

The Doc's Battery Test Report

Battery Details	
Brand	Sanyo 1850
Size	AAA AA C D 9V 6V
Type	Ni-MH Ni-Cd RAM Alkaline Titanium
Current in mAhs	1850
Stated Voltage	1.5 volts 1.2 volts
Number of batteries	Single Set of 2 Set of 4
Battery Set used	Set 1
Times charged before test started	14
Charger used to charge	Rezap RBC883 Vanson Speedy Box UBA4
Time Batteries charged in charger	See UBA graph at end of report.

Test Procedures	
Spreadsheet name	Sanyo1850NiMH-AA-Set1.123 (Discharge data file)
UBA file name	Sanyo2100NiMH-AA-Set1-14.uba (Charge file)
Select Resistance 5 or 10 ohms	5 ohms 10 ohms
Voltage cut off	3.5 volts 3.6 volts
Date of test	29/11/03

Summary of test	
Voltage	Starting voltage 5.6 volts, cut off voltage 3.6 volts
Test duration	6,925 seconds or 115.41 minutes
Max Battery Temp	33.7 degrees Celsius
Min Battery Temp	25.8 degrees Celsius

Methodology

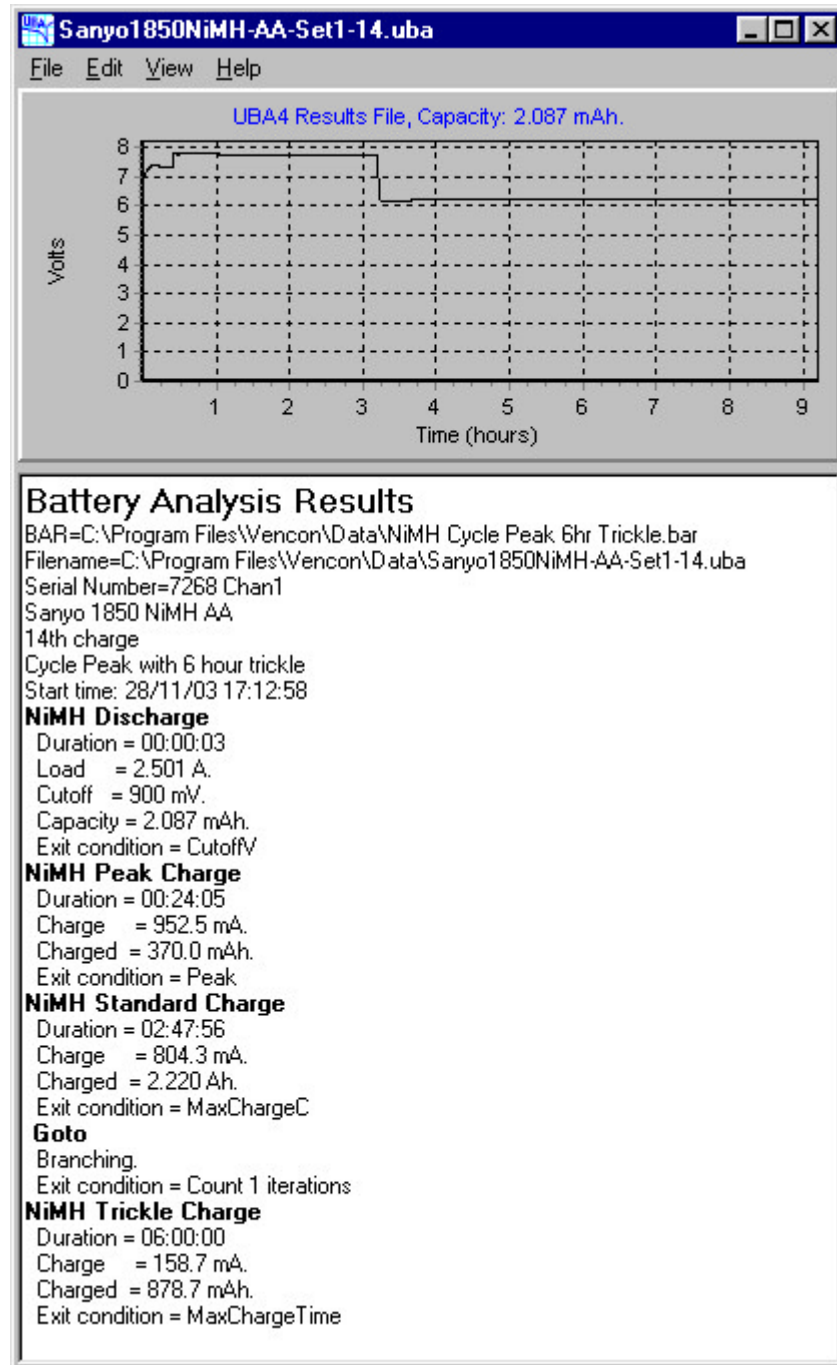
The battery set being tested has been charged at least 5 times. The charge actually used in the test is noted above. The battery set is charged in a Universal Battery Charger (UBA4). It is then tested under a load of 5 ohms, in the scientific dooverlackie. In this test the battery set was also charged in several different types of charger. Once the charger tests were completed, the battery set was charged in the UBA4 and tested. The last test is designed to discover whether the battery set's charging capacity has been materially affected during the tests. The first and last test in the UBA, while not identical, should not be materially different. The following pages give various data, including:

