# Agilent
# Battery Charger Test Using Agilent USB DAQ

Application Note

Agilent Technologies

## Introduction

There are more and more portable devices in the market today. Examples of portable devices are cellphones, MP3 players, cordless phones, and digital cameras. These devices become more common as they get less expensive. In order to support the increasing number of portable devices, more battery chargers are designed. The reliability of a battery charger is important in ensuring that it does not overcharge. This prolongs the lifespan of a battery and reduces damages to its internal components.

### Battery Charger Test

Much research has been done on the battery, leading to increased interest in evaluating the performance of the battery charger system. Figure 1 shows the basic block diagram of a battery charger system. The following tests are used in evaluating the performance of the battery charger:

- Discharge mode test
- Charge (or maintenance) mode test
- No-battery mode test

These tests typically measure voltage, current, and temperature, and you may choose to use digital multimeters and temperature sensors. The number of multimeters or sensors that are needed for measurement depends on the number of measured parameters. This is resolved, however, if Agilent's USB data-acquisition (DAQ) device is used instead.

The Agilent USB DAQ device has up to 64 input channels, and each module can be fitted into the six-slot Agilent modular instrument chassis. This gives a maximum of 384 channels when fitted into the chassis and automatically enables synchronized data measurements. This simplifies the integration of multiple instruments.

With sampling rates of up to 3 MSa/s and all the way down to 3 Sa/s, the performance of signals over short intervals can be monitored over a long period of time. USB is the most common interface in PCs nowadays. This enables low switching and start-up cost in this particular test system.

Figure 2 shows the block diagram of a test system that is used to evaluate the performance of the battery-charging system. The input channels of the Agilent DAQ device are utilized to perform simultaneous measurements of various parameters from the battery charging system. The measured variables are then sent to the PC for further analysis. The voltage is directly measured by the DAQ device using an analog–to–digital converter (ADC). The current transducer converts the measured current to voltage output before it is sent to the DAQ.

