



Recalibrating laptop batteries

If your laptop battery is older or reporting...

Written By: Nick

| Description | Value |
|---|--------------------|
| Battery Name | DELL 3VJJC56 |
| Manufacture Name | Samsung SDI |
| Serial Number | 37822 |
| Manufacture Date | |
| Power State | Discharging |
| Current Capacity (in %) | 99.3% |
| Current Capacity Value | 20,024 mWh |
| Full Charged Capacity | 20,169 mWh |
| Designed Capacity | 65,490 mWh |
| Battery Wear Level | 30.8% |
| Voltage | 12,060 millivolts |
| Charge/Discharge Rate | -21,789 milliwatts |
| Chemistry | Lithium Ion |
| Low Battery Capacity (1) | 1,976 mWh |
| Low Battery Capacity (2) | 6,549 mWh |
| Critical Bias | |
| Number of charge/discharge cycles | 0 |
| Battery Temperature | |
| Remaining battery time for the current activity (Estimated) | |
| Full battery time for the current activity (Estimated) | |
| Remaining time for charging the battery (Estimated) | |

INTRODUCTION

If your laptop battery is older or reporting incorrectly, it may be possible to recalibrate the battery. This can correct the reported capacity or battery gauge to extend the life of the battery.

IMPORTANT: Recalibration only corrects the capacity on worn out batteries. There is no way to reverse the aging process.

For help understanding what calibration is, why it's important, and how to calibrate batteries in other types of devices, check out the [Battery Calibration Wiki](#).

Guide notes

- ***If your battery exceeds 30-40 °C (86-104 °F), REPLACE THE BATTERY!***
- ***You will likely see a capacity decrease. This is good - not bad.***
- ***Try to avoid using the laptop while it is charging. This may affect the calibration.***
- ***Inconsistent reporting may indicate an EOL battery. Proper care delays this, but it cannot be avoided or reversed.***
- ***If your battery is older, consider a ~10% discharge. A full discharge may kill the battery.***

How to recalibrate the battery

- Charge the laptop to 100%. Use it until it shuts down and no longer turns on.
 - See ***BIOS lockouts and EOL quirks*** for HP and Lenovo laptops.
- Immediately recharge the battery. Do not use the laptop if possible.

BIOS lockouts and EOL quirks

- **(BIOS lockout) HP laptops have a 15% BIOS lockout and need to be bypassed for a full discharge.** Immediately charge the battery once the laptop shuts off.
 - **All HP and most Compaq laptops.**
- **(BIOS lockout)** Some Lenovo laptops have a 7% critical capacity lockout (0190).
 - **Only occurs if the laptop shuts off early. Easily bypassed.**
- **(EOL quirk) Some Dell batteries hold incorrect data once the battery is heavily worn, or end of life. This issue self corrects with time. I have seen this on a few OEM Dell batteries. Notably, the NX31D (DOM unknown/2x with same issue) 65Wh (2014 DOM/E6440) and a RMJFW 65Wh Extended (2014 DOM/E6220). The 45Wh 34GKR is prone to it, but to a lesser degree (2014 DOM/E7440).**
- **(Firmware quirk) Some laptops like to show 0% wear in BatteryInfoView - notably most HP models. In order to access the data with HP, you must run the diagnostics (UEFI may be required), or use the HP Support Assistant battery check and find the advanced info. This is not a hardware fault, but a quirk with HP.**

TOOLS:

IR Thermometer (1)

Optional; Useful to check the battery temperature.

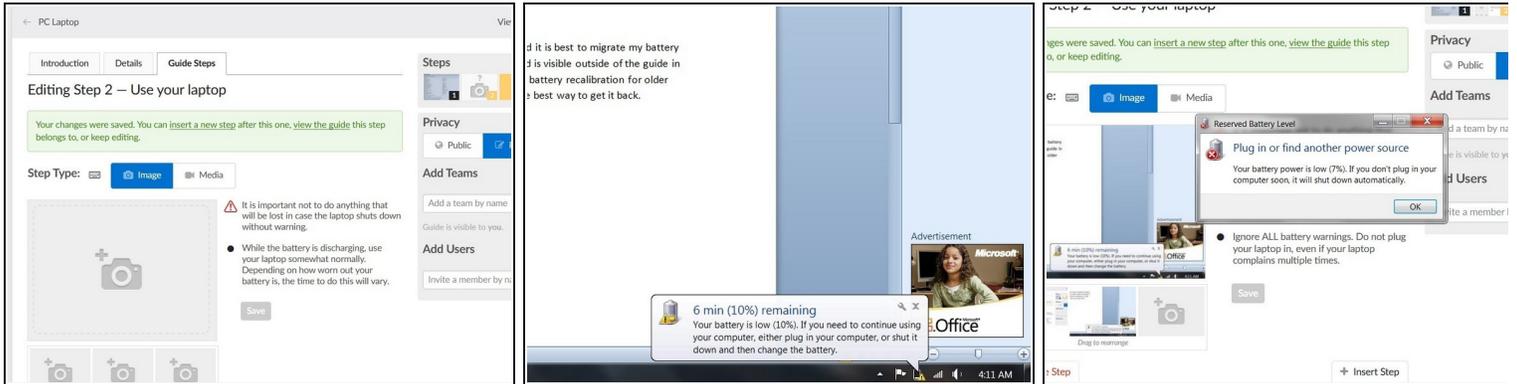
Step 1 — Log the original calibration data