1. charging information from the UBA4;
2. a graph of the voltage during the test (cut off voltage being 3.6 volts);
3. a graph of the battery temperature during the test;
4. a graph of the battery temperature verse ambient air temperature during the test;
5. a graph of the battery temperature of the Sanyo 1850 Ni-MH verse the Sanyo 2100 Ni-MH;
6. a graph comparing the charging performance of different chargers with the Sanyos; and
7. a graph comparing the initial test with the concluding test, using the UBA4 as the charger.

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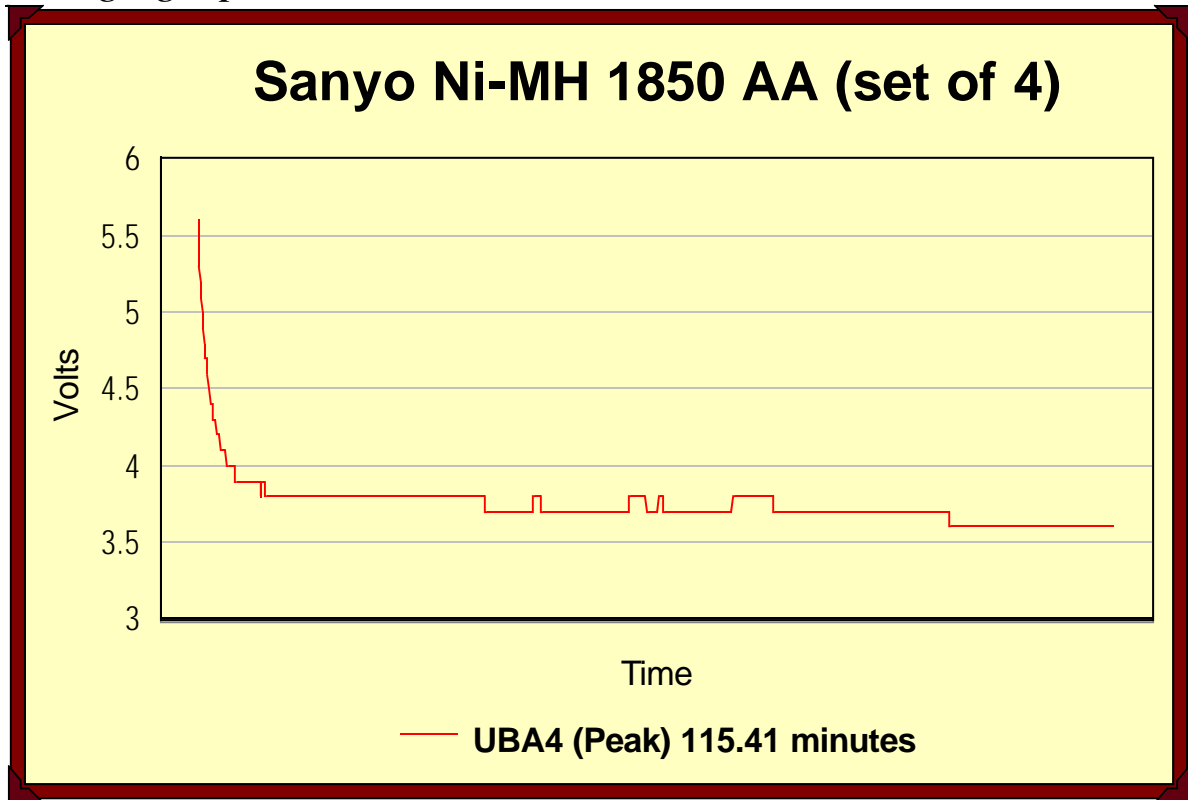
UBA report

