

Digital Camera Battery Standards

Powering Portability

The battery and camera industries have maintained standards for several decades to help promote the industries and enable greater consumer acceptance, among other responsibilities. With the introduction of digital cameras in the 1990's, both industries began reviewing how batteries power cameras to enable peak performance.

The development of battery and camera standards involves extensive background work into how the components of the camera function as well as how consumers use the camera. Once all the variables are analyzed, the final product is a standard protocol for testing or evaluating a camera or battery.

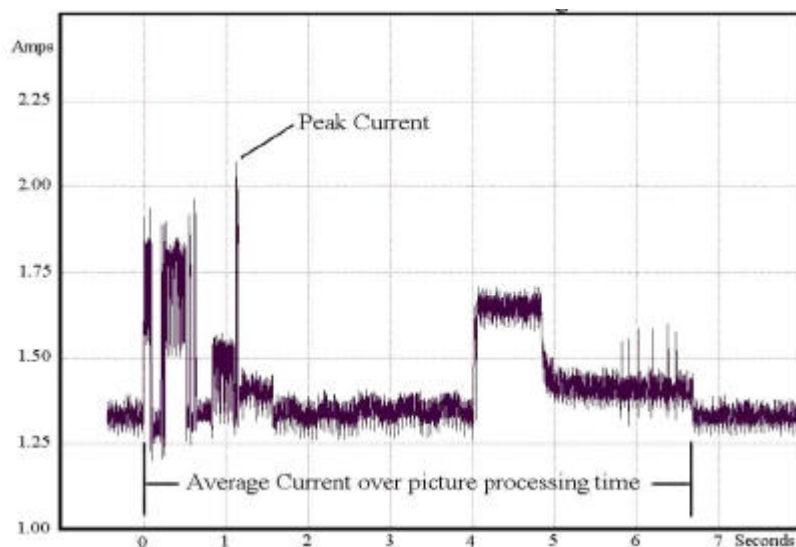
The Variables

In developing a standard digital camera test, the following items are considered:

- Camera characteristics and functions,
- Consumer usage, and
- Conditions during use.

All characteristics of a digital camera are considered when designing a standard test. Functions such as zoom, flash, resolution and LCD use are incorporated into a test. For battery-specific tests, the electrical characteristics of the camera are also considered because many battery tests are conducted as computer-controlled simulations rather than in the device. Figure 1 shows a typical camera discharge over an 8 second period when taking a picture.

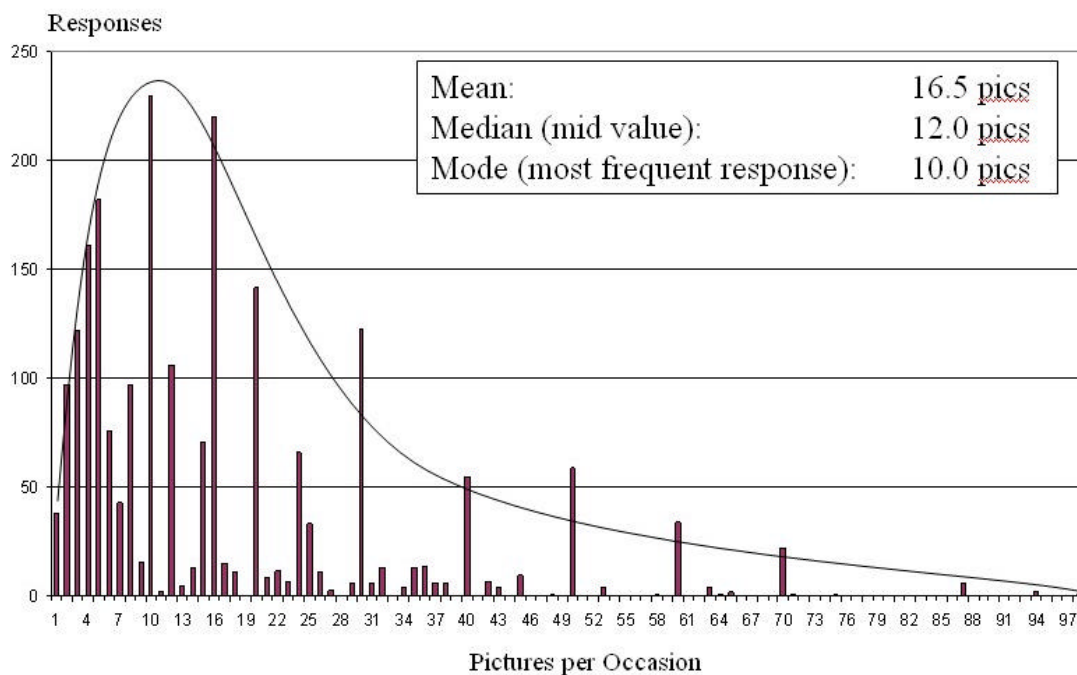
Figure 1: Power Requirements of a Digital Camera