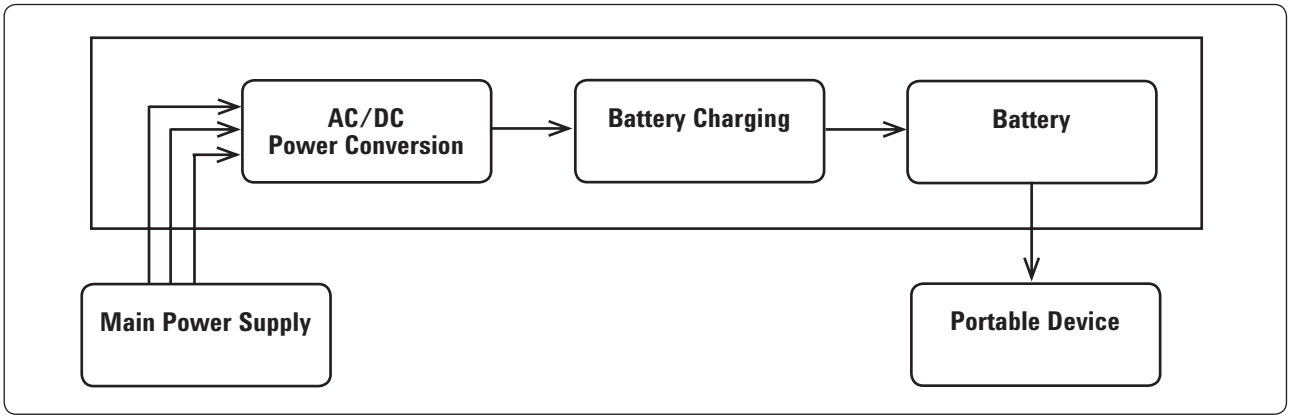


Figure 1. Block diagram of a battery charging system

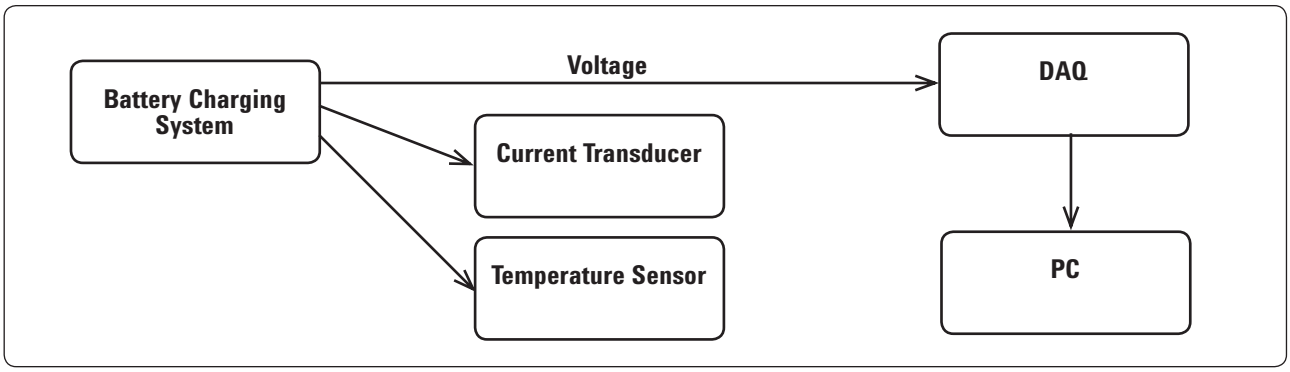


Figure 2. Test system for performance evaluation of the battery charging

## Conclusion

With the easy solution provided by the Agilent USB DAQ device, test engineers can measure multiple test parameters of battery chargers easily and effectively.

## References


- International Electrotechnical Commission, IEC 62133, Edition 1.0, 2002, Secondary cells and batteries containing alkaline or other non acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications
- Institute of Electrical and Electronics Engineers, IEEE 100, Edition 7.0, 2006, The Authoritative Dictionary of IEEE Standards Terms
- Institute of Electrical and Electronics Engineer Power Engineering Society, IEEE 96 1625–2004, Livium: IEEE Standard for Rechargeable Batteries for Portable Computing
- Buchmann, Isidor, Cadex Electronics Inc., 2001, Batteries in a Portable World: A Handbook on Rechargeable Batteries for Non–Engineers
- International Electrotechnical Commission, IEC 61960, Edition 1.0, 2003, Secondary cells and batteries containing alkaline or other non acid electrolytes—Secondary lithium cells and batteries for portable applications


## Related Agilent literature

System Developer Guide – Using USB in the Test and Measurement Environment Application Note, literature number 1465- 12

Visit www.agilent.com/find/U2300A for additional information or contact your nearest Agilent sales office or sales representative.

## Agilent Email Updates

**www.agilent.com/find/emailupdates**
Get the latest information on the products and applications you select.

## Agilent Direct

**www.agilent.com/find/agilentdirect**
Quickly choose and use your test equipment solutions with confidence.

## Agilent Open

**www.agilent.com/find/open**
Agilent Open simplifies the process of connecting and programming test systems to help engineers design, validate and manufacture electronic products. Agilent offers open connectivity for a broad range of system-ready instruments, open industry software, PC-standard I/O and global support, which are combined to more easily integrate test system development.

## Remove all doubt

Our repair and calibration services will get your equipment back to you, performing like new, when promised. You will get full value out of your Agilent equipment throughout its lifetime. Your equipment will be serviced by Agilent-trained technicians using the latest factory calibration procedures, automated repair diagnostics and genuine parts. You will always have the utmost confidence in your measurements.

Agilent offers a wide range of additional expert test and measurement services for your equipment, including initial start-up assistance onsite education and training, as well as design, system integration, and project management.

For more information on repair and calibration services, go to

**www.agilent.com/find/removealldoubt**

## www.agilent.com

For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office. The complete list is available at:

**www.agilent.com/find/contactus**

**Phone or Fax**

**United States:**
(tel) 800 829 4444
(fax) 800 829 4433

**Canada:**
(tel) 877 894 4414
(fax) 800 746 4866

**China:**
(tel) 800 810 0189
(fax) 800 820 2816

**Europe:**
(tel) 31 20 547 2111

**Japan:**
(tel) (81) 426 56 7832
(fax) (81) 426 56 7840

**Korea:**
(tel) (080) 769 0800
(fax) (080) 769 0900

**Latin America:**
(tel) (305) 269 7500

**Taiwan:**
(tel) 0800 047 866
(fax) 0800 286 331

**Other Asia Pacific Countries:**
(tel) (65) 6375 8100
(fax) (65) 6755 0042
Email: tm_ap@agilent.com
Revised: 1¼/06

Product specifications and descriptions in this document subject to change without notice.


Printed in USA, February 13, 2008
5989-5773EN

Agilent Technologies