

Product: Freeset DCT1900

Purpose: Recommendations for 9p23 Battery Management

Date: 7/12/2007

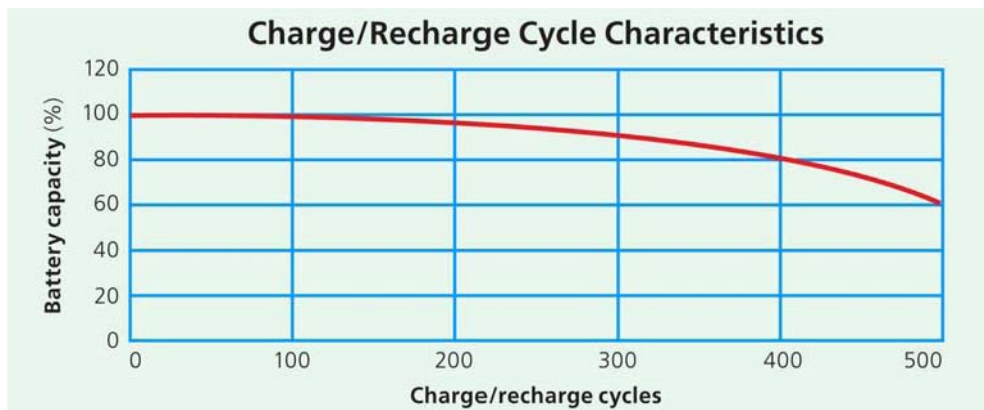
Recommendations for Battery Management (9p23)

Battery management is an important activity that needs close attention throughout the life of a portable device in frequent and essential use such as the Ascom 9p23. Old or improperly conditioned batteries will negatively impact the 9p23 performance and user efficiency. This document will focus on battery management for the Ascom 9p23.

“Old and defective batteries can lead to various 9p23 functional problems such as poor voice quality, inaudible alerts and the inability to make or receive calls and messages without triggering a shutdown or application error.”

Battery life

Several factors determine the life span of a battery but the main factor is how many charges it receives. The Ascom 9p23 utilizes a high quality NiMH battery. Most battery manufacturers are very cautious in specifying any numbers related to life span, but it has become a widely accepted “rule of thumb” that a high quality NiMH cell can typically handle about 500 recharging cycles before any significant degradation occurs. The diagram below shows typical characteristics for a NiMH battery. After about 500 cycles the battery quickly starts to lose its effective capacity and will have an adverse effect on the quality and efficiency of the on-site wireless system.



Source: Sanyo

Shelf Life

One weak characteristic on NiMH batteries is that they lose their charge rather quickly when left unused. At room temperature (70 degrees F) they will lose 30% to 40% of their charge in 30 days. There is approx. a 10% loss the first day, and roughly 1% per day afterward. The higher the temperature in the room, the faster the loss of charge. Ascom recommends that customers establish and stage a battery maintenance area to shelf, charge, distribute, condition and recycle NiMH batteries for Ascom devices.

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Storage Life

There is mixed commentary on this subject where some researchers indicate a relatively short storage life of three years for NiMH batteries [1] while others note that the Sanyo batteries can be stored indefinitely under recommended storage conditions and a recovery procedure that includes several cycles [2].

Ascom recommends that the storage life be limited to three years based on testimony from users and realistic storage and recovery procedures.

[1]. Isidor Buckman, "The Nickel-based battery, its dominance and the future." [Online document], July 2003, [2007 July 12], Available HTTP:

<http://www.batteryuniversity.com/partone-4.htm>

[2] Power Stream Technology. "Storage recommendation for various battery types in the manufacturer's words.", "NiMH (Nickel Metal Hydride) Battery Storage", [Online document], 2007 July 12, Available HTTP:

<http://www.powerstream.com/Storage.htm?nowritefs>

Using Batteries that were in "Storage"

After taking a battery out of storage, it should be "cycled", (charged and discharged), at least three (3) times to restore the battery to its "full capacity" state.

Practical operational use

Characteristics of use and charging activity vary greatly between different vertical markets. A wireless handset used in an office environment may only be recharged once per day while a handset used in a hospital environment may be recharged several times a day as the set is used between multiple shifts. Tracking charging cycles is a difficult task, therefore practically speaking, batteries should be replaced every 1 ½ years as part of an effective battery management program.

