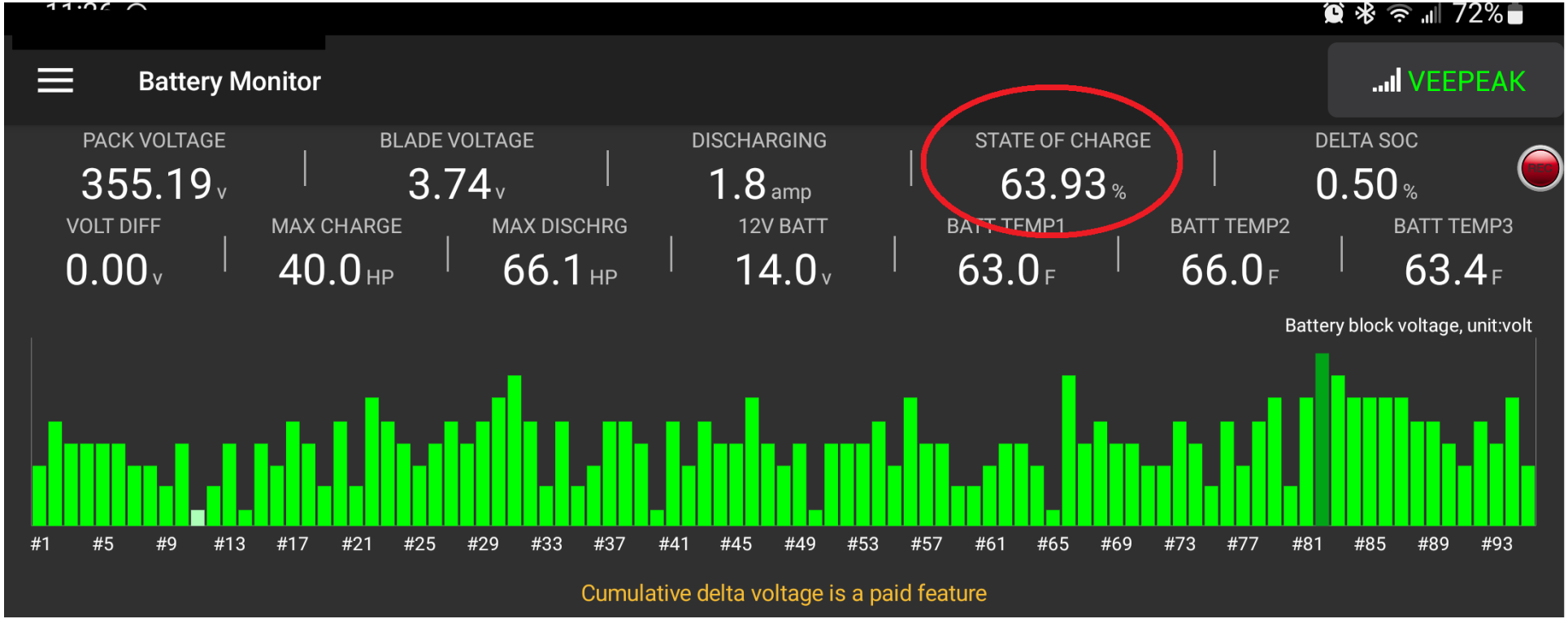
- Power up your PHEV. Use the app and adapter to see the **initial traction battery charge level.**
- Power down your PHEV.
- Set a timer for at least 10 minutes on your Apple or Android Clock app. More test time gives greater accuracy.
- Start charging and start the timer.
- When the timer reaches zero, promptly disconnect the charger plug from the car charging socket.

How to determine your PHEV per-minute charging rate

- Power up your PHEV again.
- Use the app and adapter to see the **final traction battery charge level**.
- Subtract final charge level – initial charge level.
- Divide the result by the test duration in minutes.
- That division result is your **per-minute charging rate,** in % per minute**.**
- That rate is specific to your PHEV and the charger you used.

