



# LAVA Advanced Battery Info Android Application

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## Abstract

The LBI (LAVA Battery Information) application reports battery status for select Samsung Android-based mobile devices. In addition to the standard battery information available through Android, the battery charging current is reported.

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## Introduction

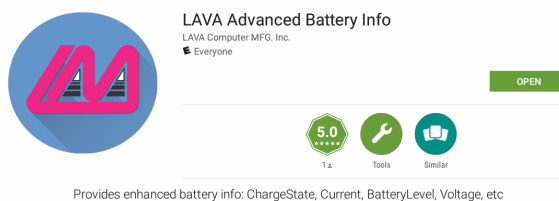
The LBI (LAVA Battery Info) application reports battery status for select Samsung Android-based mobile devices. In addition to the standard battery information available through Android, the battery charging current is reported. This application works with Samsung mobile devices compatible with the LAVASync, LAVASync+, eSTS-\*\*, nSTS-\*\*, and STS-\*\* adapters.

The latest version of the utility can be downloaded directly from the LAVA web site. Using the APK version from the LAVA web site use useful as it permits the utility to be quickly side loaded on to a mobile device for testing.

This utility is also available on Google Play to anyone working with the LAVA family of mobile device adapters. The version on Google Play is typically older than what can be loaded directly from the LAVA web site.

The Google Play filters are set to present this application only for select Samsung mobile devices. If you are using a “new” Samsung device, the filters may not have been updated. Please contact LAVA sales or support so we can get the program to you.

### “LAVA Advanced Battery Info” on Google Play



### “LAVA Advanced Battery Info” running on a mobile device



The Battery Charge Icon of an Android device does not provide a true indication that the battery is charging. This indicator only reports that a voltage has been applied to the device. If the voltage that reaches the device is too low, the device battery may actually be discharging even though the Battery Charge Icon reports charging.

You cannot rely on the Battery Level due to the update rules used by Android. The Battery Level indicator can get stuck or drop by an unexpected amount when discharging. When a device is running a CPU intensive application such as playing a video, some devices have been seen to go from 20% charge to shut down with no additional warning.

Measuring the current entering a mobile device cannot be used to confirm how the battery is being charged. The current entering the device must provide for the device operation, with excess current being available for the battery charge operation. Many Samsung mobile devices are designed to limit the current that can enter the device in SimulCharge mode that adds another complication for a system developer.

To ensure the battery is actually being charged, the battery charge current must be monitored. The Samsung mobile devices used with the LAVASync, LAVASync+, eSTS-\*\*, nSTS-\*\*, and STS-\*\* adapters have the ability to report the battery charge current.

The program uses a hidden mechanism in a Samsung mobile device that reports the battery charging current. The reported current level changes slowly, which is a device specific issue, so you must be patient when checking the charge rate.

The LBI Test Application was developed as an in-house test tool at LAVA Computer MFG Inc. This application reports the battery charging current and the standard Android Battery information. The "Charge State" is also evaluated by the application in place of the Android Battery Status.

The LBI specifications are subject to change without notice. The LBI (LAVA Battery Information) application and documentation are owned by LAVA Computer MFG Inc, Copyright 2019. The LBI application can be freely used by customers working with the LAVA family of mobile device adapters. However, this is not an open source application and has not been put in the public domain.

## Application Features

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When the LBI application is put into the background, a periodic Android Toast message reports the battery status. This allows a customer application to be run and permit the battery charge status to be still observed. The options menu has an "LBI Shutdown" to optionally terminate the program.

When the LBI application is active, the screen is not allowed to go into a sleep state.

In addition to reporting battery status, the LBI reports the screen brightness and the device serial number.

The screen brightness report has been useful during mobile device testing by LAVA. The screen is a major consumer of power. If the brightness is too high, there is less power available for battery charging.

The application has the option to write the battery information to a log file. The log file is located in the Download folder. The file format is always UTF8 (simple ASCII). The file name is LBI\_LOG\_\*, where \* is the mobile device serial number. The log file header reports the contents of each field, application version, android version, and build number, and serial number. The file is limited to 25,000,000 characters.