The graph and charging information from the UBA4.

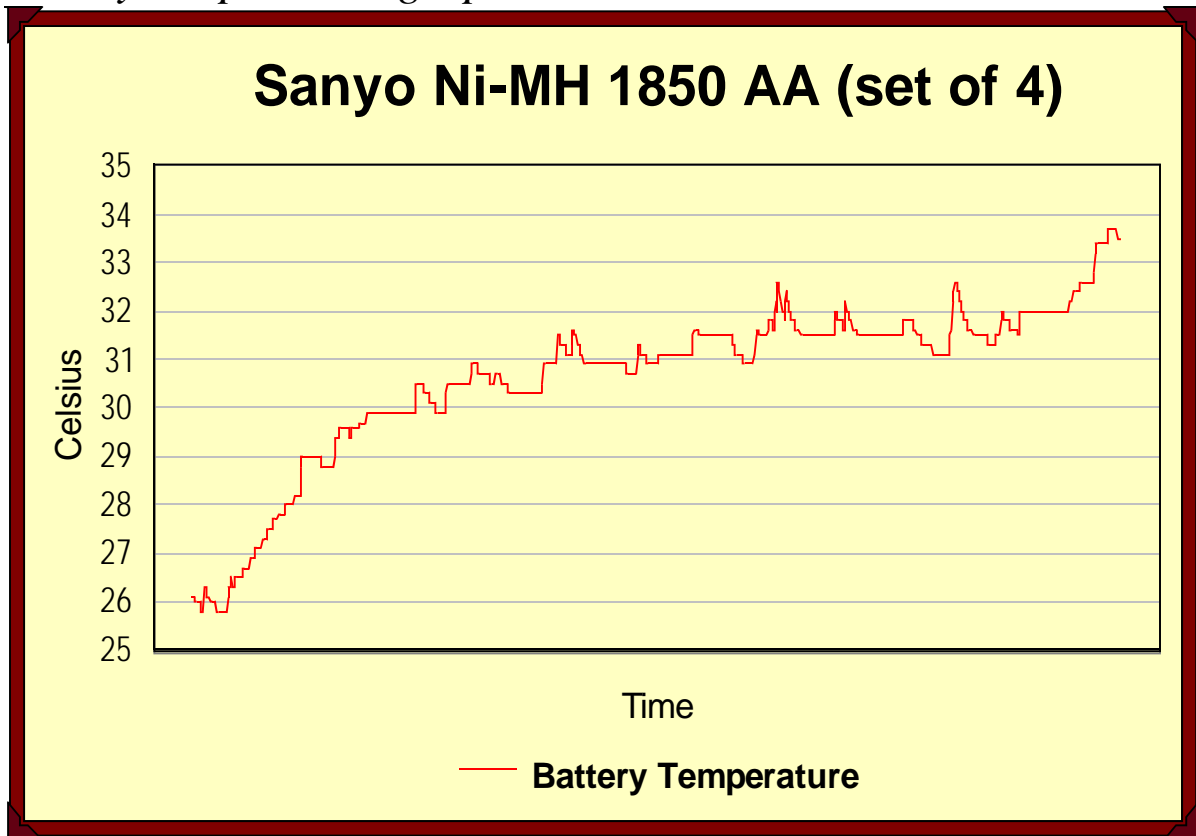


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Voltage graph