As Figure 1 shows, the amount of power required from the batteries can vary greatly during a short period of time. These peak power levels are considered during the design a computer controlled simulation test.

How a consumer uses a digital camera is probably the most variable aspect to consider when designing a standard test. Digital cameras are produced to be used by millions of people around the world. It is probable that each person uses their camera in a different way, so when designing a test, the most typical habits for LCD, flash, zoom, number of pictures, etc. are usually considered. Figure 2 shows how variable the number of pictures a consumer takes on any given occasion can be.

Figure 2: Consumer Pictures Taken Per Picture Taking Occasion



The typical consumer use of functions and the number of pictures they take are an integral part of a standard test. The mode from Figure 1 of 10 pictures per session was eventually used in the development of both standards for in-device and computer controlled simulation digital camera testing.

Another important aspect of testing is the conditions a consumer would encounter during typical use. Temperature and to a lesser extent, humidity, can alter the performance of some batteries. For this reason, both the in-device and computer controlled simulation standards have a rest period for the batteries to allow them to return to room temperature as they would during consumer use. Due to the high power requirements of digital cameras, batteries can become warm after a few pictures, and in some cases, the heat generated can artificially inflate the typical battery life a consumer would see over the life of their batteries.

The Final Products - Standards for Digital Cameras

There are five main standards organizations actively or previously working on digital camera and battery standards. These bodies are:

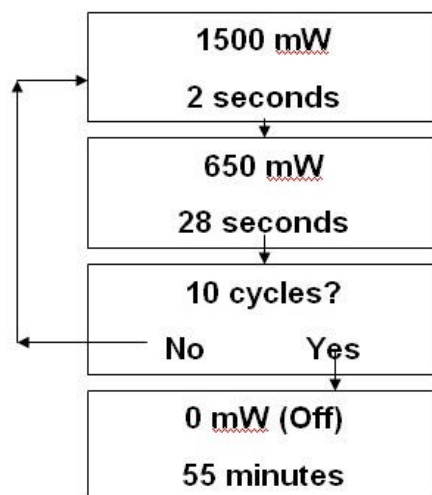
- The American National Standards Institute (ANSI) Committee 18 (C18) for portable cells and batteries;
- The International Electrotechnical Commission (IEC) - Technical Committee 35 (TC35) for portable primary cells and batteries;
- The International Imaging Industry Association (I3A);
- The Japanese Camera Industry Association (JCIA) - disbanded; and
- The Camera and Imaging Products Association (CIPA) - Japan.

These standards bodies are made up of industry experts, producers and users of digital camera, digital camera-related products and batteries from around the world.

ANSI C18

The first standardized digital camera test was developed by ANSI and published in 2001 for AA (LR6) alkaline batteries (ANSI C18.1M, Part 1-2001). This test consisted of a 1000 mA load placed on a battery for 24 hours per day, or continuously. In early 2004, the ANSI C18 committee approved a revised digital camera test for AA alkaline batteries. This same test was also adopted for AA lithium batteries and is shown in Figure 3.