Example using the app

- Power up your PHEV. Use the app and adapter to see the initial traction battery charge level: **State of Charge** (circled).

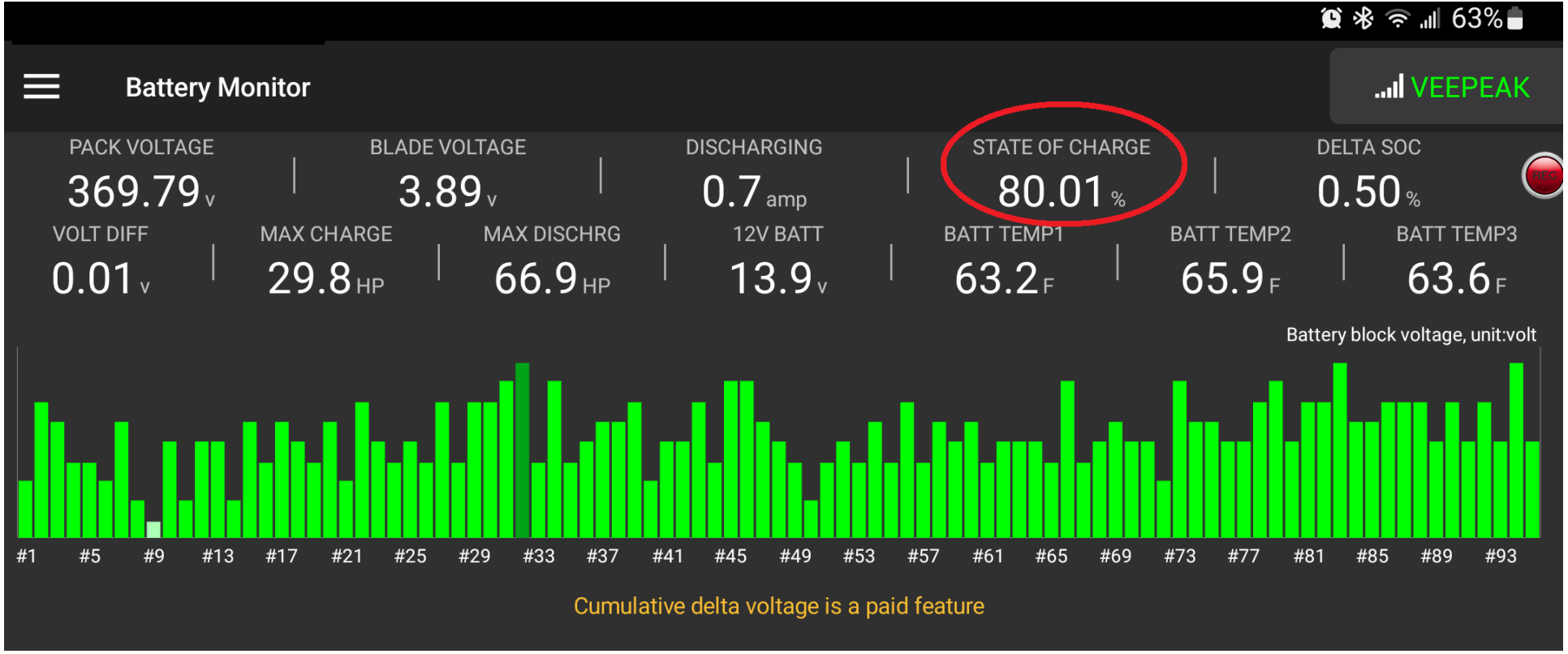


Example using the app

- Power down your PHEV
- Set the Clock app timer on your smartphone or tablet for the duration you choose for the timed charging test.
- Start charging your PHEV and start the timer.
- When the timer stops, promptly disconnect the charger.

Example using the app

- Power up your PHEV again. Use the app and adapter to see the final traction battery charge level: **State of Charge** (circled).