| Description | Value |
|---|--------------------|
| Battery Name | DELL 3VJJC56 |
| Manufacture Name | Samsung SDI |
| Serial Number | 37822 |
| Manufacture Date | |
| Power State | Discharging |
| Current Capacity (in %) | 99.3% |
| Current Capacity Value | 20,024 mWh |
| Full Charged Capacity | 20,169 mWh |
| Designed Capacity | 65,490 mWh |
| Battery Wear Level | 30.8% |
| Voltage | 12,060 millivolts |
| Charge/Discharge Rate | -21,789 milliwatts |
| Chemistry | Lithium Ion |
| Low Battery Capacity (1) | 1,976 mWh |
| Low Battery Capacity (2) | 6,549 mWh |
| Critical Bias | |
| Number of charge/discharge cycles | 0 |
| Battery Temperature | |
| Remaining battery time for the current activity (Estimated) | |
| Full battery time for the current activity (Estimated) | |
| Remaining time for charging the battery (Estimated) | |

 ***This battery is too far gone for recalibration.***

- Before recalibrating the battery, charge the battery to 100%. Take a note of the initial data.

Step 2 — Use your laptop



⚠ Any data from this step will be lost. Only plug the laptop in to get the machine started from a BIOS lockout.

⚠ If you are using a Windows laptop, make sure you turn the laptop back on after the initial shutdown. Windows is designed to shut down when the battery in the laptop reports ~3% remaining capacity. This may require brief use of the power adapter if the laptop does not turn on until the charge is higher or it has AC power.

- Use your laptop while it is discharging. You will want to do this until the computer shuts down, and if you are using Windows turn it on again until the laptop no longer turns on; this ensures a full discharge.

Step 3 — Plug your laptop in



☑ **While it is safe to use your laptop, the calibration accuracy may be affected.**

- **Every laptop has a different charge indicator.** When your laptop is fully discharged, plug it in **immediately**. Fully charge the laptop.

Step 4 — Verify the new calibration data

| Description | Value |
|---|-------------------|
| Battery Name | DELL 3VJJC56 |
| Manufacture Name | Samsung SDI |
| Serial Number | 37822 |
| Manufacture Date | |
| Power State | AC Power |
| Current Capacity (in %) | 201.6% |
| Current Capacity Value | 65,490 mWh |
| Full Charged Capacity | 32,479 mWh |
| Designed Capacity | 65,490 mWh |
| Battery Wear Level | 49.6% |
| Voltage | 12,509 millivolts |
| Charge/Discharge Rate | 0 milliwatts |
| Chemistry | Lithium Ion |
| Low Battery Capacity (1) | 1,976 mWh |
| Low Battery Capacity (2) | 6,549 mWh |
| Critical Bias | |
| Number of charge/discharge cycles | 0 |
| Battery Temperature | |
| Remaining battery time for the current activity (Estimated) | |
| Full battery time for the current activity (Estimated) | |
| Remaining time for charging the battery (Estimated) | |
| Total time for charging the battery (Estimated) | |

⚠ This procedure may "kill" end of life batteries.

- Once you are finished, check the BMS data. The reported data should be corrected.

Step 5 — (Windows 10) Battery health check

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.18299.125]
(c) 2017 Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>powercfg /batteryreport
Battery life report saved to file path C:\WINDOWS\system32\battery-report.html.