Figure 3: Digital Camera Test Simulation for AA Alkaline and Lithium Batteries
ANSI C18.1M, Part 1 - 2004. American National Standard for Portable Primary Cells and Batteries
With Aqueous Electrolyte - General and Specifications
ANSI C18.3M, Part 1 - 2004. American National Standard for Portable Lithium Primary Cells and
Batteries - General and Specifications



Repeat each hour until 1.05 volts

IEC TC35

The IEC TC35 group is currently considering a test protocol identical to the ANSI version in Figure 3 or a constant current version with the same on/off times. If adopted, this new digital camera test would appear in the scheduled 2005 revision of IEC 60086-2 (Primary batteries - Part 2: Physical and electrical specifications) for AA (LR6) alkaline batteries.

I3A

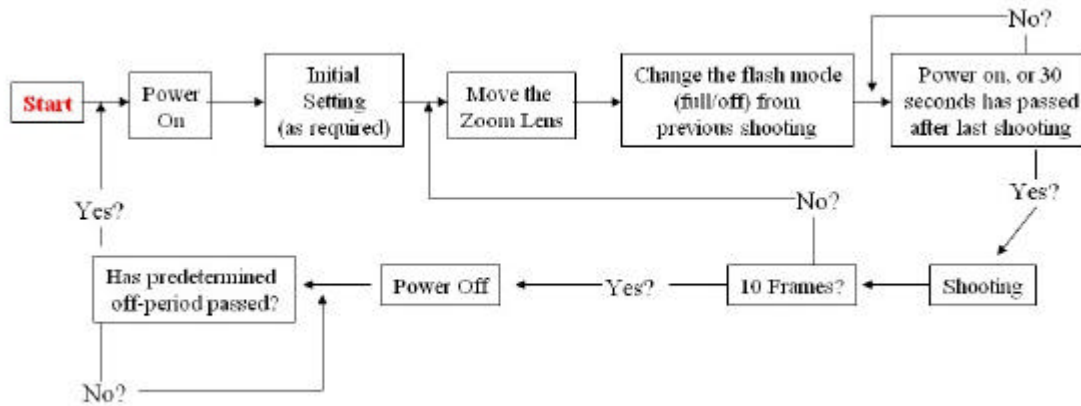
I3A has developed a number of digital camera standards including ANSI/I3A IT10.2000-2004, which specifies a profile of JPEG 2000 suitable for use in digital still cameras (DSC profile). Although I3A does not have its own digital camera battery standard, I3A has played and continues to play a critical role in the development of both the in-device and computer controlled digital camera battery standards. I3A is a member of ANSI C18 and served as an important liaison between ANSI and JCIA/CIPA. Without I3A, it is doubtful the various standards would be as harmonized as they are.

CIPA/JCIA

Soon after publication of the 2001 ANSI standard, JCIA initiated the development of a standard protocol for measuring battery life in digital cameras. This development work was started to help reduce consumer confusion about battery life in digital cameras as reported in user manuals and sales literature. JCIA disbanded in the summer of 2002 and the digital camera testing work was picked up by CIPA.

CIPA continued to publish drafts of an in-device digital camera battery test standard and in late 2003, published CIPA DC-002 - 2003. A summary of this standard is shown in Figure 4.

**Figure 4: CIPA Protocol or Measuring Battery Life in Digital Cameras
CIPA DC-002-2003**



Harmonized, consumer relevant standards are good for the interested industries as well as the consumers who use the products. Cooperation among the industries also enables potential new products with additional features consumers enjoy and can enable these products to come to market sooner than usual.

In the near future, consideration will be given to revise the various digital camera standards. While the tests are currently harmonized to a point, work remains to further improve harmonization and make the testing easier to run while also following the power requirement and function trends of newer digital cameras.