The application has an option to periodically test a network connection. The test involves opening and closing a TCP connection every \n\ seconds, where \n\ is 5 to 360. No data is transferred during the test. This test is set up using a simple UTF-8 formatted file. If this testing mechanism is of interest to you, please contact LAVA for further details.

## Application Operation

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The application reports “Charge State”, which is an alternate battery status to that reported by Android. It does so by tracking the battery charge current to see if the tendency is to go up or down. Some of the standard Android status is factored in.

The LBI application can be put into the background to permit a user selected application to run.

The battery charge current measurement update varies between the different device models. In some models, the reported current may not change for many seconds. You must observe the mobile device you are using to determine how fast the update is before accepting a reading.

The program samples the android information once a second. If the program is not in the foreground, then a toast message is displayed every 10 seconds with the following:

- Charge State
- Current
- Current Average (from last 2 minutes)
- Battery Level
- Battery Temperature

The Charge State is mainly reported as DRAINING or CHARGING, along with a current range. The following information is direct from Android and the mobile device:

- Battery Level
- Current
- Current Average
- Voltage
- Status
- Plugged
- Temperature
- Health
- Brightness
- S/N (Serial Number)

The program tracks the min and max values for Current. It also tracks an average for the Current for the last two minutes, so it is different from Current Average.

The program tracks the min and max values for Voltage. The reported Voltage is the Battery Voltage reported by Android, not the input voltage to the mobile device.

The Charge Tendency is a running sum of Current, with a limit of +250 and -250. This is the main parameter watched to determine the "charge state".

The Charge Tendency has a second sum reported between '\(' and '\)' characters. This is also a running sum of Current, but with limits of 1000000 and -1000000. In a perfect world, the long tendency would report the actual charge in the battery; however, the starting point is never known. The values in between the 1-second samples are not known. This long sum has been useful in some tests.

The Charge State Changes is simply a count of the number of jumps in Charge State.

The Sample Count is the number of times the program timer has run to collect a sample. The Sample Count should advance every second.

The Screen Brightness report is handy to know the actual brightness level. Some mobile devices only have a slider to set the brightness. This lets you know if you are at 50 percent versus 55 percent (etc.).

The brightness level of the application background can be set to a number of levels via a button. This was useful in many of our tests.

The Status field is the Android report of battery status. The Status field replaces the "charging" report with "Voltage present (from Android)". The Android Status of "charging" is misleading. If the input voltage to the mobile device is above the reset threshold, then "charging" is reported even though the battery could be draining due to a low input voltage and a bright screen. The screen is the major consumer of power on all these devices.

## **Additional Notes**

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The charge current has not been verified against physical battery measurements. Based on close observation of many mobile devices, it does provide an indication of the charge going up or down.

The LBI application does not work with the original Samsung Tab Active. This tablet is not included in the LAVA compatibility table for LAVA adapters. This tablet does not support the battery current report that other Samsung devices have. The reporting mechanism is present. However, a fixed value is always reported. The Samsung Tab Active2 works with LBI and correctly reports the charging current.

The LBI application does not restrict itself to running only on Samsung devices. The mechanism used to detect battery current is known to work on Samsung devices and is generally not found on other manufacturer's devices. As this application began as an in-house test program, only Samsung devices used with the LAVA family of adapters have been explored.

Measurements reported by LBI should always be confirmed through your own tests before deploying any system. The accuracy of the reported current can vary with each tablet and tablet model.

The LBI Test Application is owned by LAVA Computer MFG but can be freely used by customers that have purchased and are working with the LAVA family of mobile device adapters.

## Technical Support

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LAVA Technical support is open from 9:00 am to 5:00 pm Monday to Friday (EST).

Telephone: +1 416 674-5942

Fax: +1 416 674-8262

Toll-Free (the US and Canada): 800 241-5282

Internet: [www.lavalink.com/helpdesk](http://www.lavalink.com/helpdesk)

## History

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| Document Revision | Date         | Change  |
|-------------------|--------------|---|
| A00               | Sep.6, 2016  | Initial release.  |
| A01               | Jul.24,2018  | Revised text management to support smaller screens.<br>Each support screen now has a “back” arrow.<br>Moved tablet information to the new “About Device”. |
| A02               | Feb. 7, 2020 | Minor updates. Also, added comment that the APK version can be downloaded from the LAVA web site.   |
|                   |              |   |