C:\WINDOWS\system32>
```

Battery report

COMPUTER NAME LAPTOP-ACE0891Q
SYSTEM PRODUCT NAME LENOVO 8020
BIOS GCN528WHE (89W)0281
OS BUILD 16299.15.amd64fre.19h1_release.170928-1534
PLATFORM ROLE Mobile
CONNECTED STANDBY Not supported
REPORT TIME 2017-12-20 22:44:49

Installed batteries
Information about each currently installed battery

| NAME | BATTERY 1 |
|----------------------|-----------|
| MANUFACTURER | SANYO |
| SERIAL NUMBER | 893 |
| CHEMISTRY | LCR |
| DESIGN CAPACITY | 45000 mAh |
| FULL CHARGE CAPACITY | 41440 mAh |
| CYCLE COUNT | - |

Recent usage
Recent usage over the last 3 days

| START TIME | STATE | SOURCE | CAPACITY REMAINING |
|---------------------|------------------|---------|--------------------|
| 2017-12-20 22:44:49 | Active | Battery | 57% 15,000 mAh |
| | Report generated | Battery | 57% 15,000 mAh |

Battery report

COMPUTER NAME DELL-FROM-HELL-
SYSTEM PRODUCT NAME Dell Inc. Latitude E6440
BIOS A21 02/01/2018
OS BUILD 18362.1.amd64fre.19h1_release.190318-1202
PLATFORM ROLE Mobile
CONNECTED STANDBY Not supported
REPORT TIME 2020-10-07 14:19:17

Installed batteries
Information about each currently installed battery

No batteries are currently installed.

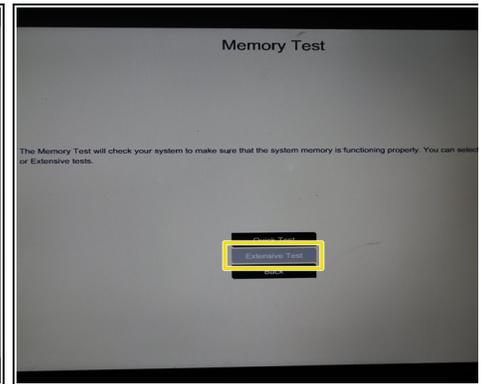
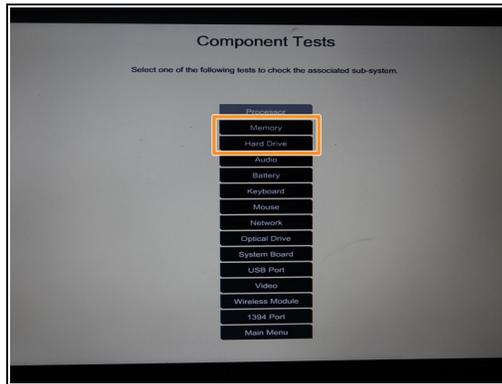
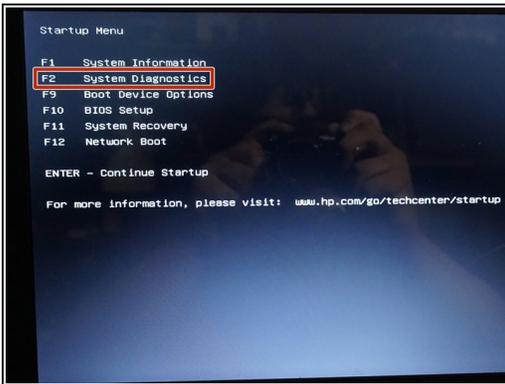
Recent usage
Recent usage over the last 3 days

| START TIME | STATE | SOURCE | CAPACITY REMAINING |
|---------------------|-----------|---------|--------------------|
| 2020-10-05 18:49:31 | Active | Battery | - |
| 18:50:33 | Suspended | - | - |
| 18:51:34 | Active | AC | - |

⚠ This may not work if your battery is older, even if it is an OEM pack.

- Run Command Prompt as an administrator. Enter **powercfg /batteryreport**.