Example of per-minute rate calculation after a rate test

- Subtract 80.01% – 63.93% = 16.08%
- In my first test, I charged the car for 60 minutes using my home AC charging adapter, supplied by Toyota.
- Divide 16.08% by 60 minutes = **0.268% / minute.**
- 0.268% is the **per-minute charging rate** for my 2020 Prius Prime PHEV when using my home AC charging adapter.

Example of Charging Duration calculation

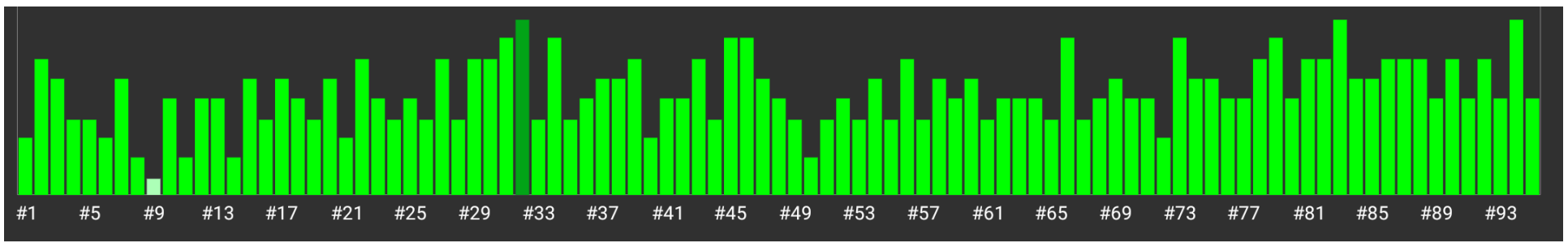
- Start the PHEV. Use the app and adapter to determine the Initial Charge Level.
- Subtract 80% - that Initial Charge Level. That result is the **desired charge level increase**.
- Divide that desired charge level increase by your Per-Minute Charge Rate.
- Example: Initial Charge Level is 25%.
  Desired charge level increase: 80% - 25% = 55%.
  Charging duration: 55% / 0.268 = 205 minutes
  (3 hours 25 minutes)

Your Hybrid or PHEV also charges during braking and driving downhill

- This uses the battery-powered motors as generators.
- My 2020 Prius Prime LE PHEV does have a setting to stop that on-the-go charging at 80% of the traction battery capacity.
- That setting is buried in the Prius Prime user interface and is not easy to find.
- Long/steep downhills can risk overcharging the battery.
- Another Prius Prime option is to turn on airco while charging the battery, to minimize battery heating.

Traction battery components status

- The number of components per traction battery varies. A Prius Hybrid has fewer components than a Prius PHEV, for instance. Some Hybrids might not have sensors on every component, but only on groups of components.
- My 2020 Prius Prime PHEV has 95 blades in its traction battery. Each blade has a sensor.
- The app bar graph displays the voltage on each blade.



Battery component diagnosis

- A 2020 Prius Prime battery component is expected to charge to no more than 9 volts and discharge to no less than 6 volts.
- The actual range of minimum and maximum voltage on a battery component is called the **Delta**.
- A long-term Delta greater than 3 volts indicates the Prius Prime battery component is failing.
- The blade bar in the graph appears yellow if the blade Delta occasionally exceeds 3 volts, and red if the blade Delta ***consistently*** exceeds 3 volts.

