Technical Bulletin CS-20-03

Spectralink 84-Series Battery Degradation Warnings

This technical bulletin explains the tools available to administrators to configure the 84-Series handsets to display battery degradation warnings to inform users when it is time ot retire old batteries.

System Affected

All 84-Series handset models

Description

The 84-Series handsets have the ability to report on the state of the battery that is installed into the handset. The handset does this each time it is powered on and will log this information. This will include the following details about each battery.

Attribute	*Description*
Serial Number	Each battery is manufactured with a unique serial number to aid in tracking and inventory control. The serial number is reported in the logging and is printed on the label of the battery.
Firmware Version	From time to time, Spectralink will update the software that is installed into the battery EEPROM that controls some of the basic functions within the battery when it interacts with the handset and chargers. This firmware version is revvd whenever changes are made.
Manufacture Date	Every battery has the date it was produced in the factory imprinted into the EEPROM. This helps in reporting the age of a battery for controlling inventory and understanding battery degradation from age.
Day Count	This is a calculation that is done by the handset based on the date of manufacture and the current date. The difference of the two is reported in this field.
Cycle Count	Whenever a battery is charged it experiences some impact to its ability to receive charge again at a later date. The discharging of a battery and then recharging is considered a cycle. Even if a battery is not entirely discharged before charging again a partial cycle will be recorded and

Attribute	*Description*
	eventually when the equivalent of a full discharge and charge cycle occurs the cycle count will be incremented accordingly.
Design Capacity	Each battery has a minimum mAh (milliamp hour) value based on the cell size. For Extended batteries this is 1750 and for Standard batteries it is 1100.
Full Capacity	While the design capacity for a battery defines what the cell is capable of handling the actual capacity of the battery when fully charged is captured in the Full Capacity value. This value will fluctuate over the life of the battery. As it degrades over time the maximum amount of Full Capacity will decrease until the battery can no longer hold sufficient charge to operate properly.
Remaining Capacity	This is the current capacity of the battery. Don't confuse this with the Full Capacity as this value is how much charge is left in the battery. As the battery is in use, this value will continue to drop. As a battery ages, this value may drop more quickly and may not reach the Full Capacity when the battery is completely charged.
Fault Count	The fault count is the cumulative number of fault events such as charging the battery when out of safe temperature ranges or over draining a battery. Some of these events may impact battery life.
Fault	This is where the last fault is reported.

With all of these values available in the log there are also parameters that can be configured to allow the administrator to trigger warnings to the user. These parameters have defined default values already in the handset that can be found in the schema file that accompanies all software release packages. The schema file is called handsetConfig.xsd.

The following are the parameters and how they are handled by the handset by default:

Parameter	*Description*
battery.check.firmwareVersionMin	This is the minimum acceptable battery PIC firmware version. The default shall be 0. Currently the firmware version is 19.
battery.check.dayCountMax	This is the maximum number of days a battery may be in service before being declared bad. The default is 9999.
battery.check.cycleCountMax	This is the maximum number of full cycle discharge equivalents allowed in a battery before the battery declared bad. The default is 9999.
battery.check.fullCapacity1100Min	This is the minimum full charge capacity allowed before the battery is declared bad. The default is 0. A reasonable limit for the customer to use is 990.
battery.check.fullCapacity1750Min	This is the minimum full charge capacity allowed before the battery is declared bad. The default is 0. A reasonable limit for the customer to use is 1575.

Parameter	*Description*
battery.check.faultCountMax	This is the maximum number of battery faults allowed before the battery is declared bad. The default is 9999.

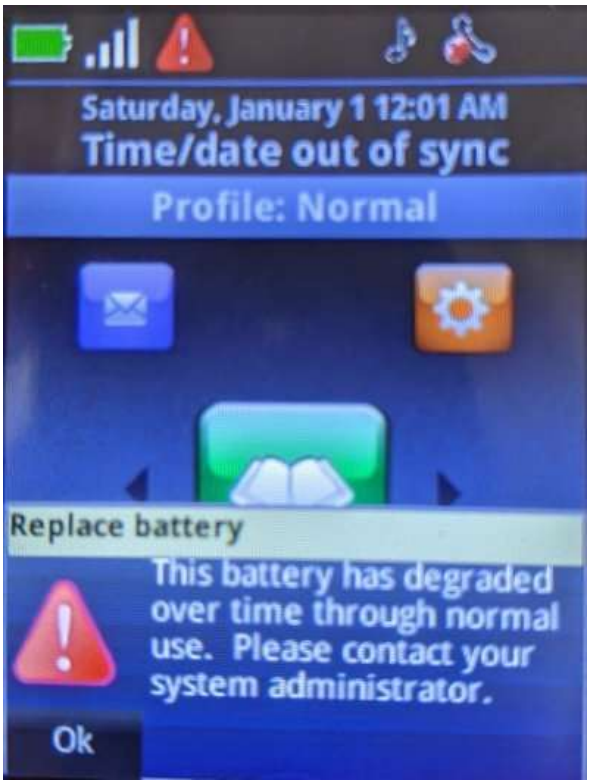
Caution

It's important to note that for the day count max parameter "*battery.check.dayCountMax*", that if the handset does not have a valid NTP server configured that the handset will display the battery degradation warning incorrectly as it will be unable to properly calculate the date correctly.

Here's an example of the configuration parameters as they would appear in a configuration file:

```
<battery
  battery.check.firmwareVersionMin="19"
  battery.check.dayCountMax="9999"
  battery.check.cycleCountMax="9999"
  battery.check.fullCapacity1100Min="0"
  battery.check.fullCapacity1750Min="0"
  battery.check.faultCountMax="9999"
 />
```

The above shows only the default values for each of these parameters. These values can be modified to whatever value is reasonable to your specific needs. When the warning does trigger, the image to the right is what the user would see displayed.



The user would be able to press the soft key immediately below the "Ok" displayed, soft key 1, and the message would be removed from the screen.

However the icon,  , in the notification bar would remain. Once the battery was replaced with a battery that no longer met the criteria chosen in the parameters the message would no longer display on the phone.

If your battery is degraded sufficiently to need replacement then please contact your Spectralink Authorized Reseller for a replacement.

For more information on Spectralink batteries for the 84-Series handsets, please review the Technical

Bulletin CS-13-10 Battery Best Practices Guide[1], and the Technical Bulletin on Battery Statistics CS-14-14[2]. If you have additional questions, please contact Spectralink Technical Support.

[1] https://support.spectralink.com/sites/default/files/resource_files/CS-13-10%20Spectralink%208400%20Battery%20Best%20Practices.pdf

[2] https://support.spectralink.com/sites/default/files/resource_files/CS-14-14%2084-Series%20Battery%20Statistics_0.pdf

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Contact Information

US Location
+1 800-775-5330

Spectralink Corporation
2560 55th Street
Boulder, CO 80301
USA

info@spectralink.com

Denmark Location
+45 7560 2850

Spectralink Europe ApS
Bygholm Soepark 21 E Stuen
8700 Horsens
Denmark

infoemea@spectralink.com

UK Location
+44 (0) 20 3284 1536

Spectralink Europe UK
329 Bracknell, Doncastle Road
Bracknell, Berkshire, RG12 8PE
United Kingdom

infoemea@spectralink.com