Technical considerations

As NiMH batteries get old/worn, they increase their internal resistance and consequently can no longer deliver the required current without that the battery voltage dropping. The voltage drop seldom creates a problem while the handset is idle because it draws very little current, but when the handset is active in a call, the transmitter will draw much more current (and it will do so in short bursts) causing repeated sharp voltage drops. These repeated short voltage drops can cause various negative effects on the practical use of the 9p23 such as; poor voice quality, clicks and pops, and inability to receive messages. A fresh battery every 1 ½ years will greatly enhance the performance of the 9p23 and will improve user satisfaction. In addition, a poor battery has reduced capacity, therefore leading to both reduced talk time and stand-by time.

Charger indications

Both the 9p23 desktop charger and the RC23 rack charger provide indications of charging problems. These indications and underlying charger functions are primarily to protect the battery from overcharging and indicate when a battery is dead. It will NOT indicate the gradual deterioration of a battery; therefore it is important not to use the charger as an indicator of when to replace batteries in an effective battery management program.

Recommendations on battery management

High quality NiMH batteries generally have a substantial shelf life. Battery manufacturers recommend using charging cycles as the way to measure battery life as opposed to using how old a battery is but this opinion varies among scientists and manufactures. Therefore, it is recommended that the system administrator manage battery life at 500 charging cycles. Also consider that experts recommend that three years is maximum time a battery should be stored prior to use.

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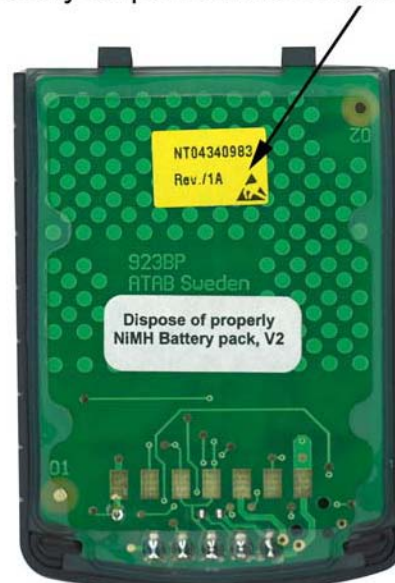
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Since we have determined that 1 ½ years is a good “rule of thumb” for 500 charging cycles then we recommend that a system administrator mark all Ascom batteries by simply writing the in service date with an indelible marker just below the batch number label in order to keep track of when to replace batteries. For sites where batteries were not marked at time of original deployment, we have a method for identifying out dated batteries. Simply remove the Ascom battery and determine the batch number label type. There are two types. Ascom Batteries with the 6+4 digit batch number labeling should be replaced or monitored immediately (see photo below left). Ascom changed the batch number label format in 2004.

Older batch marking, change battery as soon as possible.



Newer batch marking, change battery as per recommendations.



Summary

- An effective Battery Management Program is needed for mission critical performance of the 9p23.
- 9p23 battery life is approximately 500 charging cycles.
- If the exact number of charge cycles that a battery can sustain without diminishing performance to an unacceptable level is not certain but a life of 1½ years is a good assumption based on historical data.
- Frequent recharging in multiple shift environments naturally means a shorter life time.
- Old and defective batteries can lead to various 9p23 functional problems such as poor voice quality, inaudible alerts and the inability to make or receive calls and messages without triggering a shutdown or application error.
- Old and defective batteries lead to reduced stand-by and talk time imposing battery changes during a shift or event.
- Ascom recommends marking the batteries with the date of deployment and to implement an easy process for systematic (preventive) battery changes.
- Ascom recommends immediate replacement of all batteries marked with the old 6+4 digit number label series as these date back to 2003 and earlier.

Technical Service Bulletin

The logo for Ascom, consisting of the word "ascm" in a bold, lowercase, sans-serif font. The letters are red, and the "a" and "c" are connected.

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Additional Information

If you have any questions about this bulletin, please contact Ascom Technical Services at 1-877-71ASC0M (1-877-712-7266) option 3.