Dr. Prius / Dr. Hybrid app videos on YouTube

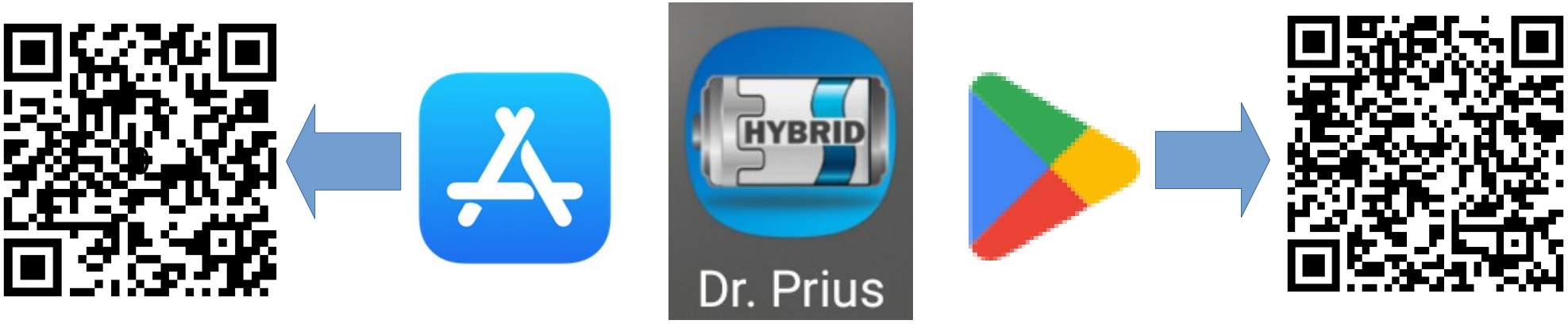
- On YouTube, search for “Dr. Prius” to find the videos.
- The videos are also accessible on the **priusapp.com** web site.
- Some of the videos explain more detailed test procedures using the app.
- Some tests are available only if you pay the subscription fee for the Pro version of the app.

If you need to replace a traction battery component

- If you are the original owner, ask your car dealer if your traction battery is covered by a warranty.
- If the traction battery is covered, then save money and have the dealer do to the warranty repair.
- The app also provides a list of traction battery repair shops offering repair in your area. You can contact the shops and compare repair prices.
- Some may be **mobile services**. Those services come to your car to do the component replacement.

Scan QR code to download the Dr Prius / Dr Hybrid app

- A zero-cost app for Apple and Android portables.



Vehicles known to work with the app

- I found this list on the **priusapp.com** site on 6/2/2025.

1. 2020+ Prius all lineup except 4WD version
2. 2020+ Highlander hybrid
3. 2017-2019 Prius Prime Plug-In
4. 2016-2019 Prius Gen4 One, Two, Two Eco, Three(Lithium) and Four(Lithium)
5. 2012-2015 Prius Plug-In
6. 2009-2015 Prius Gen3
7. 2003-2009 Prius Gen2
8. 1997-2003 Prius Gen1 (partial support)
9. Prius V
10. Auris
11. Aqua
12. Prius C
13. Feilder hybrid
14. Axio hybrid
15. Camry Hybrid
16. Avalon Hybrid
17. Highlander Hybrid
18. Lexus CT200h
19. Lexus ES300h20. Lexus HS250h
21. Lexus RX400h
22. Lexus RX450h
23. Lexus GS450h
24. Lexus LS600h
25. Lexus UX250h
26. CHR Hybrid
27. 2006 Estima Hybrid (partial support on Android and Amazon Fire)
28. GM hybrid - Tahoe

Reliable OBD2 adapters for the Dr. Prius / Dr. Hybrid app

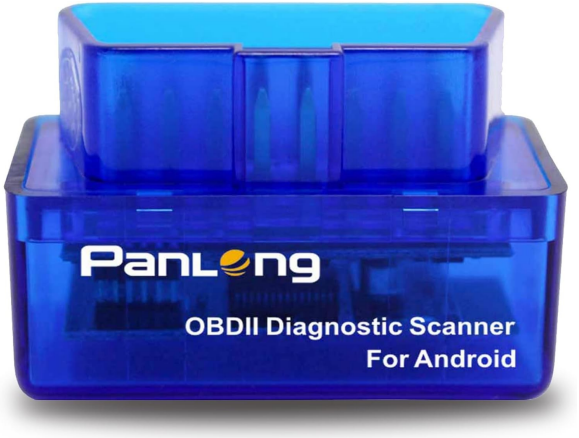
- The app maker does not make its own proprietary adapter. The app maker provides a list of adapters tested by the app maker and known to be reliable.
- Note: the list changes over time. Sometimes, an adapter is no longer made or is “upgraded”.
- I bought my **Veepeak** adapter after I came across the app a year ago. It was the top choice back then, but is no longer listed as a tested adapter. It is still available on Amazon but may have been upgraded. It is much more expensive than the ones now recommended.