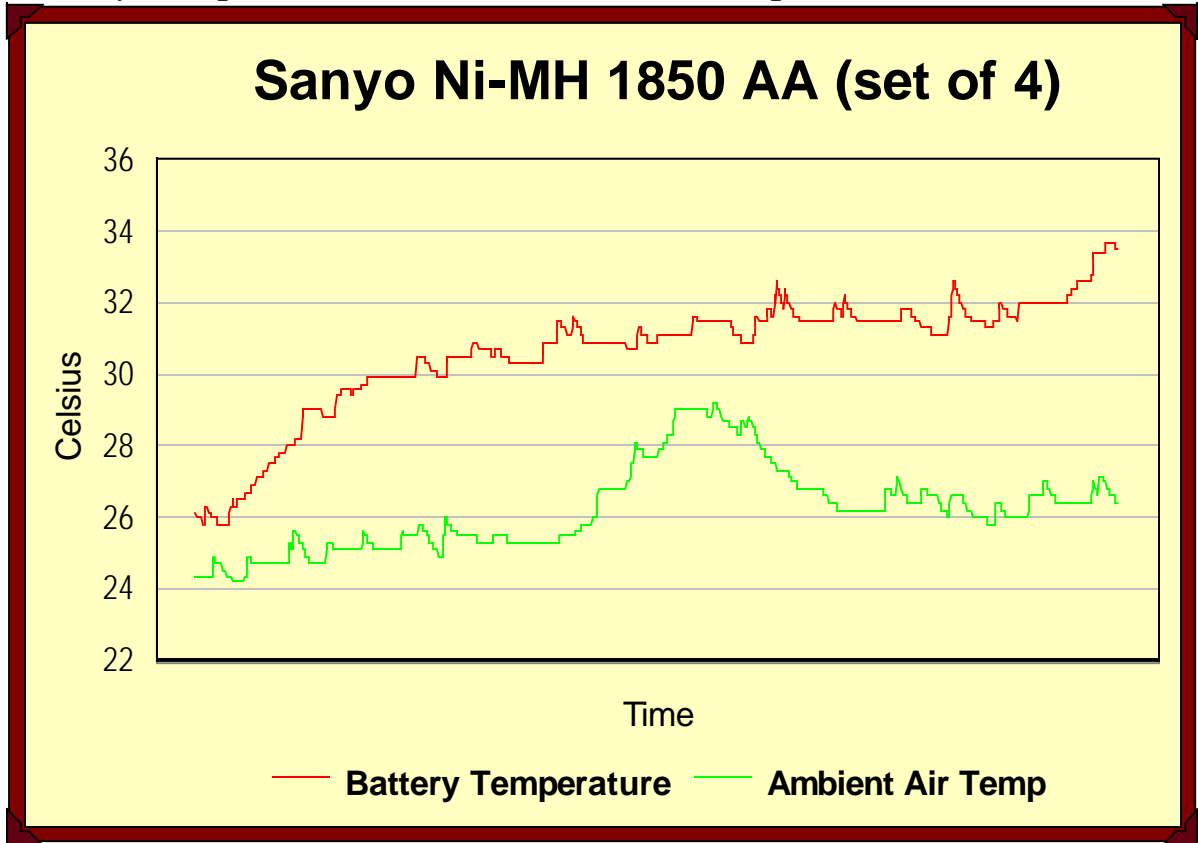
Battery temperature graph



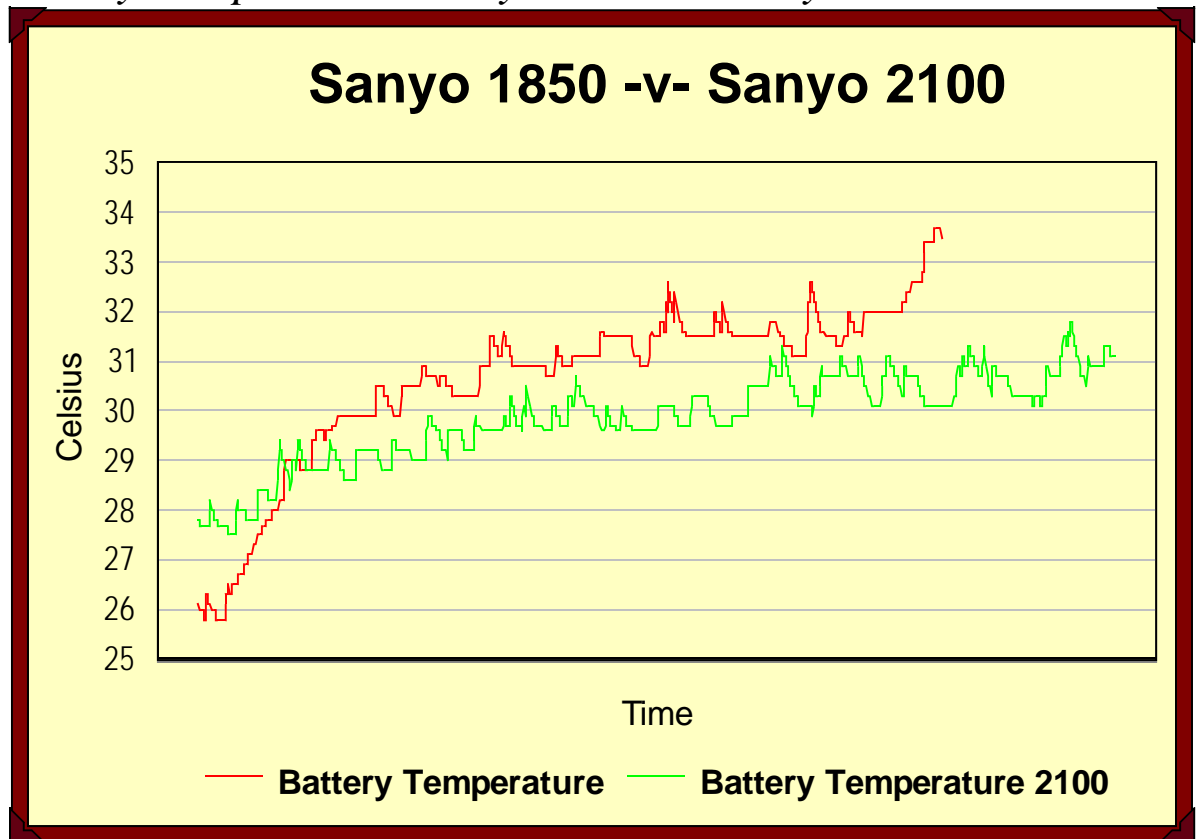
Note the battery temperature rises as the battery discharges more energy.

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Battery temperature -v- Ambient air temperature