- When the report is ready, you will receive a message stating where it is located. Check the data for consistency.

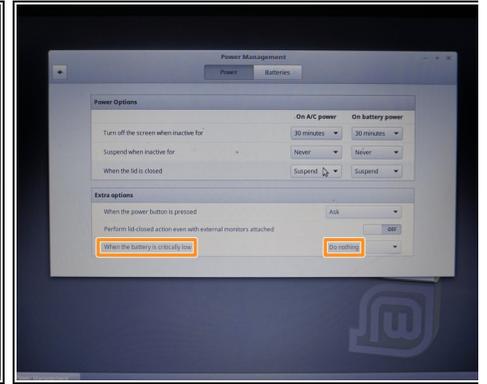
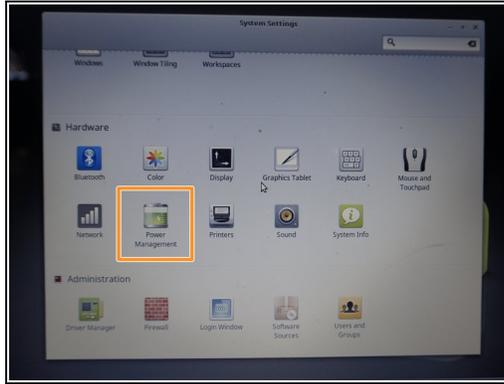
Step 6 — (HP UEFI) 15% lockout bypass



⚠ This will fully discharge the battery. HP diagnostics do not check the charge capacity.

- Plug the laptop in and turn it on; unplug it once it is on. Press **ESC** and select **System Diagnostics**.
- Open the **Component tests** submenu. Select **Memory or Hard Drive**.
- Select **Extensive test**. Choose **Loop until error**.
- **When the laptop shuts off, immediately recharge the battery.**

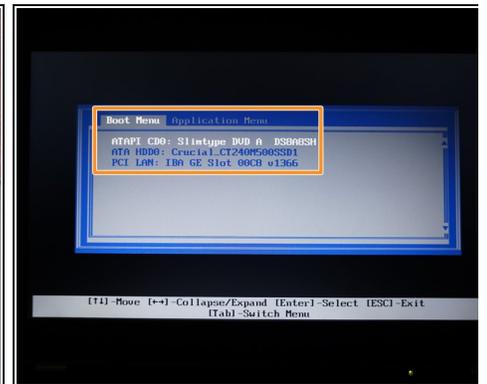
Step 7 — (HP Legacy BIOS) 15% lockout bypass



⚠ DO NOT apply these settings to your primary OS. They may damage the battery.

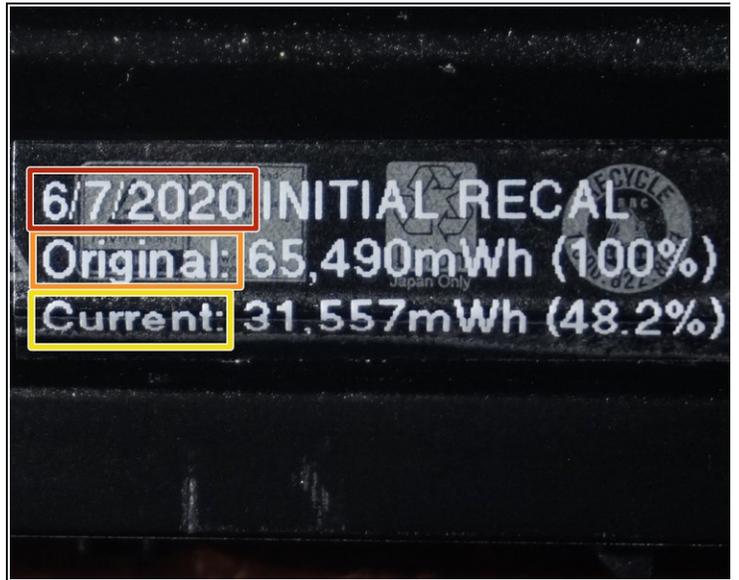
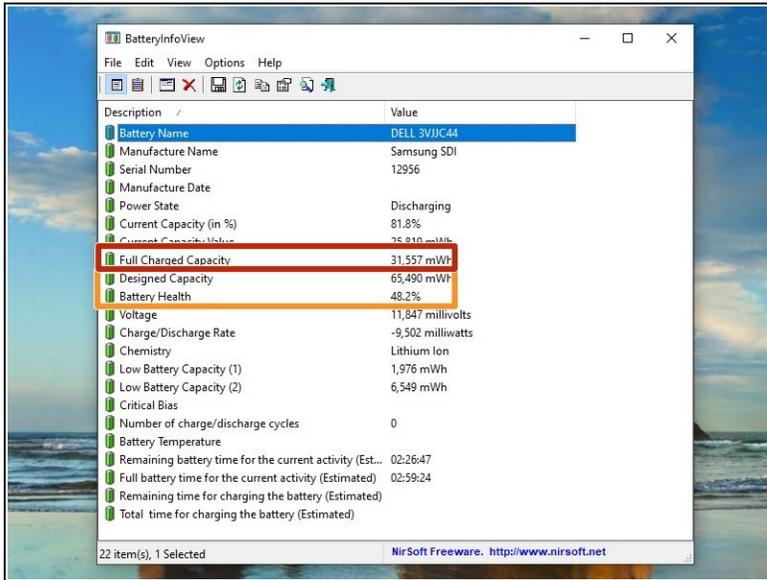
- Boot the laptop into a live [Linux Mint Cinnamon](#) session. Open **Settings** and make the following changes:
 - Open **Power Management**. Change **When the battery is critically low** to **Do nothing**.
 - Use the laptop until it shuts down. **Everything from this session will be lost.**

Step 8 — (Lenovo 0190) Critical low battery bypass



- Plug the power adapter into your laptop. **Allow POST to finish before unplugging the laptop.**
 - Disconnect the laptop once the laptop is booted. Finish discharging the battery.

Step 9 — (Optional) Label the battery



i To better track the estimated health of the battery, labeling is recommended.

- Note the date of the recalibration.
- Note the original charge capacity (Designed capacity).
- Note the current capacity of the battery (Full charge capacity).