Reliable OBD2 adapters for the Dr. Prius / Dr. Hybrid app

Tested and recommended
by the app publisher.

- PanLong adapter works with Apple and Android portables.
  $20.99 on Amazon as of 6/2/25

- PanLong adapter works with only Android portables.
  $12.98 on Amazon as of 6/2/25

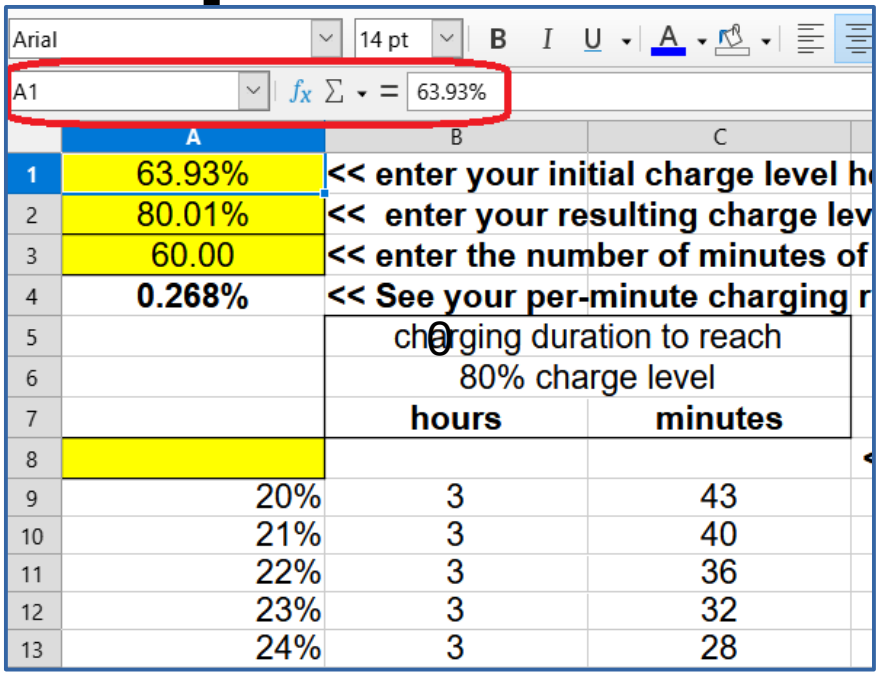


Update for BatteryMonitor.vbs

- This the the configurable Visual Basic script named **BatterMonitor.vbs** for telling you when to start or stop charging your Windows laptop battery.
- Bug fixes
- File name has not changed. Usage has not changed.
- One additional line is configurable:
  Line 33: dialog box duration in seconds (default is 5)
- New download URL: **tinyurl.com/3j8n4ram**

Charging Calculation Spreadsheet

- Works in Excel, Google Sheets, and LibreOffice Calc.
- Type in timed charging test data.
- The spreadsheet calculates:
  (1) Your pre-minute charging rate, and
- (2) a list of initial charge levels and the corresponding durations to charge to 80%, starting at 20% and in increments of 1%.
- May be the subject of a future Learn in 30 presentation.



Aerial Fireworks around DC 2025

- Saturday 6/28: Workhouse Arts Center, Fairfax
- Saturday 6/28: Lake Fairfax Park
- Saturday 6/28: Langley High School (rain date 6/29)
- Wednesday 7/2: Yeonas Park, Vienna
- Friday 7/4: National Mall, Washington DC
- Saturday 7/12: Alexandria Founders Day