Battery Temperature: Sanyo 1850 -v- Sanyo 2100



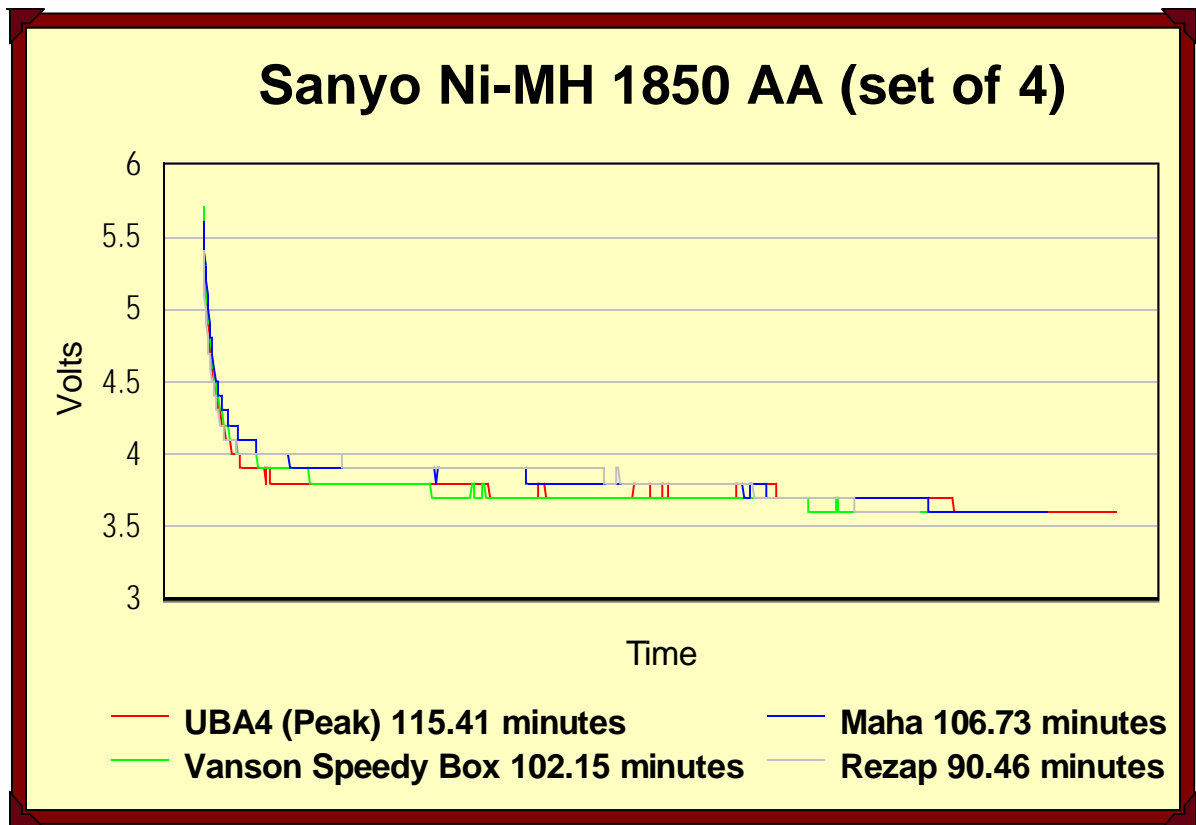
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When graphing the battery temperatures for the Sanyo 1850, The Doc noticed an usual temperature curve. So he charted the Sanyo 1850s' temperature against the Sanyo 2100s'. The relationship is noted above. The Doc also looked at the ambient air temperature during each test. While a little higher during the Sanyo 1850 test, it did not seem to influence the battery temperature in any meaningful way. The ambient temperature for the Sanyo 1850 spikes up and back down again. This was most likely caused by the morning sun passing the window during the test (The Doc also keeps the exact time of the tests!).

The Sanyo engineers do seem to have made substantial changes between the two batteries, giving the Sanyo 2100 much greater life -certainly more than the extra 250 mAh would suggest. In addition, the Sanyo 2100 is able to control its internal temperature more efficiently.

Charger comparison

The Sanyo battery set was then tested in various battery chargers to compare charging performance. Here are the results:

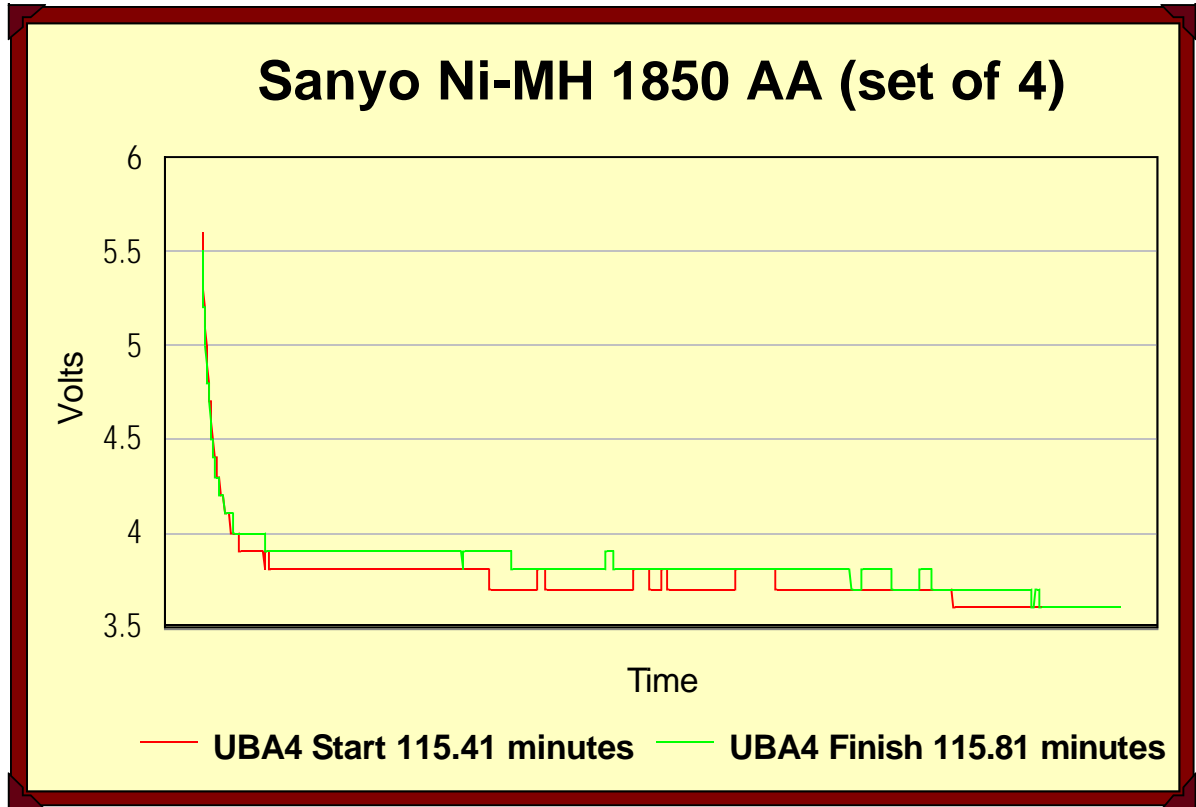


The UBA4 is clearly ahead of the pack. Neither the Maha C204F or Speedy Box are close. The Rezap is last even using the upper contacts. Why the other chargers did not charge as well here – compared to the Sanyo 2100's – is not clear. It could be as simple as the battery set being tested, or it maybe be due to the difference in chemistry between the 1850's and the 2100's.

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Starting charge compared to finishing charge

This graph compares the charge used in the test, to the one done at the conclusion of testing. Both charges were in the UBA4. The difference between the two tests is a matter of mere seconds. Allowing us to conclude that the battery's ability to take a charge during the charger tests was fairly consistent. Differences in the charger test results can be explained by charger performance rather than battery differences.



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Conclusion

The Sanyo 1850's are not the performance leader of the pack by any standard. While not the performance leader they are value for money. The patented manufacturing process used by Sanyo is superior to other forms of battery manufacture. This superiority does not show itself in performance with the 1850's, but endurance. The ability to recharge the Sanyo batteries 100's of times, up to 3 times more than other brands. Tests in Australia showed Sanyo batteries charged over 900 times, the Chinese brands lasted about 300 charges. Under controlled conditions that is quite a difference. You might think that the performance is behind that of the Powetech 1650 and Digitor 1700. On the face of it, this appears to be the case. However, The Doc actually drains the batteries below 3.6 volts. He noticed that the Sanyo 1850's lasted a very long time at 3.5 volts, about 6 minutes. That is about 3 times longer than most batteries, even the Powerex 2200, which lasted about 2 minutes. So in the real world the Sanyo 1850's will perform better than what the test suggests - since most people tend to drain the battery set below 3.6 volts. The Sanyo 1850's get the Doc's value award.

Run Time (5 ohm)	115.41 minutes
Battery build quality	Excellent
Place of Origin	Japan
Cost (set of 4)	AUD\$22.00

Report date: 26 December 2003

<http://www.users.on.net/mhains/>

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